TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE	DATE 08/15/2016	TRANSMITTAL NO. 01351-1.1
PROJECT TITLE Syncon Resins (OU2) Superfund Site	CONTRACT NO. W912DQ-15-D-3002 0002	PAGE 1 of 1
LOCATION 77 Jacobus Ave, Kearny, NJ 07032		

Item	Description	Variation	QA Code
5	Accident Prevent/ Site Safety Plan Rev 1	No	D

SECTION III - GOVERNMENT REVIEW REMARKS

- Contractor must include Activity Hazard Analysis (AHA's) for all known Definable Features of Work.

EM 385-1-1 Appendix A Section 3.b.6 states - "Within these major phases of work identified, activities [includes Definable features of Work (DFOWs) and tasks] to be performed that will require an AHA shall be specifically highlighted. This information can them be used by QC, QA, and Safety personnel to track AHA submittals. The AHAs for these activities, tasks of DFOWs are NOT submitted at teh time (AHAs created/submitted at this time would not be activity specific as they are intended to be). See Sections 01.A.14 and 01.A.15.

The DFOW have been identified in the APP/SSHP.

- Contractor must include the list of subcontractors and suppliers. (If not known at the time of initial APP submittal, the contractor shall include the following statement in their initial APP: "The subcontractors for the following DFOWs/activities are not known at this time, but additional information will be submitted to the APP for acceptance prior to the start of any activities listed")

Comment added to text of APP/SSHP.

- Contractor must include as a minimum, a general generic Asbestos Abatement Plan and Excavation/Trenching Plan as part of the APP. Detailed site specific plans may be submitted as standalone plans.

A generic Asbestos Abatement Plan and Excavation/Trenching Plan has been added to the APP.

- The following plans are generally considered to be addendums to the APP, however it is expected the Contractor will submit these as standalone plans: Site Layout Plan, Access/Haul Road Plan, Traffic Control Plan, and Arc Flash Hazard Analysis.

Agree with comment

- Critical Lift Plan - Send Critical Lift plan prior to a critical lift being performed onsite and amend the APP

Critical Lift Plan(s) are not anticipated for the project. However, text and guidance was included in the APP/ SSHP in the event a Critical Lift became necessary. All Critical Lift Plans shall be submitted to the COR for acceptance prior to performing the lift.

- Fall Protection Program - Generic plan submitted. Contractor shall submit site specific Fall Protection plan prior to personnel working at heights that would require it, per EM 385-1-1.

Since this is a remediation project and not a construction project it is difficult to determine if workers will be exposed to heights greater than six feet until operations in the field commence. Therefore, Sevenson did not submit a Generic Fall Protection Plan. A Fall Protection Program was subimitted that provides guidance to the SSHO and Superintendent in the event a Fall Protection Plan became necessary to support Site activities. A blank Fall Protection Plan is included in the Fall Protection Program.

ACCIDENT PREVENTION PLAN

FOR

Syncon Resins Operable Unit 2 (OU 2) Superfund Site
Remedial Activities
South Kearny, New Jersey
CONTRACT No.
W912DQ-15-D-3002
TASK ORDER: 0002

Prepared by:
SEVENSON ENVIRONMENTAL SERVICES, INC.
2749 Lockport Road
Niagara Falls, New York 14305

Paul Jung, CIH, CSP
Director of Health and Safety
Sevenson Environmental Services, Inc.

September2016
Revision 2

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a. Signature Sheet

Syncon Resins Operable Unit 2 (OU 2) Superfund Site
Remedial Activities
South Kearny, New Jersey
CONTRACT No.
W912DQ-15-D-3002
TASK ORDER: 0002

Accident Prevention Plan Approvals

September 2016
Revision 2

(1) Plan Preparer

Paul Jung 09/14/2016

Paul Jung, CIH, CSP — Date
Director of Health and Safety
Sevenson Environmental Services, Inc.
716-284-0431 ext 207

(2) Plan Approval

9/14/2016

Al LaGreca, Vice President — Date
Corporate Project Manager
Sevenson Environmental Services, Inc.
716-284-0431 ext 250

(3) Plan Concurrence

Steven J Gillespie 9/14/2016

Steve Gillespie — Date
Project Manager
Sevenson Environmental Services, Inc.
716-609-1416

b. Background Information

(1) Contractor

Sevenson Environmental Services, Inc.

(2) Contract Number

W912DQ-15-D-3002 Task Order: 0002

(3) Project Name

Syncon Resins Operable Unit 2 (OU2) Superfund Site

(4) Brief Project Description

Sevenson Environmental Services, Inc., (Sevenson) is under contract (W912DQ-15-D-3002 TO:0002) to EPA Region II and the U.S. Army Corps of Engineers to perform remedial action at the Syncon Resin OU2 Superfund Site, located in South Kearny, New Jersey. See Figure 1.

The work consists primarily of clearing and grubbing; construction of a staging area, temporary water treatment plant containment area and stockpile area; building and asbestos inspections; asbestos abatement; above ground storage tank (AST) inspection, removal and disposal; demolition of buildings, concrete slabs, foundations, tank holders, asphalt and rail spurs; underground storage tank (UST) removal; pre-excavation soil sampling; installation of steel sheet piling, temporary water treatment system and dewatering system; disassembly of Extraction Well C and valve box; removal of Extraction Well C, valve box and control panel; excavation; excavation dewatering; treatment of contaminated water; collection of post-excavation samples; contaminated material handling, waste characterization and offsite disposal at an approved facility; installation of monitoring wells, collection trench, Extraction Well C, valve box and control panel; and backfilling excavated areas, grading, and final restoration.

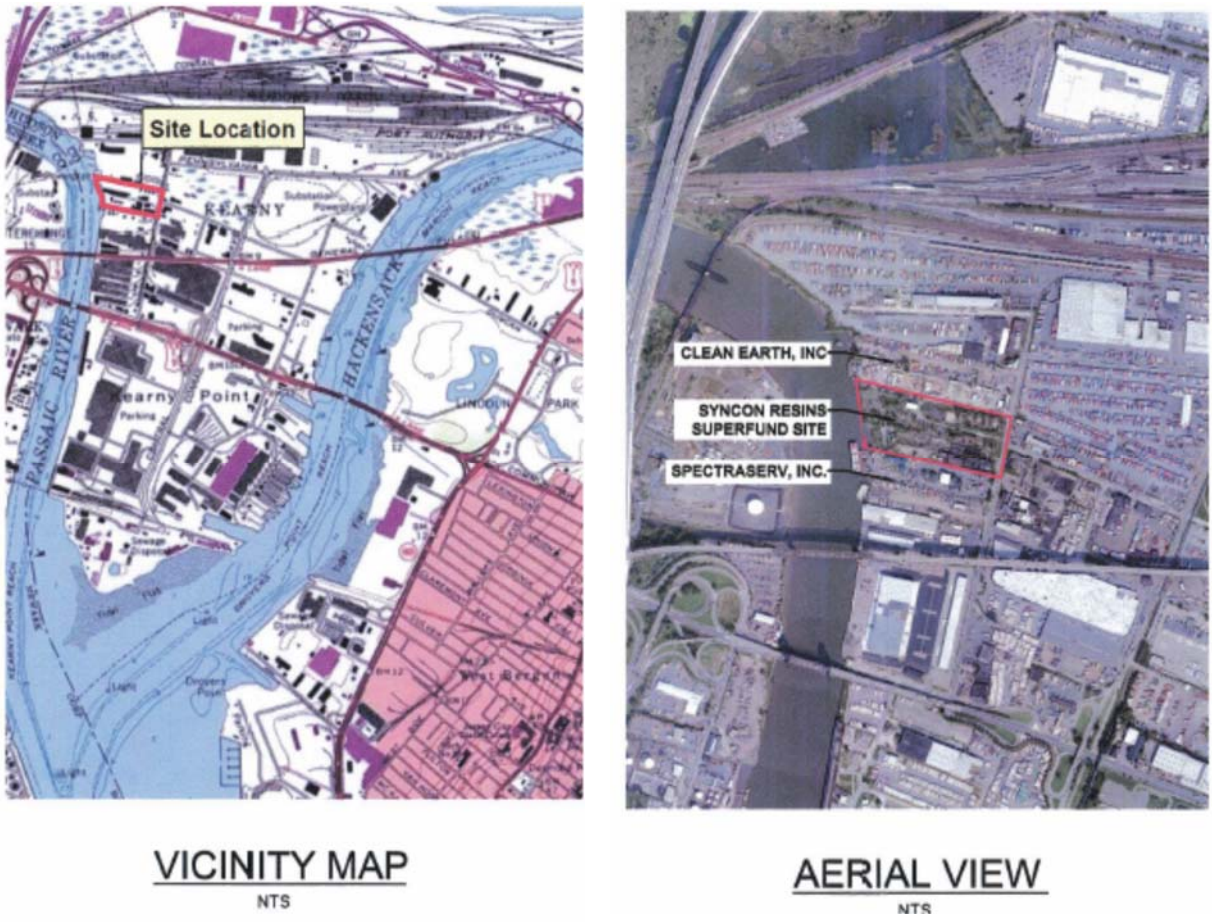
(5) Major Phases of Work Anticipated

Work includes demolition, UST removal, asbestos abatement, universal waste removal prior to demolition activities, perimeter air monitoring, excavation, water treatment, transportation, and offsite disposal of contaminated sediments, backfilling and grading of the excavated areas, restorations

(6) Work Requiring AHAs

All definable features or work will require and AHA to be submitted prior to the Preparatory Phase meeting being conducted for the task.

Figure 1 –
Site Location Overview Photo



VICINITY MAP
NTS

AERIAL VIEW
NTS

c. Statement of Safety and Health Policy

Sevenson maintains comprehensive programs to prevent health or safety risks. The quality of work life has a high priority in our organization, which means that all employees must regard health and safety protection responsibilities seriously. Our goal is to minimize injury or illness and business interruption due to accidents, fire, or other hazards.

To fulfill this goal, management is committed to:

a. Maintaining programs that identify and assess occupational health and safety risks.

b. Providing the funds to implement health and safety programs that control and minimize risks to employees.

c. Controlling and reducing employee exposure to all hazardous agents in accordance with government regulations.

d. Informing employees of health and safety risks and ensuring that all members of the organization understand the company's health and safety measures.

e. Communicating with customers, governmental agencies, and the public on matters that affect employee and public health and safety.

f. Planning, designing, and constructing a safe and healthful work environment at all job sites.

g. Developing processes and establishing operating methods that minimize health and safety risks.

h. Encouraging all employees to work in a safe and healthful manner and providing training directed toward this objective, when needed.

d. Responsibilities and Lines of Authorities

(1) Statement of Ultimate Responsibility for the Safety Program.

Sevenson is ultimately responsible for the implementation of the safety program at the Site, the responsibility for Safety and Health extends throughout our organization from top management to every employee. For this reason, it is each person's duty to notify the management personnel if a hazardous condition is identified and to make a "stop work" call when the condition represents an immediate danger to life or health, until the SSHO and Project Superintendent can make a further determination.

(2) Identification and Accountability of Personnel Responsible for Safety

a. Paul Jung CIH, CSP – Director of Health and Safety and Safety and Health Manager

b. Davis Raver, CHST – Site Safety and Health Officer

c. Dave Larson – Alternate Site Safety and Health Officer

d. Dave Goeckler – Alternate Site Safety and Health Officer

e. Wyatt Beougher – Alternate Site Safety and Health Officer

f. Ron Scarborough, CHST – Alternate Site Safety and Health Officer

g. Larry Colburn, CHST – Alternate Site Safety and Health Officer

(3) Equivalent Training to OSHA 30 hour

If equivalent training is to be used in lieu of an OSHA 30 hour course it shall cover the following areas:

a. OSH Act/General Duty Clause
b. 29 CFR 1904 Recordkeeping
c. Subparts C, CC, D, E, F, K, and M of OSHA
d. Rigging, load handling equipment, welding and cutting, scaffolding, excavations, concrete and masonry, demolition, health hazards in construction, materials handling, storage and disposal, hand and power tools, motor vehicles, mechanized equipment, marine operations, steel erection, stairways and ladders, confined spaces or any others that are applicable to the work being performed.

(4) Competent or Qualified Person(s)

The SSHO (Davis Raver), and the Superintendent (Perry Novak) have been designated as competent or qualified persons for this project.

The SSHO shall be the competent person for the following:

- Fall Protection Program

- Respiratory Protection Program
- Hazardous Communication Program
- Confined Space Program

The Superintendent (Perry Novak) shall be the competent or qualified person for the following:

- Excavations
- Demolition Operations
- Water treatment Operations
- Load Hoisting Equipment
- General Operations

(5) Risk Management Process

Sevenson utilizes Activity Hazard Analysis (AHA) and Safe Plans of Action (SPA) as part of our risk management process. The AHA is developed by the SSHO, Superintendent, and any other person who has knowledge of the process and hazards involved. The AHA is submitted to the COR prior to and is discussed in detail during the preparatory phase meeting. The SPA uses the AHA as an outline for craft and field supervision each day to plan the steps to be taken and physically identify the associated hazards indicated in the AHA. The foreman and craft determine the exact controls that are required to be implemented to control the risk associated with the task.

(6) Pre-task safety and health analysis

The competent/qualified person shall ensure a current and accurate AHA is available prior to the start of an activity. The hazards of the assigned task should be covered in either the safety meeting or pre-job briefing.

(7) No Work Condition

No work shall be performed unless the designated competent person and SSHO are present on the job site.

(8) Policy Regarding Non-Compliance

It is understood that at times it is difficult for an employee to completely understand and comply with all safety rules and regulations. Therefore, a policy of training, retraining, verbal and written warnings and finally disciplinary action including suspension and termination from the company has been placed into effect.

All operating employees receive safety and health training. It is the responsibility of both the Supervisor and the SSHO to reinforce this training by example and by correcting the employee when he\she is in violation of a particular rule. Usually this informal reinforcement enables the employee to understand the rule and thus gain his\her cooperation and compliance. However, there are instances when a more formal procedure becomes warranted. In these cases a formal verbal warning will be issued. The next step is a written warning that is placed in the employee's personnel file. If the inappropriate behavior persists, then either a suspension without pay or

termination from the company will occur. In the case of a major violation of safety procedures an employee will be removed from the job.

(9) Lines of authority

The following are the Sevenson project personnel positions and responsibilities for this project. Refer to ***Figure 2 – "Organizational Chart"***.

- **Corporate Project Manager:** Al LaGreca
- **Safety and Health Manager:** Paul Jung CIH, CSP
- **Certified Industrial Hygienist** Paul Jung CIH, CSP
- **Occupational Physician:** Dr. Peter Greaney
- **Project Manager:** Steve Gillespie
- **Project Superintendent:** Perry Novak
- **Assistant Superintendent:** TBD
- **Site Safety and Health Officer:** Davis Raver, CHST
- **Alternate Safety and Health Officers:** Dave Larson, Dave Goeckler, Wyatt Beougher, Ron Scarborough, Larry Colburn

Corporate Project Manager

The Corporate Project Manager for this project is Al LaGreca. He directs and manages all aspects of the project in compliance with all contract and technical requirements. The Corporate Project Manager will monitor and control all subcontractors to achieve optimal performance and ensure safe, high quality performance that complies with all contract requirements.

Project Manager

The Project Manager for this project is Steve Gillespie and reports to the Corporate Project Manager. His responsibilities include coordinating project activities with the Superintendent and serving as the primary liaison with the COR. The Project Manager prepares all correspondence, submittals, and other documentation required for the project; coordinates schedules; and administers the contract. The Project Manager prepares reports and documentation, supervises inspection personnel, and reviews and approves procurement and subcontract activities.

Project Superintendents

The Superintendents for this project are Perry Novak, they supervise and coordinate all construction crew activities relating to site preparation, excavation, shipping, and restoration. The Superintendents have the operational responsibility for the implementation of the APP for this project. This includes establishing an attitude of concern for safety matters by initiating prompt corrective action of hazards brought to his attention, and ensuring that the project safety and health requirements are initiated and observed by all project personnel.

The Superintendents plan and require that all work be performed in compliance with this Plan, the Sevenson Corporate Health and Safety Plan and the USACE safety

manual including all applicable local, state, and federal regulations. They will impress upon all subcontractors' supervisory personnel a sense of responsibility and accountability of each individual to maintain a safe workplace and to work in a safe manner.

Safety and Health Manager (SHM)

The Safety and Health Manager for this project is Paul Jung, CIH, CSP, and is responsible to the Corporate Project Manager. The Safety and Health Manager formulates, administers and coordinates programs for the company to reduce the risk of loss due to employee injury, regulatory non-compliance, general liability, fire, theft, or damage. The Safety and Health Manager will develop written detailed policies and procedures covering elements in the Safety, Health and Environmental Program. The Safety and Health Manager's work history/resume is located in Appendix A. The Safety and Health Manager will:

- Be responsible for the development, implementation, oversight, and enforcement of the APP.
- Sign and date the APP prior to submittal
- Visit the site as needed and at least once per field event to audit the effectiveness of the APP and be available for emergencies.
- Provide onsite consultation as needed to ensure that the APP is fully implemented.
- Coordinate any modifications to the APP with the Superintendent, the SSHO, and the COR.
- Provide continued support for upgrading/downgrading the level of personal protection.
- Be responsible for evaluating air monitoring/sampling data and recommending changes to engineering controls, work practices, and Personal Protective Equipment (PPE).
- Review accident reports and results of daily inspections.
- Serve as a member of the Sevenson's quality control staff.

Occupational Physician

The Occupational Physician for this project is Dr. Peter Greaney and is under the direction of the Safety and Health Manager. The Occupational Physician will be responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1926.65. The Occupational Physician will provide the Safety and Health Manager with a written opinion of each employee's ability to perform hazardous remedial work.

Site Safety and Health Officer (SSHO)

The SSHO for this project is Davis Raver, CHST, (alternates Dave Larson, Dave Goeckler, Wyatt Beougher, Ron Scarborough, Larry Colburn). His work history/resume, certifications, and 30 hour OSHA Outreach Course certificate are located in Appendix A. Under the direction of the Safety and Health Manager, the SSHO will be responsible for the implementation of the APP and for the daily coordination of

safety activities with the Superintendent and the COR to ensure that the planned work objectives reflect adequate safety and health considerations. The SSHO will submit to the COR Certificates of Worker/Visitor Acknowledgements for site personnel prior to initial entry onto the Site. He will maintain a complete copy of this plan (and its supplements and addenda) at the Site during all field activities and assure that all workers and visitors are familiar with it. He will perform site-specific training and briefing sessions for employee(s) prior to the start of field activities at the site and a briefing session each day before starting work. He will ensure the availability, proper use and maintenance of specified personal protective equipment, decontamination equipment, and other safety and health equipment. He will maintain a high level of safety awareness among team members and communicate pertinent matters to them promptly. The SSHO will:

- Assist and represent the Safety and Health Manager in on-site training and the day-to-day on-site implementation and enforcement of the accepted APP.
- Be assigned to the Site on a full time basis for the duration of field activities. The SSHO can have collateral duties in addition to Safety and Health related duties.
- Have the authority to ensure site compliance with specified safety and health requirements, Federal, state and OSHA regulations; and all aspects of the APP. This includes, but is not limited to, activity hazard analyses, air monitoring/sampling, use of PPE, decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls; the emergency response plan, confined space entry procedures, spill containment program, and preparation of records. This will be accomplished by performing a daily safety and health inspection and documenting results on the Daily Safety Log.
- Have authority to stop work activities if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.
- Consult and coordinate any modifications to the APP with the Safety and Health Manager, the Superintendent, and the COR.
- Serve as a member of the Sevenson's quality control staff on matters relating to safety and health. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
- Conduct accident investigations and prepare accident reports.
- Conduct daily safety inspection and document safety and health findings into the Daily Safety Inspection Log. Track noted safety and health deficiencies to ensure that they are corrected.
- Coordinate with Site Management and the Safety and Health Manager, recommend corrective actions for identified deficiencies, and oversee the corrective actions.

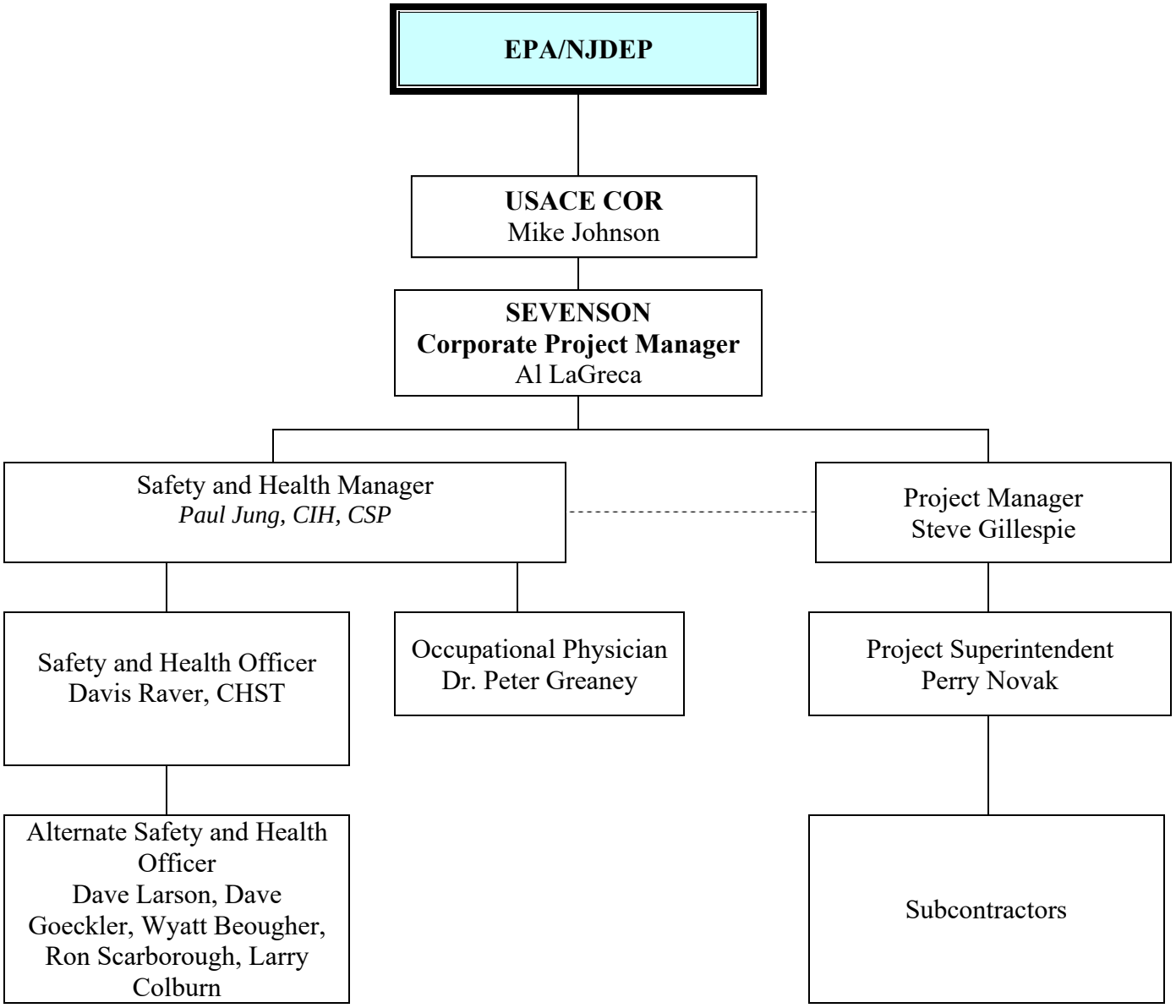
(10) Accountability

All salaried employees are subject to an annual performance review conducted by their direct supervisor. One of the items included in this review is their safety

record and performance. Accident statistics are kept for both the individual supervisor and specific project. These statistics are then taken into account when promotions, salary increases, and bonuses are decided.

Hourly employees undergo an informal review by their immediate supervisor. Their safety performance is a criterion. If an employee consistently and willfully violates safety rules and regulation, they are subject to disciplinary action.

Figure 2 –
Organizational Chart



e. Subcontractors and Suppliers

Subcontractors are covered by this APP and will be provided a copy prior to commencing work. The Sevenson SSHO will verify that subcontractor employee training; medical clearance, and respirator fit test records are current and will monitor and enforce compliance with the established plan and standard operating procedures. As with all site personnel, subcontractors will be briefed on the provisions of this plan and attend all daily toolbox safety meetings.

Sevenson will continually monitor a subcontractor's safety performance. Sevenson will observe subcontractors for hazards or unsafe practices that are both readily observable and occur in common work areas. The SSHO will note subcontractor work practices on the daily Quality Control Report. If non-compliance or unsafe conditions or practices are observed, the subcontractor safety representative will be notified and corrective action will be required. The subcontractor will determine and implement necessary controls and corrective actions. If repeat non-compliance/unsafe conditions are observed, the subcontractor will be required to stop affected work until adequate corrective measures are implemented.

(1) Subcontractors and Suppliers

- The subcontractors for the following definable features of work are not know at this time, but additional information will be submitted and amended to the APP for acceptance prior to the start of any activities listed.
  - Asbestos and lead abatement
  - Electrical installation for office trailer and water treatment plant
  - Transportation of waste material and building debris
  - Site survery

(2) Safety responsibility for subcontractors and suppliers

Sevenson will continually monitor a subcontractor's safety performance. Sevenson will observe subcontractors for hazards or unsafe practices that are both readily observable and occur in common work areas. The SSHO will note subcontractor work practices on the daily Quality Control Report. If non-compliance or unsafe conditions or practices are observed, the subcontractor safety representative will be notified and corrective action will be required. The subcontractor will determine and implement necessary controls and corrective actions. If repeat non-compliance/unsafe conditions are observed, the subcontractor will be required to stop affected work until adequate corrective measures are implemented

f. Training

(1) Requirements for New Hire

Prior to commencement of remediation activities, all site employees will attend a site-specific safety and health training session. This session will be conducted by the SHM or SSHO, to ensure that personnel are familiar with the requirements of this APP. The initial session will consist of the contents of this APP and specific procedures developed for the project. The SSHO will also provide initial site-specific training for replacement employees.

As a minimum the site-specific training will include:

- Explanation of the APP.
- Health and Safety Personnel and Organization.

- Special attention to signs and symptoms of overexposure to known and suspected site contaminants.
- Health effects of site contaminants.
- Air monitoring description.
- Physical hazards associated with the project.
- Selection, use, and limitations of available safety equipment and proper procedures for its use.
- Personal hygiene and decontamination.
- Respirator fit testing.
- PPE fitting to determine proper size for individuals.
- Site rules and regulations.
- Work zone establishment and markings.
- Site communication and the "Buddy System".
- Emergency preparedness procedures.
- Equipment decontamination.
- Medical monitoring procedures.
- Review applicable Sevenson Standard Operating Procedures.
- Site Specific Hazard Communication.
- PCB Awareness
- Lead Awareness
- Asbestos Awareness

(2) Mandatory Training and Certifications Applicable to this Project

Site personnel will be required to have various training courses to perform their work in a safe and efficient manner. The following list outlines the mandatory training requirements.

- 40 hour HAZWOPER training and three days of actual field experience under the direct supervision of a trained experienced supervisor.
  - All Site personnel assigned to the project that will perform work in either the Contamination Reduction Zone, Exclusion Zone, or handle hazardous materials that have been prepared for shipment stored in the Support Zone.
- 24 hour HAZWOPER training and one day of actual field experience under the direct supervision of a trained experienced supervisor
  - Workers on site only occasionally for specific limited tasks and who are unlikely to be exposed over permissible exposure limits.
- 8 hour HAZWOPER annual refresher training
  - All Site personnel that have completed a HAZWOPER training course shall receive at a minimum 8 hours of refresher training annually.

- 8 hour HAZWOPER Supervisor training
  - Site management and supervisors directly responsible for, or who supervise employees engaged in hazardous waste operations shall receive a minimum of 8 additional hours of training on the safety and health program and associated employee training program, personal protective equipment (PPE) program, spill containment program, and health hazard monitoring procedures and techniques.
- 30 hour OSHA Construction Outreach Training
  - The SSHO shall have completed a 30 hour OSHA Construction Outreach Training course.
- Confined Space Entry Training
  - Any person who enters into a Permit Required Confided Space must receive entrant training prior to entering the confined space.
  - Any person who is designated at a Permit Required Confined Space Attendant must receive Attendant training prior to being assigned as an attendant.
  - Any supervisor requesting personnel to enter into a Permit Required Confined Space shall receive supervisor training prior to authorizing Permit Required Confined Space work.
- Lockout Tagout Training
  - All employees will receive initial and annual training for Site procedures for the control of hazardous energy controls. This will be conducted at least annually.
- Excavation and Trenching Competent Person Training
  - Supervisors that are responsible for directing personnel performing excavation or trenching operations shall have sufficient knowledge and training to identify safe and unsafe conditions. The Competent Person shall also have the authority to call upon various resources to correct any unsafe condition.
- First Aid and Cardiopulmonary Resuscitation (CPR) Training
  - At least two site personnel will be required to complete first aid and CPR training and receive the appropriate certification. All first aid/CPR training is American Red Cross, American Heart Association approved or in accordance with OSHA standards. Additionally, First Aid/CPR qualified personnel will have received blood borne pathogen training as required by 29 CFR 1910.1030.
- Asbestos Worker
  - Workers who are required to perform asbestos abatement operations shall be licensed by the State of New Jersey to perform asbestos abatement operations.
- Lead Awareness
  - Workers involved in demolition activities shall receive lead awareness training prior to performing demolition activities.

(3) Periodic Training

Periodic training sessions will be provided at least quarterly and prior to each change of operation. The training will address safety and health procedures, work practices, any changes to this Plan, review of AHAs, work task or schedule, results of previous week's air monitoring, review of safety discrepancies and accidents, and discussion of worker concerns.

(4) Emergency Response Training

All employees will be trained in the use of fire extinguishers, spill response, emergency signals, and evacuation procedures annually or as new types of fire extinguishers are installed or evacuation procedures are modified.

g. Safety and Health Inspections

Safety and Health inspections will be conducted to discover, through specific, methodical auditing, checking, or inspection procedures, conditions and work practice that lead to job accidents and illnesses.

(1) Assignment of Responsibility

The HSM shall be responsible for ensuring that inspections are conducted at the frequency stated, reviewing the Daily Safety Logs for completeness, thoroughness, and trends; performing project inspections as necessary; and training site personnel on proper inspection techniques.

The SSHO shall be responsible for ensuring that daily inspections are conducted, reviewing the inspections findings and corrective actions for applicability and thoroughness, and providing the site management personnel with a summary of inspection findings each month.

Daily inspections shall include the date, work area inspected, employees present in work area, PPE and equipment being utilized, special safety and health issues or notes, and signature of the inspector(s).

(2) External Inspections

There is a possibility of Site inspection from outside agencies during this contract. These agencies may include but are not limited to:

- New Jersey Department of Environmental Protection
- United States Environmental Protection Agency
- Occupational Safety and Health Administration

The COR shall be immediately notified of any regulatory agency inspection. The inspection should not be delayed due to non-availability of the COR or their designee. The SSHO will provide the COR copies of any citations received or reports issued by the inspector and any correction action responses.

The SSHO shall maintain a safety and occupational health deficiency tracking system that lists and monitors the status of safety and health deficiencies in chronological order. This list will be posted on the project safety bulletin board and will be updated as new items are added. The tracking system list will identify the date and description of the deficiency, the name of the person responsible for correction, the projected resolution date, and the date actually resolved.

The SSHO will develop a safety report based on the deficient inspection items noted during the inspection and conveying the deficiencies to the Quality Control Manager (QCM). The QCM will

enter the deficiencies in a master deficiency-tracking log. The QCM and the SSHO will discuss the existence of the deficiency with the appropriate work force individual(s) responsible for its correction.

h. Mishap Reporting and Investigation

(1) Exposure Data (man-hours worked)

Copies of Sevenson's jobsite specific OSHA 300 and 300A Log that summarize recordable injuries and man-hours worked will be submitted to the COR monthly by the Project Manager via the Quality Control Manager through the Resident Management System.

(2) Mishap Reports

Employees are responsible for reporting all injuries or occupationally related illnesses as soon as possible to the SSHO or Supervisor.

All incidents (including property damage) and accidents will be reported as soon as possible, but no later than 8 hours post-accident for first aid cases and property damage less than $2,000; and not later than 4 hours for accidents considered to be recordable per 29 CFR 1904, or property damage greater than $5,000, or high visibility accident, or/and accident or any incident that involves any weight moving equipment accident to the COR. An USACE ENG FORM 3394 accident/incident report will be **c**ompleted as soon as possible but no longer than 24 hours post-accident. This report is utilized in the event of injuries, off-site releases, utility breaks, or accidents. Immediately following the incident/accident, the Site Superintendent and the SSHO will initiate an investigation.

Sevenson will provide a face-to-face briefing of all Lost Work Day accidents to the Area Engineer upon submittal (not later than five days) of the accepted ENG Form 3394. The Project Manager, SSHO, and SHM will be present during the briefing at a minimum.

(3) Immediate Notification Requirements

The following types of accidents require immediate notification to the COR:

a. A fatal injury/illness

b. A permanent total disabling injury/illness

c. A permanent partial disabling injury/illness

d. One or more persons hospitalized as inpatients as a result of a single occurrence

e. Three or more individuals become ill or have a medical condition which is suspected to be related to a site condition, or a hazardous or toxic agent on the site

f. $500,000 or greater accidental property damage or damage in an amount specified by USACE in current accident reporting regulations

g. An Arc Flash Incident/Accident

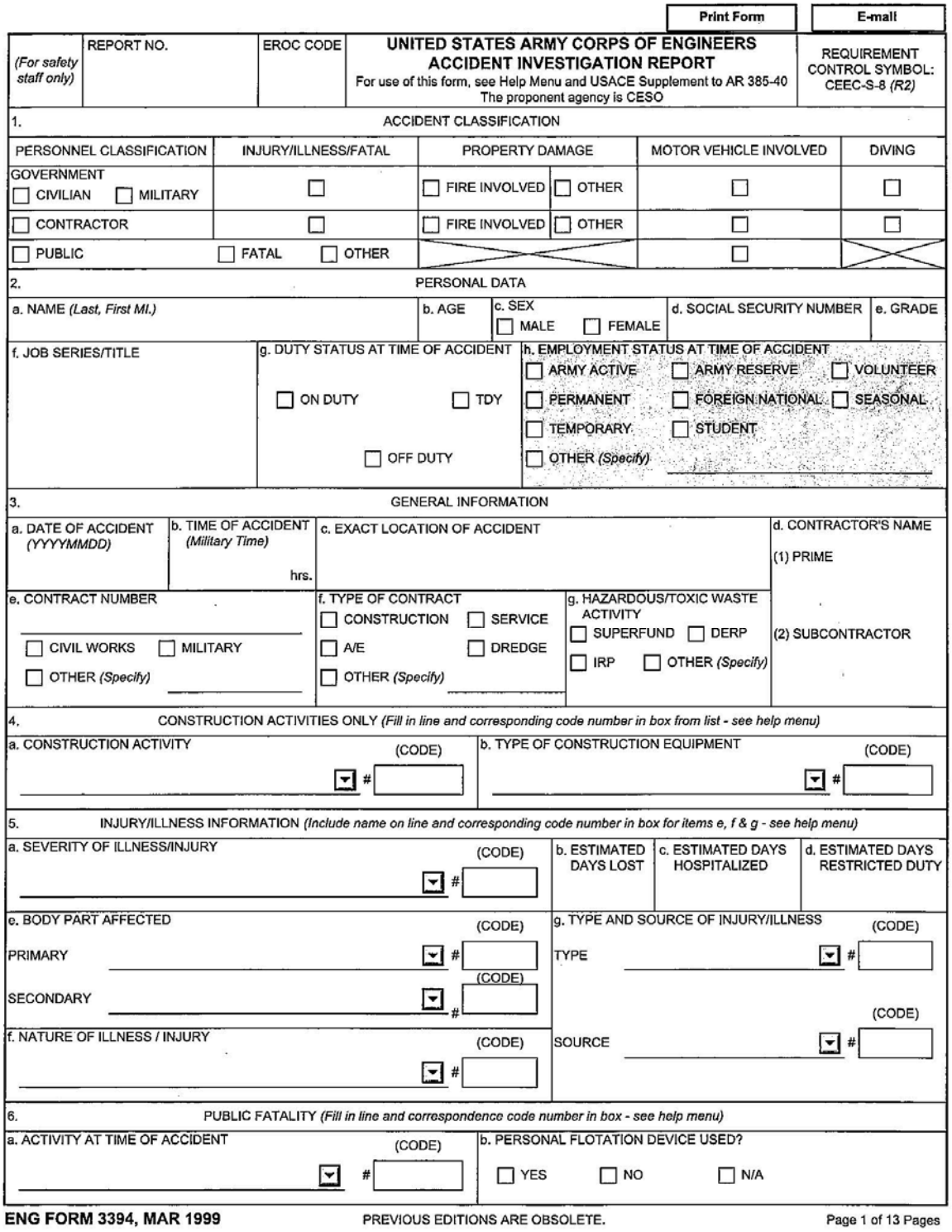
h. Contractors are responsible for notifying OSHA in accordance with 29 CFR 1904.39 within 8 hours when their employee(s) in fatally injured or one or more persons are hospitalized as inpatients, amputation, or loss of an eye from a single occurrence within 24 hours.

Except for rescue and emergency measures, the accident scene shall not be disturbed until it has been released by the SSHO and COR.

"Near misses" will be documented by the SSHO and discussed at the morning safety briefings to educate the work force to potentially hazardous operations or practices.

Accident photos will be taken, captioned, recorded, and stored according to EPA Guidance: Digital Camera Guidance for EPA Civil Inspections and Investigations, US. EPA – Office of Compliance (Mail code: 2223A) National Compliance Monitoring Policy Branch 1200 Pennsylvania Avenue, N.W. Washington, D.C. 20460 EPA-305-F-06-002.

Figure 3 –
ENG 3394 (Accident Report)



Print Form | E-mail

(For safety staff only)	REPORT NO.	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT For use of this form, see Help Menu and USACE Supplement to AR 385-40 The proponent agency is CESO	REQUIREMENT CONTROL SYMBOL: CEEC-S-8 (R2)

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE		MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED	☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED	☐ OTHER	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER			☐	

2. PERSONAL DATA

a. NAME (Last, First MI.)	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER (Specify)

3. GENERAL INFORMATION

a. DATE OF ACCIDENT (YYYYMMDD)	b. TIME OF ACCIDENT (Military Time) hrs.	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME (1) PRIME

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE ACTIVITY	(2) SUBCONTRACTOR
☐ CIVIL WORKS ☐ MILITARY ☐ OTHER (Specify)	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER (Specify)	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER (Specify)	

4. CONSTRUCTION ACTIVITIES ONLY (Fill in line and corresponding code number in box from list - see help menu)

a. CONSTRUCTION ACTIVITY (CODE) #	b. TYPE OF CONSTRUCTION EQUIPMENT (CODE) #

5. INJURY/ILLNESS INFORMATION (Include name on line and corresponding code number in box for items e, f & g - see help menu)

a. SEVERITY OF ILLNESS/INJURY (CODE) #	b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED (CODE)	g. TYPE AND SOURCE OF INJURY/ILLNESS (CODE)
PRIMARY #	TYPE #
SECONDARY (CODE) #	(CODE)
f. NATURE OF ILLNESS / INJURY (CODE) #	SOURCE #

6. PUBLIC FATALITY (Fill in line and correspondence code number in box - see help menu)

a. ACTIVITY AT TIME OF ACCIDENT (CODE) #	b. PERSONAL FLOTATION DEVICE USED?
	☐ YES ☐ NO ☐ N/A

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7. MOTOR VEHICLE ACCIDENT					
a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT APPLICABLE
☐☐ PICKUP/VAN ☐☐ AUTOMOBILE	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END	(1) FRONT SEAT	☐	☐	☐
☐☐ TRUCK ☐☐ OTHER *(Specify)*	☐ BROADSIDE ☐ ROLL OVER ☐ BACKING				
_____	☐ OTHER *(Specify)* _____	(2) REAR SEAT	☐	☐	☐

8. PROPERTY MATERIAL INVOLVED		
a. NAME OF ITEM	b. OWNERSHIP	c. AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT *(Fill in line and correspondence code number in box from list - see help menu)*	
a. ACTIVITY AT TIME OF ACCIDENT (CODE)	a. ACTIVITY AT TIME OF ACCIDENT (CODE)
_____ #	_____ #

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary, see attached page 4.)*

11. CAUSAL FACTOR*(s)* *(Read instructions before completing)*		
a. *(Explain YES answers in item 13)*	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident?	☐	☐
b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT? *(If yes, attach a copy.)*	☐	☐

12. TRAINING		
a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? ☐ YES ☐ NO	b. TYPE OF TRAINING ☐ CLASSROOM ☐ ON JOB	c. DATE OF MOST RECENT FORMAL TRAINING *(YYYYMMDD)*

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*
a. DIRECT CAUSE*(s)* *(Attach additional sheets as needed, See page 4)*
b. INDIRECT CAUSE*(s)* *(Attach additional sheets as needed, See page 5)*

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14. ACTION(s) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(s)		
DESCRIBE FULLY *(Attach additional sheets as necessary, See page 5)*		
15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.		
a. BEGINNING *(YYYYMMDD)*		b. ANTICIPATED COMPLETION *(YYYYMMDD)*
c. DATE SIGNED *(YYYYMMDD)*	d. TITLE OF SUPERVISOR COMPLETING REPORT	e. CORPS SIGNATURE, SUPERVISOR COMPLETING REPORT
c. DATE SIGNED *(YYYYMMDD)*	d. TITLE OF SUPERVISOR COMPLETING REPORT	e. CONTRACTOR SIGNATURE, SUPERVISOR COMPLETING REPORT
f. ORGANIZATION IDENTIFIER *(Division, Branch, Section, etc.,)*		g. OFFICE SYMBOL
16. MANAGEMENT REVIEW *(1st)*		
a. ☐ CONCUR b. ☐ NONCONCUR c. COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
17. MANAGEMENT REVIEW *(2nd - Chief Operations, Construction, Engineering, etc.,)*		
a. ☐ CONCUR b. ☐ NONCONCUR c. COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW		
a. ☐ CONCUR b. ☐ NONCONCUR c. ADDITIONAL ACTIONS/COMMENTS		
DATE *(YYYYMMDD)*	TITLE	SIGNATURE
19. COMMAND APPROVAL		
COMMENTS		
DATE *(YYYYMMDD)*	COMMANDER SIGNATURE	

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10.	ACCIDENT DESCRIPTION *(Continuation)*

13a.	DIRECT CAUSE*(s)* *(Continuation)*

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13b.	INDIRECT CAUSE*(s) (Continuation)*

14.	ACTION*(s)* TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE*(s) (Continuation)*

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Plans (Programs, Procedures) Required by the Safety Manual

Fatigue Management Plan

A Fatigue Management Plan has been prepared and is included as Appendix P.

Emergency Response Plan

a. Procedures and Tests

Emergency plans to ensure employee safety in case of a fire or other emergency has been prepared in writing and will be reviewed with all affected site personnel. Emergency plans will be tested at least once annually to ensure their effectiveness. On-site emergency planning shall be integrated with off-site emergency support. Off-site emergency support is brought to the site annually as part of the operating plant program. At a minimum, the local Fire Chief will be informed of the additional work to be performed at the Site.

Since the site work involves working with hazardous, toxic, or radioactive waste (HTRW) guidance in section 28.G in the USACE EM 385-1-1 will dictate the Emergency Response Plan information. The Emergency Response Plan information for the project is located in section 12 of Appendix B (SSHP).

a. Spill Plans

A Spill Prevention Controls and Countermeasures Plan is not required for this project. However, the following will be implemented during minor spills at the site. The following spill response is for project.

Spill/Release Reporting

The Projects spill and release reporting shall be governed by the regulatory requirements of the New Jersey Department of Environmental Protection (NJDEP). The NJDEP requirement states: "The owner or operator of any facility (not just major facilities) must notify the DEP of any discharge within **15 minutes** after the discharge has been discovered or should have been discovered."

Definitions

A "spill" shall be defined as any deminimus quantity of a potentially toxic or hazardous substance that contacts **off-site** soils or any waters of the state. Oil sheens observed outside oil booms shall be reported to the NJDEP.

If a spill of liquid occurs and the liquid is presumed clean and then by subsequent testing is found to be toxic or hazardous, the event must be reported as a spill.

If a liquid spill contacts an impervious surface and is contained, it is defined as a leak and need not be reported.

Reporting Procedure

At the initial discovery of any spill or release of a stored material or hazardous waste conveyance or storage system, the individual shall:

1. Immediately contact the Project Manager or the SSHO listed in Emergency Phone Numbers Table.
2. If the Project Manager or the SSHO are unavailable, contact the NJDEP Emergency Action Hotline.
3. Once contact with the Hotline Operator has been established, provide the following information:

- The company name (Sevenson Environmental Services), your name, facility address, and facility phone number
- The location of the spill/discharge (i.e., landfill cap, Rabbit Run, etc.)
- Common name of the substance discharged (i.e., fuel, other hazmat)
- The estimated quantity of each substance discharged
- The date and time the discharge began, was discovered, and ended (if it has ended by the time of notification)
- The actions proposed to contain, clean up, and remove the substances discharged (i.e., source stopped by shutting off the well, area affected was bermed, barricaded, and will be sampled to determine further action)
- The person, event, or equipment responsible for the discharge (disclosure pending investigation)
- Request and document the case number assigned to your call
- Complete "Sevenson Incident Report" or ENG 3394 (if applicable)

Responsibilities

The Superintendent or SSHO shall serve as the Emergency Response Coordinator (ERC) and direct emergency activities at the spill and assure that all safety and health equipment and supplies needed for a spill are readily available and properly used (i.e., adsorbent materials, booms, etc.).

External response agencies shall be contacted at the discretion of the ERC.

During a hazardous materials incident response and during spill clean-ups, the SSHO shall:

- Ensure the evacuation of non-essential project personnel.
- Provide care for any injured personnel (assess need for decontamination first)
- Establish site zones and evaluate conditions subject to change.
- Assist in the donning of PPE and respiratory equipment.
- Provide air monitoring for spills involving hazardous waste.
- Monitor response members for heat related illness.
- Initiate additional monitoring as necessary to ensure the protection of off-site receptors.
- Provide clean-up guidance.

The ERC shall be responsible for directing the clean-up activities of the response team. The ERC shall remain at the spill scene during clean-up activities until the scene is secured. At the earliest convenience, the ERC shall notify the Project Manager and the COR.

Operations may be resumed in the affected area(s) only after the emergency condition has been resolved. The ERC shall determine if a reportable quantity has been involved. Concise, accurate documentation will be made and included with the proper company reporting and investigation forms.

The Project Manager, in concurrence with the Site COR, will be responsible for providing the State with a written confirmation of the discharge within thirty days of its occurrence.

Completion of this report may also involve input from the response team members.

Emergency Response Equipment

The following emergency equipment shall be maintained in the facility's decontamination room in sufficient quantities and be readily accessible to response personnel in the event of emergency response:

- Protective coveralls.
- Neoprene and nitrile outer chemical resistant gloves.
- 60-mil rubber over boots.
- Chemical resistant tape.
- Face shields, ear plugs

The following emergency response supplies shall be maintained in the process area in sufficient quantities and be readily accessible for response personnel

- Water absorbing socks
- Oil absorbing pads
- Vermiculite/Oil Dry
- Plastic shovels
- Squeegee
- Empty 55 gallon open top steel drums

b. Firefighting Plan

All Sevenson personnel will be trained in the use of fire extinguishers but will not be obligated to fight a fire unless they feel it is safe to do so.

In the event of a fire, all non-ancillary personnel will be asked to evacuate the site. Section 12 of the SSHP provides greater detail for fire related emergencies at the site.

c. Posting of Emergency Telephone Numbers

Emergency numbers, instructions for reporting, and directions to the medical facilities will be posted in each office trailer, each site support vehicle that may be used to transport injured personnel, project safety bulletin board, and any other place the SSHO deems necessary to convey the information to the workforce.

d. Man Overboard

Not applicable to this project.

e. Medical Support

There will be a minimum of two personnel at the site that are trained in and will be required to perform first aid and/or CPR while work is being performed. The SSHO and health and safety technicians will be assigned to this obligation. At least one additional individual will be qualified to ensure the minimum number of qualified personnel are available to provide first aid/CPR duties. A list of qualified personnel who are responsible for this duty will be posted at all first aid kits as well as the job site safety bulletin board.

Personnel who are assigned the responsibility to provide medical assistance or first aid will have documented training in first aid and CPR/AED and will be included in Sevenson's Blood Borne Pathogen Program.

A large first aid kit will be provided for every 25 employees at the site. A larger first aid kit shall be present on each major working water platform regardless of the number of employees performing dredging operations. Smaller, portable first aid kits will be made available at each contamination reduction zone where HTRW is being performed. Smaller, portable first aid kits shall be available on work boats. First aid kits will meet ANSI Z308.1 standards.

Site Sanitation Plan

Sevenson will establish and maintain hygienic sanitation provisions for all employees in all areas of the site.

Housekeeping

All areas will be maintained as clean as possible based on the nature of work being performed. Regular housekeeping activities will be conducted in order to maintain safe and sanitary conditions at the Site.

The floor of every workroom shall be kept as dry as possible. Drainage will be maintained where wet processes are used, false floors, platforms, or other dry standing places shall be provided when possible.

To help the cleaning process, every floor, working place, and passageway shall be kept free from protruding nails, splinters, loose boards, clutter, and unnecessary holes and openings.

Drinking Water

Sevenson will supply an adequate supply of potable water in all areas of the site where work is being performed for consumption and personal cleaning. Cool drinking water will be provided during hot weather. All potable water will meet the EPA requirements for drinking water.

Only approved potable water systems will be used to deliver water to the site. Construction trailers will be supplied with potable water through a local vendor in 5-gallon water jugs and a heated/cooled dispensing station. Crews in the field will be supplied with cooled drinking water in clean insulated coolers with a tap located on the bottom of the jug. Field coolers will be marked "DRINKING WATER" and may not be used for other purposes.

Note: Open containers such as barrels, pails, or tanks, or any container (whether with or without a fitted cover) from which the water is dipped or poured are prohibited for drinking water.

Drinking water fountain dispensers shall have a guarded orifice. The use of a common cup (a cup shared by more than one person) on other common utensils is prohibited. Workers will be required to use cups when drinking from water coolers, the use of hands or mouth to tap is prohibited. Unused cups shall be kept in sanitary containers and a waste container will be provided for used cups.

Non-Potable Water

Any outlet that dispenses non-potable water will be conspicuously marked "CAUTION – WATER UNSAFE FOR DRINKING, WASHING, OR COOKING". There will be no cross-connection, open or potential, between a system furnishing potable water and a system furnishing non-potable water.

Non-potable water may be used for cleaning work areas, except where food is prepared or consumed, or shower/break rooms.

Toilets

Sevenson will provide toilets and hand washing facilities at the site to comply with the following.

Separate toilet facilities shall be provided for each sex where the building is connected to a sanitary sewer system in accordance with USACE EM 385-1-1 Table 2-1.

Table 1 –
USACE Table 2-1
Minimum Toilet Facilities
(Non Construction Sites)

TABLE 2-1

MINIMUM TOILET FACILITIES
(OTHER THAN CONSTRUCTION SITES)

Number of employees	Minimum number of Toilets[1]
1 to 15	One (1)
16 to 35	Two (2)
36 to 55	Three (3)
56 to 80	Four (4)
81 to 110	Five (5)
111 to 150	Six (6)
Over 150	Refer to Note [2]

NOTE: [1]Where toilet facilities will not be used by women, urinals may be provided instead of commodes, except that the number of commodes in such cases shall not be reduced to fewer than 2/3 of the minimum number specified.
[2] One additional toilet fixture for each additional 40 employees.

Each lavatory shall be provided with hot and cold running water or tepid running water.

Hand soap or other similar cleansing agent will be provided along with disposable paper hand towels. An adequate supply of toilet paper and a holder will be supplied. Toilets will be separated from other toilets with barrier walls and a lockable door to ensure privacy. Adequate lighting will be provided. Each commode will be equipped with a seat and seat cover.

Toilets that only allow for one person use at a time may be used by either sex. However, single toilet rooms that have more than one commode (i.e., commode and urinal in same room for either sex), only one commode may be counted in the inventory. Washrooms will be routinely cleaned and maintained in good order.

Adequate ventilation will be provided. If windows are used for ventilation they will be screened.

Toilet facilities used at the construction part of the site will be provided as follows:

Where sanitary sewers are not available chemical toilets will be used. Each toilet shall be equipped with a toilet seat and toilet seat cover. Each toilet facility (unless specifically designed and designated for females) will be equipped with a metal, plastic, or porcelain urinal trough and will be supplied with an adequate supply of toilet paper and a holder.

Toilets shall be provided for each sex as indicated in USACE EM 385-1-1 Table 2-2.

Table 2 –
USACE Table 2-2
Minimum Toilet Facilities
(Construction Sites)

TABLE 2-2
MINIMUM TOILET FACILITIES
(CONSTRUCTION SITES)

Number of employees	Minimum number of Toilets[1]
20 or fewer	One (1)
20 or greater	One (1) toilet seat and One (1) urinal per 40 workers.
200 or greater	One (1) toilet seat and One (1) urinal per 50 workers.

NOTE: [1]Where toilet facilities will not be used by women, urinals may be provided instead of commodes, except that the number of commodes in such cases shall not be reduced to fewer than 2/3 of the minimum number specified.

Separate toilet facilities don't have to be provided as long as the toilet room can be occupied by only one person at a time, can be locked from the inside, and has a toilet seat. In areas where it is not practical to provide running water, hand sanitizer or a portable hand wash facility will be provided.

Note: Many hand sanitizers contain flammable liquids and personnel shall be trained regarding their use, storage, and safety precautions.

Toilet facilities will be constructed so occupants are protected against weather and falling objects. All cracks will be sealed, the door tight fitting, and capable of being latched. Toilets will be equipped with ventilation. Windows and ventilation will be protected by screens. Seat boxes will be vented with a 4-inch pipe to the outside of the toilet box with the vent pipe intake located 1-inch below the seat. All toilets will be provided with natural illumination during day light hours. In the event of night work the units will be place near a light plant or artificial lighting will be provided if necessary based on toilet placement.

An outside vendor will be tasked with supplying chemical toilets. As part of the contract, routine cleaning services will be provided by the vendor. The vendor will be responsible for all sewage waste generated and will be included in the cost of the contract.

Employees at temporary field locations for short duration projects will be within driving distance to a toilet facility so additional facilities will not be required.

Washing Facilities

Washing facilities will be provided and maintained in a sanitary condition at toilet facilities unless it is not practical to provide running water. In areas where it is not practical to provide running water, hand sanitizer or a portable hand wash facility will be provided.

Washing facilities will be in close proximity to the worksite.

Showers

Shower trailers will be provided for workers. One shower will be provided for every ten employees of each sex, who are required to shower during the same shift. Body soap or other appropriate cleansing agents, and individual clean towels will be provided. Showers will be plumbed with hot and cold water feeding from a common discharge line.

Changing Rooms

Changing rooms will be provided for workers who wish to change into different clothing or take a shower.

Clothes Drying Facilities

Clothes drying facilities are not applicable for this project.

Food Service

No employee will be allowed to consume or store food or beverages in a toilet room or in any are exposed to hazardous materials.

Waste Disposal

A dumpster will be provided to store and remove all garbage and rubbish produced at the jobsite. An adequate number of trash cans will be provided in all office areas, break trailers, and job site locations to ensure all trash is properly disposed of to avoid creating a menace to health.

Vermin Control

Workplaces will be constructed, equipped, and maintained, as practicable as possible to prevent the entrance or harborage of rodents, insects, or other vermin. A continuing and effective extermination program will be instituted when the presence of vermin is observed. A licensed exterminator or pest control company will be utilized to provide this service.

Medical Support Agreement

Sevenson utilizes WorkCare Incident Intervention to help determine the extent of a workers condition due to a work related injury or illness. In the event a worker must be treated by a local health care professional, Sevenson has made arrangement with Jersey City Medical Center.

At least two site personnel will be required to complete first aid and cardiopulmonary resuscitation (CPR) training and receive the appropriate certification. First aid and CPR certification is renewed bi-annually. All first aid/CPR training is American Red Cross, American Heart Association approved or in accordance with OSHA standards. Additionally, First Aid/CPR qualified personnel will have received blood borne pathogen training as required by 29 CFR 1910.1030. A list of all first aid and CPR/AED qualified people will be posted on the safety bulletin board. This list shall be maintained and reposted as information is modified.

First Aid Kits will be located in the main support area, Contamination Reduction Zone and at the work activity locations. Eyewash stations will be available at the Contamination Reduction Zone. Eyewash stations will be of the pressurized, 15-minute discharge type. On-site employees have a basic knowledge of first aid and will assist the Site Superintendent and SSHO. Community emergency services (EMS, Fire, and Police) will be notified immediately if their resources are needed on site.

Blood-Borne Pathogen Program

Sevenson's Blood-borne Pathogen Program is located in Appendix E.

Exposure Control Plan

See Blood-Borne Pathogen Program in Appendix E.

Automatic External Defibrillator (AED) Program

An AED will be maintained at the site to support first aid. The AED will be kept in the SSHO's office unless determined another location is more appropriate.

Workers who are expected to perform first aid and CPR shall be trained every two years from the date of last training. Training shall be on the same model and manufacturer as the onsite unit. All AEDs shall be the same model/manufacturer.

Unit's battery and functionality checks shall be conducted and documented weekly.

Site Layout Plan and Access and Haul Road Plan

A Temporary Facilities Pan located in Appendix I.

Hearing Conservation Program

Sevenson's Hearing Conservation Program is located in Appendix N

Respiratory Protection Plan

Sevenson's Respiratory Protection Plan is located in Appendix F.

Health Hazard Control Program

The Health Hazard Control Program information is discussed in the following areas:

- Chemicals of Concern located in Appendix B (SSHP) section 1.5
- Exposure Monitoring and Operation Action Levels in Appendix B (SSHP) section 7.0

Hazard Communication Program

Sevenson's Hazard Communication Program is located in Appendix G.

Process Safety Management Plan

Blank Page

A Process Safety Management Plan is not applicable to this project.

Lead Abatement Plan

Blank Page

A Lead Abatement Plan is not applicable for this project.

Asbestos Abatement Plan

A Generic Asbestos Abatement Plan is located in Appendix Q of this Plan.

Radiation Safety Program

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A Radiation Safety Program is not applicable to this project.

Abrasive Blasting

Blank Page

An Abrasive Blasting Plan is not applicable for this project.

Heat/Cold Stress Monitoring Plan

Heat Stress

Heat stress may be a hazard for workers wearing protective clothing even if the temperature is moderate. The same protective materials that shield the body from chemical exposure prevent heat and moisture from dissipating. Personal protective clothing can therefore create a hazardous condition. Depending on the ambient temperature and the work being performed, heat stress can occur very rapidly - within as little as 15 minutes.

In its early stages, heat stress can cause discomfort and inattention, resulting in impaired functional abilities that can threaten the safety of both the individual and his co-workers. Personnel will be instructed to recognize the symptoms of the onset of heat stress. The SSHO may periodically check all personnel working in thermal stress areas to ensure that the symptoms are recognized. Frequency of heat stress monitoring and checks for symptoms of heat stress will increase with rises in air temperature, humidity, and the degree of exposure to high temperature areas.

When workers are in Level C PPE or higher, an ambient temperature of 72.5° F will be used as an action level to implement pulse monitoring, oral temperatures, and administrative controls, including rest breaks and work rotation to prevent employees from experiencing heat-related health effects including weight loss. The guidance for workers wearing permeable clothing is specified in the current version of the ACGIH Threshold Limit Values for Heat Stress. If actual clothing differs from the ACGIH standard ensemble in insulation value and/or wind and vapor permeability, changes should be made to the monitoring requirements and work rest period to account for these differences. ***Table 3 – "Frequency of Physiological Monitoring***" provides the suggested frequency of physiological monitoring for fit and acclimatized workers.

Table 3 –
Frequency of Physiological Monitoring

Adjusted Temperature Calculation	Normal Work Clothing	Impermeable Clothing
90 ºF (32.2 ºC) or above	After each 45 minutes of work	After each 15 minutes of work
87.5 - 90.0 ºF (30.8 – 32.2 ºC)	After each 60 minutes of work	After each 30 minutes of work
82.5 - 87.5 ºF (28.1 – 30.8 ºC)	After each 90 minutes of work	After each 60 minutes of work
77.5 - 82.5 ºF (25.3 - 28.1 ºC)	After each 120 minutes of work	After each 90 minutes of work
72.5 - 77.5 ºF (22.5 - 25.3 ºC)	After each 150 minutes of work	After each 120 minutes of work

The following parameters should be used when monitoring workers:

Heart rate - Count the radial pulse as early as possible in the rest period to ensure a more accurate reading. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period at the same length. If, at the end of the following work period, the heart rate still exceeds 110 beats per minute, shorten the work period again by one-third.

Oral Temperature - The utilization of oral temperature applies to the time immediately after the worker leaves the contamination reduction zone. Using a clinical thermometer, take the temperature for three minutes. If the oral temperature exceeds 99.6 °F (37.6 °C), shorten the next work cycle by one-third, without a change to the rest period. If the oral temperature still exceeds 99.6 °F (37.6 °C) at the end of the following work period, shorten the next work cycle by one-third. Do not permit a worker to perform duties requiring a semi permeable or impermeable garment if the oral temperature exceeds 100.4 ºF (38.1 ºC). Ear canal readings are a valid method to monitor the temperature of workers who remain in the contamination reduction zone.

The oral temperature shall not exceed 100.4 °F. If an employee's pulse rate exceeds the maximum age-adjusted heart rate (0.7(220-AGE)), and/or the oral temperature exceeds 100.4 °F, the employee shall be required to stop work and rest at the work site or move to an air-conditioned room after proper decontamination. The affected employee may be allowed to return to work after his/her pulse rate has dropped below 100 beats per minute. The SSHO in consultation with the affected employee, and medical personnel if necessary, shall determine whether an employee is ready to return to work. Fluids shall be provided and rest breaks will be taken. The frequency of breaks will increase with the temperature. Such things as cooling vests, portable fans, and breaks in air-conditioned areas shall be used if necessary.

When practicable, the most labor-intensive tasks should be carried out during the coolest part of the day. If necessary, a work/rest regimen will be instituted. The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, such as, the Wet Bulb Globe Temperature, duration, and type of activities performed.

A worker who becomes irrational or confused, or collapses on the job should be considered a heat stroke victim and medical help should be called immediately. Early recognition of symptoms and prompt emergency treatment is the key to aiding someone with heat stroke. While awaiting the ambulance, begin efforts to cool the victim down by performing the following:

- Move the victim to a cooler environment and remove outer clothing.
- Wet the skin with water, and fan vigorously or repeatedly apply cold packs or immerse the victim in a tub of cool (not ice) water.
- If no water is available, fanning will help promote cooling.

Any individual showing susceptibility to heat stress will be referred to a physician for evaluation. In addition, the use of prescription drugs can also contribute to the effects of heat stress and will be considered during the assignment of work. Cool (50°-60°F) water or a sport drink, such as Gatorade, will be made available to workers and encourage them to drink small amounts frequently, (e.g., one cup every 20 minutes). Ample supplies of liquids will be placed close to the work area.

Cold Stress

Cold injury (frostbite and hypothermia) and impaired ability to work are hazards to persons working outdoors in low temperatures at or below freezing. Extreme cold for a short time may cause severe injury to exposed body surfaces (frost nip or frostbite), or result in profound generalized cooling (hypothermia). Areas of the body which have high surface area-to-volume ratio such as fingers, toes, and ears, are the most susceptible to frost nip or frostbite.

Two factors influence the development of a cold weather injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked. The wind chill factor is the cooling effect of any combination of temperature and wind velocity or air movement. ***Table 4 – Wind Chill Index*** should be consulted when planning for exposure to low temperatures and wind. The wind chill index does not take into account the specific part of the body exposed to cold; the level of activity, which affects body heat production; or the amount of clothing being worn.

When practicable, the most sedentary tasks should be carried out during the warmest part of the day. If necessary, a light-work rotation schedule should be instituted or the work area heated. Heavy work that will cause heavy sweating resulting in wet clothing must also be monitored. The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, (i.e., the Wind Chill Temperature, duration, and type of activities performed).

When air temperatures are 36 ºF or less, workers who become immersed in water or whose clothing becomes considerably wet shall immediately change into dry clothing/blankets and be treated for hypothermia. Blankets will be included as part of the first aid equipment for activities where workers can become immersed in water or considerably wet. Workers will be required to have a set of dry spare change of clothing available at the Site.

If a worker expresses a concern about their ability to work in a cold environment, they are required to provide medical documentation on their ability to work in temperatures at 30 °F or below. If medical documentation shows they are suffering from diseases or taking medication that interferes with normal body temperature regulation or reduces tolerance to work in cold environments, they will be excluded from cold weather tasks.

Table 4 –
Wind Chill Index

Wind (mph)	Actual Temperature (°F)												
	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25
	Equivalent Temperature (°F)												
5	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40
10	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47
15	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51
20	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55
25	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58
30	22	16	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60
35	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62
40	20	13	6	-1	-8	-15	-22	-29	-36	-42	-50	-57	-64

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V0.16) + 0.4275T(V0.16)
T = Air Temperature (°F)
V = Wind Speed (mph)

Frostbite occurs in 45 minutes or less

Table 5 - Maximum Daily Time Limits for Exposure at Low Temperatures gives the recommended time limits for working in various low temperature ranges.

Table 5 – Maximum Daily Time Limits for Exposure at Low Temperatures	
Temperature Range (°F)	Maximum Daily Exposure
30 to 0	No limit, providing that the person is properly clothed.
0 to -30	Total work time: 4 hours. Alternate 1 hour in and 1 hour out of the low-temperature area.
-30 to -70	Two periods of 30 minutes each at least 4 hours apart. Total low temperature work time allowed is 1 hour.
-70 to -100	Maximum permissible work time is 5 minutes during an 8-hour working day. At these extreme temperatures, completely enclosed headgear, equipped with a breathing tube running under the clothing and down the leg to preheat the air, is recommended.

Table 6 - Work/Warm-up Schedule applies to any 4-hour work period with moderate to heavy work activity, warm-up periods of ten (10) minutes in a warm location and an extended break (e.g., lunch) at the end of the 4-hour period in a warm location. For light-to-moderate work (limited physical movement) apply schedule one step lower. For example, at -35 °C (-30 °F) with no noticeable wind, a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period.

Table 6 – Work/Warm-up Schedule

Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph wind		15 mph wind		20 mph wind	
°C (approx.)	°F (approx.)	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks
-26° to -28°	-15° to -19°	Norm	1	Norm	1	75 min	2	55 min	3	40 min	4
-29° to -31°	-20° to -24°	Norm	1	75 min	2	55 min	3	40 min	4	30 min	5
-32° to -34°	-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-Emergency Work Should Cease	
-35° to -37°	-30° to -34°	55 min	3	40 min	4	30 min	5	Non-Emergency Work Should Cease			
-38° to -39°	-35° to -39°	40 min	4	30 min	5	Non-Emergency Work Should Cease					
-40° to -42°	-40° to -44°	30 min	5	Non-Emergency Work Should Cease							
-43° & below	-45° & below	Non-Emergency Work Should Cease									

To guard against cold injuries, workers should wear appropriate clothing and use warm shelters for removing personal protective equipment. The personnel decontamination trailer will be used as a warm shelter when required. The SSHO may periodically monitor workers' physical conditions, specifically checking for symptoms of frostbite.

Solar Radiation Protection

Where employees are exposed to solar radiation for short periods and there is a potential for sunburn or exposure for prolong periods where long-term exposure could lead to health effects

such as skin cancer sunscreen will be provided to prevent exposure. Sunscreens will be used only in accordance with the manufactures recommendations or instructions.

Indoor Air Quality Management

Blank Page

An Indoor Air Quality Management is not applicable for this project

Mold Remediation Plan

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A Mold Remediation Plan is not applicable for this project

Chromium (VI) Exposure Evaluation

Blank Page

A Chromium (VI) Exposure Evaluation is not applicable for this project

Crystalline Silica Monitoring Plan

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A Crystalline Silica Monitoring Plan is not applicable for this project.

Night Operations Lighting Plan

Night operations at the site are anticipated. However, in the event operations are required to be conducted during periods of limited visibility or during periods of low light during the winter season the SSHO will ensure proper lighting is provided at the Site. Lighting requirements will be addressed during the preparatory phase meeting for each operation. The minimum lighting requirements listed in EM 385-1-1 Table 7-1 will be maintained at all times during nighttime operations.

Table 7 –
USACE Table 7-1 Minimum Lighting Requirements

EM 385-1-1
30 Nov 14

TABLE 7-1

Minimum Lighting Requirements

Facility or Function	Lux	Foot-candles (lm/ft^2)
Accessways		
- general indoor	55	5
- general outdoor	33	3
- exitways, walkways, ladders, stairs	110	10
Administrative areas (offices, drafting and meeting rooms, etc.)	540	50
Chemical laboratories	540	50
Construction areas		
- general indoor	55	5
- general outdoor	33	3
- tunnels and general underground work areas (min 110 lux required at tunnel/shaft heading during drilling, mucking, and scaling)	55	5
Conveyor routes	110	10
Dam Operating Areas (Interior)		
-Tunnels and underground work areas	55	5
-Control Stations	150	15
Docks and loading platforms	33	3
Elevators, freight and passenger	50	5
Temporary Electrical Panels (Interior)	300	30
Temporary Electrical Panels (Exterior)	50	10
First-aid stations and infirmaries	300	30
Maintenance/operating areas/shops		
- vehicle maintenance shop	300	30
- carpentry shop	110	10
- refueling area, outdoors	55	5
- shops, fine - medium detail work	540-325	50-30
- welding shop	300	30
Mechanical/electrical equipment rooms	110	10
Outdoor parking areas	33	3
Toilets, wash, and dressing rooms	110	10
Visitor areas	215	20
Warehouses and storage rooms/areas		
- indoor rack storage	270	25
- outdoor storage	33	3
Work areas – general (not listed above)	325	30

Traffic Control Plan

A Traffic Control Plan has been developed and submitted under separate cover.

Fire Prevention Plan

Fire on construction projects is a constant hazard that can cause loss of life, equipment and material. To assist in preventing fires on construction projects, all personnel must comply with the following safe work practices and procedures:

Major Workplace Fire Hazards

Major workplace fire hazards for this project included; flammable material storage areas, fuel dispensing stations or equipment; and fossil fueled equipment.

Potential Ignition Sources

Potential ignition sources include: flame or heat from hot work operations; fueling equipment while running or hot surfaces; smoking in non-approved areas; static electricity; lightning; and exhaust of equipment.

Fire Suppression Equipment - Access to all available firefighting equipment must be maintained at all times. Firefighting equipment must be inspected monthly and maintained in operating condition. Defective or exhausted equipment must be replaced immediately. All firefighting equipment should be conspicuously located at each jobsite. Extinguishers exposed to freezing conditions will be protected from freezing. Employees should not remove or tamper with fire extinguishers installed on equipment or vehicles or in other locations unless authorized to do so or in case of fire. After using a fire extinguisher, it must be recharged or replaced with another fully charged extinguisher. Extinguishers must be selected based on the anticipated fire hazards. To aid in the proper selection of fire extinguishers, the classes of fires are as follows:

- Class A (wood, paper, trash) - use water, dry chemical, or foam extinguisher.
- Class B (flammable liquids, gas, oil, paints, grease) - use foam, carbon dioxide, or dry chemical extinguisher.
- Class C (electrical) - use carbon dioxide or dry chemical extinguisher.
- Class D (combustible metals) - use dry powder extinguisher only.

Responsibility for Maintaining Equipment

The SSHO will be responsible for maintaining fire protection equipment in working order. He will also be responsible for completing monthly fire extinguisher inspections and scheduling the annual inspection with a licensed fire service contractor.

Personnel Responsible for Controlling Fuel Source Hazards

The Superintendent and SSHO will be responsible for controlling fuel source hazards. The SSHO shall ensure that all fuel sources are in compliance with OSHA and NFPA regulations. The Superintendent shall ensure personnel assigned to duties that require using fuel source hazards are competent in the assigned task. The Superintendent shall also consult with the SSHO prior to making changes in the flammable materials storage areas at the site.

Housekeeping Procedures

An oily rag refuse container will be positioned at each flammable materials storage area for oil and flammable material contaminated rags, towels, or clothing. No combustible material such as wood, hay, other material that will burn may be stored within 25 feet of a flammable material storage area or hot work area. Combustible materials that are to be disposed of are to be placed

into a dumpster before leaving the site for the day. Spills will be cleaned up immediately and the absorbent material will be contained in appropriate containers, segregated, and labeled for disposal.

Removal of Waste Material

Waste material will be placed into roll off dumpsters. The roll off dumpsters will be collected by an outside contractor for disposal. Dumpsters will be emptied when full. Dumpsters shall not be overloaded. Material that does not fit into a full dumpster will not be allowed to be placed outside the dumpster for greater than one shift.

Fire Prevention - Internal combustion engine-powered equipment should be located so that exhausts are away from combustible materials. Smoking is permitted in approved areas, only. Flammable material storage areas will be conspicuously posted, "No Smoking, Matches, or Open Flame." Portable battery-powered lighting equipment must be approved for the type of hazardous locations encountered. Combustible materials must be piled no higher than 20 feet (6.1 m). Depending on the stability of the material being piled, this height may be reduced.

Portable fire extinguishing equipment, suitable for anticipated fire hazards on the jobsite, must be provided at convenient, conspicuously accessible locations. Firefighting equipment must be kept free from obstacles, equipment, materials, and debris that could delay emergency use of such equipment. Employees should familiarize themselves with the location and use of the project's firefighting equipment. All oily rags, wastes, and similar combustible materials must be placed in metal containers. The containers must be emptied on a daily basis. Storage of flammable substances on equipment or vehicles should be prohibited unless such unit has adequate storage area designed for such use.

Flammable and Combustible Liquids - Explosive liquids, such as gasoline, will not be used as cleaning agents. Gasoline and similar combustible liquids must be stored, transported, and handled in approved and labeled containers in well-ventilated areas free from heat sources. Approved wooden or metal storage cabinets must be labeled in conspicuous lettering, "Flammable-Keep Fire Away." Storage in an approved storage cabinet should not exceed 60 gallons of flammable, or 120 gallons of combustible liquids. Storage of containers will not exceed 1,100 gallons in any one pile or area. Never place a pile or group within 20 feet of a building. A 12-feet wide access way must be provided within 200-feet of each container pile to permit approach of fire control apparatus. All flammable material storage areas shall be protected with bollards or barriers to prevent damage from moving equipment or vehicles.

Storage areas/tanks shall be surrounded by a curb, earthen dike or other equivalent means of containment of at least 6-inches in height, or to a height that will contain the contents in the event of a leak. When dikes or curbs are used, provisions shall be made for draining off accumulation of ground or rain water or spills of flammable liquids. Drains shall terminate at a safe location and shall be accessible to operations under fire conditions.

The use of flammable liquids and spray finishing needs to conform to the requirements of CFR1926.66 and CFR1926.152. Paints and reducers should be stored away from heat sources and out of the sun. Airless spray-painting apparatus should be of a type approved for hazardous locations. Any electrically or fuel-powered equipment used to mix, convey, and spray flammable and combustible liquids must carry an approval from a nationally recognized testing laboratory. Pneumatically operated equipment is usually suitable for use with flammable and combustible finishes.

Fire Extinguishers **-** Portable fire extinguishers are provided in adequate number and type (10 lb. ABC) and are located throughout the site. Fire extinguishers are located in readily accessible locations. Fire extinguishers are recharged regularly and the date of last inspection noted on their tags. Extinguishers should be placed free from obstructions or blockage. All extinguishers must be fully charged and in their designated places unless in use. All employees are periodically instructed in the use of extinguishers and fire protection procedures. Fire Extinguishers will be located in the following areas:

- ***Support Zone (Field):*** (1) 10 lb ABC multipurpose dry chemical type fire extinguishers.
- ***Contamination Reduction Zone:*** (2) 10 lb ABC multipurpose dry chemical type fire extinguishers.
- ***Exclusion Zone:*** (1) 10 lb ABC multipurpose dry chemical type fire extinguishers.
- ***Equipment:*** All of Sevenson's heavy equipment will be supplied with 2 lb ABC multipurpose dry chemical type fire extinguishers.

Flammable Materials Storage Area: (1) 20 lb ABC multipurpose dry chemical type fire extinguisher will be placed no closer than 25 feet but no further than 75 feet from any flammable materials storage area. The extinguisher shall be placed in an area that is readily accessible.

Wild Land Fire Management Plan

Blank Page

A Wild Land Fire Management Plan is not applicable for this project.

Arc Flash Hazard Analysis

An Arc Flash Hazard Analysis will be conducted for the WWTP and temporary electrical supply system and shall be amended to this plan.

Hazardous Energy Control Program

Sevenson Hazardous Energy Control Program is Located in Appendix H.

Standard Pre-Lift Plan

Lift Load and Capacity Calculations (Page 1 of 3)							
Lift Description:							
A. Weight of Load (Equipment) – Live Load							
1. Load/Equipment Condition New	( )		Used	( )			
2. Weight of Load/Equipment Empty		Lbs.					
3. Weight of Attachments		Lbs.					
a. Platforms and Ladders		Lbs.					
b. Piping and Accessories		Lbs.					
c. Liquids Inside		Lbs.					
d. Dirt and Debris		Lbs.					
e. Internal Trays or Liners		Lbs.					
f. Other		Lbs.					
		Lbs.					
4. Total Amount of Load/Equipment Weight (A2 through A3f)		Lbs.					
B. Total Lifted Weight (load and/or equipment + rigging + main crane deductions)							
1. Load and/or equipment weight plus contingency*		%	7. Wt. Jib Erected		Lb		
2. Amount of Equipment Weight		Lb	7a. Wt. Of Jib Stowed		Lb		
3. Weight of Headache Ball		Lb	8. Wt. Of Jib Headache Ball		Lb		
4. Weight of Main Block		Lb	9. Wt. Of Cable (Load Fall)		Lb		
5. Weight of Spreader Bar		Lb	10. Auxiliary Boom Head		Lb		
6. Weight of Slings and Shackles		Lb	11. Other:		Lb		
*Use 100% plus some percentage (example +10%) to multiply times number in A 4 to allow for contingency to compute B2.							
TOTAL LIFTED WEIGHT (Sum B2 thru B11)		Lbs.					
Source of Load Weight (A2):							
(Name Plate, Drawings, Calculated, Weighed, etc.)							
Weights and Calculations By:			Date:				
Weights and Calculations Verified By:			Date:				
(See page 2)							

Load and Capacity Calculations (Page 2 of 3)				
C. Capacities of the (Main) Crane				
Make & Model of Crane				
2. Counter Weight Size:		Type of Boom:		
3. Lifting Arrangement				
a. Max. Radius During Lift		Ft.		
b. Length of Boom		Ft.		
c. Angle of Boom at Pick		Deg.		
d. Angle of Boom at Set		Deg.		
Rated Capacity Under Most Severe Conditions				
1. Over Rear		Lbs.		
2. Over Front		Lbs.		
3. Over Side		Lbs.		
f. Rated Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side or….)				Lbs.
4. Jib				
a. Is the Jib to be used	Yes	No		
b. Length of Jib		Ft.		
c. Jib Angle		Deg.		
d. Rated Jib Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or…)				Lbs.
5. Load Line/Fall Cable				
a. Is Main Block to be used?	Yes	No		
b. Number of Parts of Cable				
c. Size of Cable		Ø inches		
d. Maximum Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or ….)				Lbs.
D. Percent of Cranes Capacity (>85% requires High Hazard Lift Approvals)				
	Total Lifted Weight X 100 = = % Rated Capacity			%
E. Size of Slings				
1. Sling Selection				
a. Type of Arrangement			(Spreader, Vertical Slings, etc.	
b. Number of Slings to Hook	Ø	Capacity	Lbs.	
c. Sling Size			Ø	
d. Sling Length			Ft.	
e. Sling Capacity (At angle used)			Lbs.	
f. Number of Slings to Load			#	

g. Total Rigging capacity (e x f)			Lbs.
Comments:			
Sketch of rigging arrangement available	Yes	No	See Page ( )
End of Standard Lift Plan Paperwork (			

Comments and Signatures (Page 3 of 3)			
Comments:			
Sketch of rigging arrangement available	**Yes**	**No**	**See Page ( )**
Reviewed by (*additional reviews required for high hazard lifts*):			
Safety Officer:			
Lift Supervisor:			
Rigging Supervisor:			
Crane Operator:			

Figure 2: Pre-Lift Checklist

		Yes	No
1.	Crane operator meets company qualification requirements?	☐	☐
2.	Lift calculations and rigging plan completed?	☐	☐
3.	Are lift equipment swing & travel requirements & clearances known?	☐	☐
4.	Are all required approvals/permits signed?	☐	☐
5.	Crane inspections up to date (Annual/Monthly/Daily)?	☐	☐
6.	Weather conditions and wind speed acceptable?	☐	☐
7.	Has the stability of the ground been assured by soil bearing analysis?	☐	☐
8.	Location and size of underground facilities are known?	☐	☐
9.	Matting and/or outrigger pads inspected and approved?	☐	☐
10.	Electrical equipment and power lines at required distance?	☐	☐
11.	Rigging Inspected for defects?	☐	☐
12.	Engineered lifting lugs fabricated and installed correctly?	☐	☐
13.	Connecting/disconnecting means been developed?	☐	☐
14.	Have the safety precautions been reviewed?	☐	☐
15.	Is survey equipment required?	☐	☐
16.	Lift Hold Point of ≥_____ lbs communicated to crew?	☐	☐
17.	Signal person(s) assigned?	☐	☐
18.	Safe Plan of Action (SPA) Completed?	☐	☐
19.	Pre-Lift Meeting/Task Safety Awareness Meeting (TSA) held?	☐	☐
20.	Hoist area & load path cleared of non-essential personnel?	☐	☐
21.	Crane set up per the lift plan (radius, configuration, etc)?	☐	☐
22.	Rigging equipment and tag line(s) installed per plan?	☐	☐

Completed By Signature: Name Printed: Date:

Critical Lift Plan

A Critical Lift Program has been prepared for this project and is located in Appendix M.

A Critical Lift Program has been inserted into the document to provide guidance in determining what defines a critical lift. A blank Critical Lift Plan has also been inserted into the appendix section. Given the nature of remediation projects versus construction projects any and all critical lifts that may or may not occur during the course of the project cannot be planned during the preparation of the APP/SSHP. A Critical Lift Plan shall be prepared and submitted to the USACE for review and acceptance prior to a critical lift being performed.

Navel Architectural Analysis

Blank Page

A navel architectural analysis is not required for this project.

Floating Plant Inspection and Certification

Blank Page

Not applicable for this project.

Contingency Plan for Floating Plants for Severe Weather

Blank Page

Not applicable for this project.

Float Plan

Blank Page

Not applicable for this project.

Site-Specific Fall Protection and Prevention Plan

Sevenson Fall Protection Program is located in Appendix J. Due to the nature of a remediation project versus a standard construction project a Fall Protection Program (with blank Fall Protection Plan) has been developed to provide guidance in the preparation of an as needed job specific Fall Protection Plan. The job specific Fall Protection Plan will be completed by the SSHO prior to personal working at heights that would require a specific Fall Protection Plan.

Demolition Plan

A Demolition Plan shall be developed by a New Jersey registered professional engineer prior to any structure requiring demolition. The Demolition Plan shall be prepared, accepted by the USACE and amended to this plan prior to the start of demolition activities.

Rope Access Work Plan

Blank Page

A Rope Access Work Plan is not applicable for this project

Excavation and Trenching Plan

The Excavation Plan is located in Appendix L.

Fire Prevention and Protection Plan for Underground Construction

Blank Page

A Fire Prevention and Protection Plan for Underground Construction Plan for tunneling is not applicable for this project.

Compressed Air Plan for Underground Construction

Blank Page

A Compressed Air Plan for Underground Construction is not applicable for this project.

Formwork and Shoring Erection and Removal Plan

Blank Page

A Formwork and Shoring Erection and Removal Plan is not applicable for this project.

Pre Cast Concrete Plan

Blank Page

A Pre Cast Concrete Plan is not applicable for this project.

Lift Slab Plan

Blank Page

A Lift Slab Plan is not applicable for this project.

Masonry Bracing Plan

Blank Page

A Masonry Bracing Plan is not applicable for this project

Steel Erection Plan

Blank Page

A Steel Erection Plan is not applicable for this project.

Explosives Safety Site Plan

Blank Page

A Explosives Safety Site Plan is not applicable for this project

Blasting Safety Plan

Blank Page

A Blasting Safety Plan is not applicable for this project.

Dive Operations Plan

Blank Page

A Dive Operations Plan is not applicable for this project.

Safe Practices Manual for Diving Activities

Blank Page

A Safe Practices Manual for Diving Activities is not applicable for this project

Emergency Management Plan for Diving

Blank Page

An Emergency Management Plan for Diving is not applicable for this project

Tree Felling and Maintenance Program

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A Tree Felling and Maintenance Program is not applicable for this project

Aircraft/Airfield Construction Safety and Phasing Plan or Aircraft/Airfield Safety Plan Compliance Document

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An Aircraft/Airfield Construction Safety and Phasing Plan or Aircraft/Airfield Safety Plan Compliance Document is not applicable for this project.

Site Safety and Health Plan for HTRW

A Site Safety and Health Plan for HTRW work has been prepared for this project and is located in Appendix B.

Confined Space Program

Sevenson's Confined Space Program is located in Appendix K.

j. Risk Management Process

Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or sub-contractor is to perform the work, an Activity Hazard Analysis (AHA) shall be prepared.

The AHA shall define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable risk.

The names of the Competent/Qualified Person(s) required for a particular activity shall be identified and included in the AHA.

The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or change in competent/qualified person(s).

If more than one Competent/Qualified person is used on the AHA activity, a list of names shall be submitted as an attachment to the AHA. Those listed must be Competent/Qualified for the type of work involved in the AHA and familiar with current site conditions.

k. Abbreviated APP for Limited-Scope Service, Supply and R&D Contracts

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Appendix A

Summary of Training and Work Experience
For Safety Personnel

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Years of Experience:

21

Education:

- B.S. Degree – Occupational Safety, SUNY – Empire State College
- A.S. Degree - Radiation Protection Technology, Central Florida Community College, Ocala, Florida

Certifications:

- Certified Industrial Hygienist Certification #10527CP
- Certified Safety Professional Certification #22748
- National Registry of Radiation Protection Technologist-2002
- 40-Hour and 8-Hour OSHA HAZWOPER Training
- 8 Hour OSHA HAZWOPER Supervisor Training
- 40 Hour ORISE Course "Implementing the MARSSIM Approach for Design and Conduct of Radiological Surveys"

Role and Responsibility:

- Oversees the health and safety aspects of all Sevenson's projects.
- Responsible for development, implementation, reviews, and evaluation of the project-specific worker health and safety plans related to occupational safety, industrial hygiene, and health physics.
- Responsible for reviewing air monitoring and exposure data to ensure appropriate controls are instituted and maintained.
- Manages a staff of 30 Site Health and Safety Officers and health physics personnel.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving: excavation and earthwork; innovative and traditional steel sheeting systems; sediment remediation; temporary and mobile water treatment systems; sludge solidification and soils stabilization; slurry wall and trench construction.

Paul Jung-CIH, CSP, RRPT

Director of Health and Safety

Mr. Jung has 21 years of practical, hands on field experience in a variety of health and safety capacities, each with increased responsibility throughout his career.

Mr. Jung is a Certified Industrial Hygienist through the American Board of Industrial Hygiene, a Certified Safety Professional through the Board of Certified Safety Professionals, and a Registered Radiation Protection Technologist through the National Registry of Radiation Protection Technologist.

Mr. Jung is Sevenson's Director of Health and Safety. He responsible for all aspects of occupational safety, marine safety, industrial hygiene, and health physics for Sevenson. The services Sevenon performs require a comprehensive safety program that involves OSHA or Agreement State regulations from the general industry, construction, and maritime standard, EPA TSCA, RCRA, and CERCLA regulations as well as Nuclear Regulatory Commission/Agreement State and United States Coast Guard regulations.

In addition to maintaining Sevenson's Corporate Health and Safety Program, he develops site specific health and safety plans for every Sevenson project. Since his time as Sevenson's Associate Director of Health and Safety and the Director of Health and Safety, he has prepared over 100 site specific health and safety plans.

Mr. Jung is responsible for the supervision and professional development for a staff of 25-40 safety, industrial hygiene, and radiological personnel. He provides safety oversight, technical support, and guidance for his safety staff as well as other project supervision.

Mr. Jung conducts Sevenson's training specific to HAZWOPER, radiation safety (health physics technician and general employee training), industrial hygiene (air monitoring protocols, data review, and method selection, job safety analysis, etc.) and occupational safety (fall protection, confined space, HAZCOM, Control of Hazardous Energy, PPE, etc.).

Mr. Jung also conducts job site inspections and audits as well as reviews all air monitoring and exposure data to evaluate and recommend controls to reduce or abate risk and exposure. He also works in conjunction with project estimators and design teams to ensure as many know physical hazards are eliminated through engineering or administrative controls as possible prior to executing the project in the field.

Mr. Jung is an active member in the Niagara Frontier Chapter of the American Society of Safety Engineers and is on the Board of Directors with the Western New York Safety Conference. As a member of the these two organizations, he has developed an extensive network of colleagues to discuss a variety of health and safety related issues to improve not only Sevenson's overall health and safety program but that of other companies and organizations as well.

Years of Experience:
25

Certifications:

- CHST – Construction Health and Safety Technician Certificate Number C9243
- OSHA 30 Hour Construction Training
- OSHA 40 Hour Training/OSHA 8 Hour Refresher
- First Aid/CPR

Role and Responsibility:

- Responsible for implementation of the project-specific worker health and safety plans.
- Responsible for overseeing the medical monitoring of project-specific field employees.
- Performs audits and safety inspections at the sites.
- Conducts informational meetings.
- Repairs and maintains field instruments.
- Manages air monitoring and sampling programs.
- Evaluates analytical data.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving:
- Excavation and earthwork;
- Innovative and traditional steel sheeting systems;
- Sediment remediation;
- Temporary and mobile water treatment systems;
- Sludge solidification and soils stabilization;
- Chemical treatment/heavy metals fixation;
- Slurry wall and trench construction;
- Collection, recovery and treatment systems construction;
- Dredging and dewater technologies
- Facilities decontamination and demolition; and
- Low level radiation, metals,

Davis Raver, CHST

Onsite Health and Safety Officer

Past Project Experience

Beech Creek Superfund Site, Waynesboro County, TN: Project Manager. Project requires the excavation, characterization, T+D of PCB contaminated materials. Existing roads will be improved to enable site access. Runoff water from the landfill will be rerouted. Excavated materials transferred to a storage pad for dewatering. Water will be collected and processed onsite at a temporary WWTP sized at 200 GPM. All disturbed areas restored to existing conditions.

New Bedford Harbor Superfund Site, New Bedford, MA: Health and Safety Officer for the hydraulic dredging and mechanical dewatering of PCB contaminated harbor sediment. Design, install, operate and maintain a liquids/solids separation and water treatment system sized at 2,000 gpm. The WWT includes clarifiers, secondary settling, pH neutralization, and sand and carbon filtration. Desanding operation incorporated to minimize waste treatment and disposal. 1,300 cf of filter presses will be used.

Onondaga Lake Dredging, Sediment Transportation and Capping Project, Syracuse, NY: Health and Safety Officer. Project requires Sevenson to provide design support of a dredging, sediment, capping, and transport system. Dredge volume estimated at 2.4 million CY of sediments. Capping will extend over approximately 600 acres. Approximately 2,100,000 CY of material will be removed using a hydraulic dredge and a mechanical excavator with a hydraulic clam bucket. Upon completion of dredging operations, Sevenson will perform backfilling and capping operations. Material barges will transport material to the backfilling and capping areas and an excavator with a clamshell bucket will be used to place the materials into a slurry system used to install the cap.

Welsbach/GGM Superfund Site, Multiple Contracts, Camden, NJ: Health and Safety Officer/Health Physics Support Staff. This project requires Sevenson to excavate, characterize, transport and dispose, off-site, soils contaminated with thorium and radium. Site is a former manufacturing facility decommissioned and demolished under a previous contract. Existing utilities (gas, electric and sewer) will be capped, removed and relocated. Waste water treatment from excavation operations is required. In addition numerous residences will require remediation and restoration.

Beazer Site, Kearny, NJ: Site Safety and Health Officer. Excavation and stabilization of soils, sediments, and silts from wetland areas and riverbank contaminated with creosote and hexavalent chromium as well the relocation of previous treated river sediments. Air monitoring for this project included real time dust and VOCs as well as occupational sampling for total dust and hexavalent chromium.

Wyeth Pharmaceuticals, Bound Brook, NJ: Site Safety and Health Officer. Excavate and mechanical stabilization of hazardous material from settling ponds for the manufacturing of organic tars, dyes, and pigments that are contaminated with benzene, chlorobenzene, ethylbenzene, toluene, xylenes, naphthalene, and nitrobenzene. The occupational monitoring performed for this project was real time dust and VOC monitoring. The majority of this work was performed in Level B PPE.

Cornell Dubilier Electronics Superfund Site, South Plainfield, NJ: Site Safety and Health Officer. Demolition of existing site structures with asbestos and lead contamination and excavation of soils contaminated with PCB, pesticides, polyaromatic hydrocarbons, and metals. The occupational and community air monitoring performed for this project was; real time dust and VOC monitoring, TO-4a (PAH) sampling, NIOSH 7300 (Lead), 7400 (Asbestos) and 5503 (PCB), and OSHA 65 (Benzidine) sampling.

FEMA Emergency Repairs, Scranton, PA: Health and Safety Officer Emergency repairs to a collapsed culvert and roadway due to a wash out from storm water damage associated with heavy rains following hurricane Ivan.

Federal Creosote Superfund Site, Manville, NJ: Site Safety and Health Officer. Creosote contaminated soil excavation, disposal, and restoration in a residential and light industrial setting. The occupational and community air monitoring performed for this project was; real time dust and VOC monitoring, EPA PM-10 sampling, TO-13 (VOC) and TO-14 (SVOC) sampling, NIOSH 1501 (PAH) and 5506 (BTEX) sampling.

WR Grace, Chattanooga, TN: Health Physics Technician/Safety and Health Technician. High activity thorium remediation project that involved mechanical excavation and dredging of sediments settling ponds at a chemical plant.

Montclair Superfund Site, Montclair, NJ: Health Physics Technician. Radioactive soil excavation and building decontamination and rehabilitation in a residential neighborhood setting.

1991-1999 Outage support for various nuclear power plants throughout the United States as well as nuclear support centers for equipment and materials decontamination and waste minimization. Mr. Raver was a health physics technician as well as a health and safety technician while working at the facilities.

Years of Experience:
10

Certifications:

- OSHA 30 Hour Construction Training
- OSHA 40 Hour Training/OSHA 8 Hour Refresher

Role and Responsibility:

- Responsible for implementation of the project-specific worker health and safety plans.
- Responsible for overseeing the medical monitoring of project-specific field employees.
- Performs audits and safety inspections at the sites.
- Conducts informational meetings.
- Repairs and maintains field instruments.
- Manages air monitoring and sampling programs.
- Evaluates analytical data.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving:
- Excavation and earthwork;
- Innovative and traditional steel sheeting systems;
- Sediment remediation;
- Temporary and mobile water treatment systems;
- Sludge solidification and soils stabilization;
- Chemical treatment/heavy metals fixation;
- Slurry wall and trench construction;
- Collection, recovery and treatment systems construction;
- Facilities decontamination and demolition; and
- Low level radiation remediation.

Wyatt Beougher

Onsite Health and Safety Officer

Past Project Experience

Bayou D'Inde (Area B) / Lower Canal Sediment Remediation, Lake Charles, LA: Health and Safety Officer for the hydraulic dredging of approximately 95,000 CY of sediment from Area B of Bayou D'Inde. Place an insitu cap with a minimum of 12 inches of clean material over the dredged area in the Lower Canal. Place an insitu cover with a minimum of 6 inches over the dredged areas in three marshes. Construct temporary berms, levees, and containment structures to facilitate the placement and settlement of dredged sediment. Install temporary weir structures and culverts to control water levels in sediment placement areas and the flow of return water. Install permanent sheet pile walls in identified locations.

Menekaunee Harbor Improvements, Marinette, WI: Health and Safety Officer. Project requires a combination of hydraulic and mechanical dredging of approximately 72,500 CY of material within the Menekaunee Harbor to improve navigation as well as remove contaminants. Mechanically dredged sediments are loaded into scows and transferred to a processing area where they are dewatered, offloaded and staged for characterization. Sediments will either be shipped offsite to an approved disposal facility or stockpiled for beneficial reuse. An existing timber pile wall along the shoreline will also be removed and replaced with a combination of riprap, ledge stone, and sheet pile wall.

Menominee River Sediment Removal Project, Marinette, WI: Health and Safety Officer. Mechanical environmental dredging of approximately 235,000 CY of river sediment. Dredged sediments loaded onto hopper barges. Barges transport sediments to an offloading and storage area. Stabilization of sediments using a pugmill. Processed sediment for offsite transportation and disposal. Dredge water treated in WWTP prior to discharge.

New Bedford Harbor, New Bedford, MA: Health and Safety Officer for the hydraulic dredging and mechanical dewatering of PCB contaminated sediments with highest concentrations of 7,650 ppm in a phased multi-year approach. Eight (8) areas of the harbor have been successfully dredged thus far. A total of 300,000 CY have been removed and processed. Design, installation, operation and maintenance of a liquids/solids separation system and wastewater treatment system to handle a 2,000 GPM flow rate. Dredge spoils conveyance system required 20,000 lf of dual containment piping. 250 million gallons of filtrate successfully treated to meet criteria limits establish for metals and PCB's (parts per trillion). Erection of 15,000 sf desanding building in 40 days. Operated under Level B.

Berrys Creek Remedial Action, Bergen County, NJ: Health and Safety Officer for this sediment removal and restoration project. Project scope of work included installation and removal of an upstream diversion sheet pile dam and wet well to control stormwater flow; installation and removal of a downstream sheet pile dam to control tidal flow incorporating flood gates; installation and operation of a 68,000 gpm variable flow bypass pumping system; maintaining a dry excavation area with an extensive dewatering system; excavation of mercury contaminated sediment; stabilization of all excavated material to meet disposal requirements; monitoring and controlling mercury vapors during all material-handling activities; and restoration of excavation areas and banks with approved material, seeding and plantings.

Former GM Facility Sediment Remediation, Sleepy Hollow, NY: Health and Safety Officer for a project requiring the water based mechanical dredging, processing and on site disposal of metals-contaminated sediment from an area along the eastern shoreline of the Hudson River. Work was performed from October 15, 2012 – February 1, 2013 and required the construction of interim material handling and staging pads; the installation and removal of approximately 250 ft x 35 ft steel sheeting; the installation and removal of approximately (20) – 55 ft round piles and 650 ft of turbidity curtain and oil boom around the work area; the setup of a water treatment system to manage decant water from dredging operations, dredging of sediment using a water based tub crane with a 9 cubic yard GPS equipped environmental clamshell bucket; the off-loading of sediment with a 200 ton land based crawler crane; the transport of excavated materials between the pads; the blending of Portland cement into the sediment to enable it to pass paint filter test prior to final placement and disposal on site; and the placement of backfill to establish cover over the dredge foot print. 10,000 LF of storm cleaning and video inspection of sewers was also required.

Non-Public Properties Newhall Neighborhood, Hamden, CT: Health and Safety Officer. Newhall Street neighborhood is an 18 block residential area which requires remediation. Pre-construction surveys were conducted for each property. The top 4 feet of soils which required removal were excavated, consolidated onsite, characterized and shipped offsite for disposal. Disturbed areas were backfilled with clean imported common fill, and restoration to pre-existing features includes landscape, patios, fencing and driveways.

Melton Valley Soils and Sediments Project, DOE Oak Ridge, TN: Onsite Health and Safety Officer. Turnkey project to remediate multiple sites in the Melton Valley area of the Oak Ridge National Laboratory. Sites included four impoundment areas; one isolated cryogenic area; flood plain areas; and six unnamed problem areas. Sevenson excavated, characterized and disposed of material either at ORNL's onsite landfill or used material as fill. Impoundment material was stabilized with cement. Project completed in compliance with strict adherence to DOE protocol.

Well Sand Project, McIntosh, AL: Health and Safety Officer. Excavation and transportation of the well sand materials to an approved disposal facility. Construction and improvements to Allen Barns Road.

Former Coal Tar Processing Facility Island End River, Everett, MA: Health and Safety Officer for field-scale demonstration to determine the means and methods for large-scale sediment dredging and dewatering project. Evaluation included auger, caisson and clam-bucket methods. Pilot study assessed water quality impacts on dredging operations that provided data necessary to implement the full-scale project in compliance with regulatory guidelines. Full-scale project included construction oversight, development of contract drawings and specifications, and detailed cost estimate of the remedial action plan. The project required Sevenson to mechanically dredge 72,000 CY of river sediment and place it into a 1,800 lf steel CDF. Dredged materials were solidified insitu after placement into the CDF. Approximately 2.8 acres of the river bottom was capped with a washed sand and gravel product, 28,000 sf were covered with a Reactive Core Mat, and 14,000 sf were covered with Marine Mattresses. A concrete cap was constructed over the CDF and serves as a bulkhead.

Fox River Phase 1, DePere, WI: Health and Safety Officer for the hydraulic dredging of 140,000 cubic yards of PCB-contaminated sediments from the Lower Fox River. Design, construct, operate, and maintain a 2,400 gpm liquids/solids separation system and wastewater treatment unit to treat filtrate from dewatering process. Placed a 6-inch sand cap over 22 acres of river bottom utilizing a custom-built dissipating system. Transportation and off-site disposal of TSCA and non-TSCA processed filter cake. Dredging and dewatering remediation operations were scheduled for 220 days.

Pond Dredging and Pressure Filtration Project, El DuPont New Johnsonville, TN: Health and Safety Officer for the hydraulic dredging and mechanical dewatering of three settling ponds at the New Johnsonville DuPont Facility. Removal of 65,000 dry tons of sediment removal was required; Sevenson exceeded this number and removed 72,000 dry tons before the original schedule was completed.

Years of Experience:
11

Education:
Restaurant School of Philadelphia
AAS Culinary Arts

Certifications:
- OSHA 40-Hour Hazardous Waste Operations and Emergency Response
- OSHA 10-Hour Construction Safety Program (1910.146 & 1926)
- OSHA 30-Hour Construction Outreach Training
- First Aid & CPR
- Confined Space Entry
- Confined Space Rescue Training
- Blood-Borne Pathogens Certificate
- General Lab Safety, "Right to Know"
- Respiratory Protection Certificate
- Respiration & Fit Test Training
- RCRA Refresher
- NJ Hazard Waste Transportation 49 CFR 172.704
- DOE Radiological Worker II

Role and Responsibility:
- Responsible for implementation of the project-specific worker health and safety plans.
- Responsible for overseeing the medical monitoring of project-specific field employees.
- Performs audits and safety inspections at the sites.
- Oversees the health and safety aspects on assigned project.
- Conducts informational meetings.
- Repairs and maintains field instruments.
- Manages air monitoring and sampling programs.
- Evaluates analytical data.

Dave Goeckler

Onsite Health and Safety Officer

Past Project Experience

Horseshoe Road Superfund Site Operable Unit 3 – Marsh and River Sediment Remediation, Sayreville Township, NJ: Health and Safety Officer. The scope of work requires the mechanical and hydraulic dredging of contaminated sediment and marsh soils. River sediments will be hydraulically dredged to fabric bags for dewatering. Marsh sediments will be excavated and transferred to a storage area for dewatering and processing. All liquids will be collected and treated at a 2,000 gpm temporary WWTP. All dredged material will be loaded into railcars for disposal offsite. All disturbed areas will be backfilled or capped. An estimated 100,000 CY of sediment and marsh soils will be removed.

Roebling Steel Superfund Site, Roebling, NJ: Health and Safety Officer for a combination of mechanical dredging and traditional excavation of an estimated 250,000 cy of contaminated sediment from 2 areas. Sediment loaded onto material barges and pushed by tug to dock for unloading; transfer and placement into an onsite storage area. A cover system will be installed over dredged sediments. Restoration includes backfill of excavation areas; wetlands restoration; and shoreline stabilization with geo-fabric and revetment stone. Level D protection.

Former Koppers Site, Westfield NJ: Health and Safety Officer. Site investigation and Excavation of contaminated soil and remediation. Personal sampling for PAH's, and volatile organic compounds using NIOSH sampling methods.

Previous Work Experience

March 2008-June 2008
Health and Safety Officer. Haztk Inc. NJSDA Camden NJ. Camden Early Childhood Development Center. Health and Safety for New Jersey School Development Authority.

January 2008-February 2008
Confined Space Rescue Technician, Haztek Inc.-Triventure Inc. Rescue Technician for hazardous waste soil remediation for NJ Transit Railroad

October 2007 –December 2007
Health and Safety Officer- Haztek Inc- Great Lakes Dredging, USACE Newark Bay Channel deepening Project. Newark NJ.

August 2007- September 2007
Confined Space Rescue Technician, Haztek Inc. NYS DEP, Rescue Technician for Waste water treatment plant tank cleaning and maintenance.

July 2007- Augus Meadowlands NJ. t 2007
Environmental Technician, Driller (GE):**Haztek Inc.** Water assessment and remediation for NYS DEP. Drilling and installation of groundwater monitoring wells and groundwater remediation systems.

December 2006-July 2007
Health and Safety Manager-Haztek Inc.USACE Fort Belvoir, Springfield VA Site investigation and Excavation of contaminated soil and remediation, UXO investigation, removal detonation. Project continuation.

November 2006- December 2006
Health and Safety Officer-Haztek Inc.WEEKS Marine Cape Canaveral FL- Dredging Operation US Coast Guard. Dredging of Cape Canaveral Channel.

September 2006-October 2006
Health and Safety Officer-Haztek Inc. WEEKS Marine, Acker Kvaerner LNG plant Cameron Louisiana, Dredging operations and pipeline installation for Liquid Natural Gas plant.

July 2006-August 2006
Health and Safety Officer-Haztek Inc. WEEKS Marine Earle Naval Weapons Station, Colts Neck NJ. Dredging Operations and pier construction for Naval Weapons Station.

May 2006-July 2006
Health and Safety Manager-Haztek Inc. USACE Fort Belvoir, Springfield VA Site investigation and Excavation of contaminated soil and remediation, UXO investigation, removal detonation.

January 2006-April 2006
Environmental Health and Safety Coordinator-Haztek Inc. Valero Refinery Paulsboro NJ. Responsible for the daily on-site safety and inspection of a fuel and tar refinery.

October 2005- January 2006
Health and Safety Officer-Haztek Inc. Meadowlands NJ, NJ Transit, Excavation of contaminated soils (PCBs) railroad ties, ID-27 soils and dioxins.

Dave Larson

Onsite Health and Safety Officer

Years of Experience:
19

Education:

- AAS Ocala Community College Radiation Protection, Ocala, FL

Certifications:

- OSHA 30 Hour Construction Training
- OSHA 40 Hour Training/OSHA 8 Hour Refresher
- First Aid/CPR

Role and Responsibility:

- Responsible for implementation of the project-specific worker health and safety plans.
- Responsible for overseeing the medical monitoring of project-specific field employees.
- Performs audits and safety inspections at the sites.
- Conducts informational meetings.
- Repairs and maintains field instruments.
- Manages air monitoring and sampling programs.
- Evaluates analytical data.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving:
- Excavation and earthwork;
- Innovative and traditional steel sheeting systems;
- Sediment remediation;
- Temporary and mobile water treatment systems;
- Sludge solidification and soils stabilization;
- Chemical treatment/heavy metals fixation;
- Slurry wall and trench construction;
- Collection, recovery and treatment systems construction;
- Facilities decontamination and demolition; and
- Low level radiation remediation.

Past Project Experience

Onondaga Lake Dredging, Sediment Transportation and Capping Project, Syracuse, NY: Health and Safety Officer. Project requires Sevenson to provide design support of a dredging, sediment, capping, and transport system. Dredge volume estimated at 2.4 million CY of sediments. Capping will extend over approximately 600 acres. Approximately 2,100,000 CY of material will be removed using a hydraulic dredge and a mechanical excavator with a hydraulic clam bucket. Upon completion of dredging operations, Sevenson will perform backfilling and capping operations. Material barges will transport material to the backfilling and capping areas and an excavator with a clamshell bucket will be used to place the materials into a slurry system used to install the cap.

Roebling Steel Superfund Site, Roebling, NJ: Health and Safety Officer for a combination of mechanical dredging and traditional excavation of an estimated 250,000 CY of contaminated sediment from two areas. Sediment loaded onto material barges and pushed by tug to dock for unloading; transfer and placement into an onsite storage area. A cover system will be installed over dredged sediments. Restoration includes backfill of excavation areas; wetlands restoration; and shoreline stabilization with geo-fabric and revetment stone.

New Bedford Harbor Superfund Site, New Bedford, MA: Health and Safety Officer for the hydraulic dredging and mechanical dewatering of PCB contaminated harbor sediment. Design, install, operate and maintain a liquids/solids separation and water treatment system sized at 2,000 gpm. The WWT includes clarifiers, secondary settling, pH neutralization, and sand and carbon filtration. Desanding operation incorporated to minimize waste treatment and disposal. 1,300 cf of filter presses will be used.

Sub-Aqueous Cap, Lake Charles, LA: Health and Safety Officer for a pilot project which required Sevenson to place, test, and monitor a sub-aqueous cap in a refinery lagoon as well as evaluate capping methodologies at a second location. The lagoon cap was constructed in multiple lifts by placing granular material over the existing sediment surface via a custom built pneumatic unit. The initial lifts provided site-specific design information on the application of sub-aqueous capping containment technologies and enabled final development of a cap design.

Former Manufactured Gas Plant Remediation, Savannah, GA: Health and Safety Officer. Oversaw all aspects of Health and Safety Plan implementation during remediation of this former MGP site. The site was comprised of two Areas: Area 1 required the excavation, characterization, and disposal of PAH contaminated soils; Area 2 entailed the remediation of an active city roadway. Roadwork included relocation of utilities; stormwater sewer improvements; excavation,

characterization, and disposal of contaminated soils; and reconstruction of 2,000 lf of road. Installation of a sheet-pile cut-off wall was required adjacent to the roadway to prevent contamination migration.

Melton Valley Earthwork, Oak Ridge, TN: Health and Safety Officer for a project to provide labor and equipment to divert upgradient surface water in an area of Melton Valley. Work involved extensive site work and earthwork including clearing and grubbing 140 acres; development of a borrow source for materials to construct two multi-layer caps – one 40 acres, the other 65 acres; extensive cuts and fills were required for site draining and improvements.

Remediation and Restoration, McIntosh, AL: Health and Safety Officer for a project which required excavation and consolidation of waste material. Material was transferred to an onsite storage area and capped. All disturbed areas were restored to existing conditions.

Spring Valley Site, (Phases I and II), Washington, DC: Health and Safety Officer for the remediation of 25 residential properties contaminated with arsenic. Sensitivity of the project required implementation of a detailed Community Relations Plan. Extensive restoration work required.

Kress Creek, West Chicago, IL: Health and Safety Officer for a design build approach to the sediment remediation of Kress Creek and the West Branch of the DuPage River. Remedial work required the excavation, mechanical dredging, characterization, stabilization, and transportation and disposal of creek and river sediments, as well as sediments from banks and floodplain areas contaminated with thorium wastes. The site included approximately 1.5 miles of Kress Creek from the storm sewer outfall to the confluence of the creek and river.

Site Containment and Cap Construction, Kalamazoo, MI: Health and Safety Officer. This project involved the installation of 84,000 sf bentonite sealed sheet pile wall to depths of 40 feet; construction of a 22 acre multimedia cap; construction of a sediment retention basin; and installation of a groundwater collection system.

Landfill Closure, Parsippany, NJ: Health and Safety Officer for a major landfill construction project. Work included waste consolidation, earth moving, liner installation, and placement of a RCRA cap over 2 - 25 acre areas. Mr. Larson was responsible for the occupational health and safety of 60 Union operators and laborers.

Lagoon Closure, Perth Amboy, NJ: Health and Safety Officer for the closure of two impoundment totaling 11 acres. The impoundment sludge was pumped to treatment area for processing. Treatment included centrifugation and waste water treatment. Contaminated underlying soils not meeting closure guidelines were removed and placed in stockpiles for offsite disposal.

Mixed Waste Pond Closure, Lima, OH: Health and Safety Officer for the remediation of a mixed waste lagoon. Work included dewatering, excavation, waste stabilization, and landfill construction. The work was performed inside of an active chemical plant.

Appendix B

Site Specific Health and Safety Plan

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Site Safety and Health Plan

FOR

Syncon Resins Operable Unit 2 (OU 2) Superfund Site Remedial Activities

South Kearny, New Jersey
CONTRACT No.
W912DQ-15-D-3002
TASK ORDER: 0002

Prepared by:
SEVENSON ENVIRONMENTAL SERVICES, INC.
2749 Lockport Road
Niagara Falls, New York 14305

Paul Jung, CIH, CSP
Director of Health and Safety
Sevenson Environmental Services, Inc.

September 2016
Revision 1

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Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists'
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
APP	Accident Prevention Plan
CBC	Complete Blood Count
CFR	Code of Federal Regulation
cm	Centimeter
CO	Carbon Monoxide
CPR	Cardiopulmonary resuscitation
CY	Cubic yard
DOT MUTCD	Department of Transportation Manual on Uniform Traffic Control Devices
EM	Engineering Manual
EMS	Emergency Medical Service
FEV1	Forced Expiratory Volume in 1 second
FVC	Forced Vital Capacity
GFCI	Ground Fault Circuit Interrupter
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	Hazardous, Toxic and Radioactive Wastes
IDLH	Immediately Dangerous to Life and Health
LEL	Lower Explosive Limit
m	Meter
mg/m^3	milligram per cubic meter
MSDS	Material Safety Data Sheets
NIOSH	National Institute for Occupational Safety and Health
NJDEP	New Jersey Department of Environmental Protection
OSHA	Occupational Safety and Health Administration
O_2	Oxygen gas
OU-2	Operating Unit 2
PEL	Permissible Exposure Limit
PID	Photo Ionization Detector
PPE	Personal Protective Equipment
ppm	parts per million
ROPS	Roll Over Protective Structure
SHM	Safety and Health Manager
SMAC 24	Blood tests that gives your doctor important information about the current status of your kidneys, liver, and electrolyte and acid/base balance as well as of your blood sugar and blood proteins.
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
TBD	To Be Determined
TWA	Time Weighted Average
ug/m^3	microgram per cubic meter
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

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1.0 INTRODUCTION

Sevenson Environmental Services, Inc., (Sevenson) is under contract (W912DQ-15-3002 TO:0002) to EPA Region II and the U.S. Army Corps of Engineers to perform remedial action at the Syncon Resins OU2 Superfund Site, located in South Kearny, New Jersey. See Figure 1.

The work consists primarily of clearing and grubbing; construction of a staging area, temporary water treatment plant containment area and stockpile area; building and asbestos inspections; asbestos abatement; above ground storage tank (AST) inspection, removal and disposal; demolition of buildings, concrete slabs, foundations, tank holders, asphalt and rail spurs; underground storage tank (UST) removal; pre-excavation soil sampling; installation of steel sheet piling, temporary water treatment system and dewatering system; disassembly of Extraction Well C and valve box; removal of Extraction Well C, valve box and control panel; excavation; excavation dewatering; treatment of contaminated water; collection of post-excavation samples; contaminated material handling, waste characterization and offsite disposal at an approved facility; installation of monitoring wells, collection trench, Extraction Well C, valve box and control panel; and backfilling excavated areas, grading, and final restoration.

1.1 Plan Objective

The objective of this Site Safety and Health Plan (SSHP) is to define the requirements and designate protocols to be followed during remedial action at the Syncon Resins Superfund Site. Applicability extends to Sevenson personnel, Sevenson's subcontractors, and visitors inclusive of USACE personnel and representatives, engineers, and subcontractors. Work performed under this contract will comply with applicable Federal, State, and Local Safety and Occupational Health laws and regulations. Through careful planning and implementation of corporate and site-specific safety protocols, Sevenson will strive for zero accidents and incidents on the project.

1.2 References

During development of this SSHP, consideration was given to current safety and health standards as defined by the USACE, United States Environmental Protection Agency (USEPA), Occupational Safety and Health Administration (OSHA), and the National Institute for Occupational Safety and Health (NIOSH). Specifically, the following reference sources have been utilized in the development of this SSHP:

- OSHA Regulations: 29 CFR 1910 and 1926;
- USEPA Standard Operating Safety Guides, June 1992;
- NIOSH/OSHA/Coast Guard (USCG)/USEPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities";
- NIOSH Pocket Guide to Chemical Hazards, September 2005;
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values for Chemical Substances and Chemical Agents, 2014;
- Hazardous Waste Handbook for Health & Safety, Martin, Lippitti, Prothero, 1987;
- Handbook of Toxic and Hazardous Chemicals and Carcinogens, Sittig, 1985;
- USACE, Safety and Health Requirements, EM 385-1-1, 2014;
- USACE, Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities, ER 385-1-1, 01 July 2003;
- Accident Prevention Plan, Sevenson, July 2016.

- Technical Specifications Syncon Resins OU2 Superfund Site.

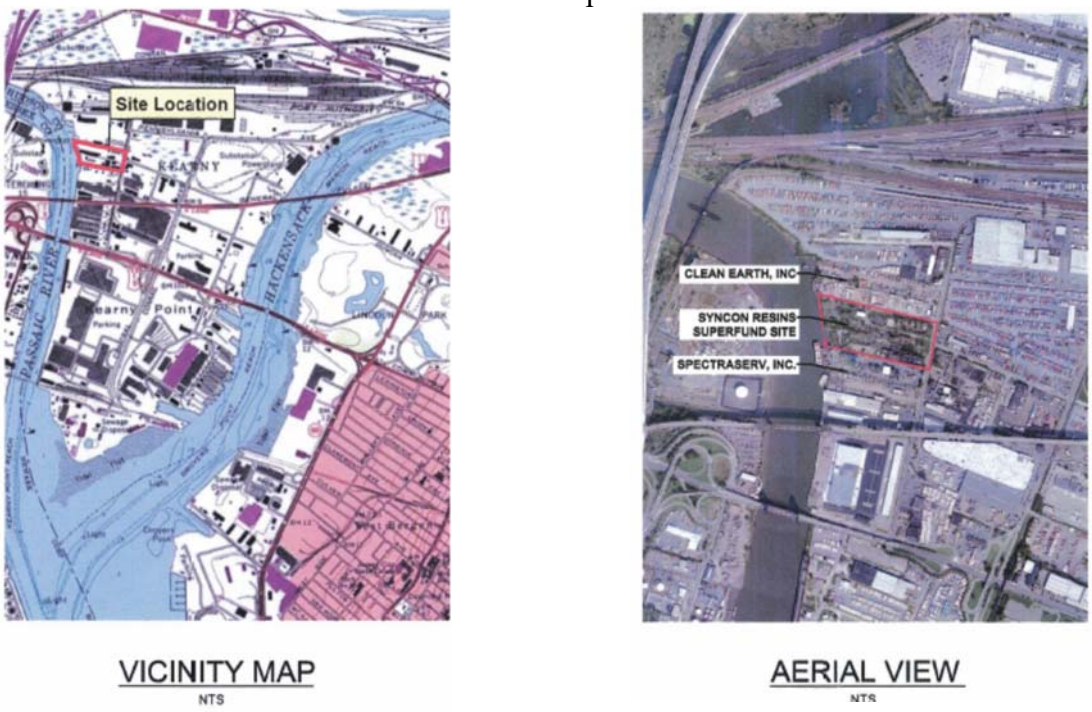
In addition to the above-referenced documents, Sevenson has established a comprehensive and realistic Safety, Health, and Environmental Program based on past experience, sound engineering practice, employee training, and enforcement of Safety and Health regulations to prevent unreasonable Safety and Health risks. For specific procedures/programs associated with this project, refer to the Sevenson Corporate Health and Safety Plan. A copy of the Sevenson Corporate Health and Safety Plan will be maintained on site.

1.3 Site Safety and Health Plan Revisions

The development and preparation of this SSHP has been based on site-specific information provided to Sevenson. Should any unforeseen hazard become evident during the performance of the work, the SSHO will bring such hazard to the attention of the Contracting Officer Representative both verbally and in writing for resolution as soon as possible. In the interim, Sevenson will take necessary actions to maintain safe working conditions in order to safeguard on-site personnel, visitors, the public, and the environment. Modifications of any portion or provision of the SSHP will be requested in writing from the Contracting Officer by the SSHO, and authorized in writing. No changes to the SSHP will be allowed until the item has been reviewed and an addendum prepared and approved by the Safety and Health Manager.

Refer to ***Figure 1 - "Site Map".***

Figure 1 –
Site Map



1.4 Chemicals of Concern

Data provided in the ROD, identifies the maximum soil concentrations. The data from this table was used to determine the exposure limits set in this document.

The predominant contaminates detected are volatile organic compounds (VOCs) poly aromatic hydrocarbons (PAHs), lead, pesticides, and polychlorinated biphenyls (PCBs). Chemical Information Sheets for these contaminants of concern can be found in the **APP *Appendix C- Chemical Information Sheets***.

Operational chemicals may be brought to the project-site for use in activities supporting the remedial activities. These chemicals are used for fuels in operating heavy equipment. The use of operational chemicals is regulated by OSHA under the 2012 Global Harmonization System Hazard Communication Standard (29 CFR 1910.1200). Safety Data Sheets (SDSs) for operational chemicals are kept on file in the project office trailer. An inventory list of the anticipated operational chemicals (Hazardous Chemical Inventory List) for use at the Site will be maintained at the site and updated as new material is received.

2.0 HAZARD RISK ANALYSIS

Uncontrolled hazardous material sites can cause a multitude of health and safety concerns, any of which can result in serious injuries and/or illnesses of workers. Some hazards are a function of the physical, biological, or chemical nature of the site itself. Others are a direct result of the construction being done. Based upon the information provided to Sevenson regarding the primary historical uses of the property and the knowledge of the current conditions, the overall Safety and Health hazard assigned to the contemplated activities at the Site is determined to be low to moderate.

Work includes demolition of site structures, excavation of contaminated soils, and site restoration. All aspects of the work will be described in the Remedial Action Work Plan submitted under a separate cover.

Sevenson will develop and submit an Activity Hazard Analysis (AHA) for major phases of work of the remedial action prior to the Preparatory Phase meeting for that phase of work. A major phase of work is defined as an operation involving a type of activity presenting hazards not experienced in previous operations, or where a new subcontractor or work crew is to perform the specified phase. The analysis will define the activity being performed and identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard. An AHA will also be prepared when new tasks are added, job situations change, or when it becomes necessary to alter safety requirements. Work will not proceed on a particular task/work area until the AHA has been reviewed and a preparatory meeting has been conducted. General hazards associated with remedial activities are described below.

A preparatory meeting will be conducted by the SSHO for site personnel prior to their initiating any new or differing site activities. At the preparatory meeting, the SSHO will ensure that site personnel are knowledgeable of the SSHP and understand the hazards and controls of the activity to be performed.

AHAs will be prepared for the features of work to be completed. The AHAs will be submitted prior to the Preparatory Phase meeting and shall be discussed in length at this meeting. The AHA shall be modified as needed as work progresses and new hazards are identified.

3.0 ORGANIZATION AND RESPONSIBILITIES

While the Sevenson Safety and Health Department directs and supervises the overall Safety, Health and Environmental Program, the responsibility for Safety and Health extends throughout our organization from top management to every employee. For this reason, it is each person's duty to notify the management personnel if a hazardous condition is identified and to make a "stop work" call when the condition represents an immediate danger to life or health, until the SSHO can make a further determination. The following are the Sevenson project personnel positions and responsibilities for this project. Refer to ***Figure 2 – "Organizational Chart"***.

- **Corporate Project Manager:** Alfred LaGreca
- **Project Manager:** Steve Gillespie
- **Project Superintendent:** Perry Novak
- **Safety and Health Manager:** Paul Jung, CIH, CSP
- **Certified Industrial Hygientist** Paul Jung, CIH, CSP
- **Occupational Physician:** Dr. Peter Greaney
- **Site Safety and Health Officer:** Davis Raver, CHST
- **Alternate SSHO:** Dave Larson, Dave Goeckler, Wyatt Beougher, Ron Scarborough, Larry Colburn
- **First Aid/CPR Qualified Personnel:** Davis Raver, Perry Novak
- **Subcontractors:** The subcontractors for the following definable features of work are not know at this time, but additional information will be submitted and amended to the APP for acceptance prior to the start of any activities listed.

3.1 Corporate Project Manager

The Corporate Project Manager directs and manages all aspects of the project in compliance with all contract and technical requirements. The Corporate Project Manager will monitor and control all subcontractors to achieve optimal performance and ensure safe, high quality performance that complies with all contract requirements.

3.2 Project Manager

The Project Manager reports to the Corporate Project Manager. His responsibilities include coordinating project activities with the Project Superintendent and serving as the primary liaison with the Contracting Officer Representative. The Project Manager prepares all correspondence, submittals, and other documentation required for the project; coordinates schedules; and administers the contract. The Project Manager prepares reports and documentation, supervises inspection personnel, and reviews and approves procurement and subcontract activities.

3.3 Project Superintendent

The Project Superintendent supervises and coordinates all construction crew activities relating to site preparation, excavation, shipping, and restoration. The Project Superintendent has the operational responsibility for the implementation of the SSHP on this project. This includes establishing an attitude of concern for safety matters by initiating prompt corrective action of hazards brought to his attention, and ensuring that the project safety and health requirements are initiated and observed by all project personnel. The Project Superintendent is the Competent Person for the operations at the site.

The Superintendent plans and requires that all work be performed in compliance with this SSHP, the Sevenson Corporate Health and Safety Plan and/or the client's safety program including all applicable local, state, and federal regulations. He will impress upon all subcontractors' supervisory personnel a sense of responsibility and accountability of each individual to maintain a safe workplace and to work in a safe manner.

3.4 Safety and Health Manager (SHM)

Responsible to the Corporate Project Manager, Paul Jung, CIH, CSP, the Safety and Health Manager formulates, administers and coordinates programs for the company to reduce the risk of loss due to

employee injury, regulatory non-compliance, general liability, fire, theft, or damage. The Safety and Health Manager will develop written detailed policies and procedures covering elements in the Safety, Health and Environmental Program. The Safety and Health Manager's work history/resume is in Appendix A. The Safety and Health Manager will:

- Be responsible for the development, implementation, oversight, and enforcement of the SSHP.
- Sign and date the SSHP prior to submittal
- Conduct initial site-specific training.
- Be present onsite during the first day of remedial activities and at the startup of each new major phase.
- Visit the site as needed and at least once per field event to audit the effectiveness of the SSHP and be available for emergencies.
- Provide onsite consultation as needed to ensure that the SSHP is fully implemented.
- Coordinate any modifications to the SSHP with the Site Superintendent, the SSHO, and the Contracting Officer's Representative.
- Provide continued support for upgrading/downgrading the level of personal protection.
- Be responsible for evaluating air monitoring/sampling data and recommending changes to engineering controls, work practices, and Personal Protective Equipment (PPE).
- Review accident reports and results of daily inspections.
- Serve as a member of the Sevenson's quality control staff.
- Conduct quarterly Site inspection and report findings to USACE during the period of work activities onsite.

3.5 Certified Industrial Hygienist (CIH)

The Certified Industrial Hygienist for this project will be Paul Jung. The CIH will assist in the development, implementation, and enforcement of the SSHP, provide consultation, review air monitoring data; and assist in safety audits and document review. Visit the site as needed and at least once per quarter for the duration of activities.

3.6 Occupational Physician

Under the direction of the Safety and Health Manager, the Occupational Physician will be responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1910.120(f), and 1926.53(f). The Occupational Physician will provide the Safety and Health Manager with a written opinion of each employee's ability to perform hazardous remedial work.

3.7 Site Safety and Health Officer (SSHO)

The SSHO for this project is Mr. Davis Raver, CHST, his work history/resume and certifications are in Appendix A. Under the direction of the Safety and Health Manager, the SSHO will be responsible for the implementation of this SSHP and for the daily coordination of safety activities with the Project Superintendent and the Contracting Officer Representative to ensure that the planned work objectives reflect adequate safety and health considerations. The SSHO will submit to the Contracting Officer Representative Certificates of Worker/Visitor Acknowledgements for site personnel prior to initial entry onto the site. He will maintain a complete copy of this plan (and its supplements and addenda) at the site during all field activities and assure that all workers and visitors are familiar with it. He will perform site-specific training and briefing sessions for employee(s) prior to the start of field activities at the site

and a briefing session each day before starting work. He will ensure the availability, proper use and maintenance of specified personal protective equipment, decontamination equipment, and other safety and health equipment. He will maintain a high level of safety awareness among team members and communicate pertinent matters to them promptly. The SSHO will:

- Assist and represent the Safety and Health Manager in on-site training and the day-to-day on-site implementation and enforcement of the accepted SSHP.
- Be assigned to the site on a full time basis for the duration of field activities excluding site grading, filling, paving, site restoration, and demobilization. The SSHO shall be at the site on a part-time basis during these activities. The SSHO may have other duties besides safety and health related duties, but health and safety duties shall come first. If operations are performed during more than one shift per day, an SSHO shall be present for each shift.
- Have the authority to ensure site compliance with specified safety and health requirements, Federal, state and OSHA regulations; and all aspects of the SSHP. This includes, but is not limited to, activity hazard analyses, air monitoring/sampling, use of PPE, decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls; the emergency response plan, confined space entry procedures, spill containment program, and preparation of records. This will be accomplished by performing a daily safety and health inspection and documenting results on the Daily Safety Log.
- Have authority to stop work activities if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.
- Consult and coordinate any modifications to the SSHP with the Safety and Health Manager, the Site Superintendent, and the Contracting Officer's Representative.
- Serve as a member of the Sevenson's quality control staff on matters relating to safety and health. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
- Conduct accident investigations and prepare accident reports. ENG Form 3394 USACE Accident Investigation form will be filled out and submitted to USACE Safety Officer for pen and ink changes, and final submitted within 5 working days.
- Review results of daily quality control inspections and document safety and health findings in the Daily Safety Log. Prepare and submit Weekly Safety Reports.
- Coordinate with Site Management and the Safety and Health Manager, recommend corrective actions for identified deficiencies, and oversee the corrective actions.
- Maintain a deficiency tracking log per EM 385-1-1, paragraph 01.A.12(d), on a health and safety bulletin board as specified in EM 385-1-1, paragraph 01.A.06.
- Maintain applicable safety reference material on the job site.
- Participate in initial pre-entry briefing and conduct periodic safety briefings.

3.8 Alternate Site Safety and Health Officer

The alternate Site Safety and Health Officer will assume all responsibilities of the SSHO in the event of his absence.

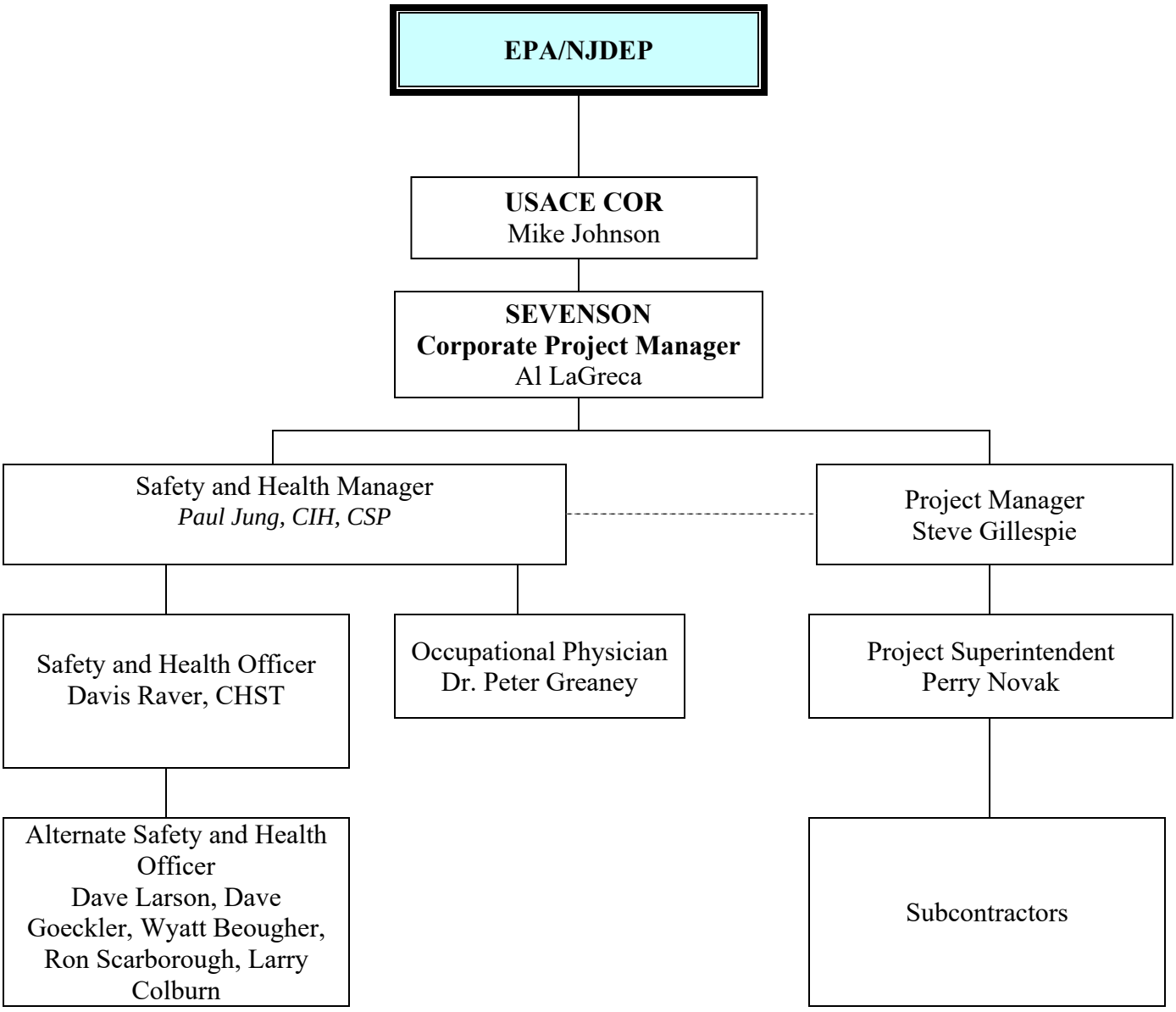
3.9 Subcontractors

Subcontractors utilized during remedial activities at the Site are covered by this SSHP and will be provided a copy of the plan prior to commencing work. The Sevenson SSHO will verify that

subcontractor employee training, medical clearance, and respirator fit test records are current and will monitor and enforce compliance with the established plan and standard operating procedures. As with all site personnel, subcontractors will be briefed on the provisions of this plan and attend all daily toolbox and weekly safety meetings.

Sevenson will continually monitor a subcontractor's safety performance. Sevenson will observe subcontractors for hazards or unsafe practices that are both readily observable and occur in common work areas. The SSHO will note subcontractor work practices on the daily Safety and Health report. If non-compliance or unsafe conditions or practices are observed, the subcontractor safety representative will be notified and corrective action will be required. The subcontractor will determine and implement necessary controls and corrective actions. If repeat non-compliance/unsafe conditions are observed, the subcontractor will be required to stop affected work until adequate corrective measures are implemented.

Figure 2 –
Organizational Chart



4.0 SAFETY AND HEALTH TRAINING

Consistent with OSHA's 29 CFR 1910.120 regulation covering Hazardous Waste Operations and Emergency Response, all Site personnel who will be performing remedial activities, intrusive sampling, emergency response operations, or come in contact with contaminated material are required to be trained in accordance with the standard.

4.1 General Hazardous Waste Operation Training

Prior to arrival on-site, Sevenson will be responsible for certifying that the employees meet the requirements of pre-assignment training, consistent with OSHA 29 CFR 1910.120 paragraph (e)(3). Sevenson will provide documentation certifying that each general Site worker has received a minimum of 40 hours of instruction off site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor. All personnel must also receive 8 hours of refresher training annually. At no time should anyone be working on-site without the minimum training requirements. Consistent with OSHA 29 CFR 1910.120 paragraph (e)(4), individuals designated as Site Supervisors require an additional 8 hours of training. A certificate of Worker/Visitor Acknowledgement will be completed and submitted for each site worker and visitor who will enter the contamination reduction zone, and/or exclusion zone.

4.2 Preparatory Meetings

Preparatory meetings will be conducted by the SSHO for site personnel prior to their initiating any new or differing site activities. At the Preparatory meetings, the SSHO will ensure that site personnel are knowledgeable of the SSHP and understand the hazards and controls of the activity to be performed (review Activity Hazard Analysis).

4.3 Site-Specific Training

All personnel working at the Site during remedial activities will review this SSHP with the SSHO. Personnel will sign an acknowledgment form to document their review and agreement to comply with the provisions of the SSHP. All visitors must sign the visitor's log and wait in the Sevenson field office for a briefing before entering the Site.

The SSHO will be responsible for ensuring Site visitors are trained in the hazard associated with the Site, to explain emergency procedures, and instruct them in the use of protective gear required during the visit. Visitors meeting requirements of HAZWOPER may be allowed in the Exclusion Zone if conditions permit and if escorted by the SSHO.

4.3.1 Initial Session

Prior to commencement of onsite field activities, all site employees will attend a site-specific safety and health training session. This session will be conducted by the SSHO or designee, to ensure that personnel are familiar with the requirements of this Site-Specific Safety and Health Plan. The initial session will consist of the contents of this SSHP and specific procedures developed for the project. The SSHO or designee will also provide initial site-specific training for replacement employees.

As a minimum the site-specific training will include:

- Explanation of the APP and SSHP.
- Health and Safety Personnel and Organization.
- Special attention to signs and symptoms of overexposure to known and suspected site contaminants.
- Health effects of site contaminants.
- Air monitoring description.

- Physical hazards associated with the project.
- Selection, use, and limitations of available safety equipment and proper procedures for its use.
- Personal hygiene and decontamination.
- Respirator fit testing.
- PPE fitting to determine proper size for individuals.
- Site rules and regulations.
- Work zone establishment and markings.
- Site communication and the "Buddy System".
- Emergency preparedness procedures.
- Equipment decontamination.
- Medical monitoring procedures.
- Review applicable Sevenson Standard Operating Procedures.
- Site Specific Hazard Communication.

4.3.2 Periodic Sessions

Periodic training will be provided at least weekly and prior to each change of operation. The training will address safety and health procedures, work practices, any changes to SSHP, review activity hazard analysis, work task or schedule, results of previous week's air monitoring, and review of safety discrepancies and accidents.

4.4 Training for Hazardous Materials Shipments

Training for hazardous materials shipments will be provided to site personnel in accordance with 49 CFR 172 Subpart H. This training will be task specific for any employee who handles, prepares, offers, or accepts hazardous materials. This training is required initially and every 3 years after that, unless there are changes in rules, regulations, manifests, or procedures.

4.5 Safety Meetings

A well-ordered flow of information is essential to a good safety program. Sevenson, through a program of safety meetings at all levels, intends to accomplish the goals of safety awareness, education, and participation.

The SSHO will conduct daily safety meetings with ALL on-site personnel. An opportunity will be provided for employees to voice safety-related concerns. The SSHO will submit a synopsis of each meeting including topics covered, safety-related concerns, action items to be addressed, status of previous items, and a signed attendance list.

4.6 Hazard Communication Training

OSHA's standard for hazard communication requires that all workers be informed of potentially hazardous materials used in their work area. Sevenson provides employees with information and training on hazardous chemicals at their work site at the time of their initial assignment, annually, and whenever a new chemical is introduced into their work site that could present a potential hazard. Personnel are briefed on the general requirements of the OSHA hazard communication standard and duty-specific hazards by their immediate supervisor before they begin any duties on the work site. Personnel transferred from another site are also briefed on the duty-specific hazards by their immediate supervisor before they begin any duties on the work site.

4.7 Excavation/Trenching Competent Person

Supervisory and other essential personnel engaged in excavation activities are required to complete Competent Person Training. This training provides knowledge about soil analysis and classification, use of protective systems, and the requirements of Excavation Standards. The Site Superintendent and the SSHO are designated Excavation/Trenching Competent Persons for this project.

4.8 First Aid/CPR Training

At least two site personnel will be required to complete first aid and cardiopulmonary resuscitation (CPR) training and receive the appropriate certification. First aid and CPR certification is renewed bi-annually. All first aid/CPR training is American Red Cross, American Heart Association approved or in accordance with OSHA standards. Additionally, First Aid/CPR qualified personnel will have received blood borne pathogen training as required by 29 CFR 1910.1030. A list of all first aid and CPR/AED qualified people will be posted on the safety bulletin board. This list shall be maintained and reposted as information is modified.

5.0 PERSONAL PROTECTION EQUIPMENT

This section provides an outline of the PPE and guidelines that will be implemented to minimize chemical, physical, and biological exposures and accidents during remedial activities. Where engineering controls and job hazard analyses do not eliminate all job hazards, employees will (where appropriate) wear PPE.

These include items such as, hard hats, face shields, safety goggles, glasses, hearing protection, foot guards, gloves, reflective vests, etc. The SSHO will ensure that equipment selected will meet the following requirements:

- It will be appropriate for the particular hazard.
- It will be maintained in good condition.
- It will be properly stored when not in use to prevent damage or loss.
- It will be kept clean, fully functional, and sanitary.
- Must meet all applicable American National Standards Institute (ANSI) standards.

Personal clothing and jewelry can present additional safety hazards. Supervisors will ensure that workers wear appropriate clothing, which will not interfere with the PPE. All PPE will be selected in accordance with 29 CFR 1910.132. Sevenson will provide proper PPE to all employees. All protective clothing will be properly used, stored, selected, and maintained.

Government personnel will be supplied with all required personal protective equipment (excluding air-purifying negative-pressure respirators and safety shoes, which will be provided by the individual visitors). Sevenson will provide basic training in the use and limitations of PPE to government personnel.

5.1 PPE Hazard Assessment

Selection of the appropriate PPE is a complex process, which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards, routes of potential exposure to employees (inhalation, skin absorption, ingestion, and eye or skin contact), and the performance of the PPE materials (and clothing seams) in providing a barrier to these hazards. The amount of protection provided by PPE is material-hazard specific. That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found that will provide continuous protection from the particular hazardous substance. In these cases, the breakthrough time of the protective material should exceed the work duration.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases, layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits, or equipment.

The following are guidelines, which Sevenson uses to select PPE. Based on the site characterization and analysis performed during the remedial activities, a combination of PPE has been selected from the different protection levels (i.e., A, B, C, D Modified, or D) as being suitable to the hazards of the work to be performed. Section 3.0 of this plan characterizes and analyzes the chemical, physical, and biological hazards; specific tasks/operations; routes of exposure; and concentrations of contaminants. Characteristics, capabilities, and limitations are summarized in this section.

- **Level A:** The highest level of skin, eye, and respiratory protection (Level A PPE is not anticipated on this project).
- **Level B:** Should be worn when the highest level of respiratory protection is needed, but a lower level of skin protection is needed, compared to that of level A.
- **Level C:** Should be worn when the criteria for using air-purifying respirators are met, and a lesser or the same level of skin protection is needed, compared to that of level B.
- **Level D Modified:** Should be worn when respiratory protection is not warranted but minimal dermal protection is necessary.
- **Level D:** Level D provides minimal protection against chemical hazards. A work uniform consisting of coveralls and/or long pants and sleeves may be worn in any area without the potential for significant respiratory or skin contact hazards.

Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound work practices.

5.1.1 Head Protection

All personnel will wear a hard hat that meets the requirements and specifications in ANSI Safety Requirements for Industrial Head Protection Z89.1. Exceptions to this requirement are personnel in the site office and rest and eating areas.

5.1.2 Hand Protection

Outer gloves used on the Site for remedial activities will be either chemical resistant or general purpose. The appropriate glove will be determined by the SSHO for a specific work task. Chemical resistant gloves will be selected using appropriate chemical degradation guides. Leather work gloves will be worn when work activities require the handling of sharp and rough-surfaced objects.

Welder's gloves or any other special type of gloves are considered outer gloves and are to be worn over inner gloves. These special outer gloves will be stored on-site and will be disposed of properly as PPE waste. Inner gloves will always be chemical resistant, will be selected using appropriate chemical degradation guides and will be disposed of as PPE waste.

5.1.3 Eye/Face Protection

Contact lenses are allowed in the Exclusion Zone and Contamination Reduction Zone unless otherwise determined by the SSHO that a chemical SDS prevents their use. Eye/face protection will be worn by all personnel in the Contamination Reduction Zone and Exclusion Zone. Double eye protection will be required when power-washing equipment during decontamination. All eye/face protection provided will be ANSI Z87 approved.

5.1.4 Footwear

Footwear will be steel/composite-toed safety boots and will be worn for all field activities. Chemical-resistant outer boot covers are to be worn in the Exclusion Zone, Contamination Reduction Zone. Boot racks will be provided in the Contaminated Reduction Zone for drying of outer boots.

5.1.5 Respiratory Protection

To control and or minimize the threat of occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective of this program will be to prevent atmospheric contamination. This will be accomplished as far as feasible by accepted engineering control measures (for example, dust suppression). When effective engineering controls are not feasible, or while they are being instituted, appropriate respiratory protection will be used. A respiratory protection program will be implemented that is compliant to the requirements of 29 CFR 1910.134, "Respiratory Protection." Respiratory protection equipment will be NIOSH-approved, and respirator use will conform to ANSI Z88.2.

Respirators will be provided when such equipment is necessary to protect the health of the employee. Sevenson will:

- Provide the respirators, which are applicable and suitable for the purpose intended.
- Be responsible for maintaining a written Respiratory Protective Program in accordance with 29 CFR 1910.134. The employee will use the provided respiratory protection in accordance with instructions and training received.
- Respirators will be selected on the basis of hazards to which the worker is exposed.
- The user will be instructed and trained in the proper use of respirators and their limitations.
- Respirators will be regularly cleaned and disinfected.
- Respirators will be stored in a convenient, clean, and sanitary location.
- Respirators used routinely will be inspected during cleaning. Worn or deteriorated parts will be replaced. Respirators for emergency use, such as self-contained devices, will be thoroughly inspected at least once a month and after each use.
- Appropriate surveillance of work area conditions and degree of employee exposure or stress will be maintained.
- There will be regular inspections and evaluations to determine the continued effectiveness of the program.
- Employees will not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. A physician will determine whether an individual is physically fit to wear a respirator. The physician's clearance allows the worker to don a respirator and work in conditions of high ambient temperatures. Heat stress will be closely monitored by the SSHO.

Each respirator will be individually assigned and not interchanged between workers without cleaning and sanitizing. The cartridges/filters will be changed at the first sign of breakthrough based on contaminant warning properties or if the user experiences excessive breathing resistance. The SSHO will make final determination of the frequency of respirator cartridge/filter change-out. Respirators will be cleaned and stored in an uncontaminated atmosphere after each use. Used cartridges will be disposed of with spent PPE. Self-contained breathing apparatus/supplied-air respirators will be inspected before and after use by the user and at least once monthly by the SSHO.

All employees working at the Site during remedial activities who have the potential of wearing a respirator will be fit-tested to ensure they utilize the proper size respirator. Sevenson will arrange for fit testing. The fit test is conducted according to the manufacturer's suggestions and will be quantitative. A quantitative fit test machine will be used to perform the test. A fit factor of 500 must be obtained by

the wearer in order to have successfully pass the fit test As per OSHA regulations, personnel that are unable to pass a fit test will not enter a work area when respiratory protection is required. In addition, facial hair is prohibited from the respirator seal area. Any person with facial hair will not be permitted to enter a work area where respiratory protection is required, regardless of the fit test results. Documentation of the fit testing will be maintained on-site.

5.2 Levels of Protection

The level of protection must correspond to the level of hazards known or suspected for the specific work activity.

5.2.1 Level A

Level A equipment, used as appropriate, is as follows:

- Positive pressure, full face piece, self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA (NIOSH-approved)
- Fully encapsulating suit (Tychem, butyl rubber)
- Outer gloves: neoprene or nitrile
- Inner gloves: latex or nitrile
- Chemical resistant or disposable overboots.
- Steel/composite-toed safety boots
- Hard hat

5.2.2 Level B

Level B equipment, used as appropriate, is as follows:

- Positive pressure, full face piece, self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA (NIOSH-approved)
- Disposable coverall (Tyvek, Polycoated Tyvek or Saranex)
- Outer gloves: neoprene or nitrile
- Inner gloves: latex or nitrile
- Chemical resistant or disposable overboots.
- Steel/composite-toed safety boots
- Hard hat

5.2.3 Level C

Level C equipment, used as appropriate, is as follows:

- Full-face, air purifying, cartridge-equipped respirators (NIOSH-approved) utilizing P-100 (HEPA) and/or organic vapor filters (half-face if approved by SSHO). Cartridges and/or filters must be replaced as needed and, as a minimum, changed weekly
- Disposable coverall (Tyvek or Polycoated Tyvek)
- Outer gloves: leather, cotton, neoprene or nitrile
- Inner gloves: latex or nitrile
- Chemical resistant or disposable overboots
- Steel/composite-toed safety boots
- Hard hat
- Safety glasses (if half-mask is utilized)
- Splash guards (worn during high pressure washing activities)

5.2.4 Modified Level D

Modified Level D equipment, used as appropriate, is as follows:

- Disposable coveralls – Tyvek or Polycoated or equivalent for wet work (equipment decontamination) or as required
- Outer gloves – leather, cotton, nitrile as required
- Inner gloves – nitrile surgical with cotton liner (cotton liner optional)
- Boot covers – Tyvek or equivalent
- Outer boots – rubber or latex disposable
- Safety boots
- Hard hat
- Reflective vests
- Safety glasses – with face shield as required

1. SSHO shall determine the need for upgrade or downgrade of PPE levels based on a conservative interpretation of information provided by air monitoring data and other appropriate information.
2. The SSHO's Daily Safety and Inspection log will list protective ensemble(s) in use for each task.

5.2.5 Level D

Level D equipment, used as appropriate, is as follows:

- Work uniform (Long pants and Shirt)
- Reflective vests
- Hard hat
- Steel/composite-toed safety boots (with disposable over boots, as required)
- Safety glasses
- Leather or heavy cloth gloves (as needed)

Air monitoring using direct-reading instruments and personal air sampling will be performed to determine if an upgrade or downgrade from initial PPE levels is warranted. All decisions on the level of protection will be based upon a conservative interpretation by the SSHO of the information provided by air monitoring results, environmental results, and other appropriate information.

6.0 MEDICAL SURVEILLANCE PROGRAM

The Medical Surveillance Program is designed to track the physical condition of employees on a regular basis as well as survey pre-employment or baseline conditions prior to potential exposures. The Medical Surveillance Program is a part of the overall Sevenson Safety and Health program.

6.1 Baseline Medical Monitoring

Each employee must receive a baseline physical, which can be part of an annual medical monitoring program, prior to being permitted to enter the Exclusion Zone or Contamination Reduction Zone. The content of the physical has been determined by Sevenson's Occupational Physician as suggested by NIOSH/OSHA/USCG/EPA's Occupational Safety & Health Guidance Manual for Hazardous Waste Site Activities. The minimum medical monitoring requirements for work at the Site are as follows:

- Complete medical and work histories
- Physical examination
- Pulmonary function tests (FVC and FEV1)
- Blood chemistry (CBC & SMAC 24)
- Urinalysis with microscopic examination
- Audiometric Testing

- Eye examination and visual acuity
- Chest X-Ray (as directed by the Occupational Physician)
- Electrocardiogram (as directed by the Occupational Physician)
- Other Biological testing as prescribed by the Occupational Physician
- Serum Lead
- Zinc Protoporphyrin

The medical surveillance provided to the employee includes a judgment by the medical examiner of the ability of the employee to use either positive- or negative-pressure respiratory protection equipment. Any individual found to have a medical condition, which could directly or indirectly be aggravated by exposure to these site contaminants, will not be employed for the project. Individuals not capable of satisfying the project requirements for wearing respiratory protection equipment will be evaluated on a case-by-case basis prior to being employed. A copy of the medical examination is provided to the employee.

The employee will be informed of any medical condition(s) that would result in work restriction or that would prevent him from working at hazardous waste sites.

6.2 Periodic Monitoring

In addition to a baseline physical, all employees require a physical every 12 months unless the advising physician believes a shorter interval is appropriate. The Occupational Physician has prescribed an adequate medical evaluation, which fulfills OSHA 29 CFR 1910.120 requirements. The pre-assignment medical outlined above is applicable.

All personnel working on the Site that enter an active Exclusion or Contamination Reduction Zone will verify currency (within 12 months) with respect to medical monitoring. Sevenson will obtain a copy of the physician's written opinion detailing the employee's ability to perform hazardous waste site work.

At termination of employment or reassignment to an activity or location that does not represent a risk of exposure to hazardous substances, an employee may be required to take an exit physical. If his/her last physical was within the last 6 months, the advising medical consultant has the right to determine adequacy and necessity of an exit exam.

6.3 Exposure/Injury/Medical Support

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and physical testing. Depending upon the type of exposure, it is critical to perform follow-up testing within 24-48 hours. It will be up to the occupational health physician to advise the type of test required to accurately monitor for exposure effects.

Any employee, who develops a loss time illness exceeding one working day, or injury during the period of the contract, must be evaluated by the occupational health physician. A written statement indicating the employee’s fitness, signed by the occupational physician must be submitted prior to the employee entering the work site.

6.4 Medical Records

The results of medical testing and full medical records will be maintained in accordance with 29 CFR Part 1910.1020. A copy of the medical certification will be kept on the Site for each person entering the Contamination Reduction Zone and Exclusion Zone.

7.0 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

This air-monitoring plan will serve to outline procedures to identify and quantify airborne contaminants at the Site. Both real-time monitoring and air sampling will be conducted throughout the duration of the project to establish the maximum levels of personal protection required, as well as to verify that worker exposure levels and respiratory protection are adequate. Perimeter Air Monitoring Plan has been prepared under separate cover and provides information pertaining to additional air monitoring to be performed for the protection of the public and the environment.

Available site information indicates that the primary concerns with respect to contamination at the site are related to inhalation of particulates. As a result, engineering controls will be utilized to the maximum extent possible to control the production of dusts during the project. Engineering controls may include the use of tarps or coverings, water misting or dust control additives. A portable meteorological station will be installed in conformance with the EPA Ambient Monitoring guidelines for the measurement of wind speed, wind direction ambient air temperature, atmospheric pressure, humidity, solar insulation, and precipitation. The station will be installed in an area relatively free of trees and houses. The station will include a continuous readout temperature gauge and a rainfall gauge and will produce a 24-hour average figure for each parameter so that the weather influences on the air samples can be characterized. In addition, visual wind direction indicators will be established in a central location at each active work area. Meteorological monitoring results will be documented in the daily safety log.

7.1 Real-Time Air Monitoring

7.1.1 Organic Vapor Monitoring

During the remedial activities, organic vapor levels will be monitored initially and every 60 minutes during intrusive activities with a Photo Ionization Detector (PID) set at the appropriate span setting and equipped with a 10.6 eV probe or equivalent device (a copy of the PID Operator's Manual will be kept on-site). The frequency may increase or decrease by the SSHO based on site conditions. Monitoring for organic vapor concentrations will consist of measurements taken within 10 feet (downwind) of each active work area. Real-time air monitoring equipment calibration will be performed in accordance with the manufacturer's recommendation prior to field use. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration procedures for all air monitoring devices will be maintained on site. Refer to ***Table 3 – "Operational Action Levels"***

7.1.2 Combustible Gases/Carbon Monoxide/Oxygen Levels/Hydrogen Sulfide

A Multi-RAE or equivalent Portable Gas Monitor will be utilized to monitor for explosive, oxygen enriched/deficient atmospheres and concentrations of VOCs during excavation and tank removal operations within 10 feet of active work areas. A copy of the instrument Operator's Manual will be kept on-site. The Portable Gas Monitor will be utilized for all intrusive remediation activities and activities where the potential for disruption of utilities exists. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration procedures for all air monitoring devices will be maintained on site.

7.1.3 Particulate Monitoring

Real-time air monitoring for dust will be performed within 10 feet (downwind) at appropriate areas adjacent to excavation and compaction. Air monitoring will be performed at the work area using a Dust Trak 8520 or equivalent PM_{10} Particulate Monitor. Real-time air monitoring equipment calibration will be performed in accordance with the manufacturer's recommendation prior to field use. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration procedures for all air monitoring devices will be maintained on site.

7.2 Personal Air Sampling

In addition to the real-time monitoring performed during excavation/dredging and material handling activities, the personal air-monitoring program will provide for the determination of worker's airborne exposure levels to arsenic. Such a determination will be made from laboratory analysis of air samples collected from workers during an 8-hour work shift. The selection of the worker to be monitored for occupational exposure will be done by the SSHO. This decision is based on his professional judgment for the physical characteristics of the job and contamination levels in each work area. Personal sampling will be conducted in a manner representative of exposure to workers at those locations or jobs where the potential for maximum exposure is predicted. Personal air monitoring results will be used to verify personnel exposure during the project. Refer to ***Table 1 – "Personal Air Monitoring"***

Table 1
Personal Air Monitoring

Contaminant	Task/Activity	Type of Sample	Sampling Method	Analysis Method
Lead	Excavation and Handling of Contaminated Materials	Breathing Zone	Personal	NIOSH 7300
BTEX compounds and Naphthalene	Excavation of VOC Contaminated Materials	Breathing Zone	Personal	NIOSH 1501 (badges)
PCBs	Excavation of PCB Contaminated Materials	Breathing Zone	Personal	NIOSH 5503
Pesticides	Excavation of Contaminated Materials	Breathing Zone	Personal	NIOSH 5510
Respirable Dust and Crystalline Silica: Quartz, Cristobalite, Tridymite	Building demolition; Destructive slab and foundation removal	Breathing Zone	Personal	NIOSH 0600/7500/modified OSHA ID-142

Personnel exposures will be evaluated by sampling in accordance with the various NIOSH Method listed in Table 1 via personnel sampling pumps or passive badges. To quantify worker exposures, the samples are collected in the personal breathing zone of workers for a minimum duration of 7 hours. The SSHO will designate at least one person per work shift in each active work area to wear the sampling device. In general, samples will be collected from those workers where site conditions represent the highest potential for occupational exposure.

7.3 Perimeter Air Monitoring

Ambient air monitoring for VOCs and PM10 will be performed during remediation activities at the Site. A Perimeter Air Monitoring Plan has been developed under separate cover and shall be used to supplement the SSHP.

7.4 Operational Action Levels

A decision-making protocol for an upgrade in levels of protection and/or withdrawal of personnel from an area based on atmospheric hazards is outlined in ***Table 2 – "Operational Action Levels".***

7.5 Noise

Noise is generated during remedial activities in such operations as transportation of materials and operation of heavy construction equipment. Noise has been defined as unwanted sounds. The human ear can tolerate a certain amount of sound without any harmful effects. Personnel will be provided protection against the effects of hazardous noise exposure whenever sound-pressure levels exceed 85 dB(A) steady-state expressed as a time-weighted average (TWA) or 140 dB(A) impulse in accordance with EM 385-1-1 05.C.01.

The USACE standard allows 90 dB (A) for a full 8 hours and for a lesser time when the levels exceed 90 dB (A). It is usually safe to assume that if you need to shout to be heard at arm's length, the noise level is at 90 dB (A) or above. Hearing protection will be utilized by personnel operating or working around construction equipment or power tools. Based on the nature of activities to be performed on site, the use of heavy equipment, power tools, and other noise producing devices, Sevenson personnel are enrolled in a Hearing Conservation Program that meets the requirements of OSHA regulation 29 CFR 1910.95 as part of our Medical Surveillance Program.

Based upon Sevenson's past experience, it is known that the noise levels emanating from the operation of the heavy equipment often exceed what is allowable for worker exposure. Consequently, equipment operators and personnel working near the equipment are required to wear hearing protection. However, Sevenson will perform measurement with noise dosimetry to verify the effectiveness of the Hearing Conservation Program. Hearing protection equipment will be provided by Sevenson to all Site personnel needing them.

In addition to worker protection various noise interventions may be employed at the Site to control noise exposure to the public. The interventions may include, but are not limited to exhaust mufflers, whisper packs, protective shrouds, and fence line noise barriers. The specific methodologies will be evaluated during the startup phase of Site work. The SSHO and Site Superintendent will be responsible to ensure these engineering controls are in place and properly maintained throughout the duration of the project.

Table 2 Operational Action Levels		
Active Work Area		
Type of Measurement	Concentration	Action
Particulate (real time)	Less than 1.0 mg/m^3 Greater than 1.0 mg/m^3	Continue work with air monitoring. Upgrade to Level C PPE, initiate dust control measures.
Lead (NIOSH 7300)	Less than 0.030 mg/m^3 Greater than 0.030 mg/m^3	No action required Upgrade to Level C PPE, initiate dust control measures.
PCBs (NIOSH 5503)	Less than 0.5 mg/m^3 Greater than 0.5 mg/m^3	No action required Upgrade to Level C PPE, initiate dust control measures.
Benzene (NIOSH 1501)	Less than 0.5 ppm Greater than 0.5 ppm Greater than 1.0 ppm	No action required Implement Benzene Safety Program, initiate vapor control measures Upgrade to Level C PPE
Naphthalene (NIOSH 1501)	Less than 10 ppm Greater than 10 ppm	No action required Upgrade to level C PPE
Toluene, Ethylbenzene and Xylenes (NIOSH 1501)	Less than 50 ppm Greater than 50 ppm	No action required Upgrade to level C PPE
Pesticides (NIOSH 5510)	Less than 0.250 mg/m^3 Greater than 0.250 mg/m^3	No action required Upgrade to Level C PPE, initiate dust control measures.
PID	0 to 5 ppm 5 – 50 ppm (>15 minutes) >50 ppm	No respiratory protection required Upgrade to Level C PPE and determine Benzene concentrations, notify SHM Cease activities; evaluate sources of exposure and control techniques
Detector tubes for benzene	0 to 5 ppm 5 – 50 ppm (>15 minutes) >50 ppm	No respiratory protection required Upgrade to Level C PPE and determine Benzene concentrations Cease activities; evaluate sources of exposure and control techniques
Crystalline Silica	$> \frac{10\ (\frac{mg}{m3})}{\%\ Si + 2}$	Control dust with engineering controls; Upgrade to Level C PPE
Combustible gas in air (real time)	> 10% LEL but < 25% LEL > 25% LEL	Stop work; Ventilate workplace Stop work; Evacuate area & investigate source
Oxygen in air (real time)	Less than 19.5% Greater than 22%	Stop work; Ventilate workplace Stop work: Ventilate workplace

8.0 HEAT AND COLD STRESS

8.1 Heat Stress

Heat stress may be a hazard for workers wearing protective clothing even if the temperature is moderate. The same protective materials that shield the body from chemical exposure prevent heat and moisture from dissipating. Personal protective clothing can therefore create a hazardous condition. Depending on the ambient temperature and the work being performed, heat stress can occur very rapidly - within as little as 15 minutes.

In its early stages, heat stress can cause discomfort and inattention, resulting in impaired functional abilities that can threaten the safety of both the individual and his co-workers. Personnel will be instructed to recognize the symptoms of the onset of heat stress. The SSHO may periodically check all personnel working in thermal stress areas to ensure that the symptoms are recognized. Frequency of heat stress monitoring and checks for symptoms of heat stress will increase with rises in air temperature, humidity, and the degree of exposure to high temperature areas.

When workers are in Level C PPE or higher, an ambient temperature of 72.5° F will be used as an action level to implement pulse monitoring, oral temperatures, and administrative controls, including rest breaks and work rotation to prevent employees from experiencing heat-related health effects including weight loss. The guidance for workers wearing permeable clothing is specified in the current version of the ACGIH Threshold Limit Values for Heat Stress. If actual clothing differs from the ACGIH standard ensemble in insulation value and/or wind and vapor permeability, changes should be made to the monitoring requirements and work rest period to account for these differences. ***Table 3 – "Frequency of Physiological Monitoring***" provides the suggested frequency of physiological monitoring for fit and acclimatized workers.

Table 3
Frequency of Physiological Monitoring

Adjusted Temperature Calculation	Normal Work Clothing	Impermeable Clothing
90 F (32.2 C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5 - 90.0 F (30.8 – 32.2 C)	After each 60 minutes of work	After each 30 minutes of work
82.5 - 87.5 F (28.1 – 30.8 C)	After each 90 minutes of work	After each 60 minutes of work
77.5 - 82.5 F (25.3 - 28.1 C)	After each 120 minutes of work	After each 90 minutes of work
72.5 - 77.5 F (22.5 - 25.3 C)	After each 150 minutes of work	After each 120 minutes of work

The following parameters should be used when monitoring workers:

Heart rate - Count the radial pulse as early as possible in the rest period to ensure a more accurate reading. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period at the same length. If, at the end of the following work period, the heart rate still exceeds 110 beats per minute, shorten the work period again by one-third.

Oral Temperature - The utilization of oral temperature applies to the time immediately after the worker leaves the contamination reduction zone. Using a clinical thermometer, take the temperature for three minutes. If the oral temperature exceeds 99.6 °F (37.6 °C), shorten the next work cycle by one-third, without a change to the rest period. If the oral temperature still exceeds 99.6 °F (37.6 °C) at the end of the following work period, shorten the next work cycle by one-third. Do not permit a worker to perform duties requiring a semi permeable or impermeable garment if the oral temperature exceeds 100.4 F (38.1C). Ear canal readings are a valid method to monitor the temperature of workers who remain in the contamination reduction zone.

The oral temperature shall not exceed 100.4 °F. If an employee's pulse rate exceeds the maximum age-adjusted heart rate (0.7(220-AGE)), and/or the oral temperature exceeds 100.4 °F, the employee shall be required to stop work and rest at the work site or move to an air-conditioned room after proper decontamination. The affected employee may be allowed to return to work after his/her pulse rate has dropped below 100 beats per minute. The SSHO in consultation with the affected employee, and medical personnel if necessary, shall determine whether an employee is ready to return to work. Fluids shall be provided and rest breaks will be taken. The frequency of breaks will increase with the temperature. Such things as cooling vests, portable fans, and breaks in air-conditioned areas shall be used if necessary.

When practicable, the most labor-intensive tasks should be carried out during the coolest part of the day. If necessary, a work/rest regimen will be instituted. The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, such as, the Wet Bulb Globe Temperature, duration, and type of activities performed.

A worker who becomes irrational or confused, or collapses on the job should be considered a heat stroke victim and medical help should be called immediately. Early recognition of symptoms and prompt emergency treatment is the key to aiding someone with heat stroke. While awaiting the ambulance, begin efforts to cool the victim down by performing the following:

- Move the victim to a cooler environment and remove outer clothing.
- Wet the skin with water, and fan vigorously or repeatedly apply cold packs or immerse the victim in a tub of cool (not ice) water.
- If no water is available, fanning will help promote cooling.

Any individual showing susceptibility to heat stress will be referred to a physician for evaluation. In addition, the use of prescription drugs can also contribute to the effects of heat stress and will be considered during the assignment of work. Cool (50°-60°F) water or a sport drink, such as Gatorade, will be made available to workers and encourage them to drink small amounts frequently, (e.g., one cup every 20 minutes). Ample supplies of liquids will be placed close to the work area.

8.2 Cold Stress

Cold injury (frostbite and hypothermia) and impaired ability to work are hazards to persons working outdoors in low temperatures at or below freezing. Extreme cold for a short time may cause severe injury to exposed body surfaces (frost nip or frostbite), or result in profound generalized cooling (hypothermia). Areas of the body which have high surface area-to-volume ratio such as fingers, toes, and ears, are the most susceptible to frost nip or frostbite.

Two factors influence the development of a cold weather injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked. The wind chill factor is the cooling effect of any combination of temperature and wind velocity or air movement. ***Table 4 – Wind Chill Index*** should be consulted when planning for exposure to low temperatures and wind. The wind chill index does not take into account the specific part of the body exposed to cold; the level of activity, which affects body heat production; or the amount of clothing being worn.

When practicable, the most sedentary tasks should be carried out during the warmest part of the day. If necessary, a light-work rotation schedule should be instituted or the work area heated. Heavy work that

will cause heavy sweating resulting in wet clothing must also be monitored. The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, (i.e., the Wind Chill Temperature, duration, and type of activities performed).

Table 4
Wind Chill Index

Wind (mph)	Actual Temperature (° F)												
	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25
	Equivalent Temperature (° F)												
5	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40
10	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47
15	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51
20	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55
25	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58
30	22	16	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60
35	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62
40	20	13	6	-1	-8	-15	-22	-29	-36	-42	-50	-57	-64

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V0.16) + 0.4275T(V0.16)
T = Air Temperature (°F)
V = Wind Speed (mph)

Frostbite occurs in 15 minutes or less

Table 5 - Maximum Daily Time Limits for Exposure at Low Temperatures gives the recommended time limits for working in various low temperature ranges.

Table 5
Maximum Daily Time Limits for Exposure at Low Temperatures

Temperature Range (°F)	Maximum Daily Exposure
30 to 0	No limit, providing that the person is properly clothed.
0 to -30	Total work time: 4 hours. Alternate 1 hour in and 1 hour out of the low-temperature area.
-30 to -70	Two periods of 30 minutes each at least 4 hours apart. Total low temperature work time allowed is 1 hour.
-70 to -100	Maximum permissible work time is 5 minutes during an 8-hour working day. At these extreme temperatures, completely enclosed headgear, equipped with a breathing tube running under the clothing and down the leg to preheat the air, is recommended.

Table 6 - Work/Warm-up Schedule applies to any 4-hour work period with moderate to heavy work activity, warm-up periods of ten (10) minutes in a warm location and an extended break (e.g., lunch) at the end of the 4-hour period in a warm location. For light-to-moderate work (limited physical movement) apply schedule one step lower. For example, at -35 °C (-30 °F) with no noticeable wind, a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period.

Table 6
Work/Warm-up Schedule

Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph wind		15 mph wind		20 mph wind	
°C (approx.)	°F (approx.)	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks
-26° to -28°	-15° to -19°	Norm	1	Norm	1	75 min	2	55 min	3	40 min	4
-29° to -31°	-20° to -24°	Norm	1	75 min	2	55 min	3	40 min	4	30 min	5
-32° to -34°	-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-Emergency Work Should Cease	
-35° to -37°	-30° to -34°	55 min	3	40 min	4	30 min	5	Non-Emergency Work Should Cease			
-38° to -39°	-35° to -39°	40 min	4	30 min	5	Non-Emergency Work Should Cease					
-40° to -42°	-40° to -44°	30 min	5	Non-Emergency Work Should Cease							
-43° & below	-45° & below	Non-Emergency Work Should Cease									

To guard against cold injuries, workers should wear appropriate clothing and use warm shelters for removing personal protective equipment. The personnel decontamination trailer will be used as a warm shelter when required. The SSHO may periodically monitor workers' physical conditions, specifically checking for symptoms of frostbite.

9.0 ACCIDENT PREVENTION PROCEDURES/PRACTICES

9.1 Medical and First Aid Requirements

Applicable Standards:

OSHA 29 CFR 1926.23, & 1926.50

USACE EM 385-1-1 Section 3 – Medical and First Aid Requirements

First-aid kits/stations and required contents are maintained in a serviceable condition. Unit-type kits have all items in the first-aid kit individually wrapped, sealed, and packaged in comparable sized packages. First-aid stations will be located as close as practicable to the highest concentration of personnel. First-aid stations will be well-marked and available to personnel during all working hours. First-aid stations will be equipped with a first-aid kit, the size of which will be dependent upon the number of personnel normally employed at the work site.

Emergency telephone numbers and Route to the Area Hospital will be clearly posted and easily visible at all times. There should be OSHA posters prominently displayed and warning signs posted for any known or potential hazard(s) present. MSDSs must be available on the job site at all times.

9.2 Hazardous Substances

Applicable Standards:

OSHA 29 CFR 1926.53 & 1910.1200

USACE EM 385-1-1 Section 6 – Hazardous Substance, Agents & Environments

When hazardous substances are used in the workplace, the hazard communication program dealing with SDSs, labeling, and employee training will be in operation. SDS materials will be readily available for each hazardous substance used. A training program, plus regular question and answer sessions on dealing with hazardous materials will be given to keep employees informed. The program will include an explanation of what an SDS is and how to use and obtain one; SDS contents for each hazardous substance or class of substances; explanation of the "Right to Know"; identification of where employees can see the employer's written hazard communication program and where hazardous substances are present in their work area; the health hazards of substances in the work area, how to detect their presence, and specific protective measures to be used; as well as informing them of hazards of non-routine tasks and unlabeled pipes. A current monthly inventory will be maintained for all hazardous substances at the Site. This inventory will be kept readily available for emergencies and will be made available to the local fire department upon request.

9.3 Fall Protection

Applicable Standards:

OSHA 29 CFR 1926.500, 501, 502, 503; 1926.106

USACE EM 385-1-1 Section 21 - Safe Access and Fall Protection

To access high and low places on jobsites a variety of equipment may be used such as ladders, scaffolding, suspended platforms, aerial lifts, stairways, and climbing lines. The use of these access systems often presents fall hazards. In addition, employees may be exposed to falls while working on elevated structures, climbing onto and off of equipment, and even while walking by falling through holes or by slipping or tripping.

To protect employees when they are exposed to fall hazards, some form of fall protection must be used. The most common forms of fall protection are guardrails, personal fall arrest systems, hole covers, and safety nets. Any, or all of these forms of fall protection may be used on construction worksites. The current OSHA standards also require that employees receive training regarding fall protection issues, and that the training is documented. An alternate fall arrest program may be implemented in cases where none of the traditional methods of fall protection are feasible. Components of our fall protection plans are listed below:

Personal Fall Arrest System - The three main parts of a personal fall arrest system are the full body harness, the lanyard/lifeline, and a suitable anchorage. Particular attention must be paid to the anchorage point(s) to ensure that they are capable of supporting 5,000 lb. (22.2 kN) or two times the maximum load on an engineered system.

Guardrail Systems - Guardrail systems consist of a toprail, midrail, and if necessary a toeboard. Guardrail systems can be made of various materials, and they must be capable of supporting a 200-pound force.

Training - All employees must receive training on the nature of the fall hazards at the site and on how to avoid falls. Employees should be familiar with the use of all personal fall arrest systems and must wear the equipment when necessary.

The requirements of all applicable OSHA regulations notwithstanding, the minimum fall protection requirements on our projects may include the following:

- All fall protection systems must meet the requirements of Part 1926, Subpart M.
- For situations where lifelines are interrupted, double lanyards are necessary to ensure that the worker is continuously protected from falling by attaching one lanyard ahead of the discontinuity prior to unhooking the trailing lanyard.
- Climbing on forms, false work, or the structure to gain access to work areas is expressly prohibited. However, it is not intended to prohibit the use of ladders for access to work areas, provided the operation is in compliance with OSHA Part 1926 Subpart X and other relevant requirements.
- Where scaffolds are necessary to provide temporary access to work areas, they must be in compliance with §1926.451. Scaffolds must include a toprail, midrail, and toeboard in compliance with 1926.451, on all open sides and ends. Personal fall arrest systems meeting the criteria of Part 1926 Subpart M are required to protect workers during installation and removal of the railings, and in situations where physical restrictions preclude installation of a standard railing.
- Fall protection is required for open sides or ends of roofs and for openings in floors, as required in Part 1926 Subpart M. In no case will a height of fall 6 feet (1829 mm) or greater from the side, end, or opening in a floor remain unprotected.
- All workers in approved personnel aerial lifts must use a personal fall arrest system meeting the criteria of Part 1926 Subpart M, with the lanyard attached to the boom or basket, as required by OSHA 1926.556.
- Because falls from structural members constitute a serious and clearly recognizable hazard, fall protection, if necessary, for all steel or concrete beams and other structural elements must be in place prior to removal. This fall protection will consist of personal fall arrest systems, safety nets, or other means meeting the requirements of Part 1926 Subpart M.
- Instances in which it is impossible to provide fall protection for workers are rare. Where an individual worker must rig the fall protection system, and it cannot be accomplished from an aerial lift or by tying-off to the existing structure, momentary exposure to a fall hazard may be unavoidable. It is essential that adequate planning of construction procedures minimize such occurrence of unprotected exposure to fall hazards. It is equally essential that the fall protection systems utilized actually enhance safety, rather than creating a secondary hazard.

Sevenson's Fall Protection Program is located in Appendix J of the APP.

9.4 Electrical

Applicable Standards:

OSHA 29 CFR 1926.400 through 449, 1910.301 through 399, 1926.550(a)(15)

USACE EM 385-1-1 Section 21- Electrical

Electricity is a serious workplace hazard that must be respected at all times. It is important to remember that exposure to even a little electric current can kill! The best protection around electricity is distance -- ample distance between the worker and the conductive materials. The following safe work practices and procedures will help prevent electrical accidents on the jobsite.

Workers should observe and strictly obey all warning and danger signs around electrical apparatus. They should never close a switch that has a danger tag on it signed by or placed there by someone else. Untrained people must not open any electrical enclosures. The one exception is that the door on a circuit

breaker panel board may be opened to operate the switches, but other types of electrical enclosures should not be opened.

Extension cords or any power tools or equipment must not be used when the cords are frayed, worn out, or the wires are bare. Defective equipment should be reported to the supervisor and turned in for repair. Report all unguarded or broken light bulbs. Do not hang lights by their cords unless the light was designed to be suspended in that manner.

Installation Safety Requirements: Live parts of electrical equipment operating at 50 volts or more must be guarded against accidental contact. Entrance to rooms and other guarded locations containing exposed live parts must be marked with conspicuous warning signs forbidding unqualified persons from entering. All pull boxes and breaker boxes must be labeled to indicate the equipment they switch. Electric installations that exceed 600 volts and that are open to unqualified persons must be made with metal-enclosed equipment or enclosed in a vault or area controlled by a lock. In addition, equipment must be marked with appropriate caution signs.

Conductors and equipment must be protected from over current in accordance with their ability to safely conduct current, and the conductors must have sufficient current carrying capacity to carry the load. Fuses and circuit breakers must also be located or shielded so that employees will not be burned or otherwise injured by their operation.

All wiring components and utilization equipment in hazardous locations must be maintained in an explosion-proof condition without loose or missing screws, gaskets, threaded connections, seals, or other impairments to a tight condition. Unless identified for use in the operating environment, no conductors or equipment can be located:

- In damp or wet locations.
- Where exposed to gases, fumes, vapors, liquids, or other agents having a deteriorating effect on the conductors or equipment.
- Where exposed to excessive temperatures.

Ground Fault Circuit Interrupters To ensure electrical safety from shocks on all construction sites, all 120-volt, single-phase, 15- and 20-amp receptacle outlets and portable generators must be protected by ground fault circuit interrupters (GFCIs), or assured equipment grounding conductor program must be established. In an assured equipment-grounding program, one or more **competent persons** must be designated to implement and enforce the following assured equipment grounding safety procedures at all construction jobsites.

Each 120-volt extension cord, tool, piece of equipment, and receptacle needs to be inspected and tested before first use, before equipment is returned to service following repairs, and before equipment is used after any incident that can be reasonably suspected to have caused damage.

Each extension cord, tool, or piece of equipment shall be visually inspected by the user before each day's use to determine signs of damage. Equipment found to be damaged or defective (frayed or damaged insulation, crushed cable, loose or missing covers or screws, and missing ground prong on plugs, etc.) must not be used until repaired. Equipment suspected to be damaged or defective shall be inspected and tested prior to use.

Overhead Transmission and Distribution Lines - A significant hazard on construction jobsites is the accidental contact of moving equipment with live overhead power distribution and service lines. Where work must be done near live lines, the movement of all equipment such as cranes, excavators and other equipment must be guided by an observer who can observe the clearance of the equipment from energized lines and give timely warning to equipment operators. The minimum clearance between live

lines and any jobsite equipment is 10 feet (3.0 m), and the clearance increases with increasing line voltages.

9.5 Lockout and Tagout

Applicable Standards:

OSHA 29 CFR 1926.417 & 1910.147

USACE EM 385-1-1 Section 12- Control of Hazardous Energy (Lockout/Tagout)

Whenever maintenance, servicing, or repairs are done to equipment, tools and machinery, there is a potential for injury from the accidental energization or movement of the equipment. Prior to beginning any work on equipment, steps must be taken to identify the energy sources present in the equipment, and to ensure that the energy sources are neutralized.

Hazardous energy sources fall into categories such as electrical, pneumatic, hydraulic, and potential (gravity, springs, etc.). One simple control in the construction industry has been to unplug cord-connected equipment. Vehicles and other motorized equipment can be protected from accidental starting by disconnecting the battery. Other controls include the use of identifiable padlocks on disconnects, breaker switches, and valves. Stored energy has the potential for release with great kinetic force and potential for injury.

All machinery or equipment capable of movement must be de-energized or disengaged and blocked or locked out during cleaning, servicing, adjusting or setting up operations, whenever required. The lockout procedure requires that stored energy (i.e. mechanical, hydraulic, air) be released or blocked before equipment is locked out for repairs. Appropriate employees are provided with individually keyed personal safety locks. Employees are required to keep personal control of their key(s) while they have safety locks in use. Employees must check the safety of the lockout by attempting a start up after making sure no one is exposed. Where the power disconnector does not also disconnect the electrical control circuit, the appropriate electrical enclosures must be identified. The control circuit can also be disconnected and locked out.

Temporary electrical service installation will be performed by a qualified electrician. Work may only be performed on de-energized equipment. Lockout/Tagout procedures will be implemented to assure the safety of personnel during electrical work activities.

Underground electric lines will be located and clearly marked. These utilities will be protected, removed, or relocated as needed to do the work safely. The excavation work will not be allowed to endanger the underground utility or the people doing the work. Barricades, shoring, or other supports as needed, will protect utilities left in place that are exposed by the excavation.

Sevenson's Control of Hazardous Energy Program is located in Appendix H of the APP.

9.6 Motor Vehicles and Mechanized Equipment

Applicable Standards:

OSHA 29 CFR 1926.600 through 606, 1926.1000 through 1003

USACE EM 385-1-1 Section 16 – Machinery and Mechanized Equipment

Many potential hazards are associated with the use of motor vehicles and mechanized equipment on construction projects. Motor vehicles may be involved in accidents due to mechanical failures or operator errors, resulting in injuries to operators themselves or to bystanders. To minimize accidents resulting from the use of motor vehicles, the following safety procedures need to be implemented and enforced on all company projects:

- All equipment left unattended at night, adjacent to highways or construction areas should have lights, reflectors, and/or barricades to identify location of the equipment.
- Supervisory personnel will ensure that all machinery and equipment is inspected prior to each use to verify that it is in safe operating condition.
- Rated load capacities and recommended rules of operation must be conspicuously posted on all equipment at the operator's station.
- Wire rope must be taken out of service when one of the following conditions exist:
  - In running ropes, six random distributed broken wires in one lay or three broken wires in one strand or one lay.
  - Wear of one-third the original diameter or outside individual wires.
  - Kinking, crushing, hoist caging, heat damage, or any other damage resulting in distortion of the rope structure.
  - In standing ropes, more than two broken wires in one lay in sections beyond connections, or more than one broken wire at an end connection.
- A fire extinguisher of 1A,10B,C rating or higher should be available at all operator stations. Where ordinary combustible materials (wood, paper, plastics) are present, an extinguisher suitable for Class A fires should also be available for use.
- When vehicles or mobile equipment are stopped or parked, the parking brake must be set. Equipment on inclines must have the wheels chocked as well as the parking brake set.
- All vehicles or combinations of vehicles must have in operable condition at least:
  - Two headlights.
  - Two taillights.
  - Brake lights.
  - Audible warning device at operator's station.
  - Seat belts properly installed.
  - Appropriate number of seats for occupants.
  - Service, parking, and emergency brake system.
- Operators should not travel in reverse with motor equipment having an obstructed rear view unless:
  - The vehicle is equipped with an audible, functioning reverse signal alarm.
  - The vehicle is backed up only under the guidance of an observer who says that it is safe to do so.
- Only those trained in the use of a specific type of machinery should be allowed to operate the machinery. Operators of heavy equipment and trucks greater than 26,000 lbs (11,794 kg) gross vehicle weight used in traffic must have a commercial driver’s license.
- Sevenson personnel that are required to operator a motor vehicle in excess 10,001 GVW or combination of vehicle and trailer weighing more the 10,001 pounds MUST be authorized by Sevenson’s Fleet Safety Manager prior to operating the vehicle on a public road. This applies even if the public road is considered part of the Site.
- Materials handling equipment such as scrapers, front-end loaders, dozers, and similar equipment must be provided with Rollover Protective Structures (ROPS).

- Accessible areas within the swing radius of cranes, backhoes, and other rotating machinery need to be barricaded to prevent employees from being struck or crushed by the rotating parts of the machinery or their loads.
- Employees should not ride on or in motor vehicles unless seats with seat belts are provided.
- No operator is to leave the equipment with the engine running.

9.7 Hand and Power Tools

Applicable Standards:

OSHA 29 CFR 1926.300 through 307

USACE EM 385-1-1 Section 13 – Hand and Power Tools

Tools are such a common part of construction work that it is difficult to remember that they may pose hazards. Workers must learn to recognize the hazards associated with the different types of tools and the safety precautions necessary to prevent injuries from those hazards. To prevent accidents resulting from the use of hand- and power-operated hand tools, management personnel need to implement and enforce the following safe work procedures on all construction jobsites.

Broken, defective, burned, or mushroomed tools should not be used. They should be reported and turned in for replacement. The proper tool and equipment should be selected and used for each task. For example, a wrench should not be used as a hammer or a screwdriver as a chisel. Leaving tools on scaffolds, ladders, or any overhead working surfaces is hazardous because they may fall. Racks, bins, hooks, or other suitable storage space must be provided to permit convenient arrangement of tools. Striking two hardened steel surfaces together is hazardous because pieces of metal may break off (i.e., two hammers, or a hammer and hardened steel shafts should not be struck together). The practice of throwing tools from one location to another, from one employee to another, or dropping them to lower levels will be prohibited. When it is necessary to pass tools or material under the above conditions, suitable containers and/or ropes must be used.

Wooden tool handles must be sound, smooth, in good condition and securely fastened to the tool. Sharp-edged or pointed tools should never be carried in employee's pockets. Only non-sparking tools will be used in locations where sources of ignition may cause a fire or explosion. Tools requiring heat-treating should be tempered, formed, dressed, and sharpened by workmen experienced in these operations. Tools designed to accommodate guards must be equipped with such guards when in use.

All rotating, reciprocating or moving parts of equipment (belts, gears, shafts, flywheels, etc.) must be guarded to prevent contact by employees using such equipment. Guarding must meet requirements set forth in ANSI B15.1-1953. All hand-held power tools (e.g., circular saws, chain saws, and percussion tools) without a positive accessory holding means must be equipped with a constant pressure switch that will shut off the power when pressure is released. A positive "on-off" control must be provided on platen sanders, grinders with wheels 2-inches in diameter or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws, and jigsaws with blade shanks ¼-inch wide or less.

A momentary contact "on-off" control must be provided on all hand-held powered drills, tapers, fasteners drivers, horizontal, vertical and angle grinders with wheels greater than 2-inches in diameter. Besides safety hazards, the use of power tools sometimes creates potential health hazards as well. The use of jackhammer and chiseling equipment often results in silica and nuisance dust exposures that can sometimes be controlled by wetting the work surfaces. Many times, however, the use of dust/mist respirators is required to prevent overexposures.

In addition to dust hazards, the hand vibration inherent in the use of some power tools may result in a restriction of blood flow to the hands and fingers, causing numbness or tingling. If workers consistently experience these symptoms after the use of power tools, they should contact their supervisor so that steps may be taken to prevent further harm to the nerves and blood vessels in their hands. The use of a different tool, changes to the offending tool to reduce vibrations, and/or the use of special gloves may be recommended to deal with the vibration problems.

Electric Tools - Electric tools present several dangers to the user; the most serious is the possibility of electrocution. The following safe work procedures for electric tools must be implemented and enforced at all company construction projects. Tools must (1) have a three-wire cord with ground and be grounded, or (2) be double insulated, or (3) be powered by a low-voltage isolation transformer. A GFCI must be used or the tool must be double insulated to prevent the worker from electrical shock hazards. Never remove the third prong from the plug. Electric tools should be operated within their design limitations.

In general, gloves and safety footwear are recommended during use of electric tools. However, gloves should not be worn when they are a potential entanglement hazard with reciprocating or rotating tools.

When not in use, tools should be stored in a dry place. Electric tools should not be used in damp or wet locations.

Powered Abrasive Wheel Tools - Power abrasive wheel tools present a special safety problem because they may throw off flying fragments. The following safe work procedures for powered abrasive wheel tools need to be implemented and enforced at all company construction projects. Portable grinding tools must be equipped with safety guards to protect workers from flying fragments as well as the moving wheel surface. Inspecting and sound- or ring-testing abrasive wheels prior to mounting is required to ensure that they are free from cracks or defects. Checking to ensure that the abrasive wheel RPM rating is appropriate for the tool will also help prevent wheel failures. The following work rules are appropriate for using a powered grinder:

- Always use eye protection and a face shield.
- Turn off the power when not in use.
- Never clamp a hand-held grinder in a vise.
- To prevent the wheel from cracking, the user should ensure that it fits freely on the spindle.
- Grinding wheel users should never stand directly in front of the wheel during start-up because there is always a possibility that the wheel may disintegrate (explode) when accelerating to full speed.

Pneumatic Tools - Pneumatic tools are powered by compressed air and include chippers, drills, hammers, and sanders. The following safe work procedures for pneumatic tools must be implemented and enforced at all company construction projects. Pneumatic tools that shoot nails, rivets, or staples and operate at pressures more than 100 psi must be equipped with a special device to keep fasteners from being ejected unless the muzzle is pressed against the work surface. Eye protection is required and face protection recommended for employees working with pneumatic tools.

Hearing protection is required when working with noisy tools such as jackhammers. When using pneumatic tools, users should check to see that the tools are fastened securely to the hose to prevent the hose from becoming disconnected. All hoses exceeding ½-inches inside diameter must have a safety device at the supply source or branch line to reduce pressure in the event of hose failure.

Airless spray guns that atomize paints and fluids at high pressures (1,000 lbs or more per in^2) must be equipped with automatic or visual manual safety devices that will prevent pulling the trigger until the

safety device is manually released. Workers operating a jackhammer are required to wear safety glasses, safety footwear, and hearing protection. Compressed air guns should never be pointed toward anyone. A safety clip or retainer must be installed to prevent attachments from being unintentionally shot from the barrel of the tool.

Liquid-Fueled Tools **-** Liquid-fueled tools are usually powered by gasoline. Vapors that can burn or explode and give off dangerous exhaust gases are the most serious hazards associated with liquid-fuel tools. The following safe work procedures for liquid-fueled tools need to be implemented and enforced at all company construction projects.

Gas or fuel should be handled, transported, and stored in approved flammable liquid containers. These containers, also known as safety cans, are no more than 5 gallons in capacity and have a spring-closing lid and spout cover that will safely relieve internal pressure when subjected to fire exposure. Before refilling the tank for a fuel-powered tool, the user must shut down the engine and allow it to cool to prevent accidental ignition of hazardous vapors. Effective ventilation and/or personal protective equipment is necessary when using a fuel-powered tool inside a closed area. Fire extinguishers must be readily available in the work area.

9.8 Fire Protection and Prevention

Applicable Standards:

OSHA 29 CFR 1926.150 through 159

USACE EM 385-1-1 Section – 9 Fire Prevention and Protection

Fire on construction projects is a constant hazard that can cause loss of life, equipment and material. To assist in preventing fires on construction projects, all personnel must comply with the following safe work practices and procedures:

Fire Protection **-** Access to all available firefighting equipment must be maintained at all times. Firefighting equipment must be inspected monthly and maintained in operating condition. Defective or exhausted equipment must be replaced immediately. All firefighting equipment should be conspicuously located at each jobsite. Extinguishers exposed to freezing conditions will be protected from freezing. Employees should not remove or tamper with fire extinguishers installed on equipment or vehicles or in other locations unless authorized to do so or in case of fire. After using a fire extinguisher, it must be recharged or replaced with another fully charged extinguisher. Extinguishers must be selected based on the anticipated fire hazards. To aid in the proper selection of fire extinguishers, the classes of fires are as follows:

- Class A (wood, paper, trash) - use water, dry chemical, or foam extinguisher.
- Class B (flammable liquids, gas, oil, paints, grease) - use foam, carbon dioxide, or dry chemical extinguisher.
- Class C (electrical) - use carbon dioxide or dry chemical extinguisher.
- Class D (combustible metals) - use dry powder extinguisher only.

Fire Prevention - Internal combustion engine-powered equipment should be located so that exhausts are away from combustible materials. Smoking is permitted in approved areas, only. Project will be conspicuously posted, "No Smoking or Open Flame." Portable battery-powered lighting equipment must be approved for the type of hazardous locations encountered. Combustible materials must be piled no higher than 20 feet (6.1 m). Depending on the stability of the material being piled, this height may be reduced.

Portable fire extinguishing equipment, suitable for anticipated fire hazards on the jobsite, must be provided at convenient, conspicuously accessible locations. Firefighting equipment must be kept free from obstacles, equipment, materials, and debris that could delay emergency use of such equipment. Employees should familiarize themselves with the location and use of the project's firefighting equipment. All oily rags, wastes, and similar combustible materials must be placed in metal containers. The containers must be emptied on a daily basis. Storage of flammable substances on equipment or vehicles should be prohibited unless such unit has adequate storage area designed for such use.

Flammable and Combustible Liquids - Explosive liquids, such as gasoline, will not be used as cleaning agents. Gasoline and similar combustible liquids must be stored, transported, and handled in approved and labeled containers in well-ventilated areas free from heat sources. Approved wooden or metal storage cabinets must be labeled in conspicuous lettering, "Flammable-Keep Fire Away." Storage in an approved storage cabinet should not exceed 60 gallons of flammable, or 120 gallons of combustible liquids. Storage of containers will not exceed 1,100 gallons in any one pile or area. Never place a pile or group within 20 feet of a building. A 12-feet wide access way must be provided within 200-feet of each container pile to permit approach of fire control apparatus.

The use of flammable liquids and spray finishing shall conform to the requirements of 1926.66 and 1926.152. Paints and reducers should be stored away from heat sources and out of the sun. Airless spray-painting apparatus should be of a type approved for hazardous locations. Any electrically or fuel-powered equipment used to mix, convey, and spray flammable and combustible liquids must carry an approval from a nationally recognized testing laboratory. Pneumatically operated equipment is usually suitable for use with flammable and combustible finishes.

Fire Extinguishers - Portable fire extinguishers are provided in adequate number and type (10 lb. ABC) and are located throughout the site. Fire extinguishers are located in readily accessible locations. Fire extinguishers are recharged regularly and the date of last inspection noted on their tags. Extinguishers should be placed free from obstructions or blockage. All extinguishers must be fully charged and in their designated places unless in use. All employees are periodically instructed in the use of extinguishers and fire protection procedures. Fire Extinguishers will be located in the following areas:

- ***Support Zone (Field):*** (1) 10 lb ABC multipurpose dry chemical type fire extinguishers.
- ***Contamination Reduction Zone:*** (2) 10 lb ABC multipurpose dry chemical type fire extinguishers.
- ***Exclusion Zone:*** (1) 10 lb ABC multipurpose dry chemical type fire extinguishers.
- ***Equipment:*** All of Sevenson's heavy equipment will be supplied with ABC multipurpose dry chemical type fire extinguishers.

9.9 Confined Space Entry

Applicable Standards:

OSHA 29 CFR 1910.146, 1926.21(b)(6)

USACE EM 385-1-1 Section 6.I – Confined Space

A confined space is a space that is large enough and so configured that an employee can physically enter and perform assigned work, has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits) and is not designed for continuous employee occupancy. Simply working in a confined space is not necessarily a hazard. However, if certain hazardous conditions exist prior to, or are created during entry, then the confined space must be treated with utmost care.

Conditions that make a confined space especially dangerous (i.e., make it a permit-required space) are:

- Contains or has the potential to contain a hazardous atmosphere.

- Contains a material that has the potential for engulfing an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section.
- Contains any other recognized serious safety or health hazard.

A hazardous atmosphere includes spaces that may expose employees to flammable gases, vapors, mists, or dusts; to an oxygen deficiency (<19.5 percent) or oxygen enriched environment (>22.0 percent); to air contaminants in excess of the permissible exposure limit (PEL), or to any other atmospheric condition that is an immediate danger to life and health (IDLH).

When a permit-required space is present, the following hierarchy of controls should be used on the space:

- Avoid entry.
- Eliminate the hazards that make the confined space a permit-required space. Ventilation, lockout/tagout, block and bleed, and other procedures can be used to eliminate hazards. Hazard elimination must be verified by air monitoring and other test procedures.
- Eliminate the hazards to the point that only atmospheric hazards remain. Use the "atmospheric hazard only" procedures entry system discussed in 1910.146(c)(5).
- Minimize and control hazards to the fullest extent possible, and enter only after the requirements of a full permit entry have been satisfied.
- Middlesex County HAZMAT Squad has agreed to perform the confined space rescue in the event of an emergency. The Sayreville Fire Department would handle any other type of emergency services at the Site. The Middlesex HAZMAT Squad and the Sayreville Fire Department will be invited to visit the Site at the start of the project phase to familiarize themselves with the hazards. The Middlesex County HAZMAT number has been added to the emergency contact list.

Employees must receive training on confined spaces so that they will acquire the understanding, knowledge, and skills necessary for a safe entry into the confined space. Confined space training will be documented.

Sevenson's Confined Space Entry Program has been included as Appendix E to the APP.

9.10 Welding and Cutting

Applicable Standards:

OSHA 29 CFR 1926.350 through 354

USACE EM 385-1-1 Section 10 – Welding and Cutting

Welding and cutting operations present various safety and health hazards. Welding and cutting operations on lead-painted surfaces often create lead fumes by "boiling off" the lead. These lead fumes may cause lead poisoning if inhaled or ingested in excessive amounts. Welding on equipment contaminated with arsenic or PCBs can cause excessive exposure to either arsenic or dioxin. Other metal fumes such as iron oxide, chromium, zinc, manganese, and cadmium may also be present during welding and cutting operations. Safety hazards such as fire may result in fatalities, serious injuries, and/or property damage.

Therefore, in an effort to eliminate or reduce the hazards associated with welding and cutting operations, the following rules and procedures shall be included and enforced in the welding safety program.

Welding and Cutting - Only qualified welders shall be authorized to do welding, heating, or cutting. Inspect work areas for fire hazards and proper ventilation before welding or cutting. Avoid welding or

cutting sparks and hot slag. Be alert to hot surfaces and avoid touching metal surfaces until they have cooled. Place compressed gas cylinders in an upright position and secure in place to prevent dropping or falling. Handle with extreme care and do not store near any sources of heat. Remove any combustibles when welding or cutting must be done. If removal is not feasible, cover combustibles with a noncombustible material. When welding near any combustible material, another employee must be posted to serve as a fire watch. Make sure this person has a fire extinguisher available and keep him/her in the area after welding/cutting is completed until all danger of fire is past.

A hot-work permit system will be implemented at the Site. When working in the vicinity of welding operations, wear approved eyewear and avoid looking directly at the flash as serious flash burns could result. When opening valves on tanks that have regulators installed, be sure the pressure adjustment screw is all the way out and do not stand in front of the regulator. An internal failure could rupture the regulator and cause the adjustment screw to become a missile.

Primers, paints, other coatings, and contaminated material shall be removed, where feasible, from the area to be heated and for at least 4-inches on all sides.

Gas Welding and Cutting - When transporting, moving, and storing compressed gas cylinders, always ensure that the valve protection caps are in place and secured. Secure cylinders on a cradle, slingboard, or pallet when hoisting. Never hoist or transport the cylinders by means of magnet or choker slings. Move cylinders by tilting and rolling them on their bottom edges. Do not allow cylinders to be dropped, struck, or come into contact with other cylinders violently. Secure cylinders in an upright (vertical) position when transporting by powered vehicles. Do not hoist cylinders by lifting on the valve protection caps. Do not use bars under valves or valve protection caps to pry cylinders loose when frozen. Use warm, <u>not boiling</u>, water to thaw cylinders loose.

Remove regulators and secure valve protection caps prior to moving cylinders, unless cylinders are firmly secured on a special carrier intended for transport. Close the cylinder valve when work is finished, when cylinders are empty, or when cylinders are moved at any time. Secure compressed gas cylinders in an upright position (vertical) except when cylinders are actually being hoisted or carried. Oxygen cylinders shall be stored at least 20 feet from other combustible materials such as acetylene. Alternatively, oxygen and fuel gas cylinders may be separated by a 5 feet-high non-combustible barrier with at least a 30-minute fire resistance rating.

Arc Welding and Cutting - Use only manual electrode holders that are specifically designed for arc welding and cutting. All current-carrying parts passing through the portion of the holder must be fully insulated against the maximum voltage encountered to ground. All arc welding and cutting cables must be completely insulated, flexible type, and capable of handling the maximum current requirements of the work in progress. Employees shall report any defective equipment to their supervisor immediately and refrain from using such equipment. Shield all arc welding and cutting operations, whenever feasible, by noncombustible or flameproof screens to protect employees and other persons working in the vicinity from the direct rays of the arc.

Fire Prevention - Welders should locate the nearest fire extinguisher in their work area in case of a fire emergency. Fire extinguishing equipment must be immediately available in the work area. Never use matches or cigarette lighters to light torches. Use only friction lighters to light torches. Never strike an arc on gas cylinders. Move objects to be welded, cut, or heated to a designated safe location. If the objects cannot be readily moved, then all movable fire hazards in the vicinity must be taken to a safe place or otherwise protected. Fuel lines shall have flashback arrestors. Do not weld, cut, or heat where the application of flammable paints or the presence of other flammable compounds, or heavy dust concentrations creates a hazard. Additional employees must be assigned to guard against fire while the actual welding, cutting, or heating is being performed when the operation is such that normal fire

prevention precautions are not sufficient. Prior to applying heat to a drum, container, or hollow structure, provide a vent or opening to release any built-up pressure during the application of heat. Never cut, weld, or heat on drums, tanks, process lines, or containers that have contained flammable liquids until they have been purged and cleaned. A *Hot Work Permit* (located in Appendix D) shall be issued prior to any of the above work being performed. A variance may be issued for Hot Work Permits in areas that have been designated a permanent hot work area and the area is inspected regularly for combustibles.

9.11 Trenching and Excavations

Applicable Standards:

OSHA 29 CFR 1926.650 through 652

USACE EM 385-1-1 Section 25 – Excavation

Trenching and excavation work presents a serious risk to all employees. The greatest risk is the cave-in of a trench or excavation. Cave-in accidents are much more likely to result in worker fatalities than any other excavation-related accidents. Other hazards include contact with buried utilities. Because of the hazards associated with excavation work, the following safe work practices and procedures will be implemented and enforced:

- Remove or support all surface encumbrances whenever their location creates a hazard to employees.
- Identify underground installation (e.g., sewer, utility, fuel) locations prior to opening an excavation. Contact utility companies or owners to advise on the proposed work and ask for the locations of utility underground installations prior to opening an excavation. Additionally, the New Jersey One Call (Dig Safely) can be contacted at 1-800-272-1000 for assistance in identifying utilities in your area.
- Retain a copy of the NJ One Call Markout Ticket and submit with the daily safety report.
- Verify underground utility marks against land surveyor maps to ensure mark outs are in the proper location.
- Protect, support, or remove underground installations, as necessary, to safeguard employees working in open excavations.
- Structural ramps used by employees as a means of access or egress from excavations must be designed by a **competent person**.
- Structural ramps for access and egress of equipment must be designed by a **competent person** qualified in structural design.
- All excavations or trenches that are 4 feet (1.2 m) or more in depth must have a stairway, ladder, ramp, or other safe means of access and egress within 25 feet (7.6 m) of travel in any direction.
- The edges of a trench or excavation must be barricaded when the excavation is not readily seen because of plant growth or some other visual barrier.
- No employees are permitted underneath loads handled by lifting or digging equipment.
- A warning system (e.g., barricades, signals, or stop logs) must be used when mobile equipment is operated adjacent to an excavation.
- Testing must be conducted in excavations where oxygen-deficient and/or toxic atmospheres exist or could reasonably be expected to exist before employees are permitted to enter excavations greater than 4 feet (1.2 m) in depth.

Take adequate precautions, such as proper respiratory protection or ventilation, to prevent employee exposure to oxygen-deficient and other hazardous atmospheres. Emergency rescue equipment must be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation.

Never work in excavations where water has accumulated or is accumulating, unless adequate precautions have been taken to protect against the hazards posed by water accumulation.

A **competent person** must conduct inspections of excavations prior to the start of work and as necessary throughout each shift. Inspections must also be made after every rainstorm. Precautions must be taken before employees enter *a trench of any depth* that shows signs of water accumulation or wall sloughing due to moisture. Preventive precautions include the use of support or shield systems to prevent cave-ins, and the use of water removal pumps.

Trenches 5-feet or more in depth must be shored, benched, or sloped back to an angle of incline required to prevent cave-ins. The angle of incline required varies with differences in the soil type, environmental conditions of exposure, and the application of surcharge loads. Any excavation in unstable soil may require shoring or sloping.

Backfilling and removal of trench boxes or supports will progress together from the bottom of the trench. Jacks, supports, or braces will be released slowly, and in unstable soil, ropes will be used to pull out the jacks and braces from above and clear of the excavation. All personnel will be clear of the trench.

Materials must be placed 2-feet or more from the edge of the excavation. Material must be placed at a distance to prevent excessive loading on the face of the excavation. Precautions must be taken to prevent such materials from falling into the excavation.

Excavations will be protected by the use of temporary fencing to ensure site personnel, visitors, or the public do not inadvertently fall into an excavation. Excavations will be protected in accordance with EM 385-1-1 section 25.B *Safe Access*.

An Excavation Plan and/or AHA shall be prepared prior to the start of any excavation and shall be amended to the APP. Excavation Plans and Excavation AHAs will be located in Appendix L of the APP once accepted by the USACE.

9.12 Stairways and Ladders

Applicable Standards:

OSHA 29 CFR 1926.1050 through 1060

USACE EM 385-1-1 Section 21 Safe Access and Fall Protection

Stairways and ladders are a major source of injuries and fatalities among construction workers. Because of the potential hazards involved in using stairways and ladders, the following safety practices and procedures need to be implemented and enforced at all construction projects. Ladders that project into passageways or doorways where they could be struck by personnel, moving equipment, or materials being handled must be secured to prevent accidental displacement or be protected by barricades. Workers should always face the ladder and use both hands when going up and down ladders. Materials and tools should be lowered or raised by a rope or other mechanical means. Hold on to the railing on stairways. The areas around the top and base of ladders must be free of tripping hazards such as loose materials, trash, and electrical cords. The same holds true for the bottom of stairways and on stairway platforms.

Ladders - Ladders must be capable of supporting four times the maximum intended load. Ladder rungs, cleats, and steps must be parallel, level, and uniformly spaced (not less than 10-inches nor more than 14-

inches). Do not tie or fasten ladders together to provide longer sections unless they are specifically designed for such use. All stepladders must be equipped with a metal spreader or locking device. Do not paint wooden ladders, except to stencil for identification. Maintain ladders free from oil, grease, and other slipping hazards. Ladders must extend at least 3 feet above the upper landing surface and be secured. The horizontal distance for the base of the ladder should extend 1 foot for every 4 feet in vertical distance. Wood job-made ladders must be used at an angle so that the horizontal distance is one-eighth the working length of the ladder and shall be made in accordance with ANSI A14.4. Do not use ladders on slippery surfaces unless they have been properly secured or provided with slip-resistant feet. Do not move, shift, or extend ladder while occupied. Never stand on the top step of a stepladder.

A competent person on a periodic basis and after any occurrence that could affect their performance must inspect ladders. Ladders with structural defects must be tagged with "Do Not Use" or similar language and withdrawn from service until repaired. Never use a metal ladder when working on electrical equipment or near electrical equipment where contact is possible. Any employee who uses a ladder or stairway must receive training by a **competent person** in the following areas:

- Types of fall hazards.
- Correct procedures for erecting, securing, maintaining, and disassembling fall protection systems.
- Proper construction (man-made), use, placement, and handling.
- Maximum intended load-carrying capacities.
- Requirements contained within 29 CFR 1926 Subpart X.

Stairways - Stairways that are not permanent parts of the structure must have landings of not less than 30 inches in the direction of travel. A platform must be provided where doors or gates open directly on a stairway. Metal pan landings and metal pan treads must be filled in with wood or other materials if they are to be used prior to being finished. Maintain all parts of stairways free from hazardous projections, such as protruding nails. Eliminate slippery conditions on stairways before the stairways are used to reach other levels. Every flight of stairs with four or more risers or rising more than 30 inches must have standard stair railings or standard handrails.

9.13 Materials Handling, Storage, Use, and Disposal

Applicable Standards:

OSHA 29 CFR 1926.250 through 252

USACE EM 385-1-1 Section 14 – Material Handling, Storage, Use and Disposal

In the handling of materials, employees must know the following: There must be safe clearance for equipment through aisles and doorways. Vehicles must be shut off and brakes must be set prior to loading or unloading. Containers of combustibles or flammables, when stacked while being moved, must be separated by dunnage sufficient to provide stability. Trucks and trailers will be secured from movement during loading and unloading operations. Hand trucks must be maintained in safe operating condition. Chutes must be equipped with sideboards of sufficient height to prevent the handled materials from falling off. At the delivery end of rollers or chutes, provisions must be made to brake the movement of the handled materials. Hooks with safety latches or other arrangements will be used when hoisting materials, so that slings or load attachments won't accidentally slip off the hoist hooks. Securing chains, ropes, chokers, or slings must be adequate for the job to be performed. When hoisting material or equipment, provisions must be made to assure no one will be passing under the suspended loads.

Stack, rack, block, interlock, or otherwise secure all materials and supplies to prevent sliding, falling, or collapse. Post the maximum safe load limits for floors within buildings and structures in a conspicuous

location. Never exceed the maximum safe load limit. Keep aisles and passageways clear to provide for the free and safe movement of material handling equipment and employees. Use ramps, blocking, or grading when a difference in road or working levels exists to ensure the safe movement of vehicles between the two levels. Do not place material within 6-feet of any hoistway or floor opening inside buildings under construction, nor within 10-feet of an exterior wall that does not extend above the material being stored. Stack bagged materials by stepping back the layers and cross-keying the bags at least every 10 bags high. Do not store materials on scaffolds or runways in excess of supplies needed for immediate operations. Remove all nails from used lumber prior to stacking. Stack lumber on level and solidly supported sills. Do not stack lumber higher than 20-feet (16-feet if handled manually).

Stack and block structural steel, poles, pipe, bar stock, and other cylindrical materials, unless racked, so as to prevent spreading or tilting. Attach handles or holders to the load to reduce the possibility of pinching or smashing fingers. Unload materials close to the point of final use to avoid unnecessary lifting. Do not stack non-compatible materials in the same pile.

Manual Materials Handling - Employees working alone should not attempt to lift or move a load that is too heavy for one person - get help! When working with materials stored in silos, hoppers, tanks, or similar storage areas, be aware that confined spaces may exist. Attach handles or holders to the load to reduce the possibility of pinching or smashing fingers. Wear protective gloves and clothing (i.e., aprons), if necessary, when handling loads with sharp or rough edges. When pulling or prying objects, workers should be properly positioned. Riding loads, slings, the ball, crane hook, or other material hoisting equipment is prohibited.

Engineering Controls - Engineering controls should be used, if feasible, to redesign the job so that the lifting task becomes less hazardous. This includes reducing the size or weight of the object lifted, changing the height of a pallet or shelf, or installing a mechanical lifting aid

OSHA standard 1926.251 provides guidance about the limitations and uses of slings used in conjunction with other material handling equipment for the movement of material by hoisting. Slings covered by this standard include those made of alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope, and synthetic web (nylon, polyester, and polypropylene). Some general work practices related to rigging include:

- Rigging equipment must be inspected prior to use on each shift and during its use to ensure that it is safe. Defective rigging equipment will be removed from service. A rigging inspection matrix form is located in Appendix C.
- Rigging equipment must not be loaded in excess of its recommended safe working load. The standard provides load capacity tables for various types of slings and associated hardware.
- Rigging equipment, when not in use, must be removed from the immediate work area.

In addition to these general guidelines, the standard has specific requirements related to alloy steel chains, wire rope, natural and synthetic rope, and synthetic webbing. Employees performing rigging work should be adequately trained in the safety and functional aspects of rigging for materials handling operations.

9.14 Signs, Signals, and Barricades

Applicable Standards:

OSHA 29 CFR 1026.200 – 203

DOT Manual on Uniform Traffic Control Devices (MUTCD)

USACE EM 385-1-1 Section 8 - Accident Prevention Signs, Tags, Labels & Signals

The use of signs, signals, and barricades is essential to make employees aware that an immediate or potential hazard exists. The following sections discuss the primary ways that employees are made aware of hazards in their work areas.

Accident Prevention Signs/Tags **-** Signs, signals, regulated areas, and barricades must be used on each construction project as appropriate.

Danger Signs are used wherever an immediate hazard (i.e., exposed electrical conductor) exists. The danger signs must have red as the predominant color in the upper panel and a white lower panel for additional sign wording.

Caution Signs are used to warn against potential hazards or to caution against unsafe practices. The caution signs must have yellow as the predominant color with a black upper panel (yellow lettering of "caution" on the upper panel) and a yellow lower panel for additional sign wording.

Exit Signs, when required, should be in legible red ¾-inches (1.9 cm) stroke letters, not less than 6-inches (15.2 cm) high, on a white field.

Safety Instruction Signs, when used, must be white with a green upper panel and white lettering to convey the principal message. Any additional wording must be in black lettering on the white background.

Directional Signals must be white with a black panel and a white directional symbol. Any additional wording must be in black lettering on the white background.

Traffic Signs must be posted at points of hazards in all construction areas. All traffic control signs or devices must conform to the DOT MUTCD, *Manual on Uniform Traffic Control Devices for Streets and Highways.*

Accident Prevention Tags are used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc.

Out of Order Tags are used to designate equipment that requires repair or maintenance. Equipment with such a tag may not be used until the tag is removed.

Signaling **-** Flagmen or other appropriate traffic controls must be provided for operations where signs, signals, and barricades do not provide the necessary protection on or adjacent to a highway or street. Signaling directions must conform to DOT MUTCD. Stop/Slow sign paddles must be used by flagmen when hand signaling. Red flags, at least 18 in^2, may be temporarily used in traffic control. Flagmen are required to wear a high visibility green or orange reflective warning vest and a hard hat while flagging. Required signs and symbols must be visible at all times when work is being done, and removed or covered promptly when the hazard no longer exists.

Cones, Barrels, Barricades, and Barriers **-** Channeling devices such as cones, barrels, or barricades are required for jobsite roadways presenting a hazard to motorized equipment or vehicles. Barriers may also provide a greater degree of work zone protection. Consult traffic control resources such as the DOT MUTCD for guidance on establishing and working in road construction work zones.

9.15 Housekeeping

Applicable Standard:

29 CFR 1910.25

USACE EM 385-1-1 Section 14.C Housekeeping

A policy of trash removal and the maintenance of good housekeeping practices will be implemented. The accumulation of construction debris may pose a significant fire hazard in addition to tripping and falling hazards.

Good housekeeping practices are the result of planning and organization. All personnel on the site must work together to maintain a clean worksite. The prompt removal of waste materials will permit a free flow of traffic through the work areas. Daily, or more frequent, inspections will be conducted by the SSHO to verify that the housekeeping controls are in place and being enforced.

Housekeeping activities in themselves may pose health hazards such as exposures to dusts, biological agents, and discarded chemicals. Liquid and solid waste chemicals must be placed in leak-proof containers for proper disposal.

9.16 Cranes and Hoists

Applicable Standards:

OSHA 29 CFR 1926.550 - 556

USACE EM 385-1-1 Section 15 – Rigging, 16.C Cranes and Derricks

The target goal of a crane safety program is zero crane accidents. To achieve this goal, the following safe work procedures must be implemented and enforced at all company projects:

- Crane operators are required to comply with crane manufacturer's specifications and limitations applicable to the operation of any and all cranes, derricks, and hoists.
- Rated load limits and recommended operating speeds, special hazard warnings, or instructions must be posted on all equipment.
- Hand signals to crane and derrick operators must conform to the applicable ANSI standard for the type of crane being used.
- A **competent person** who is knowledgeable in proper crane setup and operation activities must inspect all machinery and equipment prior to each use, and during use, to ensure it is in safe operating condition.
- Any defective parts must be repaired or replaced before use.
- A **competent person** who is knowledgeable in crane inspection techniques must perform an annual inspection of the hoisting machinery and provide a copy of the dates and results of inspections for each hoisting machine and piece of equipment to the site superintendent.
- All moving parts or equipment (belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheel, etc.) must be guarded to prevent contact by employees.
- Accessible areas within the swing radius of the rotating superstructure of the crane must be barricaded to prevent an employee from being struck or crushed by the crane.
- Exhaust pipes must be guarded or insulated to prevent contact by employees.
- Windows in cabs must be of safety glass, or equivalent, that introduces no visible distortions.
- Where necessary, a ladder or steps must be provided to allow access to a cab roof.
- Platforms and walkways must have anti-skid surfaces.
- A fire extinguisher of 3A:40B:C rating must be accessible at all operator stations or cabs of equipment. No part of a crane or load is permitted within 10 feet (3.0 m) of electric power lines, except where electrical distribution and transmission lines have been de-energized and visibly grounded. A person will be designated to observe clearance of the equipment and provide timely warning to the crane operator.
- No employee is permitted to work beneath a suspended load.

As part of a crane safety program, site superintendents will develop a working knowledge of the client's requirements for operating construction cranes, derricks, or hoists on project property. Interview prospective crane operators prior to site employment to ascertain competence and qualifications and check the prospective crane operator's past experience with previous employers, if possible. The Superintendent or his designee will conduct daily inspections to observe compliance with established company and client crane and rigging procedures and immediately shut down any crane operations that jeopardize the safety of any jobsite personnel.

9.17 Demolition

Applicable Standards:

OSHA 29 CFR 1926.850 Subpart T

USACE EM 385-1-1 Section 23 – Demolition, Renovation, and Re-Occupancy

During building/structure demolition, it is anticipated that an excavator with a grapple will be utilized to raise the structure. Applicable OSHA standards for building demolition, 29 CFR 1926.850 Subpart T, apply. A Registered Professional Engineer will perform an engineering survey and demolition plan prior to the commencement of any demolition activities. The engineering survey will determine the condition of the framing, floors, and walls, as well as the possibility of an unplanned collapse of any portion of the structure as well as the presence of hazardous materials (e.g., asbestos, lead paint, mercury vapor lights, liquids, etc).

Prior to commencement of any demolition activities, all accessible universal waste stream shall be removed from the buildings; all electric, gas, water, steam, sewer, and other service lines will be shut-off, capped, or otherwise controlled from outside of the building. The affected utility companies involved will be notified prior to of any planned demolition activities. However, utility workers during relocation activities or service cut offs performed prior to Site mobilization will not be covered by this Plan. Utility workers will be subject to their Company's health and safety programs.

Asbestos abatement and lead paint chip removal will be performed by a subcontractor licensed in the State of New Jersey. The subcontractor will prepare an Asbestos Abatement and Lead Paint Removal Work Plan prior to the start of abatement activities.

9.18 Underground Storage Tank

There is one underground storage tank (UST) that is scheduled to be removed from the Site. This tank is to be sampled to determine if there are materials present and if so, what those materials area. Once the material inside the tank is determined the appropriate steps to remove them from the tank will be covered in the task specific AHA.

Following the removal of tank contents but prior to excavation of the tanks and tank preparation activities, the tanks shall be inerted only by introducing an inert gas, carbon dioxide (CO2) or liquid nitrogen (N2), to remove flammable vapors. Before inerting, all openings in the tanks shall be plugged with threaded or expansion-type plugs, except the vent tube and the opening to be used for introducing the inert gas. Within 30 minutes prior to initiating any activities (e.g., excavation, preparation, removal, opening, demolition, transportation, or other similar activities) involving a tank which has been inerted, the inerted nature of the tank (oxygen levels less than 8%) shall be verified.

CO_2 fire extinguishers shall not be used for inerting the tank interiors. If a compressed gas (e.g., CO_2 or N_2) is introduced into the tank, the following requirements shall be met to prevent the buildup of static electricity:

- The UST and the compressed gas supply tank shall be bonded together and grounded.

- The compressed gas shall be supplied only at low flows.
- The liquid or gas shall be released at the tank bottom so that static electricity is not generated by liquid falling to the bottom of the tank. The tank shall be slowly filled from the bottom up.
- Dry ice, which evolves CO_2 gas as it evaporates, shall be introduced in the amount of at least 3 lbs per 100 gallons of tank capacity, if used. Skin contact with dry ice shall be prevented by wearing heavy cloth gloves.

Sufficient quantities of inert gas (CO_2 or N_2) shall be introduced into the tanks to lower the oxygen content to less than 8%. Pressure inside the tank shall not exceed 5 psi. Prior to proceeding with additional activities involving the tanks (e.g., excavation), the oxygen content of the tanks shall be monitored to confirm that it is less than 8%. Additional oxygen level monitoring shall be conducted at least hourly while activities involving the tanks are underway and prior to decontamination of tank interiors; at least daily during periods in which the tanks are not being disturbed; or as directed by the COR. If monitoring of tank interiors indicates that oxygen levels are not remaining below 8%, additional inert gas shall be introduced and more frequent oxygen monitoring shall be initiated.

During inerting procedures, an extension vent tube at a minimum of 12 feet above grade shall be used to discharge tank vapors. Continuous combustible gas/oxygen monitoring shall be conducted at the vent and inert gas introduction holes.

The air within the storage tanks shall be monitored to ensure the space is adequately purged and safe for personnel entry, or to ensure the tank has been adequately inerted and the oxygen content is less than 8%. In both instances, monitoring shall be performed at the top, bottom, and middle areas of the tanks to ensure stratification has not occurred. Monitoring results shall be reported to project personnel to ensure safe operations.

When monitoring to ensure purging, both oxygen content and LFL readings are required. Prior to obtaining LFL readings, the Contractor shall monitor the oxygen content of the space and verify that the CGIs are operating within the oxygen limits identified by the CGI manufacturer. Personnel shall not be permitted to enter spaces with oxygen levels less than 19.5%, except in emergencies, and then only when equipped with the proper PPE and when following permit-required confined space entry procedures.

Tanks shall be lifted using equipment with a rated capacity greater than the load to be lifted. Tanks shall be lifted by lifting eyes or by straps under the ends of the tanks. Tanks shall not be lifted by the manhole flange or by removing the bungs. Personnel shall be directed to remain away from the ends of the tanks and tanks shall be positioned, whenever possible, with the ends oriented away from occupied or traveled areas, due to potential for rupture. During transportation, the tanks shall be secured to prevent movement.

Tanks shall be demolished before being removed from the Site unless they are transported directly to a state-certified tank destruction facility. Demolition will not be permitted until decontamination of the interiors and exteriors is complete. Demolition shall involve opening the tanks sufficiently to permanently prohibit further use as containers of liquids. Tanks shall be inerted and tested before they are opened.

Safety practices and procedures for the cleaning of the storage tanks shall conform to API Std 2015. The interior and exterior of the tanks shall be decontaminated prior to removing them from the work site unless the tanks are being transported directly to a state-certified tank destruction facility. Volatile organic solvents shall not be permitted to be utilized for decontamination procedures. Personnel shall not enter any of the storage tanks as a part of this project, except when following permit- required confined space entry procedures. Decontamination fluids shall be collected and disposed of at an approved facility. Upon completion of this project, written certification shall be made that the tank was properly decontaminated prior to being removed from the Site.

Cleaning procedures will be based on tank contents. The task specific AHA shall list the proper cleaning procedure steps and materials once the tank sample results indicate its contents.

9.19 Severe Weather

9.19.1 Lightning

Work will not be permitted in open areas, near trees or other equipment outside during lightning storms. Work will cease and field personnel provided appropriate shelter until the storm passes. Work shall not resume until at least 30 minutes after lightning was last observed. A lightning detection meter shall be utilized at the Site to monitor for storms that may produce lightning. When an approaching storm is within 20 minutes of the Site, water operations will be suspended. All waterborne personnel will be brought to shore to seek appropriate shelter.

9.19.2 Tornadoes

In the event of a tornado watch/warning all activities will be immediately suspended and workers brought to shore. In the event of a tornado warning all site activities will be suspended immediately and all workers will seek appropriate shelter.

10.0 SITE CONTROL MEASURES

This section outlines site control measures to be implemented to minimize potential exposure to and accidental spread of hazardous substances during remedial activities. Listed below are the work zones that will be established. The zone boundaries may be modified as necessary as new information becomes available.

10.1 Work Zones

The Site will be divided into Exclusion, Contamination Reduction, and Support Zones. It should be recognized that the Site control zones will be modified continually. The SSHO will review the location of work zones at the daily safety briefing.

The SSHO and at least one person who has completed Supervisor's Training will be present at the Site whenever work is performed in the Exclusion Zone or Contamination Reduction Zone. Similarly, at least two First aid/CPR-trained individuals will be present at the Site when work is performed in those zones.

10.1.1 Exclusion Zone (EZ)

The Exclusion Zone is where there will be direct contact with the potentially contaminated material. PPE will be required in this zone. The SSHO will enforce these requirements. The level of PPE required will be based on hazard, site condition and air monitoring performed. The outer boundary of the Exclusion Zone will be delineated. Modification to the size and boundary of the Exclusion Zone will be made in the field by the SSHO based on operations and wind direction. The Exclusion Zone may be subdivided into different areas of contamination and different levels of PPE may be assigned based upon the expected type and degree of hazard.

All activities in exclusion zone will be conducted using the "buddy system". This involves a buddy who is able to provide his or her partner with assistance, observe for signs of chemical or heat exposure, check integrity of PPE and go for help when needed.

10.1.2 Contamination Reduction Zone (CRZ)

The Contamination Reduction Zone is where workers and equipment will be decontaminated. This will minimize the spread of contaminants from the Exclusion Zone into clean areas. The Contamination Reduction Zone will consist of the area located in front of or next to the exclusion zone so that personnel

or equipment exiting the Exclusion Zone can be decontaminated and doff the PPE. Emergency equipment to be located in this area will include eye wash stations, fire extinguishers, first aid kits and other appropriate equipment. The Contamination Reduction Zones or personal decontamination stations will be established adjacent to the Exclusion Zones. These stations will provide a means for prompt removal of potentially contaminated outer PPE at a location convenient to operations.

10.1.3 Support Zone

The Support Zone is considered to be uncontaminated. This area will be used as a storage area for operations equipment and where break and toilet and shower facilities will be located.

10.2 Site Entry and Exit Control Log

All site personnel on this project will undergo safety orientation by the SSHO prior to starting work at the site. This training will include general site safety rules, hazardous locations, personal protective equipment guidelines, and onsite emergency procedures. All site personnel will satisfy the following requirements before initiating work onsite within the Exclusion or Contamination Reduction Zones:

- Receive and pass a physical examination, including certification of ability to wear respiratory protection.
- Receive adequate hazardous waste training according to 29 CFR 1910.120 or 29 CFR 1926.65.
- Receive a briefing on all aspects of the SSHP.
- Are properly dressed, equipped, and trained in accordance with all personal protective guidelines.
- Are thoroughly trained regarding decontamination procedures.
- All personnel performing tasks when respiratory protection is needed will comply with the requirements of this plan

All personnel entering and exiting the Exclusion and Contamination Reduction Zones will sign in and out through the Support Zone. The log will indicate the date and time entering and exiting, the location entered, personal protective equipment utilized and decontamination procedures.

11.0 PERSONAL HYGIENE AND DECONTAMINATION

Decontamination (Decon) is the process of removing or neutralizing potentially harmful contaminants that have accumulated on personnel and equipment in order to reduce the spread of contamination outside the work area. Decontamination is critical to the Safety and Health of Site workers and it protects the community by minimizing the off-site migration of contaminants. One of the most important aspects of controlling contaminated material migration is the prevention of the spread of contamination. Good contamination prevention will minimize employee and public exposure.

All personnel and equipment leaving the Exclusion Zone must be decontaminated in the Contamination Reduction Zone prior to entering the Support Zone. The decontamination process is composed of a series of steps performed in a specific sequence. The basic concept is that more heavily contaminated items will be decontaminated and removed first, followed by decontamination and removal of inner, less contaminated items.

During remedial activities at the Site, all items taken into the Exclusion Zone must be considered contaminated and must be carefully inspected and/or decontaminated before leaving the Site. All contaminated vehicles, equipment and material will be cleaned and decontaminated to the satisfaction of the SSHO prior to leaving the Site. Decontamination procedures will be posted at every decontamination station throughout the project.

11.1 Personal Decontamination

Personnel exiting the Exclusion Zone during remedial activities at the Site will follow the procedure below.

As the worker leaves the Exclusion Zone, he places his equipment and tools in the Exclusion Zone or Contamination Reduction Zone. After the worker places his equipment and tools down, gross contamination will be removed from outer clothing and boots. Workers will then remove their outer boots and outer gloves and place them in plastic garbage bag-lined containers.

Once outer gloves are removed, workers will remove all outer garments and place them in plastic garbage bag lined containers. Once workers are fully decontaminated and all garments are removed, workers will remove their respirators (applicable to Level C) followed by removal of inner gloves. Used cartridges and inner gloves will be placed into plastic garbage bags.

All decontamination stations will be established on (2) - 6 mil plastic sheets, covered with approximately 2 inches of stone. The stone will be replaced of as often as is deemed appropriate.

The change trailer will be used by the on-site staff for short breaks during the workday. The trailer will have an area for changing, washbasins, and counters. This trailer is considered part of the Support Zone and cannot be entered from the Contamination Reduction Zone unless the individual has completed the outlined decontamination procedures. All equipment will be decontaminated before being brought into the trailer.

11.2 Respirator Decontamination

Respirators are to be decontaminated, cleaned and sanitized before reuse. Cartridges and/or filters must be replaced as needed and, as a minimum, changed daily. The respirators are then cleaned with cleaning and sanitizing solutions, wiped dry and placed into sanitary containers or bags and sealed closed. Before departing the change locker facility, respirators are placed into storage compartments for next day use.

11.3 Equipment Decontamination

Nearly all hardware (not consumable) is considered to be recoverable. As such, they will be decontaminated using the proper equipment, (i.e. brushes, sprayers, detergent and, if necessary, other appropriate solvents). Large heavy equipment will be decontaminated with pressure steam wash as required.

The decontamination area for vehicles and equipment leaving the Exclusion Zone will be located within the Contamination Reduction Zone. Equipment will be decontaminated over 2 layers of 6-mil plastic placed on the ground. Scrapers and brushes will be used to remove gross contamination prior to final decontamination. A pressure steam cleaner will be used for the final cleaning and decontamination of the equipment. The combination of dry removal with the brushes and use of the steam cleaner will minimize the generation of contaminated liquid. All solids and liquids will be collected for disposal. Efforts will be made to minimize soil (even non-contaminated soil) from being tracked off-site. Dirt and mud will be removed from trucks and vehicles leaving the Site to the extent practicable.

11.4 Decontamination Log

A decontamination log will be maintained and will list the equipment name and model number, the equipment I.D. number, the activities the equipment was used for, the method of decontamination, amount of decontamination, date and time of decontamination and names of personnel doing the decontamination. This log will be maintained by the SSHO and included in the Safety and Health Report.

11.5 Decontamination Residue

Decontamination residue consists of disposable PPE (such as Tyvek, gloves, tape and cartridges) and settled solids. Decontamination residue will be drummed and stored in the Exclusion Zone until subsequent treatment or disposal.

11.6 Personal Hygiene and Sanitation

Hands and face will be thoroughly washed before eating, smoking, drinking, chewing gum or tobacco.

When possible, avoid contact with contaminated materials.

Support facilities such as wash facilities, eating areas, changing areas, and portable toilets will be located in the Support Zone. This area will remain "clean" and free of contamination.

An adequate supply of potable water will be provided to the employees working at the Site. Clearly labeled potable containers will be used to dispense drinking water. Containers will be cleaned at the beginning of each day. The containers will be equipped with taps to access the water. Clean disposable cups will be provided daily.

Portable toilet facilities will be provided on-site for employees and will be located in the Support Zone.

Eating, drinking, smoking, chewing gum or tobacco, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited during remedial activities except in designated eating or smoking areas outside the Exclusion and Contaminant Reduction Zones. Sevenson employees, subcontractor employees, and service personnel are required to thoroughly decontaminate themselves prior to entering the Support Zone.

12.0 EMERGENCY CONTINGENCY PLAN

This section describes the emergency response plan that will be implemented by Sevenson to handle emergencies. The nature of the project, the contaminants present and the activities planned for the site are such that there is little potential for an emergency, which would result in a significant release of hazardous substances, and in any way threaten the adjoining community. There is always the potential at any site for emergency situations to occur which threaten the on-site workers. Possible examples of emergency situations during remedial activities include equipment fires or worker injury. In all of these cases, procedures will be implemented to minimize the possibility of an emergency situation. The procedures outlined below are designed to ensure that the workforce reacts quickly and appropriately to emergency situations, thereby protecting the health and well being of the individual workers. It is expected that modifications may be necessary upon actual site set-up and conditions.

NOTE: In the event of a serious or life threatening emergency the primary consideration is the immediate health of the individual rather than routine contamination controls. Standard contamination control protocols shall not interfere with the prompt medical attention required of a seriously injured worker.

12.1 Pre-Emergency Planning

During the site safety briefings held daily, all employees will be informed of the location of this plan, the procedures outlined in this plan, and the communication systems and evacuation routes to be used during an emergency.

On a continual basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency.

A coordination meeting with local emergency response agencies (fire, police, rescue and medical facility) will be conducted prior to work starting at the site. The site activities and potential hazards that may be encountered by responders will be reviewed during this meeting.

12.2 Personnel Responsibilities

All on-site employees have a role in mitigating an emergency incident. The Project Superintendent has primary responsibility for responding to and directing emergency response operations to correct emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the public. He is additionally responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. The SSHO will assist and advise the Project Superintendent, and will direct any emergency medical responses.

The following is an outline of job titles and corresponding responsibilities during an emergency.

- The Site Superintendent directs emergency response activities and serves as liaison with appropriate Client and Client representative's personnel, subcontractors and tenants at the industrial park. In the event of an emergency the Project Superintendent will be the Incident Commander.
- The SSHO recommends that work be stopped if any operation threatens worker or public health or safety and advises Site Superintendent of emergency procedures. The SSHO will assume the responsibility of Incident Commander if the Project Superintendent is off-site.

12.3 Evacuation Routes and Procedures

In the event of an emergency that necessitates an evacuation of the site, on-site personnel will be notified by hand-held or mobile two-way radios to leave the area by immediate emergency exit. An alternate method of communication will be the use of a portable air horn sounded in regularly spaced, repeated blasts. The Site Superintendent or his designee will notify the appropriate responding agencies.

During an evacuation, all non-emergency radio transmissions will cease. The SSHO, in conjunction with the Project Superintendent, will control the scene until the appropriate municipal and state agencies arrive and a site specific Incident Command System should be implemented. Since site conditions, (i.e., wind direction, precipitation, and work location), change often, the SSHO will determine the appropriate evacuation procedures.

All personnel will assemble/muster at the Safety and Health trailer unless otherwise directed by the Site Superintendent or SSHO. Access to the site will be restricted.

12.4 Emergency Decontamination Procedures

Decontamination of an injured or exposed worker will be performed if decontamination does not interfere with essential treatment. The objective is to successfully administer first aid without exposing rescue workers and the victim to contaminants. Project personnel will meet with the local hospital to discuss the possibility of having to treat injured personnel from the site.

If the hazards are low and decontamination can be performed, then a wash, rinse and removal of protective clothing will be performed.

If the hazards are high and decontamination cannot be done, then the following procedures will be performed:

- Wrap the victim in blankets or plastic sheeting to reduce contamination of rescue workers or other personnel.
- Alert emergency and medical personnel to potential contamination. Emergency entry into the exclusion zone will be controlled by the SSHO. The SSHO will determine if the victim can be moved

from the exclusion zone. If entrance into the exclusion zone is required, the SSHO will ensure that the emergency workers don the proper PPE.

- The SSHO will accompany the victim to the hospital.

12.5 Medical Treatment/First Aid

The SSHO will be trained in CPR and First Aid and have first aid kits for use in a medical emergency. First Aid Kits will be located in the main support area, Contamination Reduction Zone and at the work activity locations. Eyewash stations will be available at the Contamination Reduction Zone. Eyewash stations will be of the pressurized, 15-minute discharge type. On-site employees have a basic knowledge of first aid and will assist the Site Superintendent and SSHO. Community emergency services (EMS, Fire, and Police) will be notified immediately if their resources are needed on site.

If necessary, the injured or sick party will be taken to Jersey City Medical Center– Please refer to ***Figure 3 – "Route to Hospital Map"***, for directions to the area hospital. Route to the area hospital will be posted and easily visible at all times.

12.6 Emergency Alarms/Notifications and Procedures

When any emergency occurs on-site the SSHO and Project Superintendent will be notified immediately. The Project Superintendent or the SSHO will notify the client and his representatives. Please refer to the ***Table 7 – "Emergency Telephone Numbers"*** for emergency telephone numbers. Emergency Telephone numbers will be posted and easily visible at all times.

All emergency communications will flow through the radio network. Outside emergency services will be notified, as necessary. The site evacuation alarm consists of one long blast on a horn, every 10 seconds. Any time the alarm system is activated, on site personnel will be notified immediately. Personnel will extinguish any nearby ignition source and prepare for emergency response activities. This alarm will also be used to alert personnel of a sudden release of hazardous materials.

The observer of the emergency condition will brief the responding personnel as to the nature and location of the incident. When they have assessed the situation, a decision whether or not to implement these procedures will be made. If these Emergency Contingency Procedures are not implemented, the "All Clear" will be given verbally by supervisory personnel. The "All Clear" will be used to indicate a return to normal (non-emergency) conditions following emergency response activities. The alarm signals will be prominently posted at the site. The audible alarm system will be discussed with each resident within hearing range of the alarm system.

Figure 3 – Route to Hospital Map

Directions

1. Exit Site by turning RIGHT onto Jacobus Ave towards 2nd Street
2. Turn slight LEFT and merge onto US-1 Trk N/US-9 Trk N via the ramp on the LEFT
3. Stay straight to go onto Communipaw Avenue
4. Turn LEFT onto Grand Street
5. Arrive at Jersey City Medical Center at 355 Grand Street, on the right. 201-324-5000

Table 7 Emergency Telephone List	
Police	911
Fire	911
Ambulance	911
Hospital – Jersey City Medical Center **355 Grand Street** **Jersey City, NJ 07302**	201-324-5000
Dr. Greaney – Occupational Specialist (Work Care)	714-456-2154
WorkCare Injury Intervention	888-449-7787
Sevenson Environmental Services, Inc.	
Paul Jung – CIH	716-284-0431(work)/716-609-1767(cell)
Alfred LaGreca - Corporate Project Manager	716-284-0431(work)
Steve Gillespie – Project Manager	716-609-1413 (cell)
Perry Novak – Project Superintendent	973-462-1155 (cell)
Davis Raver –Safety and Health Officer	908-247-0585 (cell)
US Army Corps of Engineers	
Neal Kolb- Resident Engineer	732-846-5830
Michael Johnson - Contracting Officer Representative	
Matt Kramer – Construction Inspector	347-495-6570 (cell)
Other Numbers	
New Jersey One Call (Dig Safely)	800-272-1000
NJDEP 24-Hour Hot Line	877-WARNDEP (877-927-6337)
National Response Center	800-424-8802
CHEMTREC	800-424-9300

12.7 Implementation of the Plan

There is a logical sequence of steps to follow in responding to emergencies, which should be followed by site personnel. This sequence involves identifying the emergency, investigating the extent of the emergency, deciding on the proper initial course of action, taking corrective action to rectify the situation, and following up with a post-emergency investigation.

Equipment breakdowns, power failures, injuries, and natural disasters are usually rather dramatic and will capture the individual's attention immediately upon occurrence. In other cases, the individual may have prior warning of impending emergencies through weather reports in the case of natural disasters and trends in equipment performance in the case of some breakdowns.

In the event of a fire, explosion, accidental material release, or any other emergency, response activities will be initiated following the evaluation of the event. An assessment of the situation will be performed by the SSHO immediately upon notification. The Superintendent or SSHO is authorized to commit resources to the extent detailed in this plan. If it is determined that an emergency situation exists, he will then implement the appropriate emergency response activities.

In the event that a medical emergency or accident occurs in the Exclusion Zone, all personnel responding to the emergency shall be outfitted in the Personal Protective Equipment appropriate for the situation. As a general rule, personnel shall not enter the Exclusion Zone without donning the minimal level of PPE required. In the event that a worker is overcome or disabled for an unknown reason, the SSHO must make a determination as to the appropriate level of respiratory protection. Specifically, a determination must be made as to whether Supplied Air Respirators are necessary for the protection of the responders.

12.7.1 Conditions for Implementation

The contingency plan will be activated by the Superintendent or SSHO immediately in the event of a fire or explosion, or emissions of toxic chemicals in excess of limits set forth by Federal, State, and local agencies. In the event of a spill or material release, it will be up to the Superintendent or SSHO to make a determination as to when emergency conditions exist, as opposed to routine maintenance of the site. His determination will depend upon the location of the spill, the size of the spill, weather conditions and the proximity of the release to workers, the community and environmental receptors.

Once it becomes apparent that an emergency situation exists or that a disaster is impending, the Project Superintendent or SSHO shall conduct an assessment. Assessment of the emergency should include assessing the severity of the situation and collecting enough information to make an initial action decision.

Assessing the emergency should include identifying injured persons (if any), damage to buildings and equipment, noting potential impending damage if corrective action is not taken immediately, and itemizing resources required to correct the situation.

12.7.1.1 Fire or Explosion

The potential for fire or explosion does exist. These sources include welding gases, gasoline for portable equipment, diesel fuel for the heavy equipment, and combustible debris. In the event of an explosion, possible emergency conditions would exist. Unless extinguished immediately, a fire or explosion will trigger implementation of the emergency procedures.

12.7.1.2 Material Spills

Material spills can occur during truck loading and from vehicle accidents. Additionally, equipment fueling operations can produce spills. Ultimately, a spill can contaminate receiving surface water or cause a release of vapors to the air. A spill of fuel can also ignite. A small spill shall be cleaned up immediately, but should not trigger activation of these emergency procedures. Should an on site spill occur, the immediate response will include closing off the source of the spill, if possible, application of the sorbent material or sand bagging, and street sweeping, as appropriate. Any spill that results in a discharge to off site surface water will be contained with sorbent booms as needed. All spills will be investigated, and a written report will be provided to the regulatory agencies in accordance with applicable regulations.

12.7.1.3 Severe Weather

In the event of severe weather, the Site Superintendent and/or the SSHO have the authority to stop operations and direct evacuation procedures. All equipment will be secured and grounded. After the storm, a visual inspection will be performed by the Superintendent and/or the SSHO to check for damage and hazards. These will be performed before any work is resumed. If damage or hazards are noted, Sevenson personnel will evaluate the conditions and implement corrective actions to repair the damage or eliminate the hazard. These actions will begin as soon as possible and will take precedence over other Site activities.

The following controls will be implemented for severe weather:

- When the storm is within 20 miles of the Site all Site personnel will be notified that severe weather is approaching. Any work being performed above ground level will be stopped. Employees will take precautions to secure items that could become airborne from high winds at this time.

- When the storm becomes localized (within 8 miles of the Site) all work will be stopped, equipment secured, and workers will make their way to a designated shelter area.
- Work will not resume until the storm has cleared the Site for a minimum of 30 minutes.

The SSHO with the approval by the Contracting Officer's Representative will designate acceptable shelter areas and will post a map of these areas on the Job Site Bulletin Board.

12.7.2 Initial Action

Once the extent of the emergency is known, the Superintendent and the SSHO will make an immediate decision as to what initial steps should be taken to remedy the emergency situation. This first action, in the case of large-scale emergencies, usually consists of notifying responsible authorities and/or calling for the necessary assistance in order of priority.

The individual(s) should not unduly endanger him or herself or others by attempting tasks for which the proper equipment is not available or with which he or she is unfamiliar. In all cases, if in doubt, wait until qualified help arrives before taking action.

12.7.3 Corrective Action

When help arrives, the Site Superintendent or SSHO shall immediately inform those called of the pertinent details of the situation. Corrective action shall be continued until the situation is either under control or completely rectified. If corrective actions will take considerable time, a long-term effort to complete the task should be developed.

12.7.4 Follow-through

After the situation is corrected, the cause of the emergency event is to be determined and review of the corrective actions taken, etc. In the case of equipment failure, if negligence was not a factor, then revising maintenance procedures would be the most likely first preventive step. For natural disasters that cannot be prevented from recurring, the procedures followed in dealing with them can be reviewed to develop more effective action plans. The entire event, along with all of the responses, will be thoroughly documented for review by management and project supervisory personnel.

12.8 Spill Response and Control Plan

The purpose of this section is to define practices and procedures for the prevention, containment, and cleanup of accidental discharges of hazardous substances during the project. These substances include both the contaminated material managed as a result of the remedial project, such as contaminated soils and decontamination liquids, and construction materials typically found on any construction site, such as lubricating fluids, diesel fuel, gasoline, etc.

Spill prevention applies to all types of spills and can be described as the first and simplest approach to spill control. Human error is a major contributing factor to spills and releases. An awareness of spill consequences, preventive measures, and countermeasures will greatly reduce spill occurrences. A sound prevention program includes careful work practices, constant inspection, and immediate notification and correction of deficiencies. In the event that a spill does occur, proper containment and cleanup procedures must then be followed in order to reduce the effect of the spill.

12.8.1 Prevention

Prevention of unnecessary spills is of first priority. Prevention measures include:

- Operators and drivers will exercise extreme caution when transporting material around the site.

- When removing hoses from machines an appropriate and adequate supply of absorbents will be on hand. A supply of the following absorbents will be kept on-site, oil sorbent booms, rolls and pillows, universal towels and sheets, and vermiculite.
- Hoses will be capped when not connected to their appropriate fitting.
- All containers will be inspected daily for decay. No open container will be exposed to rainfall, snowfall, etc. without being emptied and cleaned of residue.
- All equipment will be inspected for leaks before and after service.
- Storage of material such as fuels, oils, and solvents on-site will be limited to the minimum required. All fluids will be stored in individual fluid containers appropriate and approved for the material. Most of the individual fluids containers will be further secured by storage in large, locked tool and equipment storage containers. Drums or other containers too large to be stored in containers will be stored raised off the ground on a liner and covered by plastic.

12.8.2 Reporting

All spills will be reported immediately to appropriate field and office management personnel. The sequence of reporting will be as follows:

- Notification by workers to the Project Superintendent or SSHO.
- The Project Superintendent or SSHO will immediately notify the Contracting Officer Representative regardless of the size of the spill.
- Sevenson and the Contracting Officer Representative will jointly determine the nature of the spill, its size, direction of travel, if anyone has been injured as a result of the spill and whether it requires immediate notification to regulatory agencies.
- The Contracting Officer Representative will have primary responsibility for notifying the regulatory agencies. Sevenson will have follow-up responsibility to verify that the notification is made in a timely manner. A full list of emergency contacts and telephone numbers is included this plan. This list includes Sevenson personnel, as well as federal, state and local authorities. This list will be posted in all trailers on-site.
- The NJDEP will be notified by Contracting Officer Representative or the SSHO of all spills (regardless of their size); notification will be made to the NJDEP Hot Line.

Upon notification of a spill, all project activity will be immediately suspended and all necessary equipment and personnel will be diverted to spill control and containment. In the event of a spill, and regardless of the size, a Spill Incident Report will be submitted to the Contracting Officer Representative with a copy to the USEPA within 48 hours of the incident.

12.8.3 Spill Response Equipment

Given the nature of this project, all the necessary equipment and personnel necessary to deal with a release of hazardous substances will be available on site. In addition to the heavy equipment and personal protective equipment, which is critical to spill control, Sevenson will have on hand an ample amount of sorbent materials, UN1A2 open top drums and overpacks.

12.8.4 Confinement and Containment

Prior to entering a spill area, all workers must be protected from any adverse effects of the spilled material. No one will enter any spill area alone. The SSHO will determine the level of protection required for response activities. To the extent practicable, the area will immediately be cordoned off and, if appropriate, exclusion, contamination reduction, and support zones will be established.

The decision to use confinement techniques such as diversion, diking and retention, are generally based on time, personnel, equipment, and supplies. As mentioned above, all necessary resources will be available on-site at all times. To the extent the nature of the material is known, the decision shall be made based upon a review of the harmful effects of the material. In the event of a large migrating spill, an unlikely circumstance, diversion techniques, such as placing a soil wall or absorbent boom ahead of the spill, will be implemented first. Subsequently, diking techniques, such as using material such as sand covered with liner material (PVC, hypalon) shall be implemented.

12.8.5 Cleanup

Once a spill has been contained and the source of the spill corrected and controlled, cleanup can begin. Spill cleanup can proceed at the same time as containment, if feasible. Supervisory personnel will determine the appropriate cleanup methods. The SSHO will determine the appropriate level of protection depending upon the nature of the material.

- The first action will be to absorb free liquids with absorbent pads, booms, pillows, or clay. The absorbent material will be placed in drums and moved to an appropriate storage location. Subsequent to the removal of free liquids, soil believed to be contaminated will be excavated and containerized in drums or stockpiled on poly sheeting and covered for further testing.
- Dry spills, while posing less of a risk of migration, will still require appropriate and immediate action. The nature of the spilled material will be ascertained. The spilled material will be recovered for reuse if appropriate. Material which cannot be recovered, and residual contaminated soil will be shoveled into 55-gallon drums, placed in the drum storage area, and sampled and analyzed for waste characterization and disposal.
- Once containerized, Sevenson Environmental will provide for the appropriate sampling and analysis for waste characterization and disposal facility acceptance. Results of waste characterization analysis, waste profiles, and manifests will be provided to the Construction Representative for review.
- All spilled material and visually contaminated soil will be excavated and containerized in the initial spill response. If there appears to be a possibility that contaminants have migrated into the surrounding soil, post-remedial sampling will be initiated. Soil samples will be taken from the areas of suspected contamination and analyzed for the compounds, which were released.
- NJDEP requires the immediate notification for spills (regardless of their size) to the NJDEP Hot Line.

Personnel Decontamination - In general, all spill response operations will be performed in accordance with the provisions of the approved SSHP.

12.9 Report/Review

An immediate verbal notification will be given to the appropriate government agencies (EPA and NJDEP, National Response Center) and the Contracting Officer Representative with a written report to follow within 24 hours of the incident resolution. The Contracting Officer Representative will be provided with a copy. In addition, all key personnel will have a meeting within 48 hours of the incident to discuss and critique all of the aspects of the Emergency Contingency Plan according to new site conditions and lessons learned.

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Appendix C

Chemical Information Sheets

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Polychlorinated Biphenyls (PCBs)

CAS Number: 1336-36-3

What are PCBs?

Polychlorinated biphenyls (PCBs) were developed in the 1940's and were used extensively in the manufacture of transformers, capacitors, and other heat transfer devices through the late 1970's. PCBs are a group of chemicals that have extremely high boiling points and are practically nonflammable. Because of this, they were used extensively as heat transfer fluids in transformers and capacitors. In 1979 their manufacture and importation was banned in the United States, based on mounting evidence that they were toxic to humans and wildlife. Today they are classified as probable human carcinogens and are listed in the top 10% of EPA's most toxic chemicals. At older federal facilities today, there are still many PCB-containing transformers and capacitors. Many of these transformers are at or close to the end of their useful life and proper disposal of them is required to prevent the unnecessary (and unlawful) release of PCBs into the environment.

How might I be exposed to PCBs?

Fish consumption appears to be the major pathway of exposure. PCBs do not easily break down, and can bioaccumulate in the fatty tissues of fish and mammals. A significant trend of increasing body burden is associated with increased fish consumption. People who eat sport-caught fish consumed 2-3 times more fish than the overall U.S. population.

Concentrations of PCBs in subsurface soil at a Superfund site have been as high as 750 ppm. People who live near hazardous waste sites may be exposed to PCBs by consuming PCB-contaminated sportfish and game animals, by breathing PCBs in air, or by drinking PCB-contaminated well water.

Although PCBs are no longer made in the United States, people can still be exposed to them. Many older transformers and capacitors may still contain PCBs, and this equipment can be used for 30 years or more. Old fluorescent lighting fixtures and old electrical devices and appliances, such as television sets and refrigerators, may contain PCBs if they were made before PCB use was stopped. When these electric devices get hot during operation, small amounts of PCBs may get into the air and raise the level of PCBs in indoor air. Because devices that contain PCBs can leak with age, they could also be a source of skin exposure to PCBs.

Workplace exposure to PCBs can occur during the repair and maintenance of PCB transformers, accidents, fires, or spills involving PCB transformers and older computers and instruments, and disposal of PCB materials. In addition to older electrical instruments and fluorescent lights that contain

PCB-filled capacitors, caulking materials, elastic sealants, and heat insulation have also been known to contain PCBs. Contact with PCBs at hazardous waste sites can happen when workers breathe air and touch soil containing PCBs. Exposure in the contaminated workplace occurs mostly by breathing air containing PCBs and by touching substances that contain PCBs.

How can PCBs enter and leave my body?

If you breathe air that contains PCBs, they can enter your body through your lungs and pass into the bloodstream. We do not know how fast or how much of the PCBs that are breathed will pass into the blood. A common way for PCBs to enter your body is by eating meat or fish products or other foods that contain PCBs. Exposure from drinking water is less than from food. It is also possible that PCBs can enter your body by breathing indoor air or by skin contact in buildings that have the kinds of old electrical devices that contain and can leak PCBs. For people living near waste sites or processing or storage facilities, and for people who work with or around PCBs, the most likely ways that PCBs will enter their bodies are from skin contact with contaminated soil and from breathing PCB vapors. Once PCBs are in your body, some may be changed by your body into other related chemicals called metabolites. Some metabolites of PCBs may have the potential to be as harmful as some unchanged PCBs. Some of the metabolites may leave your body in the feces in a few days, but others may remain in your body fat for months. Unchanged PCBs may also remain in your body and be stored for years mainly in the fat and liver, but smaller amounts can be found in other organs as well. PCBs collect in milk fat and can enter the bodies of infants through breast-feeding.

How can PCBs affect my health?

Many studies have looked at how PCBs can affect human health. Some of these studies investigated people exposed in the workplace, and others have examined members of the general population. Skin conditions, such as acne and rashes, may occur in people exposed to high levels of PCBs. These effects on the skin are well documented, but are not likely to result from exposures in the general population. Most of the human studies have many shortcomings, which make it difficult for scientists to establish a clear association between PCB exposure levels and health effects. Some studies in workers suggest that exposure to PCBs may also cause irritation of the nose and lungs, gastrointestinal discomfort, changes in the blood and liver, and depression and fatigue. Workplace concentrations of PCBs, such as those in areas where PCB transformers are repaired and maintained, are higher than levels in other places, such as air in buildings that have electrical devices containing PCBs or in outdoor air, including air at hazardous waste sites. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Is there a medical test to determine if I have been exposed to PCBs?

Levels of PCBs in the environment were zero before PCBs were manufactured. Now, all people in industrial countries have some PCBs in their bodies. There are tests to determine whether PCBs are in the blood, body fat, and breast milk. These are not regular or routine clinical tests, such as the one for cholesterol, but could be ordered by a doctor to detect PCBs in people exposed to them in the environment and at work. If your PCB levels are higher than the background levels, this will show that you have been exposed to high

levels of PCBs. However, these measurements cannot determine the exact amount or type of PCBs that you have been exposed to, or how long you have been exposed. Although these tests can indicate whether you have been exposed to PCBs to a greater extent than the general population, they do not predict whether you will develop harmful health effects. Blood tests are the easiest, safest, and probably the best method for detecting recent exposures to large amounts of PCBs. Results of such tests should be reviewed and carefully interpreted by physicians with a background in environmental and occupational medicine. Nearly everyone has been exposed to PCBs because they are found throughout the environment, and people are likely to have detectable amounts of PCBs in their blood, fat, and breast milk. Recent studies have shown that PCB levels in tissues from United States population are now declining.

What levels of exposure have resulted in harmful health effects?

Human health studies indicate that: 1) reproductive function may be disrupted by high levels of exposure to PCBs; 2) neurobehavioral and developmental deficits occur in newborns and continue through school-aged children who had in-utero exposure to PCBs; 3) other systemic effects (e.g., self-reported liver disease and diabetes, and effects on the thyroid and immune systems) are associated with elevated serum levels of PCBs; and 4) increased cancer risks, e.g., non-Hodgkin's lymphoma, are associated with PCB exposures.

What recommendations has the federal government made to protect human health?

The federal government has developed regulations, guidelines, and standards to protect people from the possible health effects of exposure to PCBs.

The federal government develops regulations and recommendations to protect public health. Regulations can be enforced by law. Federal agencies that develop regulations for toxic substances include the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the Food and Drug Administration (FDA). Recommendations provide valuable guidelines to protect public health but cannot be enforced by law. Federal organizations that develop recommendations for toxic substances include the Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Occupational Safety and Health (NIOSH).

Regulations and recommendations can be expressed in not-to-exceed levels in air, water, soil, or food that are usually based on levels that affect animals; then they are adjusted to help protect people. Sometimes these not-to-exceed levels differ among federal organizations because of different exposure times (an 8-hour workday or a 24-hour day), the use of different animal studies, or other factors.

Recommendations and regulations are periodically updated as more information becomes available. For the most current information, check with the federal agency or organization that provides it. Some regulations and recommendations for PCBs include the following:

The EPA standard for PCBs in drinking water is 0.5 parts of PCBs per billion parts (ppb) of water. For the protection of human health from the possible effects of drinking the water or eating the fish or shellfish from lakes and streams that are contaminated with PCBs, the EPA regulates that the level of PCBs in these waters be no greater than 0.17 parts of PCBs per trillion parts (ppt) of water.

The FDA has set residue limits for PCBs in

various foods to protect from harmful health effects. FDA required limits include 0.2 parts of PCBs per million parts (ppm) in infant and junior foods, 0.3 ppm in eggs, 1.5 ppm in milk and other dairy products (fat basis), 2 ppm in fish and shellfish (edible portions), and 3 ppm in poultry and red meat (fat basis).

OSHA regulates that workers not be exposed by inhalation over a period of 8 hours for 5 days per week to more than 1 milligram per cubic meter of air (mg/m^3) for 42% chlorine PCBs, or to 0.5 mg/m^3 for 54% chlorine PCBs.

NIOSH recommends that workers not breathe air containing 42 or 54% chlorine PCB levels higher than 1 microgram per cubic meter of air ($\mu g/m^3$) for a 10-hour workday, 40-hour workweek.

EPA requires that companies that transport, store, or dispose of PCBs follow the rules and regulations of the federal hazardous waste management program. EPA also limits the amount of PCBs put into publicly owned waste water treatment plants. To minimize exposure of people to PCBs, EPA requires that industry tell the National Response Center each time one pound or more of PCBs has been released to the environment.

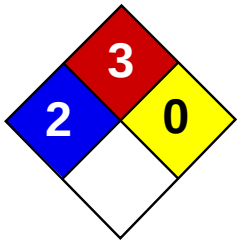
Where can I get more information?

If you have more questions or concerns, please contact your state health or environmental department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road, E-29
Atlanta, Georgia 30333

References

1. Agency for Toxic Substances and Disease Registry (ATSDR). *Public Health Statement for PCBs*. Atlanta, GA: U.S. Department of Health and Human Services, 1990.
2. Birmingham et al. 1989
3. Newhook 1988
4. Fitzgerald et al. 1996
5. Courval et al. 1996



Material Safety Data Sheet
Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C6-H6

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powferful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction

of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m3) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m3) [Canada] TWA: 0.5 (ppm) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Aromatic. Gasoline-like, rather pleasant. (Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:
Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia)) Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism,and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients

for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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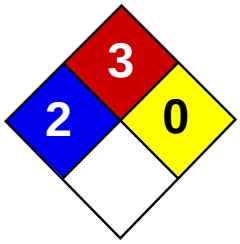

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C8H10

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (irritant, sensitizer). CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:
CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001) CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001) CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States] TWA: 435 STEL: 545 from OSHA (PEL) [United States] TWA: 435 STEL: 545 (mg/m3) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States] TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)] TWA: 100 STEL: 125 (ppm) [Belgium] TWA: 100 STEL: 125 (ppm) [Finland] TWA: 50 (ppm) [Norway] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:
Easily soluble in diethyl ether. Very slightly soluble in cold water or practically insoluble in water. Soluble in all proportions in Ethyl alcohol. Soluble in Carbon tetrachloride, Benzene. Insoluble in Ammonia. Slightly soluble in Chloroform. Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:
Lethal Dose/Conc 50% Kill: LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg Lowest Published Lethal Dose/Conc: LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data. May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate. May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Can cause mild skin irritation. It can be absorbed through intact skin. Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm , it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS) Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include

headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and conciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987). Ingestion: Do not drink, pipet or siphon by mouth. May cause gastroinestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Ethylbenzene Illinois toxic substances disclosure to employee act: Ethylbenzene Illinois chemical safety act: Ethylbenzene New York release reporting list: Ethylbenzene Rhode Island RTK hazardous substances: Ethylbenzene Pennsylvania RTK: Ethylbenzene Minnesota: Ethylbenzene Massachusetts RTK: Ethylbenzene Massachusetts spill list: Ethylbenzene New Jersey: Ethylbenzene New Jersey spill list: Ethylbenzene Louisiana spill reporting: Ethylbenzene California Director's List of Hazardous Substances: Ethylbenzene TSCA 8(b) inventory: Ethylbenzene TSCA 4(a) proposed test rules: Ethylbenzene TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97 SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Manufacturer's Material Safety Data Sheet. -Fire Protection Guide to Hazardous Materials, 13th ed., National Fire Protection Association (NFPA) -Registry of Toxic Effects of Chemical Substances (RTECS) -Chemical Hazard Response Information System (CHRIS) -Hazardous Substance Data Bank (HSDB) -New Jersey Hazardous Substance Fact Sheet -Ariel Global View -Reprotext System

Other Special Considerations: Not available.

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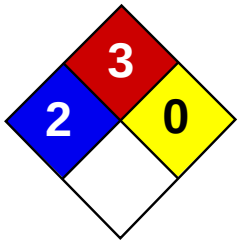

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C6-H5-CH3 or C7-H8

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:
Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N2O4; AgClO4; BrF3; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m3) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Cauess mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abraisons. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophostatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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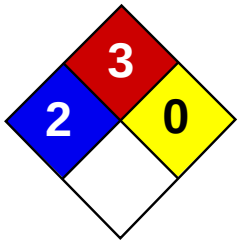

Material Safety Data Sheet
Xylenes MSDS

Section 1: Chemical Product and Company Identification

Product Name: Xylenes

Catalog Codes: SLX1075, SLX1129, SLX1042, SLX1096

CAS#: 1330-20-7

RTECS: ZE2100000

TSCA: TSCA 8(b) inventory: Xylenes

CI#: Not available.

Synonym: Xylenes; Dimethylbenzene; xylol; methyltoluene

Chemical Name: Xylenes (o-, m-, p- isomers)

Chemical Formula: C6H4(CH3)2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Xylenes	1330-20-7	100

Toxicological Data on Ingredients: Xylenes: ORAL (LD50): Acute: 4300 mg/kg [Rat]. 2119 mg/kg [Mouse]. DERMAL (LD50): Acute: >1700 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 464°C (867.2°F)

Flash Points: CLOSED CUP: 24°C (75.2°F). (Tagliabue.) OPEN CUP: 37.8°C (100°F).

Flammable Limits: LOWER: 1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Vapors may travel to source of ignition and flash back.

Special Remarks on Explosion Hazards:
Vapors may form explosive mixtures with air. Containers may explode when heated. May polymerize explosively when heated. An attempt to chlorinate xylene with 1,3-Dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin) caused a violent explosion

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined

areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 (ppm) [Canada] TWA: 435 (mg/m3) [Canada] TWA: 434 STEL: 651 (mg/m3) from ACGIH (TLV) [United States] TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 138.5°C (281.3°F)

Melting Point: -47.4°C (-53.3°F)

Critical Temperature: Not available.

Specific Gravity: 0.864 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 1 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Miscible with absolute alcohol, ether, and many other organic liquids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles

Incompatibility with various substances: Reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Store away from acetic acid, nitric acid, chlorine, bromine, and fluorine.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2119 mg/kg [Mouse]. Acute dermal toxicity (LD50): >1700 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5000 4 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS).

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:
Lowest Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Man] - Route: Oral; Dose: 10000 ppm/6H

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in animal. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects (male and femael fertility (spontaneous abortion and fetotoxicity)) and birth defects based animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. Can be absorbed through skin. Eyes: Causes eye irritation. Inhalation: Vapor causes respiratory tract and mucous membrane irritation. May affect central nervous system and behavior (General anesthetic/CNS depressant with effects including headache, weakness, memory loss, irritability, dizziness, giddiness, loss of coordination and judgement, respiratory depression/arrest or difficulty breathing, loss of appetite, nausea, vomiting, shivering, and possible coma and death). May also affects blood, sense organs, liver, and peripheral nerves. Ingestion: May cause gastrointestinal irritation including abdominal pain, vomiting, and nausea. May also affect liver and urinary system/ kidneys. May cause effects similar to those of acute inhalation. Chronic Potential Health Effects: Chronic inhalation may affect the urinary system (kidneys) blood (anemia), bone marrow (hyperplasia of bone marrow) brain/behavior/Central Nervous system. Chronic inhalation may alsocause mucosal bleeding. Chronic ingestion may affect the liver and metabolism (loss of appetite) and may affect urinary system (kidney damage)

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Xylenes UNNA: 1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Xylenes Illinois chemical safety act: Xylenes New York acutely hazardous substances: Xylenes Rhode Island RTK hazardous substances: Xylenes Pennsylvania RTK: Xylenes Minnesota: Xylenes Michigan critical material: Xylenes Massachusetts RTK: Xylenes Massachusetts spill list: Xylenes New Jersey: Xylenes New Jersey spill list: Xylenes Louisiana spill reporting: Xylenes California Director's List of Hazardous Substances: Xylenes TSCA 8(b) inventory: Xylenes SARA 302/304/311/312 hazardous chemicals: Xylenes SARA 313 toxic chemical notification and release reporting: Xylenes CERCLA: Hazardous substances.: Xylenes: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R10- Flammable. R21- Harmful in contact with skin. R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S36/37- Wear suitable protective clothing and gloves. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 12:54 PM

Last Updated: 05/21/2013 12:00 PM

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United States Environmental Protection Agency
Office of Solid Waste Washington, DC 20460
January 2008

Polycyclic Aromatic Hydrocarbons (PAHs)

What are PAHs?

Short for polycyclic aromatic hydrocarbons, PAHs describe chemicals that are often found together in groups of two or more. PAHs are found naturally in the environment but they can also be man-made. In their purest form, PAHs are solid and range in appearance from colorless to white or pale yellow-green. PAHs are created when products like coal, oil, gas, and garbage are burned but the burning process is not complete. Although PAHs can exist in over 100 different combinations, the National Waste Minimization Program defines this group using the Toxic Release Inventory reporting category for polycyclic aromatic compounds.

Chemicals included in this category, by name and CAS number, are:

1. Benzo(a)anthracene, 56-55-3
2. Benzo(a)phenanthrene (chrysene), 218-01-9
3. Benzo(a)pyrene, 50-32-8
4. Benzo(b)fluoranthene, 205-99-2
5. Benzo(j)fluoranthene, 205-82-3
6. Benzo(k)fluoranthene, 207-08-9
7. Benzo(j,k)fluorene (fluoranthene), 206-44-0
8. Benzo(r,s,t)pentaphene, 189-55-9
9. Dibenz(a,h)acridine, 226-36-8
10. Dibenz(a,j)acridine, 224-42-0
11. Dibenzo(a,h)anthracene, 53-70-3
12. Dibenzo(a,e)fluoranthene, 5385-75-1
13. Dibenzo(a,e)pyrene, 192-65-4
14. Dibenzo(a,h)pyrene, 189-64-0
15. Dibenzo(a,l)pyrene, 191-30-0
16. 7H-Dibenzo(c,g)carbazole, 194-59-2
17. 7,12-Dimethylbenz(a)anthracene, 57-97-6
18. Indeno(1,2,3-cd)pyrene 193-39-5
19. 3-Methylcholanthrene, 56-49-5
20. 5-Methylchrysene, 3697-24-3
21. 1-Nitropyrene, 5522-43-0

It should be noted that some PAHs are listed individually on EPA's Priority Chemical list. They are:

1. Acenaphthene, 83-32-9
2. Acenaphtylene, 208-96-8
3. Anthracene, 120-12-7
4. Benzo(g,h,i)perylene, 191-24-2
5. Fluorene, 86-73-7
6. Phenanthrene, 85-01-8
7. Pyrene, 129-00-0

Why are PAHs bad actors?

PAHs are a concern because they are persistent. Because they do not burn very easily, they can stay in the environment for long periods of time. Individual PAHs vary in behavior. Some can turn into a vapor in the air very easily. Most do not break down easily in the water.

What are PAHs used for?

Most PAHs are used to conduct research. However, some PAHs are used to make dyes, plastics, and pesticides. Some are even used in medicines.

How can PAHs enter and leave your body?

One of the most common ways PAHs can enter the body is through breathing contaminated air. PAHs get into your lungs when you breathe them. If you live near a hazardous waste site where PAHs are disposed, you are likely to breathe PAHs. If you eat or drink food and water contaminated with PAHs, you could be

exposed. Exposure to PAHs can also occur if your skin contacts PAH-contaminated soil or products like heavy oils, coal tar, roofing tar, or creosote. Creosote is an oily liquid found in coal tar and is used to preserve wood. Once in your body, PAHs can spread and target fat tissues. Target organs include the kidneys and liver. However, PAHs will leave your body through urine and feces in a matter of days.

How can you be exposed to PAHs?

You can be exposed to PAHs in the environment, in your home, and in the workplace. Because PAHs exist naturally in the environment and are man-made, you can be exposed in a number of ways. Fumes from vehicle exhaust, coal, coal tar, asphalt, wildfires, agricultural burning and hazardous waste sites are all sources of exposure.

You could be exposed to PAHs by breathing cigarette and tobacco smoke, eating foods grown in contaminated soil, or by eating meat or other food that you grilled. Grilling and charring food actually increases the amount of PAHs in the food.

If you work in a plant that makes coal tar, asphalt and aluminum, or that burns trash, you can be exposed to PAHs. You can also be exposed if you work in a facility that uses petroleum or coal, or where wood, corn, and oil are burned.

How can PAHs affect your health?

A number of PAHs have caused tumors in laboratory animals that were exposed to PAHs through their food, from breathing contaminated air, and when it was applied to their skin. When pregnant mice ate high doses of a PAH (benzo(a)pyrene) they experienced reproductive problems. In addition, the offspring of the pregnant mice showed birth defects and a decrease in their body weight. Other effects include damage to the skin, body fluids, and the immune system. However, these effects have not been seen in humans.

Is there a medical test to determine if you have been exposed to PAHs?

There is a test that can measure the presence of PAH in your urine. This test can only tell you if you have been exposed; but it can't reveal how harmful the effects of the exposure will be. This test would have to be performed in a laboratory that has special equipment to detect the PAHs. Another test currently being developed will be able to measure PAHs in your body tissue and blood.

What are the medical treatments in cases of exposure?

Most exposures to PAHs happen every day at very low levels in the air we breathe and the foods we eat. Treatment for a short-term exposure is unlikely. Contact your doctor if you experience symptoms of PAHs poisoning.

What levels of exposure have resulted in harmful health effects?

There is no information available from studies on humans to tell what effects can result from being exposed to individual PAHs at certain levels. However, breathing PAHs and skin contact seem to be associated with cancer in humans. Animal studies showed that mice exposed to 308 parts per million (ppm) of PAHs (specifically benzo (a) pyrene) in food for 10 days (short term exposure) caused birth defects. Mice exposed to 923 ppm of benzo (a) pyrene in food for months caused problems in the liver and blood.

Where can I get more information?

Contact your state health or environmental department, or:

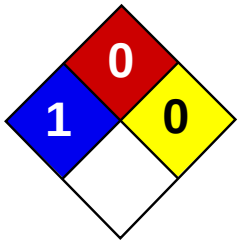
Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road, N.E., E-29
Atlanta, Georgia 30333

References

1. Agency for Toxic Substances and Disease

Registry (ATSDR), Public Health Statement, *Polycyclic Aromatic Hydrocarbons, December 1990.* U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA, December 1990.

2. United States Environmental Protection Agency, Office of Environmental Information, *Emergency Planning and Community Right-to-Know Act – Section 313: Guidance for Reporting Toxic Chemicals: Polycyclic Aromatic Compounds Category*, EPA 260-B-01-03, Washington, DC, August 2001.



Material Safety Data Sheet
Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m3) from OSHA (PEL) [United States] TWA: 0.03 (mg/m3) from NIOSH [United States] TWA: 0.05 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungsby mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually abssorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, deliriuim, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead cholic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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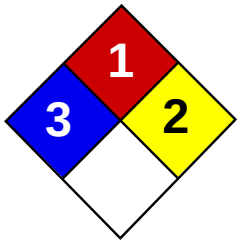

Health	3
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet
Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.01 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R22- Harmful if swallowed. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 04:16 PM

Last Updated: 05/21/2013 12:00 PM

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Material Safety Data Sheet

SWX-630/531/240 Cadmium

Shieldwerx
4529 Arrowhead Ridge Dr. SE
Rio Rancho, NM 87124

Tel: 505.892.5144
Fax: 505.890.8319

Section 1. PRODUCT AND COMPANY NAME

Product Identity: Cadmium Metal

Manufacturer:
Shieldwerx a division of Bladewerx
4529 Arrowhead Ridge Dr. SE
Rio Rancho, New Mexico 87124

Section 2. – COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredient	Approximate % by Weight	CAS Number	Occupational Exposure Limits (OELs)	
Cadmium	99.95+%	7440-43-9	OSHA PEL	0.005mg/m³
			OSHA SECAL*	0.015 or 0.05mg/m³
			ACGIH TLV	0.01mg/m³ Total
				0.002mg/m³ Respirable
			NIOSH REL	Lowest feasible level

Section 3. – HAZARDS IDENTIFICATION

Emergency Overview: A bluish-silver lustrous metal that does not burn in bulk. Clouds of finely-divided dust are a fire and explosion hazard, however. When heated strongly in air cadmium oxide fumes can be generated. Freshly formed cadmium fume is an intense pulmonary irritant and may result in development of pulmonary edema several hours after exposure. Inhalation or ingestion of dust or fumes may produce both acute and chronic health effects. Probable cancer hazard. A self-contained breathing apparatus (SCBA) and full protective clothing are required for all emergency response personnel when cadmium is involved in a fire situation. Do NOT use water or foam. Apply dry chemical, dry sand, or special powder extinguishing media.

Continued

Potential Health Effects: Cadmium dust and fume have both acute and chronic health effects. Cadmium dust is a pulmonary irritant. Freshly formed cadmium is an intense pulmonary irritant, resulting in respiratory distress and possible pulmonary edema that may develop 4 to 10 hours after exposure. In severe cases death may result. Long term exposures may cause kidney dysfunction and lung injury (emphysema) as well as other symptoms. Cadmium is classified as a carcinogen or probable carcinogen by IARC, ACGIH, NTP, OSHA, and the EU.

Potential Environmental Effects: Cadmium metal has low bioavailability but its compounds are hazardous in the environment at low concentrations. Bioaccumulation of cadmium readily occurs in the aquatic and terrestrial food chains, specifically in plants and aquatic organisms.

SECTION 4. – FIRST AID MEASURES

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, immediately obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: *Dust: Remove* contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Quickly and gently blot or brush away excess chemical. Wash gently and thoroughly with lukewarm gently flowing water and non-abrasive soap for 5 minutes. If irritation persists, repeat flushing. Obtain medical advice. Completely decontaminate clothing, shoes and leather goods before reuse or else discard. *Molten Metal:* Flush contact area to solidify and cool, but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Inhalation: remove source of contamination or move victim from exposure area to fresh air immediately. If breathing is difficult, trained personnel should administer medical oxygen. DO NOT allow victim to move around unnecessarily. Treat pulmonary edema as a priority, even is no symptoms (i.e. wheezing, coughing, shortness of breath, tec.) are apparent. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Quickly transport victim to an emergency care facility.

Ingestion: NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 2-8 oz. (60-240ml) of water. The irritant and emetic action of swallowed cadmium usually leads to spontaneous vomiting. If vomiting occurs naturally, have victim rise mouth with water again. Immediately obtain medical attention and bring a copy of this MSDS.

SECTION 5. - FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is not flammable or combustible. Finely-divided metallic dust or powder is a moderate fire hazard and moderate explosion hazard when dispersed is air at high concentrations and exposed to heat, flame or other ignition sources. Freshly oxidized cadmium powder, in contact with limited amounts of water, may heat spontaneously and may ignite combustible materials in contact with the powder. Fires and explosions may also occur upon contact with certain incompatible materials.

Continued

Extinguishing Media: Do NOT use water or foam. Burning metal reacts violently with extinguishing agents such as water, foam, carbon dioxide, and Holons. Apply dry chemical, dry sand, or special powder extinguishing media.

Fire Fighting: If possible, move material from fire area and cool material exposed to flame. Apply dry chemical, sand or special powder extinguishing media to burning cadmium. Highly toxic cadmium oxide fumes evolve in fires. Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask.

Flashpoint and Method: Not applicable.

Upper and Lower Flammable Limit: Not Applicable.

Autoingnition Temperature. Not Applicable.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible. Restrict access to the area until completion of clean-up. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection. Molten metal should be allowed to solidify prior to clean-up. If solid metal, wear gloves, pick up and return to process. If dust, wear recommended personal protective equipment (see Section 8) and use methods that will minimize dust generation (e.g. vacuum solids). Return uncontaminated spilled material to the process if possible. Place contaminated and non-recyclable material in suitable labeled containers for later disposal. Treat or dispose of waste material in accordance with all local, state and federal requirements, as applicable.

Personal Precautions: Persons responding to an accidental release should wear protective clothing; gloves and a respirator (see Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with dust and fume. Where molten metal is involved, wear heat-resistant gloves and suitable clothing for protection from hot-metal splash as well as a respirator to protect against inhalation of cadmium fume. Workers should wash and change clothing following clean-up of a cadmium spill to prevent personal contamination with cadmium dust.

Environmental Precautions: Cadmium metal has limited bioavailability but its compounds can pose a severe threat to the aquatic and terrestrial environments. Contamination of water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Store cadmium in a DRY, covered area, away from incompatible materials and food or feedstuffs. Cadmium ingots suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Otherwise, entrained moisture could expand explosively and spatter molten metal out of the bath. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking or smoking in appropriate, designating areas, as well as at the end of the workday. No special packaging materials are required.

Continued

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective Clothing: Gloves and coveralls or other work clothing are recommended to prevent prolonged or repeated direct skin contact when cadmium is processed. Appropriate eye protection should be worn where fume or dust is generated. Where hot or molten metal is handled, heat resistant gloves, goggles or face shield, respirator and clothing to protect from hot metal splash should be worn. Safety type boots are recommended.

Ventilation: Use adequate local or general ventilation to maintain the concentration of cadmium fumes in the working environment will below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system. Local exhaust is strongly recommended for melting, casting grinding and welding or flame cutting of cadmium.

Respirators: Where cadmium dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-100 particulate filter cartridge). When exposure levels are unknown, a self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask should be worn.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Soft bluish-silver lustrous metal	**Odor:** None	**Physical State:** Solid	**pH:** Not Applicable
Vapor Pressure: 1 mm at 394ºC Negligible @ 20ºC	**Vapor Density:** Not Applicable	**Boiling Point:** 765ºC	**Freezing/Melt Point Range:** 321ºC
Specific Gravity: 8.65	**Evaporation Rate:** Not Applicable	**Coefficient of Water/Oil:** Not Applicable	
Solubility: Insoluble in Water	**Odor Threshold:** None		

SECTION 10. STABILITY AND REACTIVITY

Stability and Reactivity: Massive metal is stable under normal temperatures and pressures. Metal surfaces tarnish on exposure to moist air. Finely powdered metal or dust can be ignited from a dust cloud in air. Freshly oxidized cadmium powder, in contact with limited amounts of water, may spontaneously and may ignite combustible materials in contact with the powder.

Incompatibilities: Cadmium reacts vigorously with oxidizing agents such as peroxides, chlorates, nitrates and halogens or interhalogen compounds such as chlorine trifluoride as well as with elemental sulfur, zinc, selenium, or tellurium. Mixtures with nitric acid liberate toxic fumes of nitrogen oxides. Violent explosions can occur when the metal is in contact with fused ammonium nitrate or immersed in hydrazoic acid. Burning metal reacts violently with fire extinguishing agents such as water, foam, carbon dioxide or Halons. Cadmium metal reacts with strong acids giving off flammable hydrogen gas.

Continued

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting or burning, electric arc welding or overheating a molten bath will generate highly toxic cadmium oxide fumes. They are highly soluble in body fluids and the particle size of the metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body.

SECTION 11. TOXICOLOGICAL INFORMATION

General: Cadmium dust and fume are both pulmonary irritants, but freshly generated cadmium fume is an intense irritant and its small particle size allows it to reach into the lung more easily. The onset of symptoms is frequently delayed by 4 to 10 hours after exposure. Pulmonary edema may then develop rapidly. The mortality rate from acute pulmonary disease is about 20% according to the ACGH. Those surviving an episode of acute poisoning generally recover slowly but without apparent residual effects.

Chronic exposure to cadmium has been associated with a wide variety of gastrointestinal symptoms, pulmonary edema and kidney malfunction with increased excretion of a specific low molecular weight protein (beta-2-microglobulin). The body to a large extent retains absorbed cadmium, and excretion is very slow. Cadmium has been linked to both prostate cancer and lung cancer, though several researchers have questioned the association with prostate cancer recently.

Individuals with pre-existing lung, liver, kidney and blood ailments should be precluded from exposure until approved by a physician. Initial and periodic medical examinations are recommended for persons exposed to levels above the exposure limits of cadmium.

Acute:
Skin/Eyes: Contact with dust or fume may cause irritation but would not cause tissue damage.

Inhalation: Fumes of cadmium (i.e. cadmium oxide) are highly toxic by inhalation. They may cause serious systemic poisoning and possible permanent damage to the lungs. Early symptoms of excessive exposure include dryness of the throat, irritation of the nose, throat, and respiratory tract, headache, coughing, and a metallic taste. After a delay of several hours (up to 10), a person may develop constriction of the chest, persistent cough, and progressive shortness of breath. There may be headache, chills, diarrhea, muscle aches, nausea, vomiting, irritability, and restlessness. Pulmonary congestion may progress rapidly causing wheezing and symptoms of oxygen deficiency. Death may follow. Recovery from an acute exposure episode is slow but generally without ongoing or lingering effects. Milder cases of acute exposure have produced symptoms resembling metal fume fever with some symptoms and signs of acute gastroenteritis as well.

Ingestion: Ingestion of excessive quantities of cadmium dust may cause salivation, choking, nausea, vomiting, diarrhea, abdominal pain, tenseness, blurred vision, dizziness, vertigo, and headache. Convulsions, exhaustion, collapse, shock, and unconsciousness may occur. Death has followed within 24 hours from shock or after 7 to 14 days from acute kidney failure or cardiopulmonary depression.

Continued

Chronic:
Prolonged exposure to cadmium dust and/or fume may cause loss of sense of smell, occasional ulcerations of the nasal passages, rhino laryngitis, cough, shortness of breath, mild anemia, sleeplessness, irritability, loss of appetite, and cadmium-yellow fringe on teeth. The primary target organ for chronic cadmium effects is the kidney with increased excretion of a specific low molecular weight protein (beta-2-microgloblulin). Damage to the lungs (of the emphysematous type) has been reported in some studies of cadmium-exposed workers but not found in other studies. Cigarette tobacco contains cadmium and smoking adds to the daily intake of cadmium which may increase the risk of cumulative toxic effects. Clinical evidence of the cumulative effects of cadmium may appear after exposure has ceased. Disease then may be progressive.

The International Agency for Research on Cancer (IARC) has classified cadmium and certain cadmium compounds as Group 1 carcinogens (carcinogenic to humans). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies cadmium as a suspected human carcinogen (A2). The National Toxicology Program (NTP) classifies cadmium as a know human carcinogen and OSHA lists cadmium as a carcinogen. The European Union (EU) classifies cadmium as a Category 2 (probable) carcinogen.

SECTION 12. ECOLOGICAL INFROMATION

White cadmium metal is insoluble, it's processing or extended exposure in the aquatic and terrestrial environments may lead to the release of cadmium in bioavailable forms. Compared to most other heavy metals, cadmium is relatively mobile and highly toxic in the aqueous environment. Water hardness, PH and dissolved organic carbon content are factors which regulate the degree of toxicity. In soils, higher acidity results in the release of cadmium ions, causing higher toxicity to soil organisms and the uptake of cadmium by plants.

Cadmium is strongly accumulated by all organisms through both food and water. Bioaccumulation in aquatic organisms is greatest in invertebrates, followed by fish, and aquatic plants. Bioaccumulation in terrestrial plants results in higher levels of cadmium in land mammals that feed on the plants.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process, dispose of in accordance with applicable regulations.

Notice to Reader:
Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Bladewerx/Shieldwerx extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This material safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations, therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

Appendix D

Safety and Health Forms

This page is blank for duplex printing.

Job No. _____

Job Address _____

_____

Sevenson Environmental Services, Inc.

Report of Accident, Injury, or Illness

Instructions: Please print. Fill in all blanks. When completed, return this form to Sharon Lee at the main office.

Name _____ Sex:_____ Age: _____

Social Security Number _____ Birth Date: _____

Address _____ Phone Number _____

Marital Status: ☐ Single; ☐ Married; ☐ Separated; ☐ Divorced; ☐ Widowed

# of Dependents _____ Date of Accident _____ Time _____ AM/PM

Date Employee notified employer: _____ Who was notified: _____

Employment Start Date:	Wage Rate:
Occupation:	Average Hours Worked:
Date Last Worked:	Average Days Per Week:
Time Shift Began:	Was worker paid for day of injury?
Name of Witness:	Did salary continue?
Describe how the accident happened:	
What was employee doing when injured?	
Describe the injury in detail and indicate part of body affected:	
Name of object or substance that directly injured the employee:	
Date & Time medical attention was sought:	

Name, address and phone number of hospital or doctor:
Was employee involved in any other incidents/accidents? If yes, describe:
Any history of work accidents, absenteeism, and/or disciplinary problems:
Substance abuse test administered:___ Yes, ___ No – if no, why not?
Medical release obtained:
Corrective Action Taken:

Supervisor _____ Date _____

Safety Officer _____ Date _____

Comments:_____

_____

_____

_____

Report of Accident, Injury, or Illness

Sevenson Environmental Services, Inc.

Acknowledgment of Site Safety and Health Plan

I certify that I have received a Site orientation and have been given the opportunity to read and ask questions on the contents of the Site Safety and Health Plan to include emergency response actions and the contaminates of concern for the project.

DATE	NAME (please print)	SIGNATURE

Safe Plan Of Action

Project No. _____
Job/Task _____ **Work Area** _____ **Date** _____

Steps of Task	Hazard/Reaction to Change	Safe Plan	Resources

Team Members' Signatures

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

The signature of the supervisor confirms the completion of the hazard assessment and Safe Plan of Action by the crew.

Supervisors Signature: _____ Date_____

Instructions: 1. Write name of job or task in space provided. 2. Conduct walk-through survey of work area. 3. Write the steps of the task in a safe sequence. 4. List all possible hazards involved in each step and reaction to change. 5. In the Safe Plan column, state actions that will be taken to prevent the hazards or injury from reaction to change. 6. In Resources column, list equipment, tools, etc. needed to do the job. 8. Ask each team member, who helped develop and will use this SPA, to sign in spaces provided. 9. Review the SPA at the end of the task for improvements.

Work shall stop when conditions change, the job changes, or a deficiency in the plan is discovered, and the current SPA will be modified or a new SPA created.

Project No. _____

Job/Task _____ **Work Area** _____ **Date:** _____

Team Member Signature Sheet Continuation

Review checklist while completing front page of SPA. Check all that apply.

A new SPA is required if the job scope or work conditions change.

Required Permits	Hazards	Safe Plan
☐ Confined Space	☐ Overhead Utilities	☐ Power de-energization required ☐ Insulation blankets required ☐ Wire watcher required
☐ Critical Lift		☐ Required clearance distance = _____Ft. ☐ Safe work zone marked
☐ Hot Work	☐ Crane or other	☐ Signalman assigned ☐ Tag lines in use ☐ Area around crane barricaded
☐ Lock Out/Tag Out	Lifting Equipment	☐ Lifting equipment inspected ☐ Personnel protected from overhead load
☐ Soil Disturbance (Over 12")	☐ Underground Utilities	☐ Reviewed as-builts ☐ Subsurface surveys ☐ Received dig permit
☐ Utility Clearance		☐ Required clearance distance = _____ Ft. ☐ Safe work zone Marked
Required PPE	☐ Electrical	☐ Lock Out/Tag Out/Try Out ☐ Permit required? ☐ Confirm that equipment is de-energized
☐ Hard Hat, Class C		☐ Reviewed electrical safety procedures
☐ Hard Hat, Class E *(Elect. Protect)*	☐ Excavations	☐ Permits ☐ Inspected prior to entering ☐ Proper sloping/shoring
☐ Ear Plugs/Ear Muffs		☐ Barricades provided ☐ Access/egress provided ☐ Protection from accumulated water
Eye Protection:	☐ Fire Hazard	☐ Hot Work Permit ☐Fire Extinguishers ☐ Fire watch
☐ Safety Glasses		☐ Adjacent area protected ☐ Unnecessary flammable material removed
☐ Face Shield	☐ Vehicular Traffic or	☐ Traffic Barricades ☐ Cones ☐ Signs ☐ Flagmen ☐ Lane closure
☐ Chemical Goggles	Heavy Equipment	☐ Communication with equipment operator
☐ Welding Hood	☐ Noise >85 dB	Hearing protection is required: ☐ Ear plugs ☐ Ear Muffs ☐ Both
Hand Protection:	☐ Hand & Power Tools:	☐ Inspect general cond. ☐ GFCI in use ☐ Identified PPE required for each tool
☐ Cut Resistant Gloves		☐ Reviewed safety requirements in operators manual(s) ☐ Guarding OK
☐ Welders Gloves	☐ Hand Hazards	List sharp tools, material, equipment: _____
☐ Nitrile Gloves		☐ PPE gloves, etc. ☐ Protected sharp edges as necessary
☐ Surgical Gloves	☐ Manual Lifting	☐ Reviewed proper lifting tech. ☐ Identified material requiring lifting equipment
☐ Rubber Gloves		☐ Hand protection required ☐ Back support belts
☐ Elect. Insulated Gloves	☐ Ladders	☐ Inspect general cond. before use ☐ Ladder inspected with in last quarter
☐ Arm Sleeves		☐ Ladder tied off or held ☐ Proper angle and placement ☐ Reviewed ladder safety
Foot Protection:	☐ Scaffolds	☐ Inspect general condition before use ☐ Tags in place ☐ Properly secured
☐ Sturdy Work Boots		☐ Toe boards used ☐ Footings adequate ☐ Materials properly stored on scaffold
☐ Safety Toe Boots	☐ Slips, Trips Falls	☐ Inspect for trip hazards ☐ Hazards marked ☐ Tools & material properly stored
☐ Rubber Boots		☐ Extension cords properly secured ☐ Work zone free of debris
☐ Rubber Boot Covers	☐ Pinch Points	List potential pinch points: _____
☐ Dielectric Footwear		☐ Working near operating equipment ☐ Hand/Body positioning
Respiratory. Protection:	☐ Working w/ Chemicals	☐ List specific chemicals involved and list hazards and precaution on front side.
☐ Dust Mask		☐ Reviewed MSDS ☐ Exposure Monitoring required ☐ Have proper containers and labels.
☐ Air Purifying Respirator	☐ Asbestos or Lead Paint	☐ Identified proper PPE (respirators, clothing, gloves, etc.)
☐ Supplied Air Respirator	Potential	☐ Areas to be worked may contain asbestos or lead paint ☐ Asbestos controls incorporated
☐ SCBA	☐ Heat Stress Potential	☐ Lead based point controls in place ☐ Exposure monitoring conducted.
☐ Emergency Escape Respirator		☐ Heat stress monitoring (>85°) ☐ Liquids available ☐ Cool down periods
Special Clothing:	☐ Cold Stress Potential	☐ Sun Screen ☐ Reviewed Heat Stress symptoms
☐ Tyvek ®		☐ Proper clothing (i.e.. gloves, coat, coveralls) ☐ Wind chill <32°
☐ Poly Coated Tyvek ®	☐ Environmental	☐ Reviewed Cold Stress symptoms ☐ Warm up periods
☐ Fire Resistant Coveralls		☐ Air emissions ☐ Water discharge ☐ Hazardous wastes ☐ Other wastes
☐ Rain Suit	☐ Natural or Site Hazards	☐ Pollution prevention ☐ Waste minimization
☐ Safety Vest		☐ Weather ☐ Terrain ☐ Adjacent operations or processes ☐ Biological hazards
Fall Protection:	☐ Adjacent Work/Processes	☐ Animals/reptiles/insects hazards
☐ Harness		☐ Notified them of our presents ☐ Other workers adjacent, above, or below.
☐ Double Lanyard Required	☐ Barricades/covers	☐ Coordinated with adjacent supervisor/customer/operator ☐ Need barriers between.
☐ Anchorage Point Available		☐ Caution barricade tape required ☐ Danger barricade tape required ☐ Rigid railing required
☐ Additional Anchorage Connector Needed e.g. Cross Arm Strap, etc.		☐ Covers over opening ☐ Warning signs required
☐ Retractable Device Needed	**Additional Information:**	
☐ Horizontal Life Line System Req'd.		
☐ Fall Clearance Distance Adequate		
☐ Fall Rescue/Retrieval Plan Set Up		

Sevenson Environmental Services, Inc.

CONFINED SPACE PERMIT

Date_____ Time of Issue_____ Length of Permit_____
Location _____ Equipment ID_____
Purpose of Entry & Description of Work _____
_____
_____
Authorized Entrant(s)_____
Will "HOT" Work be authorized for this Entry? ☐ No; ☐ Yes (describe)_____
_____

HAZARDOUS IDENTIFICATION

Indicate ALL potential Hazards of this Permit Space:	YES	N/A
a. Contains or may contain a hazardous atmosphere	☐	☐
b. Contains a material for potential engulfment	☐	☐
c. Has an internal configuration for potential entrapment	☐	☐

If "Yes", describe _____
_____

d. Contains the following serious safety or health Hazards:_____

PRE-ENTRY PREPARATION

		YES	N/A	Done			Removed		
				Date	Time	By	Date	Time	By
1. Lines broken and/or blanked:									
Line Contents	Location								
a.									
b.									
c.									
2. Drain or at a workable level									
3. Purge - flush and vent									
4. Force air to bottom & vent									
5. Lock out power feeds:									
Equip/Location of Lock out									
a.									
b.									
6. Shut-off heating systems									
7. Other:									

TEST TO BE TAKEN

	P.E.L.	Time Tester Yes	Time Tester N/A	Time Tester Results	Time Tester Results	Time Tester Results
% of Oxygen	19.5% to 23%					
% of LEL	Any % over 10					
Carbon Monoxide	25 ppm					
Hydrogen Sulfide	10 ppm					
VOC						
Temperature	< 110ºF/43ºC					

PREVENTION OF UNAUTHORIZED ENTRY

	YES
1. Have Worker(s) to enter been trained for this specific entry?	☐
2. Have Attendants been trained for this specific space?	☐
3. Post "WORKER IN CONFINED SPACE" Sign	☐

4. Set-up the following additional barriers:

_____

_____

MANDATORY SAFETY EQUIPMENT REQUIRED

	YES	N/A
1. Fire Extinguisher	☐	☐
2. Retrieval Lines	☐	☐
3. Respirator	☐	☐
4. Goggles	☐	☐
5. Hearing Protection	☐	☐
6. Protective Clothing	☐	☐
7. Special Boots or Shoes	☐	☐
8. Gloves	☐	☐
9. Other Safety Equipment Required	☐	☐

_____ _____

_____ _____

_____ _____

_____ _____

COMMUNICATION PROCEDURES AND EQUIPMENT TO BE USED FOR THIS ENTRY

(Verify that chosen equipment is in place and operation.)

Verified by:

1._____ _____

2._____ _____

RESCUE EQUIPMENT TO BE PROVIDED ON-SITE

		YES	N/A
a.	Two chest harnesses or two wristlets	☐	☐
b.	Two five minute supplied air escape respirators	☐	☐
c.	One 30 minute S.C.B.A.	☐	☐
d.	One emergency siren	☐	☐
e.	Man basket	☐	☐
f.	Retrieval wench	☐	☐
g.	Other necessary Rescue Equipment	☐	☐

_____

_____

_____

IN CASE OF EMERGENCY

Rescue Service	Phone Number or Ext.
1._____	_____
2._____	_____
3._____	_____

Confined Space Entry Supervisor or designee must sign below AFTER all the above actions are fully understood and conditions necessary for SAFE entry have been met.

Authorization of Entry

Signature (if not CSE Supervisor, add title)	Date	Time

Termination of Entry

Signature	Date	Time

Form 16-3

CRITICAL LIFT PLAN

For use of this form, see EM 385-1-1, Section 16. Proponent is Crane HHWG.

Date:	Prepared By:
Location:	USACE District:

A "critical lift" is defined as any non-routine crane lift requiring detailed planning and additional or unusual safety precautions. Critical lifts include: lifts made where the load weight is greater than 75% of the rated capacity of the crane; lifts which require load to be lifted, swung or placed out of the operator's view ; lifts made with more than one crane; lifts involving non-routine/technically difficult rigging arrangement; hoisting personnel with a crane or derrick; or any lift which the crane operator believes should be critical.

A. TOTAL LOAD

1. Load Weight		lbs
2. Wt. of Aux. Block		lbs
3. Wt. of Main Block		lbs
4. Wt. of Lifting Beam		lbs
5. Wt. of Sling/Shackles		lbs
6. Wt. of Jib/Ext. (erected/stowed)		lbs
7. Wt. of Hoist Rope		lbs
8. Other:		lbs
TOTAL WEIGHT		

Note: Source of load weight (Drawings, Calcs, etc.) must be attached on Page 2.

B. CRANE

1. Type of Crane: Mobile Hydraulic Truck
2. Maximum Crane Capacity _____ lbs.
3. Radius (Maximum) _____ ft.
4. Radius (Minimum) _____ ft.
5. Boom Length (Maximum) _____ ft.
6. Boom Length (Minimum) _____ ft.
7. Crane Capacity (Max Radius) _____ lbs.
8. Crane Capacity (Min Radius) _____ lbs.
9. Boom Angle (Maximum) _____ deg.
10. Boom Angle (Minimum) _____ deg.
11. Gross Load of Crane _____ lbs.
12. Lift is _____ % of the Crane's rated capacity
13. If Jib/Ext. is to be used:
    - Length _____ ft.
    - Offset _____ ft.
14. Rated Capacity of Jib/Ext. _____ lbs

C. HOIST ROPE

	Main	Aux 1	Aux 2	
1. # of Parts				
2. Rope Diameter				
3. Capacity				

D. RIGGING

1. Hitch Type(s) _____
2. No. of Slings: _____ Size: _____
3. Sling Type: _____
4. Sling Assembly Capacity: _____ lbs.
5. Shackle Size(s): _____
6. Shackle Rated Capacity(s) _____ lbs.

E. CRANE PLACEMENT *(Mobile Cranes Only)*

1. Maximum Bearing Pressure _____ PSF
   Note: Bearing Pressure Calculations must be attached on Page 3.
2. Ground Conditions Suitable for Load? _____ YES / NO
   Note: Ground Condition Calculations must be attached on Page 3.
3. High Voltage or Electrical Hazards? _____ YES / NO
   Note: If Electrical Hazards are present they must be shown on Page 4.
4. Obstructions to Lift or Swing? _____ YES / NO
   Note: If Obstructions are present they must be shown on Page 4.
5. Travel with Load Required? _____ YES / NO
6. Other? _____

F. OPERATOR QUALIFICATIONS

1. Certified Operator? _____ YES / NO
2. Option? _____
3. Certified for Type, Class & Capacity? _____ YES / NO
4. Designated in writing by employer: YES / NO

G. PRE-LIFT CHECKLIST

G. PRE-LIFT CHECKLIST	*(YES)*	*N/A*	*(NO)*
1. Crane Inspected			
2. Rigging Inspected			
3. Crane Set-up			
4. Overhead Hazard Check			
5. Swing Check			
6. Counterweight Check			
7. Operator Qualifications			
8. Signal Person Qualifications			
9. Rigger Qualifications			
10. Load Chart in Crane			
11. Load Test			
12. Tag Lines			
13. Wind Conditions			
14. Traffic Hazard Check			
15. Site Control			
16. Signatures			

H. SIGNATURES

1. Crane Operator _____
2. Rigger _____
3. Signal Person _____
4. Lift Supervisor _____
5. Other _____
6. Other _____

Form 16-3

CRITICAL LIFT PLAN

For use of this form, see EM 385-1-1, Section 16. Proponent agency is Crane HHWG.

LOAD CALCULATIONS

Show here or attach calculations, drawings, etc.

Form 16-3

CRITICAL LIFT PLAN

For use of this form, see EM 385-1-1, Section 16. Proponent agency is Crane HHWG.

BEARING PRESSURES & GROUND CONDITIONS

Show here or attach calculations, drawings, etc.

Form 16-3

CRITICAL LIFT PLAN

For use of this form, see EM 385-1-1, Section 16. Proponent agency is Crane HHWG.

LOAD CHART

Show here or attach load chart

Form 16-3

CRITICAL LIFT PLAN

For use of this form, see EM 385-1-1, Section 16. Proponent agency is Crane HHWG.

OPERATOR, RIGGER, SIGNAL PERSON QUALIFICATIONS

Show here or attach operator qualifications

Form 16-3
CRITICAL LIFT PLAN

For use of this form, see EM 385-1-1, Section 16. Proponent agency is Crane HHWG.

SITE PLAN

Show here or attach site plan and sequencing

Daily Air Monitoring Report

Project Number:	Project Name:	Project Supervisor

Date:	Duration of Monitoring

Work Location and Task:

Instrument:		Instrument:		Instrument:	
Reading	**Time**	**Reading**	**Time**	**Reading**	**Time**
Calibration:		Calibration:		Calibration:	

Perimeter Samples Collected:

Personnel Samples Collected:

Perimeter and Personnel Sample Results from Previous Day (Provide Data when Received):

Comments:

Name:	Title:
Signature:	**Date:**

Daily Air Monitoring Report (Cont.)

Project Number:		**Project Name:**		**Project Supervisor**	
Instrument:		**Instrument:**		**Instrument:**	
Reading	**Time**	**Reading**	**Time**	**Reading**	**Time**
Calibration:		**Calibration:**		**Calibration:**	
Signature:			**Date:**		

Sevenson Environmental Services, Inc.
Daily Safety Meeting

DATE: **DAY:**	**JOB NAME:** **& NUMBER:**

TOPIC:

PRINT	SIGNATURE:

Sevenson Environmental Services, Inc.
DAILY SAFETY REPORT

DATE:

WORK PERIOD COVERED:

WEATHER CONDITIONS:

SUMMARY OF DAY'S WORK ACTIVITY:

EQUIPMENT UTILIZED BY SAFETY MONITORS:

PROTECTIVE CLOTHING AND EQUIPMENT BEING USED BY TASK:

PHYSICAL CONDITION OF WORKERS (any heat or cold stress or other medical problems):

ACCIDENTS OR BREACH OF PROCEDURES:

DESCRIPTION OF MONITORING AND AIR SAMPLES TAKEN:

TYPE AND NUMBER OF PERMITS ISSUED:

SUMMARY OF TRAINING AND SAFETY MEETING:

NAME:	TITLE: Site Health and Safety Officer
SIGNATURE:	

Sevenson Environmental Services, Inc.

Incoming Trailer Inspection and Off Loading Plan

Truck and Trailer Id# _____ Date:_____

Cargo:_____

Is load properly secured? ☐ YES ☐ NO

If load is not properly secured, is it stable? ☐ YES ☐ NO ☐ N/A

If load is not properly secured, can it be unloaded safely? ☐ YES ☐ NO ☐ N/A

If the load can not be unloaded safely at the site, the load must be rejected.

Methods for removing the load

Equipment	Personnel
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Steps to remove load

1. _____
2. _____
3. _____
4. _____
5. _____

List responsibilities of personnel by name

1. _____
2. _____
3. _____
4. _____
5. _____

Critical Lift Plan required? ☐ YES ☐ NO

Pre Job Briefing Held? ☐ YES ☐ NO

Signature of attendance

1. _____
2. _____
3. _____
4. _____
5. _____

Sevenson Environmental Services, Inc.

EMPLOYEE & VISITOR LOG

DATE:

PRINT NAME	SIGNATURE	COMPANY	Time In	Time Out

Sevenson Environmental Services, Inc.
Equipment Decontamination Log

Project Number:	Project Name:	Project Supervisor:

Equipment Description	Equipment Number	Date Decontaminated	Date Demobilized

Comments:

Site Safety and Health Officer	**Signature**

DAILY EXCAVATION CHECKLIST

Location of Excavation: _____

Name of Qualified Person: _____

Date of Inspection: _____ Utility Locate No.: _____

Soil Type: ☐ Stiff Clay ☐ Firm Clay ☐ Dry Granular ☐ Wet Granular ☐ Saturated Granular ☐ Running

Hydrostatic Conditions: ☐ Dry ☐ Wet ☐ Saturated

Weather Conditions: ☐ Sunny ☐ Overcast ☐ Rain

Angle of Repose: (width and height) _____

Unsupported Wall Height: (measurement required) _____

Protection Required: ☐ Trench Box ☐ Shoring ☐ Sheeting ☐ Benching ☐ Sloping

Personal Protection Requirements: (list) _____

_____

Egress/Ingress: (identify) _____

Ladders/Ramps Location: _____

Location of Spoils: _____

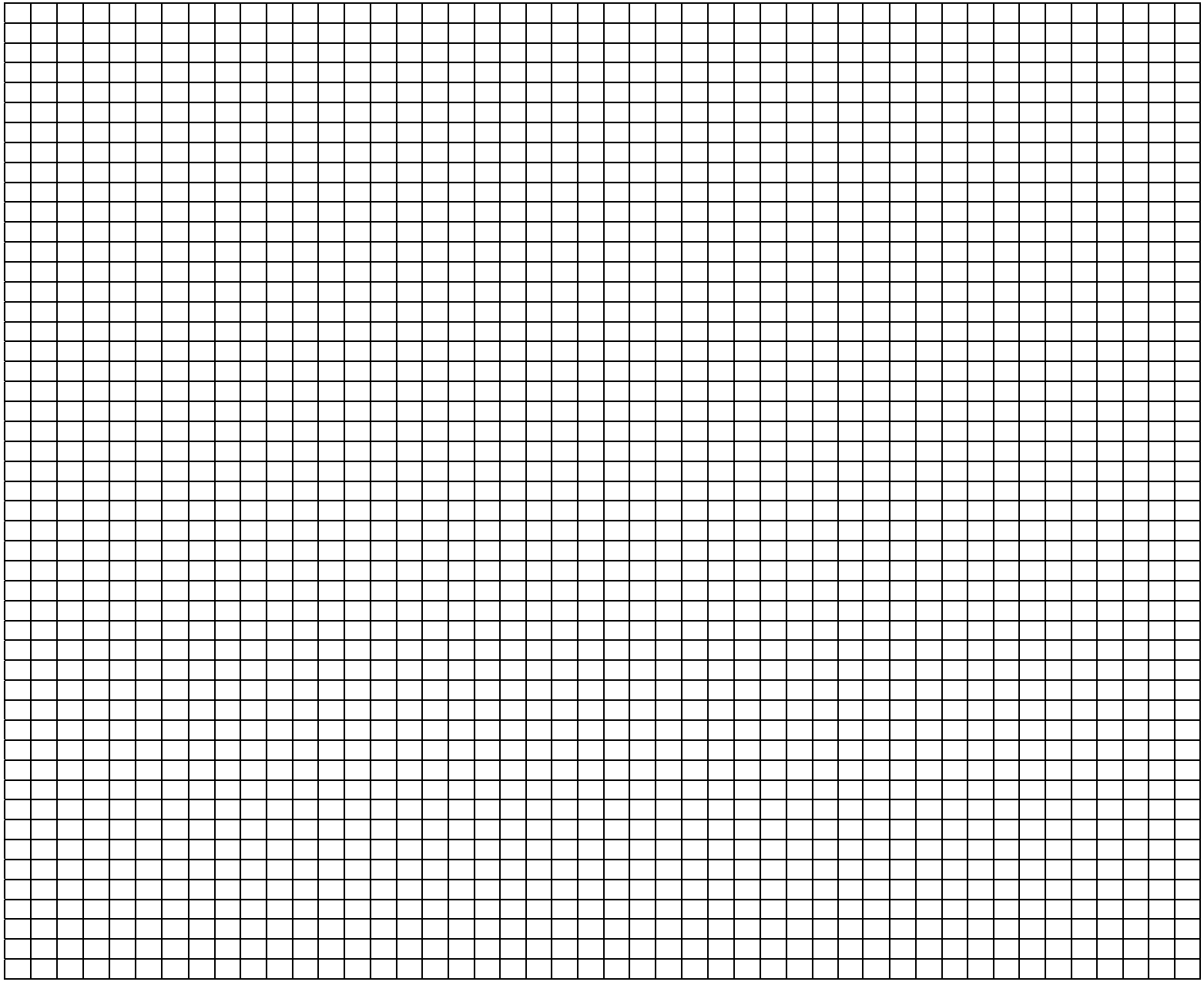
Location of Overhead Lines: _____

Name of Spotter for Overhead Lines: _____

Sketch excavation plan on reverse side and retain in file for 3 years.

EXCAVATION SITE PLAN

LOCATION



ABOVE GROUND CONSIDERATIONS

- ☐ Building Overhangs
- ☐ Electrical Lines
- ☐ Canopies
- ☐ Tree Overhangs
- ☐ Traffic Lights
- ☐ Street Lights

GROUND LEVEL CONSIDERATIONS

- ☐ Buildings
- ☐ Manholes
- ☐ Trees
- ☐ Hydrant
- ☐ PIVs
- ☐ Parking Lots
- ☐ D-Islands
- ☐ Curbs
- ☐ Ditches/ Drains
- ☐ Towers
- ☐ Shrubs
- ☐ Fences
- ☐ Signs
- ☐ Lamp Posts
- ☐ Guard Posts
- ☐ Gate Arms
- ☐ TV Cameras
- ☐ Walls

BELOW GROUND CONSIDERATIONS

Site Prints

- ☐ Site Lightings
- ☐ Comm. Duct Bank
- ☐ 13.2 kV Electricity
- ☐ Fire Line
- ☐ Water
- ☐ Natural Gas
- ☐ Lawn Irrigation
- ☐ Chilled Water
- ☐ Steam
- ☐ Sanitary

Building Prints

- ☐ Fuel Lines
- ☐ Electricity for Gate Arms
- ☐ Electricity for TV Cameras
- ☐ UST (Tanks)

Sevenson Environmental Services, Inc.

Equip Type_____ Equip. ID#_____ Week ending _____ Hours/Miles_____ **ITEM(S) INSPECTED**	MON	TUE	WED	THU	F R I	SAT	SUN
Falling Object Protective Structure (FOP)							
Roll-Over Protective Structure (ROP)							
Seat Belts							
Operator Seat Bar(s)							
Side Shields, Screens, or Cab							
Grab Handles							
Back-Up Alarm - Working							
Lights							
Guards							
Horn							
Anti-Skid Tread Steps Clear of Mud							
Safety Signs/Warning Labels							
Fire Extinguisher							
Oil Level (Full/ No Leaks)							
Operator's Area Clear of Extra Materials							
Controls Function Properly							
Hydraulic System Level (Full/ No Leaks)							
Parking Brake							
Lift Arm and Bucket							
Tires/Tracks							
Steering							
Other:							
Other:							
Operators Initials							

Instructions: Inspect all applicable items at beginning of each shift. If item is found to be unsatisfactory report to Safety Officer or Superintendent immediately.

Sevenson Environmental Services, Inc.

HOT WORK PERMIT

Job Description: ☐ **Welding;** ☐**Torch/oxy/acetylene;** ☐ **Grinding/Cut saw;** ☐**Maintenance;**
☐ **Heating Operation;** ☐ **Other:**_____

Permit Duration: ☐ **4 hrs;** ☐ **8 hrs;** ☐ **10 hrs;** ☐ **12 hrs**

Person(s) Performing Hot Work: _____

Fire Watch Required? ☐ **Yes;** ☐ **No**

If yes, Fire Watch Attendant:_____

Air Monitoring Required? ☐ **Yes;** ☐ **No** **Respiratory Protection Required?** ☐ **Yes;** ☐ **No**

MONITORING
(Acceptable Levels)

DATE	TIME	O_2 (19.5-22.0%)	LEL (0-10%)	ORGANIC VAPOR* (0-25ppm)

FIRE PROTECTION

Fire extinguisher present: YES ☐; **Area cleared of combustibles: YES** ☐; **Are operations in compliance with OSHA Regulations: YES** ☐;

Activity Hazard Analysis attached and reviewed by affected personnel: YES ☐

Requirements for Performing Hot Work

- **Flame retardant gloves, coat, and proper eye protection (glasses or shield with welding/cutting rated glass lens)**
- **Respirators will be required when welding/cutting/heating areas that cannot be decontaminated or when welding on stainless steel (Cr-VI) or galvanized metal (metal fume fever).**
- **Use fire blankets when necessary to protect material or areas where removing combustibles is not practical.**
- **Inspect welder, lead lines, and ensure unit is properly grounded.**
- **Maintain a 50 ft diameter clearance for flammables (i.e., fuel cans, vapors) an/or 25 ft diameter clearance for combustibles (i.e., wood, rags, debris)**
- **Oxygen & Acetylene bottles are secure with regulators removed and caps installed prior to moving or unattended during breaks**
- **Inspect all hoses, torch, tips and regulators for defects and ensure flash suppressors are installed**
- **Properly store all empty and full cylinders from vicinity and protect from hot work activities**
- **Barricade walkway under any overhead work**
- **If welding shields are not available, barricade and delineate all work areas when using a torch or welder with a minimum distance of 75 feet.**
- **When normal fire prevention precautions are not sufficient, a qualified fire watch is required. The fire watch shall be instructed in anticipated fire hazards and shall perform assigned duties to 30 minutes after hot work was stopped.**
- **At completion of work activity, disassemble all hoses and regulators and properly store**
- **Toxic surface coatings must be removed prior to welding, cutting or heating. A minimum of 4-inches must be cleared from each side of the weld, cut, or heated area.**
- ***If working with fuel oil the PID for organic vapors will be used to determine the LEL due to the poor LEL sensor response to heavy hydrocarbons. Acceptable PID readings for ensuring vapors are less than 10% LEL will be less than 250 ppm VOCs.**

Health and Safety Officer:_____ **DATE:**_____

Job Safety Enhancement Program

JSEP Form

"You can force compliance, you have to earn commitment"

☐ Safety Observation ☐ Task Improvement ☐ Hazard Identification

Description:_____

Recommendations:_____

Submitted By:_____ Date:_____

JESP Number:_____

Follow up or Corrective Action (if required):_____

Person Responsible for Follow up or Corrective Action:_____

Estimated Completion Date:_____ Actual Completion Date:_____

Person responsible for verification:_____ Date:_____

Sevenson Environmental Services, Inc.

Sevenson Environmental Services, Inc.

Sevenson Environmental Services, Inc.

Job Safety Enhancement Program

NEAR MISS REPORT

A near miss is a potential hazard or incident that has not resulted in any personal injury . Unsafe working conditions, unsafe employee work habits, improper use of equipment or use of malfunctioning equipment have the potential to cause work related injuries. It is everyone's responsibility to report and /or correct these potential accidents/incidents immediately. Please complete this form as a means to report these near-miss situations.

Location _____ Date: _____

Time _____ ☐ am ☐ pm

Please check all appropriate conditions:

☐ Unsafe Act ☐ Equipment: Defective, broken, damaged

☐ Unsafe Condition ☐ Improper use of equipment ☐ Complacency

Description of incident or potential hazard : _____

_____

_____

Employee Signature _____ Date _____

(*optional*)

NEAR MISS INVESTIGATION

Description of the near-miss condition: _____

_____

Causes (primary & contributing) _____

_____

Corrective action taken (Remove the hazard, replace, repair, or retrain in the proper procedures for the task)

_____

_____

_____

Signed: _____ Date Completed _____

Not completed for the following reason: _____

Management _____ Date _____

Near Miss Report Number:_____

Sevenson Environmental Services, Inc.

RESPIRATOR FIT TEST RECORD

EMPLOYEE NAME:	**DATE:**

RESPIRATOR MANUFACTURE:
RESPIRATOR SIZE:

RESULTS			
	Isoamyl Acetate	Irritant Smoke	Other
FIT			
NO FIT			
COMFORT:	Very Comfortable ___	Comfortable ___	Tolerable ___
	Uncomfortable ___	Very Uncomfortable ___	

COMMENTS:

EMPLOYEE SIGNATURE:

Sevenson Environmental Services, Inc.

RESPIRATOR FIT TEST RECORD

EMPLOYEE NAME:	**DATE:**

RESPIRATOR MANUFACTURE:
RESPIRATOR SIZE:

RESULTS			
	Isoamyl Acetate	Irritant Smoke	Other
FIT			
NO FIT			
COMFORT:	Very Comfortable ___	Comfortable ___	Tolerable ___
	Uncomfortable ___	Very Uncomfortable ___	

COMMENTS:

EMPLOYEE SIGNATURE:

Sevenson Environmental Services, Inc.

TRAINING ACKNOWLEDGMENT FORM

NAME:

ADDRESS:

SOCIAL SECURITY NO.: XXX-XX-

EMPLOYER:

I have completed and understand the training program for work to be carried out during work at the Site, including the following topics:

a. Work Rules and Safety Requirements
b. Personal Protection Equipment
c. Potentially Hazardous Chemicals
d. Emergency Equipment and Plan
e. Reporting Injuries and Illnesses
f. Emergency Procedures
g. Job Assignment
h. Personal Hygiene
i. Medical Tests
j. Standard Operating Procedures
k. Applicable Rules and Regulations
l. Respiratory Protection
m. Site Safety and Health Plan was reviewed

Site Personnel Signature: _____	Date:_____

I certify that the above has received adequate safety training and instruction and that this person is proficient in the use of protective clothing and equipment and knowledgeable in all aspects of the Health and Safety Plan.

Safety Officer Signature: _____	Date: _____

Appendix E

Blood-Borne Pathogen Program

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Syncon Resin OU2 Superfund Site
Kearny, New Jersey

Blood-Borne Pathogen Program

Prepared by:

Sevenson Environmental Services, Inc.
Niagara Falls, NY

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Bloodborne Pathogen Program

1. PURPOSE

One of the major goals of the Occupational Safety and Health Administration (OSHA) is to promote safe work practices in an effort to minimize the incidence of illness and injury experienced by employees. Relative to this goal, OSHA has enacted the Bloodborne Pathogens Standard, codified as 29 CFR 1910.1030. The purpose of the Bloodborne Pathogens Standard is to "reduce occupational exposure to Hepatitis B Virus (HBV), Human Immunodeficiency Virus (HIV) and other bloodborne pathogens" that employees may encounter in their workplace.

Sevenson believes that there are a number of "good general principles that should be followed when working with bloodborne pathogens. These include:

- It is prudent to minimize all exposure to bloodborne pathogens.
- Risk of exposure to bloodborne pathogens should never be underestimated.

We have implemented this Exposure Control Plan to meet the letter and intent of the OSHA Bloodborne Pathogens Standard. The objective of this plan is twofold:

- To protect our employees from the health hazards associated with bloodborne pathogens.
- To provide appropriate treatment and counseling should an employee be exposed to bloodborne pathogens.

2. GENERAL PROGRAM MANAGEMENT

A. RESPONSIBLE PERSONS

There are three major "Categories of Responsibility" That are central to the effective implementation of our Exposure Control Plan. These are:

- The "Exposure Control Officer."
- Education/Training Coordinator.
- Our Employees.

B. EXPOSURE CONTROL OFFICER

The "Exposure Control Officer" will be responsible for overall management and support of our company's Bloodborne Pathogens Compliance Program. Activities which are delegated to the Exposure Control Officer typically include, but are not limited to:

- Overall responsibility for implementing the Exposure Control Plan for the entire company.
- Working with management and other employees to develop and administer any additional bloodborne pathogens related policies and practices needed to support the effective implementation of this plan.

- Looking for ways to improve the Exposure Control Plan, as well as to revise and update the plan when necessary.
- Collecting and maintaining a suitable referenced library on the Bloodborne Pathogens Standard and bloodborne pathogens safety and health information.
- Knowing current legal requirements concerning bloodborne pathogens.
- Acting as a liaison during OSHA inspections.
- Conducting periodic audits to maintain an up-to-date Exposure Control Plan.

Davis Raver has been appointed as the project's Exposure Control Officer.

C. EDUCATION/TRAINING COORDINATOR

Our Education/Training Coordinator will be responsible for providing information and training to all employees who have the potential for exposure to bloodborne pathogens. Activities falling under the direction of the Coordinator include:

- Maintaining an up-to-date list of personnel requiring training.
- Developing suitable education/training programs.
- Scheduling periodic training seminars for employees.
- Maintaining appropriate training documentation such as "Sign-in Sheets', Quizzes, etc.
- Periodically reviewing the training programs with the Exposure Control Officer, to include appropriate new information.

Davis Raver has been selected to be the Site's Education/Training Coordinator.

D. EMPLOYEES

As with all of our company's activities, our employees have the most important role in our bloodborne pathogens compliance program, for the ultimate execution of much of our Exposure Control Plan rests in their hands. In this role they must do things such as:

- Know what tasks they perform that may cause occupational exposure.
- Attend the bloodborne pathogens training sessions.
- Develop good personal hygiene habits.

E. AVAILABILITY OF THE EXPOSURE CONTROL PLAN TO EMPLOYEES

To help them with their efforts, our facility's Exposure Control Plan is available to our employees at any time. Employees are advised of this availability during their education/training sessions. Copies of the Exposure Control Plan are kept as part of the Site Health and Safety Plan.

F. REVIEW AND UPDATE OF THE PLAN

We recognize that it is important to keep our Exposure Control Plan up-to-date. To

ensure this, the plan will be reviewed and updated under the following circumstances:

- Annually, on or before May 5th of each year.
- Whenever new or modified tasks and procedures are implemented which affect occupational exposure of our employees.
- When our employee's jobs are revised such that new instances of occupational exposure may occur.

3. EXPOSURE DETERMINATION

One of the keys to implementing a successful Exposure Control Plan is to identify exposure situations employees may encounter without the regard to the use of personal protective equipment. To facilitate this in our company, we have prepared the following:

- Job classifications in which all employees have occupational exposure to bloodborne pathogens.
- Job classifications in which some employees have occupational exposure to bloodborne pathogens.
- Tasks and procedures in which occupational exposure to bloodborne pathogens occur (these tasks and procedures are performed by employees in the job classifications shown on the next two lists).

JOB CLASSIFICATIONS IN WHICH ALL EMPLOYEES HAVE EXPOSURE TO BLOODBORNE PATHOGENS

Below are listed the job classifications in our facility where all employees may come into contact with human blood or other potentially infectious materials, which may result in possible exposure to bloodborne pathogens:

JOB TITLE	DEPARTMENT/LOCATION
Site Safety & Health Officer	Entire Site
Emergency Responder/First Aid & CPR	Entire Site

JOB CLASSIFICATIONS IN WHICH SOME EMPLOYEES HAVE EXPOSURE TO BLOODBORNE PATHOGENS

Below are listed the job classifications at our Site where some employees may come into contact with human blood or other potentially infectious materials, which may result in possible exposure to bloodborne pathogens:

JOB TITLE	DEPARTMENT/LOCATION
Site Safety and Health Officer	Safety

WORK ACTIVITIES INVOLVING POTENTIAL EXPOSURE TO BLOODBORNE PATHOGENS

Below are listed the tasks and procedures in our facility where employees may come into contact with human blood or other potentially infectious materials which may result in exposure to bloodborne pathogens:

JOB TITLE	JOB CLASSIFICATION	DEPARTMENT/LOCATION
First Aid	Site Safety & Health Officer	Entire Site
	Emergency Responder (First Aid/CPR)	Entire Site

4. METHODS OF COMPLIANCE

We understand that there are a number of areas that must be addressed in order to effectively eliminate or minimize exposure to bloodborne pathogens in our facility. The first three areas we deal with in our plan are:

- The use of Universal Precautions.
- Implementing appropriate Work Practice Controls.
- Using necessary Personal Protective Equipment.

Each of these areas is reviewed with our employees during their bloodborne pathogens related training (see the "Information and Training" section of this plan for additional information). By rigorously following the requirements of OSHA's Bloodborne Pathogens Standard in these three areas, we feel that we will eliminate or minimize our employees' occupational exposure to bloodborne pathogens as much as is possible.

A. UNIVERSAL PRECAUTIONS

In our facility we have begun the practice of "Universal Precautions". As a result, we treat all human blood and body fluids such as semen and vaginal secretions as if they are known to be infectious for HBV, HIV and other bloodborne pathogens.

We assume all body fluids to be potentially infectious.

B. WORK PRACTICE CONTROLS

In addition to engineering controls, our facility uses a number of Work Practice Controls to help eliminate or minimize employee exposure to bloodborne pathogens.

Our company has adopted the following Work Practice Controls as part of our Bloodborne Pathogens Compliance Program.

- Employees wash their hands immediately, or as soon as feasible, after removal of potentially contaminated gloves or other personal protective equipment.
- Following any contact of body areas with blood or any other infectious materials, employees wash their hands and any other exposed skin with soap and water as soon as possible.
- Where hand wash facilities are not readily available, sanitizing hand wash solution must be made available.

C. PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment is our employees' "last line of defense" against bloodborne pathogens. Because of this, our company provides (at no cost to our employees) the Personal Protective Equipment that they need to protect themselves against such exposure. This equipment includes, but is not limited to:

- Gloves.
- Safety glasses.
- Goggles.
- Face shields/masks.
- Respirators.

Hypoallergenic gloves, gloveliners and similar alternatives are readily available to employees who are allergic to the gloves our company uses.

To ensure that personal protective equipment is not contaminated and is in the appropriate condition to protect employees from potential exposure, our company adheres to the following practices:

- All personal protective equipment is inspected periodically and repaired or replaced as needed to maintain its effectiveness.
- Reusable personal protective equipment is cleaned, laundered and decontaminated as needed.

To make sure that this equipment is used as effectively as possible, our employees adhere to the following practices when using their personal protective equipment:

- Any garments penetrated by blood or other infectious materials are removed immediately, or as soon as feasible.
- All potentially contaminated personal protective equipment is removed prior to leaving a work area.
- Gloves are worn in the following circumstances:
    - Whenever employees anticipate hand contact with potentially infectious materials.
    - When handling or touching contaminated items or surfaces.

- Disposable gloves are replaced as soon as practical after contamination or if they are torn, punctured or otherwise lose their ability to function as an "exposure barrier".
- Utility gloves are decontaminated for reuse unless they are cracked, peeling, torn or exhibit other signs of deterioration, at which time they are disposed of.
- Masks and eye protection (such as goggles, face shields, etc.) are used whenever splashes or sprays may generate droplets of infectious materials.

D. CONTAMINATED SURFACE AREAS

Potentially infectious materials must be packaged properly to ensure unnecessary exposure is controlled during handling, storage and transportation. Contaminated PPE and first aid supplies must be placed into a properly labeled and mark leak proof bag or container.

Surfaces such as floors, walls, door knobs, and furniture shall be decontaminated after contact with blood or other infections materials. The following procedure should be

followed:

- Secure the area to assure that no one is exposed to the blood, while waiting for the cleanup to proceed.
- Don appropriate personal protective equipment and lay out clan up materials that will be needed (garbage bag, tear off paper towels, set out disinfectant, etc.)
- Spray area with disinfectant and begin wiping up with paper towels, working inward to assure that the area is minimized, not enlarged.
- Place soiled paper towels in garbage bag.
- Repeat as necessary.
- Remove PPE and place in garbage bag.
- Remove gloves and place in bag.
- Close bag and secure.
- Store in designated area and arrange for pick up by authorized personnel.

V. HEPATITIS B VACCINATION POST-EXPOSURE EVALUATION AND FOLLOW-UP

Everyone in our company recognizes that even with good adherence to all of our exposure prevention practices, exposure incidents can occur. As a result, we have implemented a Hepatitis B Vaccination Program, as well as set up procedures for post-exposure evaluation and follow-up should exposure to bloodborne pathogens occur.

A. VACCINATION PROGRAM

To protect our employees as much as possible from the possibility of Hepatitis B infection, our facility has implemented a vaccination program. This program is available, at no cost, to all employees who have occupational exposure to bloodborne pathogens.

The vaccination program consists of a series of three inoculations over a six-month period. As part of their bloodborne pathogens training, our employees have received information regarding Hepatitis vaccination, including its safety and effectiveness.

Sharon Lee Sheelar is responsible for setting up and operating our vaccination program.

To ensure that all employees are aware of our vaccination program, it is thoroughly discussed in our bloodborne pathogens training.

EMPLOYEES ELIGIBLE FOR HEPATITIS B VACCINATION

EMPLOYEE	DEPARTMENT	ACCEPTED/ DECLINED	DATES SCHEDULED	INOCULATION RECEIVED #1 / #2 / #3			ADMINISTERING HEALTHCARE PROFESSIONAL (INITIALS)

VACCINATION DECLINATION FORM

Date:

Employee Name:

Employee ID#:

I understand that due to my occupational exposure to blood or other potential infectious materials I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline the Hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If, in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.

_____ _____

Employee Signature Date

_____ _____

Facility Representative Signature Date

B. MEDICAL RECORDKEEPING

To make sure that we have as much medical information available to the participating healthcare professional as possible, our facility maintains comprehensive medical records on our employees. WorkCare, Inc. is responsible for setting up and maintaining these records for 30 years post employment, which include the following information:

- Name of the employee.
- Social security number of the employee.
- A copy of the employee's Hepatitis B Vaccination status.
- Dates of any vaccinations.
- Medical records relative to the employee's ability to receive vaccination.
- Copies of the results of the examinations, medical testing and follow-up procedures which took place as a result of an employee's exposure to bloodborne pathogens.
- A copy of the information provided to the consulting healthcare professional as a result of any exposure to bloodborne pathogens.

As with all information in these areas, we recognize that it is important to keep the information in these medical records confidential. We will not disclose or report this information to anyone without our employee's written consent (except as required by law). Your information is available to you by written request to:

WorkCare, Inc.
300 S. Harbor Blvd, Suite 600
Anaheim, CA 92805

VI. INFORMATION AND TRAINING

Having well informed and educated employees is extremely important when attempting to eliminate or minimize our employees' exposure to bloodborne pathogens. Because of this, all employees who have the potential for exposure to bloodborne pathogens are put through a comprehensive training program and furnished with as much information as possible on this issue.

This program was set up so that employees would receive the required training on or before June 4, 1992. Employees will be retrained at least annually to keep their knowledge current. Additionally, all new employees, as well as employees changing jobs or job functions, will be given any additional training their new position requires at the time of their job assignment.

Davis Raver is responsible for seeing that all employees who have potential exposure to bloodborne pathogens receive this training. He will be assisted by the following instructors:

- Wyatt Beougher
- Dave Goeckler
- Dave Larson
- Paul Jung

A. TRAINING TOPICS

The topics covered in our training program include, but are not limited to, the following:

- The Bloodborne Pathogens Standard itself.
- The epidemiology and symptoms of bloodborne diseases.
- The modes of transmission of bloodborne pathogens.
- Our facility's Exposure Control Plan (and where employees can obtain a copy).
- Appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials.
- A review of the use and limitations of methods that will prevent or reduce exposure, including:
    - Work practice controls.
    - Personal protective equipment.

- Selection and use of personal protective equipment including:
    - Types available.
    - Proper use.
    - Location within the facility.
    - Removal.
    - Handling.
    - Decontamination.
    - Disposal.

- Information on the hepatitis B Vaccine, including its:
  - Efficacy.
  - Safety.
  - Method of Administration.
  - Benefits of Vaccination.
  - Our facility's free vaccination program.

- Actions to take and persons to contact in an emergency involving blood or other potentially infectious materials.

- The procedures to follow if an exposure incident occurs, including incident reporting.

- Information on the post-exposure evaluation and follow-up, including medical consultation, that our facility will provide.

B. TRAINING METHODS

Our facility's training presentations make use of several training techniques including, but not limited to, those checked below:

__ • Classroom type atmosphere with personal instruction.
__ • Videotape programs.
__ • Training manuals/employee handouts.
__ • Employee Review Sessions.

Because we feel that employees need an opportunity to ask questions and interact with their instructors, time is specifically allotted for these activities in each training session.

C. RECORDKEEPING

To facilitate the training of our employees, as well as to document the training process, we maintain training records containing the following information for three years:

- Dates of all training sessions.
- Contents/summary of the training sessions.
- Names and qualifications of the instructors.
- Names and job titles of employees attending the training sessions.
- Medical records will be maintained by WorkCare, Inc. during and 30 years after employment has been terminated.

We have used the forms on the following pages and/or our computer systems to facilitate this recordkeeping.

These training records are available for examination and copying to our employees and their representatives, as well as OSHA and its representatives.

BLOODBORNE PATHOGENS TRAINING SESSIONS

Date of Session: _____ Session Summary (Attached)

Instructor(s) Qualifications

* * * * * *

Attendee Name	Job Title

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Appendix F

Respiratory Protection Program

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Syncon Resin OU2 Superfund Site
Kearney, New Jersey

RESPIRATORY PROTECTION PROGRAM

Prepared by:

Sevenson Environmental Services, Inc.
Niagara Falls, NY

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1.0 Methods

The Site Safety and Health Officer SSHO, will review product Safety Data Sheets, SDS as well as monitor for the contaminants of concern at the site to determine the need for respiratory protection. This review will include the intended use of products brought onto the site as well as the site activities that have the potential to expose workers to chemicals in concentrations at or above established action levels.

2.0 Procedure for Selection of Respirators

Respiratory protection utilized to prevent exposures to airborne workplace hazards will only be used when accepted engineering controls are not feasible. Administrative controls (i.e., worker rotation) will not be considered an accepted control measure to reduce personnel exposures.

Sevenson will select and provide respiratory protection based on the respiratory hazards to which its employees are exposed. Potential atmospheric hazards associated with non-routine activities performed shall be identified and assessed in separate Activity Hazard Analyses, AHA's. Additional performance considerations including cleaning, inspection, proper disassembly and assembly, and any other workplace and/or user factors that affect respirator reliability shall be identified and communicated to project staff during training sessions conducted annually or when deficiencies are observed by the SSHO. Sevenson will only issue respiratory protection that bears National Institute of Occupational Safety and Health, NIOSH approval.

All respiratory protection used by Sevenson personnel will be selected in accordance with procedures outlined in the NIOSH Respirator Decision Logic (May 1987), 29 CFR 1926.1101 (Table 1), 29 CFR 1926.62 (Table 1), and USACE EM385-1-1 (30NOV2015). Selection will be based on the following criteria:

- The nature of the contaminants (gas, vapor, dust, mist, or fume);
- The warning properties of the known or suspected contaminants;
- Applicable exposure limits published by OSHA, ACGIH, and NIOSH;
- The potential for exposure to workplace atmospheres which may be immediately dangerous to life or health (IDLH);
- Qualitative estimates of airborne contaminant concentrations;
- The results of air monitoring; and
- The nature of the work being performed for which respiratory protection is required.

Potential activities performed on the project site that may require respiratory protection include:

- Demolition Activities (concrete, asphalt and railroad tracks);
- Soil Excavation and Disposal
- Chemical Sampling

- Decontamination of Tools/Equipment

Use of respiratory protection shall be based upon task analysis, the results of air monitoring as determined by real time instrumentation, or both.

3.0 Medical Evaluations

All personnel whose job duties require, or may require the use respiratory protection, must successfully pass a pulmonary function test (PFT) and physical exam conducted by an occupational physician approved by Sevenson's Medical Consultant, Work Care. Work Care shall, upon successful completion of the medical exam and PFT, issue a written *Health Status Report* approving the use respiratory equipment. The *Health Status Report* shall include the telephone, email, and physical address as well as the printed name and signature of the physician issuing the opinion. The *Health Status Report* shall also state the date of the exam and the date the clearance expires. The PFT test is part of the Sevenson medical surveillance program and will be repeated on an annual basis. The *Health Status Report* that contains the physician's written approvals for each Sevenson employee using respiratory equipment is maintained by the SSHO in the employee's safety and health file and may be reviewed in the site safety office.

All USACE respirator users shall have a pre-placement history and targeted physical. The exam shall include a pulmonary function test, evaluation of the cardiovascular and respiratory system, and any tests required by the Occupational Health Provider

Any physical problems associated with respirator use during the project will be noted in the employee's medical file; such information will be forwarded to Work Care upon approval by the Health and Safety Manager.

Additional medical evaluations shall be provided when:

- An employee reports medical signs or symptoms that are related to the ability to use a respirator
- A supervisor or the SSHO informs the employer that an employee needs to be reevaluated
- Information from the respiratory protection program, including observations made during the fit testing and program evaluation, indicates a need for employee reevaluation
- A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee
- It has been more than 12 months since the last medical exam

4.0 Fit Testing Procedures for Tight-Fitting Respirators

All personnel required to use respiratory protection by their job tasks must undergo a qualitative fit test on an annual basis (no more than one year may elapse between fit tests). Fit testing will also be required if an employee is assigned a respirator of a make, type, or size different from any previously fit-tested.

Qualitative fit testing will be performed by in-house personnel using the fit test protocols identified in 29 CFR 1920.134, Appendix A, Section B, Subsection 5 (Irritant Smoke). The fit test results will include, at a minimum, the following information:

- The name, signature, and social security number of the employee being fit tested;
- The respirator brand, model, and size;
- The date of the fit test;
- The method of fit testing used;
- A statement that the fit test protocols meet the requirements of 20 CFR 1910.134; and
- The name and signature of the fit testing instructor.

Fit test reports shall be completed annually for all site personnel medically qualified and required to use respiratory protection. Fit test reports are maintained in the employee's personal health and safety file by the SSHO and may be reviewed upon request.

5.0 Procedure for Proper Use of Respirators in Routing and Reasonably Foreseeable Emergency Situations

Project employees will only use the respiratory equipment provided for the project. The project utilizes a community use system for respiratory equipment. The employee will only use the size and make of respirator used during the fit test procedure.

If the employee is not sure of his/her size, they will check with the SSHO who will refer to his/her fit test record for verification. The exception to this procedure will be subcontractor personnel, who are responsible for reporting to the site with their own properly assigned and fitted respirators. Compliance with these requirements will be monitored by the SSHO.

Contact lenses may be worn while using a full-face piece respirator. Sevenson will provide special eyeglass inserts designed for the respirator if an employee must wear eyeglasses with a full face-piece respirator.

The actual use of all respiratory protective equipment will conform to the manufacturer's operating instructions and training provided to the employee. A copy of all operating instructions for each type of respiratory equipment utilized will be maintained by the SSHO. The SSHO shall reference these operating instructions during annual fit-testing exercises and/or training involving respiratory equipment. Upon request to the SSHO, operating instructions shall be made available.

Respirators will not be worn when conditions exist that prevent a good face-to-face piece seal. These conditions include, but are not limited to:

- The growth of a beard or sideburns,
- The use of a skull cap which projects under the face piece,
- The use of regular corrective glasses where the temple bars prohibit a proper seal, or
- The absence of one or both dentures.

As stated, employees will be required to equip their respirators with the project's standard APR cartridge, HEPA (P100)/Organic Vapors/Acid Gases, for operations that require APR use. The cartridge change-out schedule is based on the site contaminant arsenic, which has the lowest Permissible Exposure Limit (PEL) for any of the project's contaminants of concern. Based on the Woods Equation (predictive model), APR cartridges will be changed at the end of each shift.

Employees will be required to perform a positive and negative fit check each time they don a respirator. Employees will be instructed to leave any work area where respirators are being used in the following situations:

- Before removing the respirator face piece for any reason;
- Before changing respirator cartridges; or
- When leakage around the face piece or a change in breathing resistance is detected

6.0 Procedure for Cleaning, Disinfecting, Storing, Inspecting, Repairing, Discarding, Maintaining Respirators

Respirators must be cleaned and disinfected at a frequency necessary to ensure the proper protection is provided to the wearer. Respirators worn on a daily basis will be cleaned and disinfected at the end of the shift and during the annual inspection session. A respiratory cleaning station is set up in the decontamination area. The station will include, at a minimum, the following items:

- A bucket with a respirator cleaner/sanitizer solution and a soft bristle brush;
- Warm water clean rinse;
- Clean water rinse; and
- A non-contaminated area where respirators may be hung to dry.

Gross decontamination of the respirator shall be completed prior to immersion in the sanitizing solution and does not constitute respirator cleaning, but should always be completed as a precursor. Employees will remove and discard respirator cartridges prior to cleaning. Discarded cartridges exposed to site contaminants shall be discarded as hazardous waste.

Each employee who wears respiratory protection shall be responsible for cleaning the respirator they use. The following instructions will be posted at the respirator cleaning stations to ensure adequate cleaning and disinfection.

- Clean and disinfect respirators daily.
- Follow appropriate respirator cleaning/disinfection procedures. These procedures include:

  -Remove mouth and nose pieces prior to cleaning respirators.

  -Wash all parts thoroughly with sanitizer solution using a soft bristle brush.

  -Rinse all parts in warm water.

  -Perform a second rinse in clean water.

-Place respirators in a non-contaminated area to dry.

The SSHO will ensure compliance with the requirements of this section by periodically observing employees' cleaning techniques.

Cleaned and sanitized respiratory protection will be stored in designated areas in plastic bags identified with the words "**Cleaned and Disinfected**" and secured with a tamper-proof seal. Respirators shall be stored upright on the shelving to eliminate distortion.

During field use, special attention will be paid to protecting respiratory protection from:

- Harmful chemical or physical agents;
- Dusty conditions;
- Temperature extremes;
- Direct sunlight;
- Mechanical force; and/or
- Distortion of the rubber and elastic respirator components.

Respiratory equipment users shall store their respirator in the plastic bag provided when taken from the shelf during periods of non-use.

New and/or replacement respirators will be stored in the Safety Officer trailer in protective plastic bags and/or in manufacturer's boxes away from heat, direct sun, and dust.

Employees will be instructed to inspect the respirator they select prior to each use, after each use, during cleaning, and at any other time, as necessary. The inspection will focus on:

- Cleanliness;
- Respirator and respirator component integrity; and
- The presence and correct installation of component parts.

The SSHO will be required to hold an inspection session with the staff on an annual basis. The purpose of this session will be to allow the staff a chance to inspect a personal respirator. This inspection will provide aid in the identification of problems that the inspector of the respirator may not notice.

During this session, the respirator will be completely disassembled in accordance with the manufacturer's instruction. Specific disassembly procedures will be reviewed during the training. Copies of the manufacturer's assembly/disassembly instructions will be made available to all site employees. All individual parts will be thoroughly cleaned and inspected prior to assembly and use.

Sevenson will have available approved replacement parts for all respirators used on site. Respirator users will notify the SSHO when an inspection reveals a problem or inconsistency. The SSHO, or a designated representative, will then examine the respirator and determine if the complete respirator or a component part needs to be replaced. The SSHO, or a designated representative, will provide the appropriate replacement part/respirator and assist in the installation, as necessary. If a respirator cannot be

immediately repaired, the respirator will be tagged with a "Do Not Use" sign and taken out of service until repairs can be completed.

Respiratory protection equipment that is no longer usable or viable will be discarded as soon as practical by the SSHO.

7.0 Training in Respiratory Hazards

Employees will be trained in the specific hazards anticipated at the Site. This training shall include but is not limited to:

- Coworker medical emergency
- Site wide evacuation
- Fire at the site
- HAZCOM training for the chemicals of interest or use at the site

8.0 Training in Proper Use

All personnel required to use respiratory protection on this project will meet specific training requirements, and have the corresponding documentation available in the site safety files.

Personnel will be expected to have at least rudimentary knowledge of respirator use prior to job assignment. However, all site personnel will receive additional respirator training as a portion of their site-specific safety and health training.

The additional site-specific respirator training will include, at a minimum, the following information:

- Why the training is necessary;
- What conditions can render a respirator ineffective;
- What the limitations and capabilities of the respirator are;
- How to use the respirator effectively in emergency situations;
- How to inspect, put on and remove, and check the seals of the respirator;
- What respirator cleaning, storage, inspection, and maintenance procedures are; and
- How to recognize medical signs and symptoms that may limit or prevent effective use of the respirator.

This initial training will be reinforced and updated through a series of regularly scheduled safety meetings and interaction with area supervisors. Training records will be maintained by the SSHO and will be available for review in the site safety office.

9.0 Procedure for Evaluating the Program

The SSHO will periodically review this respiratory protection program. The program will, at a minimum, be reviewed annually. More frequent reviews may be implemented by the SSHO if site conditions or concerns warrant an additional review. Changes will be enacted

in respirator use procedures or policies based on the results of the SSHO's audits and observations or if legitimate concerns or issues are addressed to the SSHO on a repetitive basis. Any changes in the respiratory protection program will be documented and must first be approved by the Safety and Health Manager (SHM)

10.0 Voluntary Use Guidelines

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide and additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If Sevenson provides you a respirator or you supply your own, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

- Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
- Choose a respirator certified for use to protect against the contaminant of concern. NIOSH, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
- Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles, will not protect you against gases, vapors, or very small particles of fumes or smoke.
- Keep track of your respirator so that you do not mistakenly use someone else's respirator.

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Appendix G

Hazard Communication Program

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Hazard Communication Program

June 2015

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, NY 14305

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Hazard Communication Program

1. PURPOSE

The Hazard Communication Standard, OSHA 1910.1200, recently amended to meet the international Global Harmonization Standard (GHS), is the primary regulation to communicate information about chemical hazards. The regulation requires that each employer develop and implement its own program to assure employees know and understand how to protect themselves from the hazards of using chemicals at Sevenson.

2. SCOPE

This program and the procedures described herein apply and shall be practiced by all Sevenson employees using or potentially exposed to the hazards of chemical in the workplace. This program applies to permanent facilities and construction sites equally.

3. REQUIREMENTS

All employees who may be exposed to hazardous materials will be trained according to the requirements of this Hazard Communication Program BEFORE using or being potentially exposed to hazardous chemical. . The training requirements are in Section 6.

Retraining will occur as needed when new hazards become recognized, when employees become exposed to new hazards as a result of transfer, process changes, or new chemical introductions, or when they demonstrate a lack of understanding and/or adherence to the program requirements. In the event non-English speaking or reading employees are utilized at the site, accommodations will be made to obtain a SDS in their native langue and have someone who can communicate effectively with the individual(s) participate in the training. Employees shall demonstrate comprehension of the chemical hazards they may be exposed to, how to protect themselves from such hazards, how to use an SDS to recognize and avoid those hazards.

4. ROLES & RESPONSIBILITIES

Job site personnel shall be under the general direction of the Sevenson Project Manager. Each project shall also have personnel with the primary responsibility of site safety and who are under the direction of the Sevenson Director of Health and Safety. Facility-based personnel shall be directly responsible to the Director of Health and Safety. Following is a description of the different program roles.

Site Safety/Health Officer (SSHO) reports directly to the Sevenson Director of Health and Safety. The on-site SSHOs are responsible for implementing the Sevenson Hazard Communication Program. Depending upon the size of the project, the SSHOs may have safety technicians reporting to them. The SSHO's are responsible for;

1. Assuring all personnel on the job site have received training described by this program.

2. Obtaining and managing all SDSs of chemicals used on the site.

3. Conveying site-specific hazard communication information.

4. Conducting site observations to assure that this program is properly implemented.

Project Superintendents/field supervisors assigned to field management roles are required to;

1. Enforce the requirements of the Sevenson Hazard Communication Program.

2. Apprise other contractors regarding the hazardous chemicals which their employees may be exposed to. Contractors, whose employees may be exposed to hazardous substances used by Sevenson employees, will be given access to this Hazard Communication Program.

3. Ensure that all Subcontracts working at the site shall submit all SDSs for the materials they are using at the site to the Site Safety and Health Officer. The Site Safety and Health Officer will review the SDSs to ensure the product is not restricted by the site owner.

Craft and Facility Personnel are responsible for carrying out the requirements of this program and notifying their immediate supervisor of any deficiencies or concerns.

5. HAZARD COMMUNICATION PROGRAM

I. INVENTORY

A written inventory of all the hazardous chemicals used or stored by Sevenson is maintained by the Site Safety Officer and is available in the Site Safety Office. Likewise, a written inventory will be maintained at each facility location and will include all chemicals used at that facility.

II. WARNING LABELS

Sevenson will ensure that each container of hazardous chemical in the workplace will be labeled with the following information, provided on the manufacturer's SDS:

a. Identity of the hazard.

b. Appropriate hazard pictogram (see next page).

c. Signal word (danger or warning).

d. Hazard statement with degree of hazard.

e. Precautionary statements.

Employees are required to label secondary containers into which hazardous chemicals are

transferred from labeled containers even if only for immediate use and under constant control. Manufacturer's and/or shipping labels will be left on the containers and that all containers will be labeled.

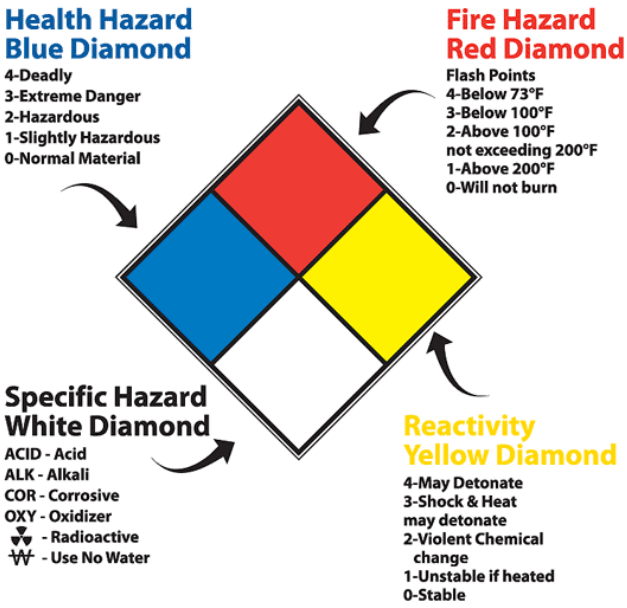
Labeling Chemicals in the Workplace:

HCS Pictograms and Hazards - Mandatory

Health Hazard ▪ Carcinogen ▪ Mutagenicity ▪ Reproductive Toxicity ▪ Respiratory Sensitizer ▪ Target Organ Toxicity ▪ Aspiration Toxicity	**Flame** ▪ Flammables ▪ Pyrophorics ▪ Self-Heating ▪ Emits Flammable Gas ▪ Self-Reactives ▪ Organic Peroxides	**Exclamation Mark** ▪ Irritant (skin and eye) ▪ Skin Sensitizer ▪ Acute Toxicity ▪ Narcotic Effects ▪ Respiratory Tract Irritant ▪ Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder ▪ Gases Under Pressure	**Corrosion** ▪ Skin Corrosion/Burns ▪ Eye Damage ▪ Corrosive to Metals	**Exploding Bomb** ▪ Explosives ▪ Self-Reactives ▪ Organic Peroxides
Flame Over Circle ▪ Oxidizers	**Environment (non-Mandatory)** ▪ Aquatic Toxicity	**Skull and Crossbones** ▪ Acute Toxicity (fatal or toxic)

The following labels may continue to be used in addition to the mandatory requirements above.

NFPA Method – optional



HMIS Method - optional

Refer to the National Paint & Coatings Association for further explanation of the HMIS system.

Informing Vendors and Sub-Contractors

It is the responsibility of the Site Safety Officer to provide contractors the following information:

- Hazardous chemicals to which they may be exposed while on the jobsite; and
- Precautions the employees may take to lessen the possibility of exposure by usage of appropriate protective measures

III. SAFETY DATA SHEET (SDS)

Sevenson shall obtain or develop a SDS for all hazardous chemicals used in the workplace. The SDS is a form that provides more detailed information about a chemical than the label. It is accessible upon request. The SDS file exists both on a computerized data system and in hard copies. The SDS file is maintained by the Site Safety and Health Officer and is available for review at any time from the Safety Office. All material received on-site must have a SDS prior to the use of this material.

Sevenson's procedures - If a SDS is not received with the material, then the procedures for obtaining a SDS are as follows:

Step 1 - A letter will be sent at any time an item is received and a SDS does not accompany it.

Step 2 - If after 30 days, a SDS has not been received, a follow up request will be sent.

Step 3 - If after an additional 30 days from the follow up letter a SDS has not been received, the company will report to OSHA in an attempt to receive the proper information.

Below is a sample letter requesting a SDS:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Date

Dear Sir:

The Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200) requires that employers be provided Safety Data Sheets (SDS) for all hazardous substances used in their facility, and to make these forms available to employees potentially exposed to these hazardous substances.

In an effort to comply with these regulations, we ask your cooperation in providing us with a current Safety Data Sheet on (product name) no later than (date). Delays in receiving the SDS information may prevent use of your product.

Please consider this letter as a standing request to your company for any information concerning the safety and health aspects of using this product that may become known in the future.

Your cooperation is greatly appreciated. Thank you for your timely response to this request. If you have any questions concerning this matter, please contact myself at the above address.

Sincerely,

SEVENSON ENVIRONMENTAL SERVICES, INC.

Your name

Title

The Site Safety and Health Officer will review all incoming SDS for completeness and accuracy and make the information directly available to employees. Employees will be advised of precautionary measures in using the product.

The following is an outline of the guidelines used to check for SDS completeness:

A. Is a SDS available for the hazardous chemicals used?

B. Is the SDS in English?

C. Are all mandatory sections of the SDS included?

1. Identification
2. Hazard(s) identification
3. Composition
4. First Aid
5. Fire-fighting
6. Accidental release
7. Handling and storage
8. Exposure limits & controls
9. Properties
10. Stability and reactivity
11. Toxicology
12. Ecological information
13. Disposal
14. Transportation
15. Regulations
16. Other information

D. SDS information and key sections follows;

Section 1. Product Name & Identification

Chemical Manufacturer's Name - this may list one or more alternate manufacturers or importers, the address and emergency telephone number.

Name of Product - generally the trade name, which is an adopted name that is given by a manufacturer to distinguish it as produced by him and that it may be protected as a trademark.

Chemical Name - lists the name of the chemical. (In some cases this may be listed as a "Trade Secret" but the remainder of the SDS should be filled out).

A manufacturer, importer, or employer may withhold the chemical identity if it is a trade secret. However, it must be stated clearly that the chemical is a trade secret and the hazardous nature of the chemical **MUST** still be listed, both on the label and the SDS.

Section 2. Hazard identification

This includes all the information required on the label for that chemical including the hazard pictogram(s), signal word, hazard statement, and precautionary statement(s).

Section 3. Composition/Information on Ingredients

Here you will find information on the chemical identity, common names or synonyms, CAS numbers or other unique identifiers as well as any impurities and stabilizing additives which are themselves classified and which contribute to the classification of a substance and any concentrations of the mixture if applicable.

Section 4. First Aid

Here you will find the immediate treatment and response to an emergency exposure.

Section 5. Firefighting measures

This section provides firefighting measures, e.g., suitable and unsuitable extinguishing media, specific hazards arising from the chemical (nature of any hazardous combustion or decay products), and special PPE for firefighters.

Section 6. Accident Release Measures

Here you will find personal precautions, PPE and emergency procedures, environmental precautions, and methods/materials for containing and cleaning up the release.

Section 7. Handling and storage

This section details how the chemical must be handled to prevent fire, explosion, or spill which could result in exposure to employees or the environment.

Section 8. Exposure controls/personal protection

Here you will find the regulatory allowable exposures, engineering controls, and personal protective equipment necessary to minimize exposure.

Section 9. Physical and Chemical Properties

This section provides information on appearance, odor, odor threshold, pH, melting/freezing point, boiling point and range, flash point, evaporation rate, flammability, upper and lower explosive limits, vapor pressure, relative density, solubility, partition coefficient, auto ignition temperature, decomposition temperature, and viscosity.

Section 10. Stability and Reactivity

This section provides information on reactivity, chemical stability, possibility of hazardous reactions, conditions to avoid (static discharge, shock, vibration) incompatible materials,

hazardous decomposition products.

Section 11. Toxicology Information

This section provides concise but compete and comprehensible description of the various toxicological (health) effects and the available data used to identify those effects.

Section 12. Ecological Information

This section provides information on eco-toxicity, persistence and degradability, bio-accumulative potential, mobility in soil, and other adverse effects.

Section 13. Disposal Information

This provides a description of waste residues and information on their safety handling and methods of disposal, including the disposal of any contaminated package.

Section 14. Transportation Information

This section provides the UN number, UN proper shipping name, transport hazard class(es), packing group, environmental hazards (marine pollutant), transporting in bulk, and special precautions which a user needs to be aware of, or needs to comply with, in connection with the transport or conveyance within or outside their premises.

Section 15. Regulatory Information

This provides safety, health and environmental regulations specific for the product in question.

Section 16. Other Information

This section allows the manufacturer or distributer to add additional information they feel should be conveyed to the user.

6. TRAINING

Prior to handling or being exposed to chemical hazards and as required, each employee shall receive instruction as described below.

A. TRAINING COURSE OUTLINE

I. Course Introduction

A. Chemical Hazard Recognition
B. Sources of Information on Chemical Hazards
C. Control of Chemical Hazards

II. Chemical Hazard Recognition

Employees shall be instructed of the health hazards of each hazardous chemical in

their workplace.

A. Types of Hazards

1. Physical Hazards - employees shall be instructed on the fire hazard of hazardous chemicals in their workplace.

   a. Combustible liquid
   b. Compressed Gas
   c. Explosive
   d. Flammable
   e. Oxidizer
   f. Pyrophoric
   g. Unstable or Reactive

2. Health Hazards

   a. Acute Hazards

      i. corrosive
      ii. highly toxic
      iii. toxic
      iv. irritant
      v. sensitizer

   b. Chronic Hazards

      i. carcinogens
      ii. mutagens
      iii. teratogens and reproductive toxins
      iv. hepatotoxins
      v. nephrotoxins
      vi. neurotoxins
      vii. other toxic effects

   Employees shall be instructed on how to protect themselves when exposed to hazardous chemicals. They will also be instructed on the type and use of personal protective equipment required when using a particular hazardous chemical.

B. Routes of Entry

1. Ingestion
2. Inhalation
3. Skin absorption

C. Symptoms of Exposure to Hazardous substances

1. Acute exposure

   a. Short term exposure period

b. Usually high concentrations
c. Immediate health effect

2. Chronic exposure

a. Long term exposure period
b. Usually low concentrations
c. Long term health effects

3. Types of reaction to acute and chronic exposures

a. Chronic lung disease-silica, cotton dust
b. Anesthetics-solvent vapors
c. Irritants-formaldehyde, acids
d. Chronic liver damage-carbon tetrachloride
e. Sensitizers-reactive dyes
f. Cutaneous Hazards-ketones, chlorinated compound
g. Eye hazards-methanol, acids

D. Relationship of Dose to Risk

1. Toxicity of chemical
2. Concentration of chemical
3. Mode of exposure and exposure time
4. The greatest risk is posed by toxic substances that are:
   a. highly toxic
   b. present in high concentrations and
   c. to which employees are exposed to several hours per day/day after day

E. Exposure standard

1. OSHA Permissible exposure limits

a. 8-hour time weighted averages
b. 15 minute ceiling
c. legally binding

2. ACGIH Threshold Limit Values

a. 8-hour time weighted averages
b. instantaneous ceiling
c. not legally binding

3. Other Relevant Standards or Criteria

a. NIOSH Criteria Documents
b. ANSI Standards
c. EPA Health Assessment Documents

4. Common Features of Exposure Limits

a. units-very small amounts

i. ppm, ppb, ppt
ii. mg/m3, ug/m3

b. Not "safe" limits but exposure to concentration below levels is generally low risk

III. Sources of Information on Chemical Hazards

A. Summary of HCS

1. Hazard determination-performed by manufacturer
2. SDS
3. Labeling
4. Training Requirements
5. Written Hazard Communication Program
6. List of Hazardous substances in workplace

B. Contents of a SDS

1. Manufacturer's address and phone number
2. Hazardous ingredients/identity
3. OSHA, PEL, ACGIH, TLV, other recommended limits
4. Physical/Chemical characteristics
   a. boiling point
   b. vapor pressure
   c. vapor density
   d. solubility in water
   e. specific gravity
   f. melting point
   g. evaporation rate
   h. appearance and odor
5. Fire and explosion hazard data
   a. flash point
   b. flammable limits
   c. explosive levels
   d. extinguishing media
   e. special firefighting procedures
   f. unusual fire and explosion hazards
6. Reactivity Data
   a. stability
   b. conditions to avoid
7. Health Hazard Data
   a. routes of entry
   b. acute and chronic hazards, including carcinogen
   c. signs and symptoms of exposure

d. medical conditions aggravated by exposure
e. emergency first aid procedures

8. Precautions for Safe Handling and Use

a. steps to be taken in handling and storage
b. waste disposal method
c. precautions to be taken in handling and storing
d. other precautions

9. Control measures

a. ventilation

i. local exhaust, special
ii. mechanical other

b. sealed systems
c. other engineering controls
d. respiratory protection
e. protective gloves
f. other protective clothing or equipment
g. eye protection
h. workplace practices, industrial hygiene procedures

C. Labeling

1. Labels tell you

a. what the principal hazards are
b. what precautions you should take
c. emergency first aid procedures

2. Labels provide this information by

a. words
b. symbols
c. numbers
d. colors
e. combinations

D. Recognizing Hazardous Chemicals are present

1. Appearance or odor of hazardous chemicals
2. Physical or health effects
3. Monitoring
4. Inventory Control

IV. Control of Chemical Hazards

A. Chemical Hazards are Controlled by Various Methods

1. Engineering control, e.g. ventilation

2. Workplace practices e.g., grounding containers of flammable substances
3. Personal protective devices
    a. gloves, shoes
    b. safety glasses
    c. protective clothing
    d. dust masks
    e. respirators
4. Isolation of chemical

B. Safe Handling of Hazardous Chemicals

1. Storage practices
2. Reactivity considerations
3. Proper containers
4. Spill prevention
5. Spill cleanup procedures
6. Personal protective equipment

Appendix H

Control of Hazardous Energy (LO/TO) Program

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Control of Hazardous Energy (Lockout/Tagout) Program

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, NY 14305

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1.0 Purpose

It is this company's policy that before any work or maintenance is performed on any machine, equipment, tool, or electrical system, that they are made totally safe before work starts by removing any source of energy or power to them. The Lockout/Tagout Program provides for a safe method of working on, near, or in machinery or equipment that can cause serious injury.

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It will be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

NOTE: This program will be available to all employees for review and a copy will be located in the following area(s):

1. Health and Safety Office

4. Main Office Trailer

2.0 Authority and Reference

Occupational Safety and Health Administration (OSHA) 29 CFR 1910.147.

This standard covers the servicing and maintenance of machines and equipment in which the unexpected energizing or start up of the machines or equipment, or release of stored energy could cause injury to employees.

3.0 Application

This program applies to the control of energy during servicing and/or normal maintenance of machines and equipment if:

1. An employee is required to remove or bypass a guard or other safety device.
2. An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is being performed at or upon the point of operation, or when an associated danger zone exists during a machine operating cycle.

EXCEPTION: Minor tool changes and adjustments which take place during normal production operations are not covered by the OSHA Standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection.

NOTE: The OSHA Lockout/Tagout Standard (See 29 CFR 1910.147) does not apply to work on cord-and-plug-connected electrical equipment when the employee performing the service or maintenance controls energizing by unplugging the equipment from the energy source. The standard also does not apply to hot tap operations involving transmission systems from substances such as gas, steam, water, or petroleum, when they are performed on pressurized pipelines. However, it must be demonstrated that the continuity of service is essential, shut off of the system is impractical, and special equipment is used which provides effective protection.

3.1 Affected Employees

Job Classification(s) required following Lockout/Tagout procedures include:

1. Mechanics

2. Service Technicians
3. Equipment Operators
4. Laborers
5. Electricians

3.2 Authorized Employees

Job classifications that have the authority and responsibility to perform lockout operations:

1. Mechanics
2. Service Technicians
3. Equipment Operators
4. Electricians
5. Laborers

3.3 Other Employees

Job classifications whose work operations are or may be in an area where energy control procedures may be utilized:

1. Health and Safety personnel
2. Site Superintendent
3. Project Manager

3.4 Sources of Energy and Stored Energy Requiring Lockout

1. Electrical: service panels, outlets, transformers, motors, and capacitors
2. Mechanical: spring-loaded equipment, tensioning devices
3. Hydraulic: rams, oil-powered equipment
4. Pneumatic: compressed-air equipment
5. Kinetic/Gravity: counterweights, flywheels
6. Fluids/Steam: heating pipes, steam lines

4.0 Compliance with this Program

4.1 All Employees

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout procedures. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment, which is locked out to perform servicing, or maintenance will not attempt to start, energize, or use that machine or equipment. Any employee who does not follow this lockout/tagout program will be subject to disciplinary action including written warning, suspension, or dismissal from the company. In the event that a particular assignment makes it impractical to follow all the provisions of this program, the supervisor directing the work activities will be notified immediately and before work starts.

4.2 Health and Safety Officer

The Site Safety and Health Officer or approved alternate will be responsible for the following:

1. Development of a facility-specific energy control policy.
2. Definition and procurement of authorized lockout and tagout devices.
3. Training of supervisors and employees on facility policy and procedures for hazardous energy control.
4. Implementation of the Energy Control Policy and review of supervisory/employee performance.
5. Assurance that newly acquired equipment or overload equipment can accommodate locks.
6. Master file maintenance of specific policies, lockout procedures review and training records.

The Site Safety and Health Officer or approved alternate shall:

1. Identify specific hazards and develop hazard isolation procedures within the facility.
2. Assure that the facility's hazardous energy control policy and procedures are communicated to employees in the work unit.
3. Monitor hazard isolation procedures for effectiveness.
4. Enforce hazard isolation procedures within his/her work unit and between work units or employers in the case of outside contractors.
5. Maintain work unit files documenting employee training.
6. Specify controls capable of being locked out when replacing or updating equipment controls.

5.0 Transfer of Lock/Tagout Responsibility

No employee shall remove a lockout or tagout device affixed by another employee unless authorized. Responsibility for lockout or tagout remains that of the authorized employee who affixes the lockout or tagout device subject to the following exception.

When an incoming authorized employee is to assume lock/tagout responsibilities on a piece of equipment from a departing employee due to shift or personnel changes, the incoming employee shall affix his/her properly labeled locks and/or tag devices to the equipment. If it is intended that the equipment remain securely locked out until the departing employee returns, responsibility does not need to be passed on to the incoming employee.

6.0 Definitions

Affected Employee:

An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which servicing or maintenance is being performed.

Authorized Person:

A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

Energy Isolating Device:

A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker, a disconnect switch, a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy Source:

Any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal or other potential energy source that could have potential to endanger personnel.

Entry Point of Power:

The point at which energy enters the system, machine or unit, such as the main electrical disconnect. Changes in power routing at the entry point should be shown on the circuit diagrams for the machines.

Lockout:

The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Other Employees:

All other employees whose work operations are or may be in an area where control procedures may be utilized.

Power:

Any type of energy that can operate equipment, cause movement, or cause injury directly from the energy source. Common types of power are electricity, air or gas under pressure, gravity, springs, oil or water under pressure and steam.

Residual Electrical Power:

Electrical energy, which is retained in a system, machine or unit when the supply line disconnect, is placed on the "OFF" position. Power capacitors and electric or magnetic fields are examples that may have residual power if not properly dissipated.

Residual Pressure:

The differential pressure remaining within a component after the pressure source is closed off.

Tagout:

The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

6.0 Energy Control Procedures

Procedures will be developed and documented when employees are engaged in activities that potentially could be hazardous, due to exposure from an energy source. The following exceptions to required documentation include:

1. The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees.

2. The machine or equipment has a single energy source, which can be readily identified and isolated.
3. The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment.
4. The machine or equipment is isolated from that energy source and locked during servicing or maintenance.
5. A single lockout device will achieve a locked-out condition
6. The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance.
7. The servicing or maintenance does not create hazards for other employees.
8. The employer, in utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

Energy control procedures shall clearly and specifically outline the purpose, rules and techniques to be utilized for the control of hazardous energy. (See Form #1) These procedures must include the following:

1. A specific statement of the intended use of the procedures.
2. Specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy.
3. Specific procedural steps for the placement, removal and transfer of lockout or tagout devices and the responsibility for them.
4. Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

7.0 Equipment for Lockout/Tagout

For the purpose of achieving lockout/tagout, employees will be provided with appropriate lockout equipment. Equipment shall include, but not be limited to:

7.1 Padlocks

One or more padlocks will be issued to each authorized employee. Each employee will have an individual key. Only one key per lock shall be issued. These locks may be used only for lockout purposes. Locks will be identified by a number assigned to each employee and/or by the use of a nametag. Only the authorized person may apply and remove the lock, and the key may never be given to another person.

Note: A second or master key for each lock will be issued to designated supervisors to enable them to open and remove a padlock after taking the required precautions.

7.2 Lockout Tags

Authorized employees will be issued warning tags, which must be used whenever a padlock cannot be applied. The tag must be affixed as closely as possible to the energy disconnect with a single purpose 50-pound strength plastic tie. Extra caution must be exercised since there is no physical restraint when only a tag is used and energy can be restored without removing a padlock. In addition, where possible, energy source components should be altered, removed, or obstructions should be placed to restrict access to energy disconnects. Electricians may remove

fuses but must attach a tag to the panel involved and remove it when the machine is ready for service and the fuse is replaced.

Tag legends may include, but are not limited to:

DANGER Do Not Start	DANGER Do Not Energize
DANGER Do Not Open	DANGER Do Not Operate
DANGER Do Not Close	

Warning tags shall bear the name of the authorized person and the date of application. Tags must be durable, weather proof and not easily damaged

7.3 Lockout hasps

These devices are designed to accommodate more than one lockout padlock when more than one person is working on de-activated equipment. Each person, to assure his or her safety, will apply a lock and warning tag and remove it when the task is completed

7.4 Circuit Breaker Lockout Devices

These devices are designed to attach to circuit breakers inside a panel box. Once attached a lock and tag may be applied to the device to prevent the breaker from being energized.

8.0 Sequence of Lockout

1. The authorized employee shall notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance. It is the responsibility of the equipment operator to notify all affected supervision and employees when a piece of equipment is to be repaired.
2. The authorized employee will refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, will understand the hazards of the energy, and will know the methods to control the energy.
3. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).
4. De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source. (Examples: main switch, circuit breaker, flow/control valve, etc).
5. Lock out the energy isolating device(s) with assigned individual lock(s). If more than one person is exposed to the hazard or is working on the machine or equipment, each person must attach his or her individual lock. Only the person who attaches the lock is authorized to remove their lock.
6. Dissipate or restrain any stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam or water pressure, etc.) by such actions as grounding, repositioning, blocking, bleeding down, etc.
7. Ensure that the machine or equipment is disconnected from the energy source(s) by first checking that no persons are exposed, then verify the machine or equipment is isolated by operating the push/on button or other normal operating control(s) or by testing to make certain the machine or equipment will not operate. Cautions: Return operating control(s) to neutral or “off” position after verifying the isolation of the machine or equipment. For

any electrical work, voltage checks will be made of any circuit elements and electrical parts on which work is to be performed and any exposed adjacent parts.

8. The machine or equipment is now locked out, and servicing or maintenance may proceed.

9.0 Procedures Involving More Than One Person (Group Lockout)

In the preceding steps, if more than one individual is required to lock the energy-isolating device(s), they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device. When an energy-isolating device cannot accept multiple locks, a multiple lockout or tagout device (hasp) may be used.

10.0 Restoring Equipment to Service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps will be taken.

1. Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact, and all guards are installed.
2. Check the work area to ensure that all employees have been safely positioned or removed from the area. Notify all affected employees that the lockout/tagout is going to be removed.
3. Verify that the controls are in the neutral position.
4. Remove the lockout/tagout device and reenergize the equipment. Except in emergencies, only the person who attached the lockout device may remove it!

   Note: The removal of some forms of blocking may require reenergization of the machine before safe removal.
5. Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

11.0 Abandoned Lock Removal Procedures

If an employee who has departed the building has left a safety lock in place, it shall be removed only by adherence to the following procedure:

Before the lock is removed:

1. A thorough inspection of the equipment is to be made by the supervisor responsible for the area.
2. The supervisor must confirm that the authorized employee who applied the lockout device is not at the facility.
3. The supervisor shall make all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed.
4. The supervisor shall remove the lock providing he/she has determined starting up the equipment will not endanger other personnel.
5. Each time it is necessary to remove/cut a safety lock, the person authorized to remove the lock shall prepare a written report and a copy will be sent to the H&S Officer (Position designated).

6. The supervisor shall ensure that the authorized employee has knowledge of this release before he/she resumes work at the facility.

12.0 Training

Lockout/Tagout training will be conducted for all employees who are required to perform work on any equipment as referenced in this program. The training will address all components and procedures of this program. It will include methods to ensure employees understand the purpose and function of the program, that they can recognize applicable lockout/tagout situations, and that they have acquired the knowledge and skills required for applying, using, and removing the locks and tags.

1. Each authorized employee will receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control. The training will be documented on Form #2.
2. Each affected employee will be instructed in the purpose and use of the energy control procedure. The training/instruction will be documented on Form #3.
3. All other employees whose work operations are or may be in an area where energy control procedures may be utilized, will be instructed about the procedure and about the prohibition relating to attempts to restart or re-energize machines or equipment which are locked out. The instruction will be documented on Form #4.
4. When employees are assigned to work in or on equipment that could potentially endanger personnel should it be activated, the supervisor assigning employees to this work is responsible for ensuring that these workers are provided with specific equipment and instructions to comply with this power lockout procedure.
5. Authorized and affected employees will be retrained whenever there is a change in their job assignments that could affect their lockout responsibilities, a change in the machines that presents a hazard or when there is a change in energy control procedures.
6. Additional retraining will be conducted whenever the periodic inspection reveals that there are deviations from or inadequacies in the employee's knowledge or use of energy control procedures.
7. The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

13.0 Periodic Inspection/ Assessment

The SSHO or approved alternate will be conduct a comprehensive inspection/audit of the energy control procedures at least annually to ensure that the facility is in compliance with the OSHA Power Lockout/Tagout Standard 29 CFR 1910.147 and the procedures outlined in this policy. The results of the annual inspection will be recorded on the Annual Power Lockout/Tagout Certified Inspection Worksheet. (See Form #5) Each machine/equipment-specific lockout procedure must be assessed at least annually to ensure that the procedure remains valid or if any changes are warranted. This assessment must be machine-procedure specific and be documented.

14.0 Outside Personnel (Contractors, etc.)

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures. The on-site employer shall ensure that

his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program. The exchange of this information shill be documented on Form #6.

LIST OF SAMPLE FORMS

Form 1: Specific Energy Control Procedures

Form 2: Authorized Employee Training Certification

Form 3: Affected Employee Training Certification

Form 4: Other Employee Training Certification

Form 5: Annual Power Lockout/Tagout Certified Inspection Worksheet

Form 6: Documentation of Information Given to Contractors Pertaining to Lockout/Tagout Procedures

Form 7: Lockout/Tagout Inventory Form

Form 8: Lockout/Tagout Inspection Form

Lockout/Tagout Form #1

SPECIFIC ENERGY CONTROL PROCEDURES FOR EACH PIECE OR TYPE OF MACHINE OR EQUIPMENT

Procedure Number/ Name: _____ Date: _____

Completed By: _____

Machine(s) or Equipment utilizing this procedure: _____

_____

Number of Locks required: _____

Other Lockout Devices required: _____

PROCEDURES FOR CONTROLLING HAZARDOUS ENERGY

1. Sources of Hazardous Energy (examples)
   - Electrical Natural Gas Springs
   - Hydraulic Gravity Steam
   - Chemical Pneumatic Thermal
   - Other: _____

2. Notify affected employees that the machine is about to be shut down and locked out. Specific Instructions

_____

_____

_____

_____

_____

3. Shut down the machine using normal stopping procedures.
Specific Instructions:

_____

_____

_____

4. Isolate all energy sources listed above.
Specific Instructions:

5. A) Apply locks to all isolate devices operated in Step Four.
Specific Instructions:

B) If a tag is used in lieu of a lock when the energy-isolating device is incapable of lockout, the following additional safety precaution will be taken:
Specific Instructions:

6. Block or dissipate all stored energy in rams, flywheels, springs, pneumatic or hydraulic systems, etc.
Specific Instructions:

7. Verify that the machine is locked out by testing the machine operating controls.
RETURN ALL CONTROLS TO THE "NEUTRAL" OR "OFF" POSITION AFTER TESTING.
Specific Instructions:

PROCEDURE FOR REMOVING LOCKS/TAGS

1. Check the machine to be sure it is operationally intact, tools have been removed, and guards have been replaced.

Specific Instructions:

2. Check to be sure all employees are safely positioned.

Specific Instructions:

3. Notify all affected employees that locks/tags are going to be removed and the machine is ready for operation.

Specific Instructions:

4. Remove all locks, blocks, or other energy restraints.

Specific Instructions:

5. Restore all energy to the machine/equipment.

Specific Instructions:

Other Comments/Special Precautions:

Lockout/Tagout Form #2

"AUTHORIZED" EMPLOYEE TRAINING CERTIFICATION

Date of Training: _____

Instructor's Name: _____

Instructor's Signature: _____

The following employees have received "AUTHORIZED" employee training on lockout/tagout procedures:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Employee Name (Please Print):_____

Employee Signature:_____

Lockout/Tagout Form #3

"AFFECTED" EMPLOYEE TRAINING CERTIFICATION

Date of Training:_____

Instructor's Name: _____

Instructor's Signature: _____

The following employee have received "AFFECTED" employee training on lockout/tagout procedures:

Employee Name (Please Print):_____

Employee Signature: _____

Lockout/Tagout Form #4

"OTHER" EMPLOYEE TRAINING CERTIFICATION

Date of Training:_____

Instructor's Name: _____

Instructor's Signature: _____

The following employees have received "OTHER" employee training on lockout/tagout procedures:

Employee Name (Please Print):_____

Employee Signature: _____

Lockout/Tagout Form #5

ANNUAL POWER LOCKOUT/TAGOUT CERTIFIED INSPECTION WORKSHEET

DATE: _____ DEPT.: _____

MACHINE/EQUIPMENT NAME: _____

REVIEW WITH EMPLOYEE (S) PERFORMING SERVICE OR MAINTENANCE ON THE FOLLOWING:

• HAVE YOU HAD LOCKOUT TRAINING? ☐ YES, ☐ NO

• DO YOU HAVE A SAFETY LOCK? ☐ YES, ☐ NO

• ARE LOCKOUT PROCEDURES FOR ABOVE MACHINE/ EQUIPMENT AVAILABLE AND/OR POSTED? ☐ YES, ☐ NO

• DOES EMPLOYEE (S) UNDERSTAND HIS/HER LOCKOUT RESPONSIBILITIES? ☐ YES, ☐ NO

OBSERVATION:
WERE LOCKOUT PROCEDURES FOLLOWED? ☐ YES, ☐ NO

NONE REQUIRED:
LIST DEVIATION (S) OR INADEQUACIES OBSERVED: _____

_____

_____

CORRECTIONS/CHANGES/COMMENTS:
EMPLOYEE (S) INSPECTED:

NAME: _____ DEPT.: _____

NAME: _____ DEPT.: _____

NAME: _____ DEPT.: _____

NAME: _____ DEPT.: _____

INSPECTED BY:

NAME: _____ POSITION: _____

Lockout/Tagout Form #6

DOCUMENTATION OF INFORMATION GIVEN TO CONTRACTORS PERTAINING TO LOCKOUT/TAGOUT PROCEDURES

Date	Contractor	Information Given

Contractor's Signature: _____ Date: _____

Authorized Employee Signature: _____ Date: _____

Authorized Supervisor's Signature: _____ Date: _____

Lockout/Tagout Form #7

LOCKOUT - TAGOUT INVENTORY FORM

Location: _____

1. Machine/Equipment: _____

2. Maintenance or service performed on this machine/equipment in this work area?

☐ YES, ☐ NO

3. Type of Power/Energy Source(s)
Electrical_____

Hydraulic_____

Gas_____

Pneumatic_____

Water_____

Gravity _____

Other _____

4. Energy Source Type
Main Source/Location_____

Source on Machine/Equipment_____

5. What type of lockout processes can be used on this equipment?
(Check all available)
Keyed locks with tags _____Blocks _____
Tags only _____Wedges _____
Chains _____
Other (list) _____
_____
_____
_____

6. What steps should be taken to secure this machine/equipment from accidental start-up?

_____

_____

_____

Lockout/Tagout Form #8

LOCKOUT - TAGOUT INSPECTION FORM

Agency/Institution: _____

Department: _____

Type of Machine Locked Out: _____

Employee: _____ Job Title: _____

Employee Observed by: _____ Job Title: _____

Date and Time of Inspection: _____

Employee obeying safe procedures for locking and tagging:

_____

_____

Unsafe procedures or practices observed:

_____

_____

Recommendations:

_____

_____

Corrective actions taken:

_____

_____

Inspection reviewed with employee observed: _____

Date/Time: _____

Observed Employee's signature: _____ Date: _____

Inspection Performed by: _____ Date: _____

Appendix I

Temporary Facilities Plan

Submitted as separate submittal approval to be added upon acceptance by USACE

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Appendix J

Fall Protection Program

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Sevenson Environmental Services, Inc.
Syncon Resin OU2 Superfund Site
Kearney, New Jersey

FALL PROTECTION PROGRAM

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Attachments

Attachment 1 – Fall Protection Plan

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1.0 Introduction

The objective of this Fall Protection Program is to identify and evaluate fall hazards to which employees will be exposed at the Syncon Resin OU2 Superfund Site (Site), and to provide specific training as required by the Occupational Safety and Health Administration (OSHA) Fall Protection Standard, 29 CFR 1926, Subpart M and the USACE Health and Safety Manual EM 385-1-1 (30NOV2014), Section 21.

2.0 Policy

It is the policy of Sevenson Environmental Services, Inc. (Sevenson) to protect its employees and sub contractors from occupational injuries by implementing and enforcing safe work practices and appointing a competent person(s) to manage the Fall Protection Program. This Fall Protection Program shall comply with OSHA and USACE requirements. A copy of the EM 385-1-1(30NOV2014) and OSHA Fall Protection Standards shall be made available to all employees, and may be obtained from the Site Safety and Health Officer(s) (SSHO).

This Fall Protection Program covers the use of Personal Fall Arrest Systems at a number of areas at the Site. These areas are:

1. Working at heights greater than 6 feet or leading edge work
2. Working in aerial/man lifts
3. Securing of ladders

3.0 Definitions

Anchorage – means a secure point of attachment for lifelines, lanyards or deceleration devices.

Basic rescue – means providing rescue services for a fallen employee(s) who does not require immediate emergency medical services and can be performed with a ladder or aerial lift man basket.

Body harness – means straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system. Section 21.I.06.a.(3) States; All full body harnesses shall be equipped with Suspension Trauma preventers such as stirrups, relief steps, or similar to provide short term relief from orthostatic intolerance.

Deceleration device – means any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest. (Section 21.I.07.b.(6); Effective two years from the date of publication, (30NOV2014) all energy absorbers used shall be equipped with deployment indicator.

Deceleration distance – means the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before

stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of the attachment point after the employee comes to a full stop.

Guardrail system – means a barrier erected to prevent employees from falling to lower levels.

Infeasible – means that it is impossible to perform the construction work using conventional fall protection systems (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of the these systems to provide fall protection.

Lanyard – means a flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchorage.

Personal Fall Arrest System – means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

Positioning device system – means a body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Self-retracting lifeline/lanyard – means a deceleration device contained in a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Unprotected sides and edges – means any side or edge (except entrances to point of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches high.

4.0 Duties and Responsibilities

1. Sevenson

   It is the responsibility of Sevenson to provide fall protection to affected employees, and to ensure that all employees understand and adhere to the procedures of this plan and follow the instructions of Site Safety and Health Officer (SSHO) or Competent Person.

2. Program Manager – Mr. Davis Raver

   It is the responsibility of SSHO as the Fall Protection Program Manager to implement this program by:

   1. Performing routine safety checks of work operations;
   2. Enforcing Site safety policy and procedures;
   3. Correcting any unsafe practices or conditions immediately;

4. Training employees and supervisors in recognizing fall hazards and the use of fall protection systems;
5. Maintaining records of employee training, equipment issue, and fall protection systems used at the Site; and
6. Investigating and documenting all incidents that result in employee injury.

3. Competent Person

   Is it the responsibility of the Competent Person to:

   1. Understand the hazards posed by falls.
   2. Calculate fall forces.
   3. Understand the methods of fall protection.
   4. Assist in the implementation of the Fall Protection Program.
   5. Select, inspect and maintain the fall arrest equipment.
   6. Ensure Site personnel are properly trained in the use and limitation of fall protection.

4. Employees

   It is the responsibility of all employees to:

   1. Understand and adhere to the procedures outlined in this Fall Protection Program;
   2. Follow the instructions of the SSHO or Competent Person;
   3. Bring to management's attention any unsafe or hazardous conditions or practices that may cause injury to either themselves or any other employees; and
   4. Report any incident that causes injury to an employee, regardless of the nature of the injury.

5.0 Description of Tasks

(Examples – Specific tasks to be entered once identified)

1. Working at heights greater than 6 feet for construction activities or leading edge work

   Workers may be exposed to falling greater than six feet from either working at heights or working near the edge of a drop off.

2. Working in aerial/man lifts

   Workers may utilize aerial lifts at the Site to perform maintenance on equipment or systems. Any time a person is in the basket of an aerial lift they will utilize a restraining system.

3. Securing ladders

   Workers may have to utilize ladders at the Site to perform assigned job tasks. Any time a person utilizes a straight ladder that must be secured a Fall Protection Plan will be completed to ensure a safe plan has been developed to protect workers.

6.0 Training Requirements

All employees who may be exposed to fall hazards are required to receive training on how to recognize such hazards, and how to minimize their exposure to them. Employees shall receive training as soon after employment as possible, and before they are required to work in areas where fall hazards exist.

A record of employees who have received training and training dates shall be maintained by the SSHO. Training of employees shall include:

1. Nature of the fall hazards employees may be exposed to.
2. Correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems.
3. Use and operation of controlled access zones, guardrails, personal fall arrest systems, safety nets, warning lines, and safety monitoring systems.
4. Limitations of the use of mechanical equipment during roofing work on low-slope roofs (if applicable).
5. Correct procedures for equipment and materials handling, and storage and erection of overhead protection.
6. Requirements of the OSHA Fall Protection Standard, 29 CFR 1926, Subpart M and the USACE EM 385-1-1(30NOV2014) Section 21, “Fall Protection”.
7. Sevenson and USACE requirements for reporting incidents that cause injury to an employee.
8. Documented training for personnel utilizing an aerial lift.

Additional training shall be provided on an annual basis, or as needed when changes are made to this Fall Protection Program, the EM 385-1-1 (pertaining to fall protection), or the OSHA Fall Protection Standard.

7.0 Anticipated Hazards

Prior to the use of a personal fall arrest system a Fall Protection Plan, a Fall Hazard Analysis (FHA), and an Activity Hazard Analysis (AHA) will be completed for the associated task. The Fall Protection Plan (Attachment 1) will be completed by the SSHO or his designee. The Fall Protection Plan, FHA, and AHA will identify the anticipated hazards and the controls to be implemented to reduce or eliminate these hazards.

Some of the anticipated hazards at the Site include , the use of aerial lifts, erection of the sediment treatment, and water treatment equipment, and work from ladders.

8.0 Fall Hazard Prevention and Control

Engineering Controls

This should always be the first option for selection whenever possible (i.e., light bulb changing, telescoping arm, changing valve, relocate at ground level).

Guardrails

For all work areas, only guardrails made from steel, wood, and wire rope will be acceptable. All guardrail systems will comply with the current OSHA and EM 385-1-1 (30NOV2014) standards (i.e., withstand 200 pounds of force, 42-inch high hand rail, midrail, and toeboard). These guardrails will be placed in the following areas if necessary or feasible based on job location or requirements:

1. On all open sided floors.
2. Around all open excavations or pits.
3. On leading edges of roofs or decking.

Personal Fall Protection Systems

All employees that will be required to wear a personal fall arrest or restraint system will follow these guidelines:

1. A full body harness will be used at **all** times.
2. **All personal fall arrest systems will be inspected before each use by the employee.** Any deteriorated, bent, damaged, impacted and/or harness showing excessive wear will be removed from service. Full body harnesses shall be equipped with Suspension Trauma preventers such as stirrups, relief steps, or similar in order to provide short term relief from the effects of orthostatic intolerance.
3. Connectors will be inspected to ensure they are drop forged, pressed, or formed steel or are made of equivalent materials **and** that they have a corrosion resistant finish as well as that all surfaces and edges are smooth to prevent damage to interfacing parts of the system.
4. Verify that D rings and snap hooks have a minimum tensile strength of 5,000 lbs and that the D rings and snap hooks are proof tested to a minimum tensile load of 3,600 lbs without cracking, breaking, or taking permanent deformation.
5. Only shock absorbing lanyards or retractable lanyards are to be used so as to keep impact forces at a minimum on the body (fall arrest systems). All energy absorbers shall be equipped wit h a deployment indicator.
6. Only nylon rope or nylon straps with locking snaphooks are to be used for restraints.
7. All lanyards will have self-locking snaphooks.
8. Snap hooks are not engaged in the following manners:

a. To a tie off adapter D ring to which another snap hook or other connector is attached;

b. In a manner that would result in a load on the gate;

c. In a false engagement, where features that protrude from the snap hook or carabiner catch on the anchor and without visual confirmation seems to be fully engaged to the anchor point;

d. To each other;

e. Directly to webbing or rope lanyard or tie-back unless the manufacturer's instructions for both the lanyard and the connector specifically allow such a connection;

f. To any object which is shaped or dimensioned such that the snap hook or carabiner will not close and lock, or that rollout could occur.

9. The maximum free fall distance is not to exceed **6 feet**. Consideration must be given to the total fall distance. The following factors can affect total fall distance:

    a. Length of connecting means (i.e., lanyard length, use of carabiners, snaphooks, etc.).

    b. Position and height of anchorage relative to work platform/area (always keep above head whenever possible).

    c. Position of attachment and D-ring slide on the full body harness.

    d. Deployment of shock absorber (max 42-inches).

    e. Movement in lifeline.

    f. Initial position of worker before free fall occurs (i.e., sitting, standing, etc.).

Calculating Total Fall Distance

Knowing how to calculate Total Fall Distance is as important as picking the proper harness, lanyard, and anchorage system. Total Fall Distance (TFD) is defined as the sum of the Free Fall Distance (FFD), Deceleration Distance (DD), Harness Effect (HEFF), Vertical Elongation (VEL), and Safety Factor (SF) of at least one foot. The TFD can be calculated by:

TFD = FFD+DD+HEFF+VEL+SF

Where:

- TFD Total Fall Distance or the vertical distance a worker travels between the onset of a fall till the fall event is completed.
- FFD Free Fall Distance or the vertical distance a worker travels between the onset of a fall until just prior to the point where the Fall Arrest

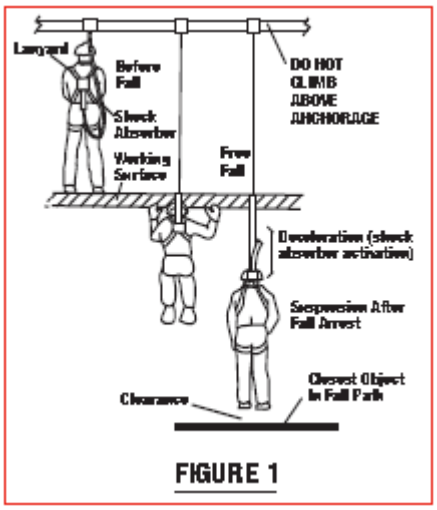
System begins to arrest the fall.

- DD Deceleration Distance or the vertical distance a worker travels between the activation of the Fall Arrest System and the final fall arrest. (Federal OSHA limits this distance to 3.5-feet or less. This distance is determined by the manufacturer and can be found on the product label.)
- HEFF Harness Effect Distance or the stretch of a harness during a fall arrest. (This is typically one foot or less for a properly fitted harness. However, some harnesses use elastic-type webbing that can increase the harness effect to two feet or more. Check manufacturer's information to determine this distance.)
- VEL Vertical Elongation Distance or the stretch in the lifeline of the Personal Fall Arrest System. Vertical Elongation is measured on the part of the lifeline that is under tension during deceleration and final fall arrest. This variable will change drastically depending upon the type of Fall Arrest System. For example, most shock-absorbing lanyards are designed to have a maximum deceleration distance of 3.5 feet, which includes the vertical elongation of the lanyard. However, if you are using a rope grab system or a horizontal lifeline, vertical elongation must be calculated based on the stretch of the vertical or horizontal lifelines in those systems. You will need to check the specific manufacturers' product information for exact stretch percentages.
- SF Safety Factor Distance is an additional factor of safety to ensure that you have the required clearance below your working surface. This should be at least one foot but can reflect any number with which you feel comfortable.

Example:

- Full body harness
- 6-foot shock absorbing lanyard
- Fixed, ridged anchor point (such as a D-plate bolted to a structural I-beam)
- Figure , provides visual for example

Figure 1- Example for Calculating Fall Distance



In Figure 1 we see a worker with a 6-foot shock absorbing lanyard on an elevated platform. In this example, let's assume the anchor point is 2-feet about the back D-ring of the harness. For every 1-foot the lanyard attachment point is above the harness back D-ring, 1-foot is deducted from the FFD. For every 1-foot the lanyard attachment point is below the harness back D-ring, 1-foot is added to the FFD. In this example, if the worker falls, the FFD will equal 4-feet since the lanyard attachment point is 2-feet above the back D-ring of the harness. So the formula looks like this:

- TFD = 4 feet + DD + HEFF + VEL + SF

The next value to consider is Deceleration Distance or the DD. Federal OSHA requires that this distance not exceed 3.5-feet. Since all manufacturers' products are slightly different, you will have to read the label or product specification sheet to determine the maximum DD that a product will permit and use that value for your calculation. In this example, the maximum deceleration distance will be 3.5-feet.

- TFD = 4 feet + 3.5 feet + HEFF + VEL + SF

The Harness Effect or HEFF variable is relatively constant at less than 1-foot. This will vary slightly due to the adjustment of the harness, so we generally use 1-foot to account for these slight differences. However, elastic type harnesses can have more than 1-foot of stretch, possibly 2-feet or more, and that additional distance must be accounted for in your calculation. In this example, we are using a non-elastic harness.

- TFD = 4 feet + 3.5 feet + 1 foot + VEL + SF

Most manufacturers design their shock absorbing lanyards so that the vertical elongation of the lanyard is included in the OSHA mandated 3.5-feet maximum DD. However, if we were using a rope grab or vertical life line, or if you were attaching to a non-ridged anchorage connector, the VEL would need to be based on the specifications of those components in the Fall Arrest System. Since this

example uses a ridged anchor point and a 6-foot shock absorbing lanyard and the VEL is already considered in the lanyard design the VEL for our equation will be zero (0).

- TFD = 4 feet + 3.5 feet + 1 foot + 0 feet + SF

The final variable of the formula is the safety factor or SF. It is always a good idea to include at least 1-foot, however, that safety factor could reflect any number that makes you comfortable with your calculation. If you are using a non-ridged system it would not be uncommon to see a SF of 3-feet or more.

- TFD = 4 feet + 3.5 feet + 1 foot + 0 feet + 1-foot

We can now solve for Total Fall Distance or TFD. The TFD for this example would be 9.5-feet. So, you will need a minimum of 9.5-feet clearance from the workers feet to the next level or object below.

NOTE: Some people calculate the TFD from the anchor point, to modify this equation to reflect the distance from the anchor point you would add the distance from the working surface to the workers D-ring and add it to the equation.

Example: Let's use the same example from above. The distance from the working level (the level the worker is standing on) to the distance the harness D-ring is from that surface is 5-feet. You would add 5-feet to 9.5 feet for a total distance of 14.5-feet from the anchor point to the lower level or object.

Engineered Lifeline

Lifeline systems must be designed and approved by an engineer or qualified person.

Lifeline systems must be engineered to have appropriate anchorages, strength of line designed to hold X number of individuals connected to it, line strength to aid in the arrest of a fall, and durability to hold a fallen employee(s) suspended until rescue can occur.

Warning Line System

All flat roofs greater than 50 feet wide (i.e., roof with less than 4/12 slope) where work is performed 6 feet or further back from the edge of the roof can be completed by installing a Warning Line and using a safety monitor. Warning Lines will consist of the following:

1. Will be erected 6 feet from the edge of the roof.
2. Be constructed of stationary stanchions capable of resisting without tipping over a force of at least 16 pounds applied horizontally against the stanchion.
3. Wire, chain, or rope shall be rigged and supported in such a way that at its lowest point (including sag) is no less than 34 inches from the walking/working surface and its highest point is no more than 39 inches for the walking/working surface.
4. Wire, chain, or rope will be flagged at no more than 6-foot intervals with high visibility material. The rope, wire or chain shall have a minimal tensile strength of 500 pounds.

5. The warning line will guard the entire perimeter of the roof where work is being performed.

If an employee must access an area within 6 feet of the roof edge for reasons *other than* exiting the roof via a ladder or fixed industrial ladder, another employee must monitor that individual and warn him/her of any dangers. If another employee is not available to act as a safety monitor, then the employee must don a full body harness and attach a fall restraint lanyard to an anchor point to prevent reaching the edge of the roof.

9.0 Rescue Plan and Procedure

The height of the work to be performed at the Site requiring the use of personal fall arrest systems is less than 20 feet.

Will this section include wording to address the newly required suspension trauma preventers, in 21.I.06.a.(3)?

An employee who falls must be rescued within 15 minutes to avoid permanent physical harm. Site personnel will be responsible for performing basic rescue for persons involved in a fall arrest situation when no life threatening injuries are present. If a situation occurs where the fallen person receives injuries that require immediate emergency medical attention, local emergency services will be summons via 911.

The following basic rescue equipment will be made available at the Site where personal fall arrest systems are employed:

- A straight or folding ladder tall and strong enough to reach the maximum height an individual may be suspended from.
- In the absence of a suitable ladder, an aerial lift with a man basket may be used.

Basic rescue equipment shall be located and inspected prior to work being performed. During the rescue, ladders will be properly positioned and either held in place or secured in place to prevent the ladder from sliding or falling. If a fallen worker cannot access the ladder under their own power, 911 will be immediately called for rescue assistance. At no time will the ladder weight restriction be compromised to perform a basic rescue.

If injuries are involved where the worker cannot be moved or should not be moved, 911 will be immediately called for rescue assistance.

A medical professional must evaluate and clear any worker involved in a fall arrest stop for suspension trauma before being allowed to resume work duties.

10.0 Designs of Personal Fall Arrest Systems

Personal fall arrest systems will be designed by a professional engineer and installed as directed by the manufacturer. All equipment used in a personal fall arrest system shall meet the requirements set forth in ANSI/ASSE Z359.1-2007. Full body harnesses labeled to meet the requirements of ANSI A10.14 shall not be used. The SSHO shall ensure all personal fall arrest system equipment meets these standards by showing proof from the manufacturer. The proof can be presented by the manufacturer in either as built drawings/specifications or affixed tags to the system parts.

11.0 Inspection, Maintenance, and Storage of Fall Protection Equipment

The following criteria will be utilized to maintain all equipment in good working condition.

Full Body Harnesses

1. Inspect before each use.
    - Closely examine all of the nylon webbing to ensure there are no burn marks, which could weaken the material.
    - Verify there are no torn, frayed, broken fibers, pulled stitches, or frayed edges anywhere on the harness.
    - Examine D-ring for excessive wear, pits, deterioration, or cracks.
    - Verify that buckles are not deformed, cracked, and will operate correctly.
    - Check to see that all grommets (if present) are secure and not deformed from abuse or a fall.
    - Harness should never have additional punched holes
    - All rivets should be tight, not deformed.
    - Check tongue/straps for excessive wear from repeated buckling.
    - Inspect suspension trauma preventer device?
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. Storage will consist of hanging in an enclosed cabinet, to protect from damage.
4. All harnesses that are involved in a fall will be destroyed.

Lanyards/Shock Absorbing Lanyards

1. Inspect before each use.
    - Check lanyard material for cuts, burns, abrasions, kinks, knots, broken stitches and excessive wear.
    - Inspect the snaphooks for hook, locks, and eye distortion.
    - Check carabiner for excessive wear, distortion, and lock operation.
    - Ensure that all locking mechanisms seat and lock properly.
    - Once locked, locking mechanism should prevent hook from opening.
    - Visually inspect shock absorber for any signs of damage, paying close attention to where the shock absorber attaches to the lanyard.
    - Verify that points where the lanyard attaches to the snaphooks are free of defects.

2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. Storage will consist of hanging in an enclosed cabinet, to protect from damage.
4. All lanyards that are involved in a fall will be destroyed.

Snaphooks

1. Inspect before each use.
    - Inspect snaphooks for any hook and eye distortions.
    - Verify there are no cracks, pitted surfaces, and eye distortions.
    - The keeper latch should not be bent, distorted, or obstructed.
    - Verify that the keeper latch seats into the nose without binding.
    - Verify that the keeper spring securely closes the keeper latch.
    - Test the locking mechanism to verify that the keeper latch locks properly.
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. All snaphooks involved in a fall will be destroyed.

Self-Retracting Lanyards

1. Inspect before each use.
    - Visually inspect the body to ensure there is no physical damage to the body.
    - Make sure all back nuts or rivets are tight.
    - Make sure the entire length of the nylon strap is free of any cuts, burns, abrasions, kinks, knots, broken stitches, and excessive wear and retracts freely.
    - Test the unit by pulling sharply on the lanyard to verify that the locking mechanism is operating correctly.
    - If manufacturer requires, make certain the retractable lanyard is returned to the manufacturer for scheduled annual inspections.
2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. Service per manufacturer specifications.
4. Inspect for proper function after every fall.

Tie-off Adaptors/Anchorages

1. Inspect for integrity and attachment to solid surface.

2. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.
3. All tie-offs adapters will be destroyed and replaced after a fall.

Articulating Man Lift

1. Inspect before each use.
2. Inspect/service per manufacturer guidelines. Forklift, scissors lifts, and safety nets will be inspected at the beginning of each shift in use. Structural integrity or forklift basket will be checked per same schedule.
3. Semi-annual inspection of all harnesses will be completed by the SSHO; documentation will be maintained on file.

Maintenance will be performed as specified by the manufacturer.

Personal fall arrest equipment will be stored as follows:

1. Never store the personal fall arrest equipment in the bottom of a tool box, on the ground, or outside exposed to the elements (i.e., sun, rain, snow, etc.).
2. Hang equipment in a cool dry location in a manner that retains its shape.
3. Always follow manufacturer recommendations for inspection.
4. Clean with a mild, nonabrasive soap, and hang to dry.
5. Never force dry or use strong detergents in cleaning.
6. Never store equipment near excessive heat, chemicals, moisture, or sunlight.
7. Never store in an area with exposures to fumes or corrosives elements.
8. Avoid dirt and build-up on equipment.
9. Never use this equipment for any purpose other than personal fall arrest.
10. Once exposed to a fall, remove equipment from service immediately.

A designated storage area will be established for personal fall arrest equipment. An inspection sheet will be posted at the storage area to allow site personal to document their inspection prior to use. The inspection sheet will also provide direction and requirements for ensuring the equipment is in satisfactory condition.

12.0 Incident Investigation Procedures

All incidents that result in injury to workers, as well as near misses, regardless of their nature, shall be reported and investigated. The SSHO and Site Superintendent shall conduct investigations as soon after an incident as possible to identify the cause and means of prevention to eliminate the risk of reoccurrence.

In the event of such an incident, the Fall Protection Program shall be reevaluated by the SSHO and Safety and Health Manager to determine if additional practices, procedures, or training are necessary to prevent similar future incidents.

13.0 Evaluation of Program Effectiveness

This fall protection program will be evaluated periodically to determine effectiveness. The following criteria will be used to evaluate its performance:

1. Accident reports, number of accidents.
2. Management/staff compliance with program components.
3. Periodic on-site audits.
4. Safety Observation Reports
5. Staff feedback, interviews.

14.0 Inspection and Oversight Methods Employed

The SSHO, Site Superintendent, and the Construction Quality Control Systems Manager will be responsible for performing Safety Observation Reports for personnel performing tasks that involve the use of personal fall arrest systems. These observations will be done on a random basis and will be used in to aid in the evaluation of the Fall Protection Programs effectiveness. The Fall Protection Program will also be audited on a quarterly basis by the Safety and Health Manager or a member Sevenson's corporate health and safety staff.

Fall Protection Plan

Syncon Resin OU2 Project

Project Location:		Plan Effective Dates
Specific Equipment Involved		Start:
Project Description		End:
Fall Protection Plan Author (Print)		Office or Cell Phone Number
Fall Protection Plan Author (Sign)		
Competent Person (Print)		Office or Cell Phone Number
Competent Person (Sign)		
Site Superintendent (Print)		Office or Cell Phone Number
Site Superintendent (Sign)		

Fall Protection Plan

Elevated Surface Work Plan

Questions to Consider	Answers or Solutions
Has an Activity Hazard Analysis (AHA) and a Fall Hazard Analysis (FHA) been performed to identify the hazards and controls to be used to eliminate hazards for work at unprotected elevations?	
What is the job to be performed?	
What is the location and the height of the work?	
What is the working or walking surface like (flat steel, textured steel, wood planking, dirt, etc.)?	
Are there any environmental factors to consider (i.e., heat, cold, slippery, wet, wind, glare, etc.)?	
Are there any hazards nearby or underneath that are exposed or could become exposed in an impact (i.e., plumping lines, electrical exposures, protruding or impalement hazards, etc.)?	
Will the work require special PPE (besides fall protection)?	
Will workers be utilizing the buddy system or will someone be monitoring the worker?	
How will the tools and equipment get to the work location (bucket with rope, tool belt, manlift, etc.)?	

Fall Protection Plan

Questions to Consider	Answers or Solutions
Does the lower level work area need to be barricaded to keep non-essential personnel away from the work area?	
Can the work be performed from the ground with extendable tools?	
Can the work be performed from a secured ladder?	
Can an aerial lift or scissor lift be used? Is the operator qualified to use this equipment?	
If not, can portable guardrails be installed?	
If not, can a fall arrest system be used?	
If yes, has a Fall Hazard Analysis and Rescue Plan been developed?	
Other?	

Fall Protection Plan

Fall Hazard Analysis for Fall Arrest

Are there any existing approved anchorage points that can be used? Where?	
Is the anchorage point labeled or obviously capable of holding 5000 pounds or more as determined by a qualified person?	
If not, can approved pre-engineered or manufactured anchorages be installed?	
Is the right equipment (full body harness, minimum length lanyard, shock absorber, connecting hardware, I-beam strap, self-retracting life line, etc.) available to affected employees?	
What is the distance a person may fall?	
Is there at least 6 feet of clear space from anchorage point before the next level down? (Calculate fall distance.)	
Will the worker hit anything on the way down during a fall?	
Has a Fall Rescue Plan been developed to determine how a fallen person will be rescued if suspended in the harness?	

Fall Protection Plan

Rescue Plan

A rescue plan must be developed whenever fall arrest systems are in use and when personnel may not be able to self-rescue if a fall occurs.

What is the emergency rescue service contact information (Emergency phone number and name of agency)?	
Are there any special instructions to give to the emergency rescue service when requesting assistance?	
Is basic (non-emergency) rescue equipment (i.e., ladders, aerial lifts, additional harnesses) immediately available at the work area for this task?	
Are there any obstructions in the way of reaching the suspended worker? If so, what.	
How will the rescue be assured within 15 minutes of the occurrence of the fall to minimize the risk of further injury or death due to suspension trauma?	
How will the safety of the rescuers be assured as well as that of the suspended worker?	
What communication systems will be used between the suspended worker and the rescue team?	

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Appendix K

Confined Space Program

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Sevenson Environmental Services, Inc.
Syncon Resin OU2 Superfund Sites
Kearney, New Jersey

CONFINED SPACE PROGRAM

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1.0 Purpose

The purpose of this Confined Space Entry Program is to protect the health and safety of employees who enter confined spaces and/or are assigned to serve as attendants or rescue personnel at the Syncon Resin OU2 Superfund Site (Site). This program is also intended to ensure compliance with 29 CFR 1910.146 and EM 385-1-1(30NOV2014) Section 34.

2.0 Application

This program applies to:

2.1. All employees, who are authorized to enter a confined space

2.2. All employees assigned to serve as attendants

2.3. Provide assistance during a confined space emergency rescue

2.4. Employees who serve as Confined Space Entry Supervisors or Confined Space Entry Program Administrators.

3.0 Definitions

3.1. ACCEPTABLE ENTRY CONDITIONS - conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space can safely enter and perform work.

3.2. ATTENDANT - an individual stationed outside the permit-required confined space who had specific training (34.A.07.c(1): new requirement to identify necessary training requirements of entrants and workers within visual contact) and monitors the authorized entrants inside the space.

3.3. AUTHORIZED ENTRANT - employee who is authorized (new requirement to identify necessary training requirements of entrants and workers within visual contact) to enter a permit-required space.

3.4. BLANKING OR BLINDING - absolute closure of a pipe, line, or duct by fastening across its bore a solid plate that completely covers the bore and can withstand the maximum upstream pressure.

3.5. CONFINED SPACE - a space that meets <u>all</u> the following criteria:

1) is large enough and so configured that an employee can bodily enter and perform assigned work;

2) has limited means of entry and egress; and

3) is not designed for continuous employee occupancy.

Examples may include tanks, silos, boilers, pits, bins, manholes electrical vaults, degreasers, and hoppers.

3.6. ENGULFMENT - surrounding and effective capture of a person by a liquid or finely divided solid substance (i.e. sand, corn. grain, sawdust etc).

3.7. ENTRY - a person's intentional passing through an opening into a permit-required confined space.

3.8. ENTRY PERMITS - a written or printed document that allows and controls entry into a permit space.

3.9. ENTRY SUPERVISOR - person responsible for:

1) determining if acceptable conditions are present before entering a permit space;
2) for authorizing entry;
3) coordinating and supervising all entry operations; and
4) terminating entry.

3.10. HAZARDOUS ATMOSPHERE - an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from one or more of the following causes

1) Flammable gas, vapor or mist in excess of 10% of its Lower Explosive Limit (LEL).
2) Airborne combustible dust at a concentration that meets or exceeds its LEL.
3) Atmospheric oxygen concentration below 19.5 percent or above 23.0 percent (22% for USACE sites)
4) Atmosphere concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environment Control, or in Subpart Z, Toxic and Hazardous Substances, of 29 CFR 1910 and which could result in employee exposure in excess of its dose or PEL
5) Any other atmospheric condition that is immediately dangerous to life or health.

3.11. HOT WORK PERMIT – employer's written authorization to perform operations (for riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

3.12. IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) - any condition that poses an immediate threat to life, or a delayed threat to life, or that would cause irreversible adverse health effects, or interfere with an individual's ability to escape unaided from a permit space.

3.13. ISOLATION - process by which a permit space is removed from service and completely protects against the release of hazardous energy or material into the space.

3.14. LOWER EXPLOSIVE LIMIT (LEL) - the lowest concentration of gas or vapor, expressed in percent by volume in air, that burns or explodes if an ignition source is present at room temperature.

3.15. LINE BREAKING - intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas or any fluid at a volume, pressure, or temperature capable of causing death or serious physical harm.

3.16. NON PERMIT CONFINED SPACE- A confined space that does not contain or have the potential to contain an atmospheric hazard or any other serious safety or health hazard.

3.17. OXYGEN DEFICIENT ATMOSPHERE - an atmosphere containing less than 19.5% oxygen.

3.18. OXYGEN ENRICHED ATMOSPHERE - an atmosphere containing more than 22.0% oxygen (23% for non-USACE sites).

3.19. PERMISSIBLE EXPOSURE LIMIT (PEL) - the airborne concentration of a hazardous material that must not be exceeded over a specified time. This value is established by the Occupational Safety and Health Administration (OSHA).

3.20. PERMIT-REQUIRED CONFINED SPACE - a confined space that has one or more of the following characteristics:

1) Contains or has a reasonable potential for hazardous atmospheres.

2) Contains a material that has the potential for engulfment.

3) Is internally configured so an employee could become trapped or asphyxiated by inwardly converging walls or a floor that slopes downward into a smaller cross-section.

4) Contains any other recognized serious safety or health hazard.

3.21. PROHIBITED CONDITION - any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

3.22. RESCUE SERVICE - personnel designated to rescue employees from permit spaces.

3.23. RETRIEVAL SYSTEM - equipment used for a non-entry rescue of persons from permit spaces (i.e., tripod).

3.24. TESTING - process by which hazards that may affect entrants of a permit space are identified and evaluated.

3.25. THRESHOLD LIMIT VALUE (TLV) - the airborne concentration of a hazardous material that should not be exceeded over a specified time. This value is established by the American Conference of Governmental Industrial Hygienists (ACGIH).

3.26. WELDING/CUTTING PERMIT - written authorization to perform operations that can provide a source of ignition (e.g., welding, cutting, burning, or heating) or a hazardous atmosphere.

4.0 Responsible for Compliance

4.1. The Confined Space Entry Program Administrator is the SSHO, or Alternate SSHO. The SSHO for the Syncon Resin OU2 Superfund Site Davis Raver.

The responsibilities of this individual shall include:

1) Conducting/coordinating hazard assessments.

2) Determining the classification (permit required/non permit space and location of each confined space.

3) Coordinating the posting of appropriate danger/caution signs by each confined space.

4) Supervising the selection and use of respirators in conjunction with the Respiratory Protection Program Administrator.

5) Coordinating the medical screening of respirator users.

6) Conducting/coordinating supervisory and employee training (including attendants) and maintaining all training records.

7) Conducting an annual evaluation of the overall program to determine its continued effectiveness.

8) Consulting employees and their authorized union representatives on the development and implementation of the Confined Space Entry Program.

4.2. Managers and Supervisors

The responsibilities for these people shall include:

1) Actively supporting the Confined Space Entry Program and providing funding to purchase equipment when needed.

2) Ensuring all assigned personnel are knowledgeable of all aspects of the Confined Space Entry Program.

3) Ensuring their employees comply with all elements of Confined Space Entry Program.

4) Ensuring appropriate PPE and equipment is properly utilized and maintained.

4.3. Confined Space Entry Supervisor is the Superintendent. The Superintendent for the Syncon Resin Superfund Site is Perry Novak.

The responsibilities of this individual shall include:

1) Providing confined space entry personnel with a copy of the most current Confined Space Entry Program and any future changes.

2) Knowing the hazards that may be encountered during entry and informing the entrants about the hazards, including information on the mode, signs, or symptoms and consequences of exposure.

3) Verifying that the proper atmospheric tests have been conducted and that all procedures and equipment, mentioned in the permit, are in place before signing the Confined Space Entry Permit.

4) Assuring that the Confined Space Entry Permit is completed prior to each entry.

5) Terminating the entry and canceling the permit when needed.

6) Verifying that rescue or other emergency personnel are available and that the means for summoning them are operable in the event that an emergency occurs. New language: 34.A.07.h, Requires documentation of procedures and agreements of emergency responders for notifying emergency services of a pending entry and summoning rescue and emergency services for rescuing PRCS entrants.

7) Removing unauthorized individuals who have entered or who attempt to enter the confined space.

8) Determining whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, and that entry operations remain consistent with terms of the entry permit.

9) Maintaining completed entry permits and equipment calibration records.

10) Providing employees and their authorized union representative(s) an opportunity to observe the atmospheric testing of the confined space.

NOTE: The Confined Space Entry Supervisor may also serve as an attendant or as an authorized entrant providing that person is properly trained and equipped. The duties of the Confined Space Entry Supervisor may also be passed from one individual to another during the course of an entry operation as long as the alternate is qualified.

4.4. Authorized Entrants See 34.A.08 Employee Training

All authorized entrants shall be responsible for:

1) Knowing and recognizing the hazards that may be faced during entry including information on the mode, signs, or symptoms and consequences of exposure.
2) Using and maintaining the proper PPE and other equipment.
3) Communicating with the attendant as necessary.
4) Alerting the attendant when hazardous conditions are detected, identified, or suspected.
5) Exiting the confined space immediately whenever:
    a. Ordered to do so by other entrants, the attendant or the Confined Space Entry Supervisor.
    b. Warning signs/symptoms are identified,
    c. Prohibited conditions are identified,
    d. An evacuation alarm is activated.
6) Complying with all other aspects of the Confined Space Entry Program

4.5. Attendants (Standby persons)

All authorized attendants shall be responsible for:

1) Knowing the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
2) Knowing the possible behavioral effects of the hazard exposure in the authorized entrants.
3) Maintaining an accurate count of authorized entrants in the confined space and ensures that the means used to identify the authorized entrants accurately identifies who is in the space.
4) Remaining outside the confined space during entry operations until relieved by another attendant.

Note: Attendants may enter a confined space to attempt a rescue if they have been trained and equipped for rescue operations and if they have been properly relieved.

5) Communicating with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the confined space.
6) Monitoring activities inside and outside the confined space to determine if it is safe for authorized entrants to remain in the space and order the authorized

entrants to evacuate the space immediately under any of the following conditions:

a. If the attendant detects a prohibited condition.

b. If the attendant detects a behavioral effect of the hazard exposure in an authorized entrant.

c. If the attendant detects a situation outside the confined space that could endanger the authorized entrants; or

d. If the attendant cannot effectively and safely perform all the duties required.

7) Summoning rescue and other emergency services as soon as the attendant determines that entrants need assistance to escape from the confined space hazards.

8) Taking the following actions when an unauthorized person(s) approach or enter a confined space while entry is underway:

a. Warn the unauthorized person(s) that they must stay away from the confined space.

b. Advise the unauthorized person(s) that they must exit immediately if they have entered the confined space.

c. Inform the authorized entrants and the entry supervisor if an unauthorized person(s) have entered the confined space.

d. Performing non-entry rescues as specified in Section 6.8.2.

9) Performing no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

5.0 Permit System

5.1. Permit

Before entry is authorized, an entry permit shall be prepared in order to document the completion of safety measures required (as discussed in section 6.0 of this Program). The completed permit shall be made available to all authorized entrants or their authorized representatives, at the time of entry, by posting it at the entry portal or by any other equally effective means.

1) The Confined Space Entry Supervisor shall sign a completed Confined Space Entry Permit or in his absence another member of the health and safety staff (if properly trained) to authorize entry into a permit-required confined space.

2) The Confined Space Entry Supervisor shall ensure that the permit specifies the location, type of work, personal protective measures, authorized entrants, monitoring equipment, hazards of the permit space, hazard control measures and any required rescue equipment. The procedure for contacting rescue services will also be included on the permit. See: 34.A.07:

3) The permit shall be dated and carry an expiration time limiting the work to one shift.

4) The duration of the permit may not exceed the time required to complete the assigned task or job.

5) The Confined Space Entry Supervisor shall terminate the permit if a potential hazardous situation occurs which exceeds the conditions authorized on the permit or the entry operations, documented on the permit have been completed.

6) Cancelled entry permits shall be retained for at least 1 year.

7) The permit must be available at the work area outside the confined space entry point.

8) All confined space entry permits must be given to the Confined Space Entry Supervisor after the work is completed.

9) Hot work (potential ignition sources) must be authorized on a separate hot work permit that is attached and noted on the confined space entry permit.

10) Individuals authorizing entry into a permit required confined space may serve as entrants or attendants if they have received the proper training.

5.2. Entry Procedure

Supervisors, attendants and authorized employees must complete the general requirements, discussed in the next section. Entry procedure to permit required confined space are as follows:

1) The Confined Space Entry Supervisor shall be notified prior to the time that an entrant enters a permit-required confined space.

2) A Confined Space Entry Permit shall be properly completed and signed by the Confined Space Entry Supervisor or in their absence another member of the health and safety staff (if properly trained) prior to entry into the permit-required confined space.

3) Only properly trained and authorized individuals will be allowed to enter a permit required confined space. Authorized entrants will maintain contact with the attendant either visually or verbally.

4) Each individual entering a permit-required confined space will, whenever practical, have a safety or retrieval line attached to a body harness or wristlets. The other end of the line must be secured to a secure anchor point or lifting device (i.e., tripod) outside the entry portal. **Note: The anchor point shall not be secured to a motor vehicle in a manner that would pull the line out of the space if the vehicle moved unless proper Lockout/Tagout controls are in place.** A retrieval line is not required if:

   a. A permit space has obstructions or turns that would prevent pull on the retrieval line from being transmitted to the entrant, or

   b. A permit space from which an employee being rescued with the retrieval system has projections which would injure the employee if forcefully removed,

   c. A permit space when entered by an entrant using an air supplied respirator and retrieval lines could pose an entanglement hazard, or

d. A permit required excavation other than a trench.

5) A properly trained individual shall test the atmosphere for oxygen content, flammable gases, and potential toxic air contaminants prior and during entry. Each entrant shall be required to wear an air-monitoring instrument if the confined space is large enough and/or has a potentially hazardous atmosphere, excavations are exempt from this requirement unless working with unknown drums or containers. See 34.B.02; Before and During Entry (of vessels)… Added: At a minimum the entry log or form shall have the time and date, monitoring devise type, model, serial number, and calibration date, and the name of the individual doing the testing.

6) During any confined space entry, all safety rules and procedures shall be followed.

7) At least one attendant should be provided outside the permit space into which entry is authorized for the duration of entry operations.

8) Personal protective equipment, including respirators, shall be provided to entrants as necessary for safe entry into the confined space and used properly.

   a. All PPE must be approved by the Confined Space Entry Supervisor.

   b. An atmosphere supplied breathing apparatus shall be used for entry into an unknown atmosphere. The Rescue Team, with self-contained breathing apparatus (SCBA) must be present on-site and immediately available if entry is into an atmosphere that is actually or potentially immediately dangerous to life or health.

9) Electrical equipment used in the confined space shall be appropriate for the hazard and meet the requirements of the National Electric Code if a hazardous atmosphere is present.

10) Any condition making removal of an entrance cover unsafe (i.e. pressured differential, physical obstacles, etc.) shall be eliminated before the cover is removed.

   a. When the cover has been removed, the opening(s) shall be promptly guarded to prevent accidental fall into the opening and prevent objects from falling into the opening.

   b. Appropriate vehicle and pedestrian barriers shall be used to protect workers.

11) Metal ladders shall not be used when working around electrical equipment.

12) Any use of chemicals or welding, soldering, or cutting operations must be approved by the Confined Space Entry Supervisor.

6.0 General Requirements

6.1. Workplace Evaluation

The Confined Space Program Administrator will coordinate/conduct an evaluation of the workplace to determine if confined spaces are present. A detailed assessment will be made of each space in order to determine type and location of each space, its dimensions and number of exits, the reason(s) for entry, actual or potential health and safety hazards, and its classification (permit or non-permit). The assessment will also specify the equipment and personal protective equipment (PPE) required for entry and any special precautions that must be followed for safe entry and work in the confined space. The results of the assessment will be recorded on a Confined Space Hazard Assessment Form (See Form I - Part 1 and 2). It is required that all affected employees be trained for their respective duties, prior to their entry

6.2. Identification of Confined Spaces

Effective means of identifying confined spaces (i.e. training, etc.) may be used to prevent unauthorized entry.

1) Warning Signs and Posting

a. When using warning signs or placards for the identification of Confined Spaces, all types shall be printed both in English and (if applicable) in the predominant language of any non-English reading employees.

b. Where confined space entry symbols are established, they shall also be used in conjunction with a warning sign.

c. Signs shall include, but not necessarily be limited to, the following information:

i. **DANGER: PERMIT REQUIRED CONFINED SPACE - DO NOT ENTER UNLESS AUTHORIZED**

d. The following statements shall be added in large letters to the warning sign when a specific work practice must be performed or when specific safety equipment is necessary:

i. Respirator Required For Entry

ii. Lifeline Required For Entry

iii. Hot Work Permit-Required

e. Signs are <u>not required</u> at manholes, or any other entry, located in public traffic areas.

6.3. Atmospheric Requirements Prior to Entry: See Added Definitions (Vessels) in 34.B.01a through d.

The atmosphere in the confined space within the entrant's immediate area may be continuously monitored for oxygen and combustible gas and any other hazardous substance which the employer has reason to believe may be present in the confined space. Excluding excavations greater the 4 feet in depth which will be checked initially and then periodically thereafter unless determined otherwise by the Confined Space

Entry Supervisor.

Before entering or re-entering a confined space, the following atmospheric conditions must be met:

1) The oxygen level is between 19.5% and 22.0%.
2) The concentrations of flammable gas, vapors, or mists are below 10% of their Lower Explosive Limits (LEL).
3) The level of airborne hydrogen sulfide (H_2S) is below 10 parts per million (ppm).
4) Toxic air contaminates are less than the OSHA Permissible Exposure Limit (PEL). **Note:** If the substance does not have a PEL, use the Threshold Limit Value (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH).
5) Atmospheric concentrations of toxic substances are below what is considered as the IDLH.
6) The level of carbon monoxide (CO) is less than 35 ppm.

Entry into a confined space is **not** allowed if monitoring indicates deficiency in any of these categories. Respirators or a self-contained breathing apparatus (SCBA) shall not to be used to allow entry into deficient atmospheres unless specifically approved in writing by Sevenson's Safety and Health Manager (and the USACE Contracting Officer's Representative).

In order to achieve and maintain a safe atmosphere, one or more actions may have to be taken to render the space safe for human occupancy. This could include:

1) Isolation - precautions taken to prevent release of material and/or energy into the space. This can be achieved through blinding, blanking, disconnecting, lockout/tagout, or removal of incoming pipes or related energy sources.
2) Ventilation - purging, inserting, flushing, or otherwise ventilating the space with fresh air. The replacement air will displace the contaminated air allowing for safe entry. This can be accomplished by removing ports and openings or by mechanically ventilating the vessel.
3) Separation - where there is a possibility of external hazards, the space may require barricades to protect the entrants from falling objects or from unauthorized entry.

6.4. Ventilation

If a confined space being entered is found to contain a hazardous atmosphere, forced ventilation may be provided for a period of time in order to bring the air quality within the acceptable limits. Once the determined ventilation period expires, employees shall monitor the confined space according to subsection entitled "Air Monitoring". If the sampling shows that a hazard still exists, then additional ventilation and sampling may be required.

Note: Control of atmospheric hazards through forced ventilation does not constitute elimination of hazards.

If the hazard still exists after repeated ventilation steps, the confined space shall then be considered a permit-required confined space and the Confined Space Entry Team (entrant, attendant, and Confined Space Entry Supervisor) must follow the proper procedures for permit-required confined space entry.

Note: Forced ventilation may not be used in lieu of monitoring. Consideration must also be given to the possibility of static discharge that could be a source of ignition.

Forced air ventilation should be so directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees leave.

Whenever ventilation is used, employees shall:

1) Keep the blower controls at least 10 feet from the confined space, and out of the wind or downwind from the entrance to the confined space.
2) Use a ventilation blower that is designed to be intrinsically safe if the possibility of an explosive atmosphere could exist.
3) Ensure that the exhaust systems are designed and placed so that they protect employees in the surrounding area from being contaminated.
4) Ensure that the ventilation system is fully operational and air is supplied from a clean source.
5) Ensure that contaminated air is not recirculated into the confined space.
6) Purge the ventilation hose outlet for at least one-minute (at street or blower level if possible) before inserting the hose into the confined space.
7) Maintain continuous local ventilation when toxic atmospheres are being produced as part of a work procedure (i.e., welding, painting or cleaning operations).

6.5. Lockout/Isolation

Each confined space (if applicable) shall have its own specific written lockout/isolation procedures. These procedures will be posted above and/or next to the entrance of the confined space, where feasible.

1) Electrical Isolation: In order to prevent employees from being exposed to activation of moving parts, or from being exposed to energized objects, authorized entrants shall lockout circuit breakers and/or the disconnect in the open (off) position with a key-type lock. If more than one authorized entrant is to be inside the confined space, each employee must place his/her own lock on the circuit breaker or disconnect.
2) Mechanical Isolation: All equipment with moving mechanical parts that could unexpectedly rotate or move will be blocked in such a way that there can be no accidental rotation or movement. Isolation of mechanical parts can be performed by disconnecting linkages or removing drive belts and/or chains.
3) Blanking: A solid plate or cup capable of withstanding the maximum pressure of the gas or liquid inside the pipe may be placed across a pipe or duct to prevent unexpected release of the contents.

4) Line Isolation: Lines can be isolated by 1) double blocking and bleeding the line or 2) by blocking two closed in-line valves or 3) blocking or bleeding open to the outside atmosphere the drawn or the bleed-in line between the two closed valves.

6.6. Air Monitoring

Before any permit required confined space may be entered by any employee, the entry supervisor (or designee if qualified) must monitor the atmosphere of the confined space to determine that the characteristics of the air for all levels and all areas within the confined space are safe. The atmosphere within the authorized entrant's immediate area should be continuously monitored for oxygen, combustible gases and any other hazardous substance.

When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.

Note: Authorized entrants and/or their authorized representatives shall be provided an opportunity to observe the atmospheric testing of the confined space that is conducted prior to entry and subsequent testing. Reevaluation of the permit space shall be done in presence of the authorized entrant or employee's authorized representative who requests the reevaluation.

Sampling Devices

1) A direct readout sampling device which can simultaneously test for oxygen, hydrogen sulfide and/or carbon monoxide and combustible gas without manual switching shall be used to sample the atmosphere of the confined space.

2) The sampling device shall be equipped with an audible and visible warning device that warns the entrant and/or attendant of the hazardous atmosphere in the permit space.

3) Sampling devices shall be calibrated relative to the oxygen content of the ambient air at the time of sampling. Calibration of the sampling device relative to the oxygen content shall be performed where the 20.9% natural content of oxygen in the air is most likely to occur.

   Note: Oxygen calibration should not be performed near a confined space opening.

4) A sampling device, which has a zero set, shall be zeroed in a clean atmosphere before each sampling. Calibration of a sampling device shall be conducted daily before each use.

5) Non-sparking Equipment: When sampling the atmosphere of a confined space, the sampling device shall have an attached non-sparking probe.

6) Manhole Sampling: When a confined space entry is by means of a manhole, a probe shall be inserted through the pick hole of the manhole cover, or the manhole cover shall be preyed open on the downwind side to allow just enough room for insertion of the probe or other sampling device.

7) Intrinsically Safe: When the confined space to be entered is expected to have

combustible vapors present, employees shall be required to use an approved explosion-proof or intrinsically safe sampling device.

6.7. Assessment of Additional Hazards

Before entering a confined space, the Confined Space Entry Supervisor or, in his absence, another member of the health and safety staff, if qualified, shall conduct an assessment of any additional hazards which the entrant may encounter during the confined space entry. This assessment shall include, but is not limited to, a review of the following additional hazards:

1) Thermal hazards due to extremes in hot and cold temperatures.
2) Engulfment Hazards due to loose, granular materials, such as sand, coal, or ash, stored in bins or hoppers.
3) Noise hazards, which can affect hearing and emergency communications.
4) Slick/wet surfaces, which can increase the risk to slips and falls. Wet surfaces also increase the risk and effects of shocks from electrical tools, machinery, and circuitry.
5) Falling Objects from work being performed above an employee or by objects falling through open confined space entrances.
6) Mechanical equipment that is required to be operating during the entry.
7) Electrical Hazards from exposed wires, power lines, etc.
8) Fall Hazards.
9) Biological Hazards.

6.8. Emergency Rescue

Note: The OSHA Confined Space Standard allows two options for rescue operations. The Confined Space Administrator and Confined Space Entry Supervisor must select one of the following types of rescue for each permit required confined space identified at the Site.

6.8.1. Emergency Service Confined Space Rescue

Prior to utilizing a rescue service/contractor, the Confined Space Program Administrator shall:

1) Evaluate the prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified.

   Note: What is considered "timely" will vary according to the specific hazards involved in each entry;

2) Evaluate the prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified;

3) Select a rescue team or service that has the capability to reach the victim(s) within a time frame that is appropriate for the permit space

hazard(s) identified, and is equipped for and proficient in performing the needed rescue services;

4) Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and

5) Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

Note: OSHA 29 CFR 1910.146 Appendix F contains examples of criteria that employers can use in evaluating prospective rescuers.

6.8.2. On-site Confined Space Rescue

In the event that a confined space related emergency is expected, all employees involved in the rescue shall be provided with the proper emergency rescue training, PPE, and rescue equipment needed in order to make a safe rescue attempt, at no cost to the employees.

1) Before a confined space rescue attempt is made, the following equipment must be available near the entrance of the confined space:

a. Personal Protective Equipment

1. Fully charged SCBA with at least a 30-minute air supply or a Type C airline respirator with an emergency escape air tank.
2. Protective clothing/gloves, if needed
3. Head protection, if needed
4. Hearing protection, if needed
5. Eye protection
6. Communication devices

b. Retrieval equipment

1. Full body harness and lifeline

Note: Wristlets may be used in lieu of the full body harness if the employer can demonstrate that the use of a full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest way and most effective alternative.

2. Winch/hoist fully capable of retrieving personnel from a vertical type confined space more than five feet deep.

Retrieval line shall be attached at the center of the entrants back near shoulder level, above the entrants head, or at another point which presents a profile small enough for the successful removal of the entrant. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.

3. Ladders.

c. Emergency equipment:

1. First aid kit
2. Fire extinguisher(s) appropriate for the situation

2) Duties of Rescuing Attendants - (Non-Fire Emergency)

In the event that either a non-permit or permit-required confined space non-fire related emergency rescue occurs, rescuing attendants shall follow the following procedures:

a. Alert the employees in the confined space to immediately vacate the space and verify that the employees understood these instructions.

b. Notify the following personnel via a two-way radio or telephone with detailed information about the emergency.

1. Rescue Service
2. Confined Space Entry Supervisor and SSHO

Note: The Confined Space Entry Supervisor or area supervisor will then request assistance from the Local Fire Department if medical attention is needed.

c. Begin emergency extraction from outside of the confined space:

1. Verify that all employees are exiting the confined space. If not, then perform the following:
2. Notify the Confined Space Entry Supervisor that the employee(s) are disabled.
3. Begin winching/hoisting employee(s) from the confined space.
4. Do **not** enter the confined space until help arrives**.**

3) Duties of Rescuing Attendants - Fire Emergency

a. **No attempt should be made to enter a burning confined space.**

b. Standby personnel shall immediately call 911 and will indicate that a fire emergency is involved and the location of the confined space.

c. The attendant(s) shall attempt to remove the employee or employees via the hoist/winch from outside the confined space.

4) Rescue Attempt. Upon arriving at the confined space, the rescue service shall;

a. Sample the air in the confined space.

Note: Entry is **not** permitted if the air quality in the confined space is outside the acceptable limit for combustible gas. If the combustible gas content is more than 10% of the LEL, the confined space must be ventilated and/or the source of the combustible gas shut off or removed before entry is permitted.

b. Assess the potential hazards that rescue personnel could encounter by entering the space.

c. If entry conditions are determined safe, enter the confined space with the proper retrieval equipment, personal protective equipment, and a fully charged SCBA or a supplied airline respirator equipped with an emergency air tank.

d. Search for the disabled employee(s).

e. Assess the type of accident/injuries.

f. Administer proper first aid/CPR, if needed.

g. Begin extraction procedures, taking care not to cause further injury.

5) Substance Information. If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other written information is required to be kept at the work site, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

7.0 Employee Training

All employees who are required to enter a Permit Required Confined Space or serve as an attendant shall be trained and properly equipped to recognize, understand, and control hazards that may be encountered in the confined space. Training records (certification) shall be available for inspection by employees and their authorized representative.

7.1. Training shall be provided to each affected employee:

1) Before the employee is first assigned duties under this section.

2) Before there is a change in assigned duties.

3) When there is a change in the permit space operations that present a hazard about which an affected employee has not previously been trained.

4) Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures or that there are inadequacies in the employee's knowledge or use of these procedures.

5) Before each activity requiring entry into a confined space, the entrant, authorized attendant, supervisors/managers, and workers in close proximity shall review the entry procedures, the use of air monitoring equipment, PPE, and retrieval equipment.

6) Training shall be documented and include a roster of those attending and topics discussed.

7.2. Confined Space Entry

All employees who are required to either enter a confined space or serve, as attendants shall receive training in the following areas:

1) Associated safety and health hazards of the confined space entry

2) Duties of entrants and attendants

3) Air monitoring and attendants

4) Respiratory protection

5) Emergency rescue procedures

6) Lockout isolation procedures

Training shall be provided to each affected employee:

1) Before the employee is first assigned confined space entry duties.

2) Before there is a change in assigned duties.

3) Whenever there is change in confined space operations that presents a hazard about which the employee has been previously trained.

7.3. Personal Protective Equipment (PPE)

All employees who are required to either enter a confined space and/or serve as attendants, shall receive training on the proper use of any PPE needed to perform the job safely, such as, protective clothing and suits, gloves, respiratory protection; confined space rescue equipment, body harnesses, hearing protection, and eye/face, hand, foot and head protection.

7.4. Emergency Rescue Training

An emergency rescue employee(s) who is designated to provide permit space rescue and emergency services shall be trained in the following measures with an adequate level of proficiency shown in:

1) The use of personal protective equipment (PPE) needed to conduct permit space rescues safely.

2) The assigned rescue duties (same as entrants).

3) Basic first aid and CPR - At least one member of the rescue team or emergency service shall hold a current certification in first aid and CPR.

Emergency rescue personnel shall perform a permit space rescue at least once every 12 months by means of simulated rescue operations in which dummies, manikins, or actual persons are removed from the actual permit spaces or from representative permit spaces.

Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

8.0 Work Involving Subcontractors

8.1. When the Site Superintendent arranges to have employees of a subcontractor perform work that involves confined space entry, the Confined Space Entry Program Administrator or the Confined Space Entry Supervisor shall:

1) Inform the contractor that the workplace contains permit spaces and the permitted space entry is allowed only through compliance with a permit space program that complies with CFR 1910.146.

2) Inform the contractor of the hazards identified and Sevenson's experience with the confined space that made the space in question a confined space.

3) Coordinate entry operations with the subcontractor when personnel from both

employers will be working in or near the confined space.

4) Verify that the subcontractor has an appropriate Confined Space Entry program.

8.2. Debrief the contractor at the conclusion of the confined space entry operation(s) regarding the permit space entry procedures that were followed (if applicable) and the hazards that were confronted or created during entry operations.

9.0 Non- Permit Required Confined Space Entry (.

9.1. No employee shall enter or work in a non-permit confined space unless the following steps have been performed:

1) Obtains permission to enter the confined space from the Confined Space Entry Supervisor, or in their absence another member of the health and safety staff.

2) Obtains and uses the proper PPE, tools and other equipment.

3) Complies with all other applicable confined space entry procedures

Note: Atmospheric testing of a non-permit confined space is not required by the OSHA Confined Space standard. However, testing the atmosphere for toxic gases and oxygen deficiency prior to entering the confined space is recommended if a suitable, and properly calibrated, sampling devise is available. The OSHA Standard also does not require an attendant for entry into a non-permit required confined space, however having an attendant present (if practical) is again strongly recommended. Other OSHA standards (i.e. Personal Protective Equipment, Respiratory Protection, etc.) still apply to entry into all confined spaces.

10.0 Reclassification of a Permit Required Confined Space to Non-Permit Confined Space

10.1. A permit required confined space may be entered as a non-permit confined space if the permit space contains no actual or potential atmospheric hazard, and all other hazards within the space can be eliminated without entry into the space. Hazards may be eliminated, for example, by:

1) Following all designated lockout/tagout procedures for the space in question;

2) Emptying a vessel to remove an engulfment or other content hazard;

3) Draining chemical tanks of their contents, purging any residual chemicals with water, and ventilating the space after purging is complete;

4) Shutting boilers down, opening all access ports to allow for temperature reduction and natural ventilation, and by taking all appropriate safety measures (i.e. locking out machines, etc.) to render the space safe for entry.

If the hazards arise within a permit space that has been declassified to a non-permit space, each employee in the space shall exit the space as soon as possible. The employer shall then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with other applicable provisions.

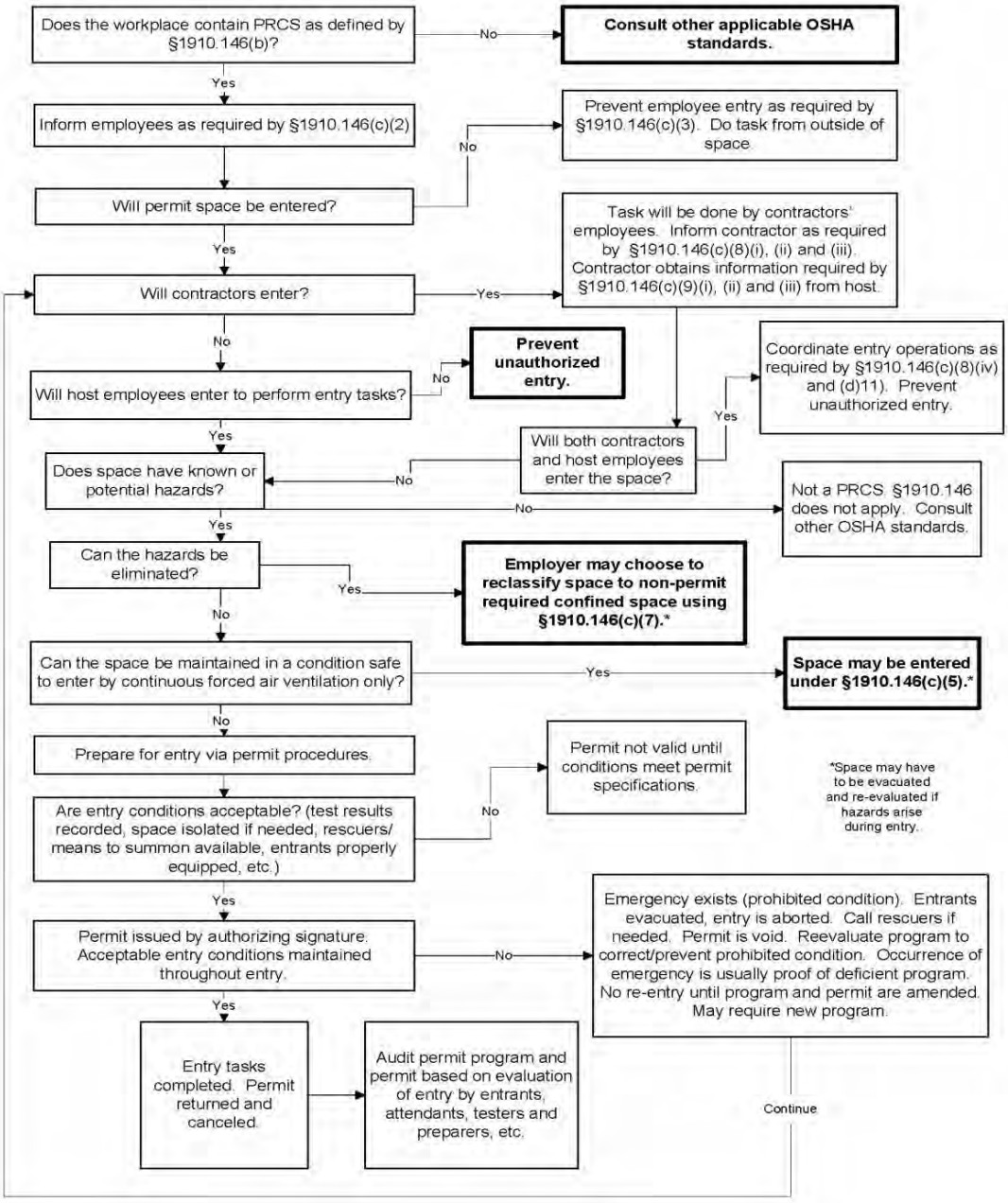
11.0 Reclassification of a Non-Permit confined Space to a Permit Required Confined Space

11.1. When there are changes in the use of a non-permit confined space that may increase the hazards, the space shall be reevaluated and classified as a permit-required space if necessary. Reclassification would be required, for situations such as:

1) During application of solvents, paints chemicals or other materials that could potentially create a hazardous atmosphere in a confined space.

2) During welding, cutting, brazing, or soldering in some confined spaces with limited ventilation.

11.2. The Confined Space Entry Supervisor shall reevaluate and reclassify confined spaces as necessary depending upon the work activities to be performed in these spaces.



12.0 Other Safety Rules and Work Practices

12.1. In order to protect the safety and health of all employees associated with the confined space entry, employees (and supervisors) shall comply with the following safety rules and work practices:

1) General Safety Rules

a. All employees within the confined space and those employees assigned to serve, as attendants shall be in constant two-way communication.

b. All employees required to wear respiratory protection must properly

use and maintain properly the respirator in accordance with 29 CFR 1910.134 and the specific instructions provided to them by their supervisor and during training.

c. Smoking is not permitted within the confined space or within a 10 feet radius of the entrance of a confined space.

d. All employees shall comply with the requirements and limitations on the confined space entry permit, including the maximum number of employees permitted to work in the confined space.

2) Underground and Aboveground Storage Tanks

Before any employee enters a boiler or any other vessel type confined space, the following safety precautions shall be implemented:

a. Ensure there is only residual material left in the bottom of the underground storage tank (UST) before an entry.

b. Ensure that all lines leading into and away from the tank(s) are blanked, blinded, and/or double blocked and bled before an entry is allowed.

c. Ensure that all employees entering a tank are secured by a lifeline to a winch or other retrieval device outside the confined space.

d. Treat all boilers and other vessel-type confined space in a manner consistent with that of other confined spaces.

Note: If a confined space entry is required for fuel oil (diesel fuel) tank the LEL must be determined with a Photoionization Detector (PID). This is due to LEL sensor[1] technology and its response to heavy hydrocarbon fuels is unreliable. The PID reading must be less then 250 ppm for entry into the tank in Level C PPE with OVA cartridges.

3) Traffic Safety

a. Entrances to confined spaces that are located in streets shall be guarded in accordance with the following requirements:

1. Employees shall activate the following warning lights

a. Vehicle's beacon light

b. Four-way hazard flashers

b. Employees shall park the vehicle used to transport their confined space equipment in such a way that the vehicle does not obstruct the normal traffic flow and shall, when possible, use the vehicle to provide protection for the employees.

c. Employees shall park the vehicle in such a manner that the vehicles exhaust fumes cannot accumulate in the confined space. If this is not possible, the vehicle's exhaust pipe shall be extended away from the confined space.

[1] Application Note AP-219, "*Using PID for 10% of LEL Decisions*" Revision 1, RAE Systems, Inc., San Jose, CA,

d. Employees shall properly place traffic safety cones around the manhole and any vehicle in accordance with state and federal traffic ordinances to adequately warn oncoming traffic.

e. Traffic safety cones shall be visible to traffic in all directions and in such a manner as to protect the employees from the traffic flow. Traffic cones should also be placed far enough form the confined space to give drives adequate notice.

When working on the street or an easement surface, all standby and flag person employees shall at all times wear a traffic safety vest or the equivalent. A flag person(s) shall be added to the Confined Space Entry Team when the need arises. The flag person(s) shall not be considered as the required attendant for a permit required confined space.

4) Cleaning purposes

When a confined space entry is required for cleaning purposes, the Confined Space Entry Supervisor or in their absence another member of the health and safety staff, shall review and authorize the procedures and processes to be used while cleaning the confined space before entry can take place.

The following specific cleaning methods shall be used depending upon the product or products in the space:

a. Flammable/Combustible Atmosphere: The atmosphere within the confined space shall be purged with an inert gas if the atmosphere is above the upper flammable limit to remove the flammable and/or combustible substance before forced ventilation of the space. Initial cleaning shall be done, if possible, from outside the tank.

b. Cleaning Process Hazards: When additional hazards are created by the cleaning process, the Confined Space Entry Supervisor shall develop additional safety procedures to address the newly created hazards. These special procedures shall be developed before a confined space cleaning process takes place.

5) Use of equipment and tools inside the confined space

When the confined space entry requires the use of equipment and tools inside the space, this equipment shall be inspected and must meet the following requirements:

a. Hand tools must be in good repair and be kept clean.

b. Portable electrical tools, equipment, and lighting shall be listed Class I, Division I, Group D. All grounds must be checked before electrical equipment is used in a confined space. **Note:** Ground Fault Protectors should be used whenever possible to protect employees from electrical shock when working in damp or wet locations.

c. All electrical cords, tools, and equipment must be constructed of a heavy-duty, double-insulated cord and equipped with a 3-prong plug. Note: double insulated tools with a 2-prong pug may be appropriate in

some cases.

d. All electrical cords, tools, and equipment must be visually inspected for defects before being used in a confined space. If found defective, they will be replaced, repaired, or destroyed before any employee enters the confined space.

e. Cylinders of compressed gases must never be taken into a confined space and will be turned off at the cylinder valve when not in use. Exempt from this rule are cylinders that are part of SCBA or resuscitation equipment.

f. Ladders must be adequately secured or of a permanent type which provides the same degree of safety. Note: Permanent ladders must be inspected for rust or corrosion and repaired or replaced if necessary.

All equipment that may be used in a flammable atmosphere shall be approved as either explosion proof or intrinsically safe for the atmosphere and shall be approved by a recognized testing laboratory (i.e., UL, FM).

13.0 Recordkeeping

13.1. The following records will be maintained on file for at least one year:

1) Employee Training Records - including dates and the names of attendees.

2) Confined Space Entry Equipment Inspections - including dates, results, and corrective action.

3) Monitoring Equipment Calibration/Servicing Reports - indicating calibration dates and any service conducted by the manufacturer.

4) Confined Space Permits - for all Permit Required confined space entries.

14.0 Annual Program Review and After Action Review (required in Section 34)

14.1. Due to the infrequent nature of confined space entry in many locations, The Confined Space Entry Program Administrator shall review the Confined Space Program at least annually using cancelled Confined Space Permits and other available information and records in order to determine if:

1) Changes should be made to improve the program's overall effectiveness;

2) Additional hazards have been identified within a given space;

3) Additional measures should be taken to protect the entrants;

4) Additional confined spaces should be included within the program; and

5) Some locations can be removed from the program.

CONFINED SPACE HAZARD ASSESSMENT FORM

PART I

Hazard Codes:

1. Atmosphere is within acceptable limits.
2. Contains or has a potential to contain a hazardous atmosphere.
3. Contains a material that has the potential for engulfing an entrant (i.e. soil, sand)
4. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
5. Contains moving parts or machinery.
6 Contains any other recognized health or safety hazard.

Confined Space (Tank, Manhole, etc)	Location	Reason(s) for Entry	Classification (Permit Required/Non Permit)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

CONFINED SPACE HAZARD ASSESSMENT FORM
PART II

Confined Space (Part I)	Tools/Equipment Required for Entry	PPE Required for Entry	Special Precautions Required for Entry
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Assessment Performed By _____ Title _____ Date _____

Sevenson Environmental Services, Inc.

CONFINED SPACE PERMIT

Date_____ Time of Issue_____ Length of Permit_____
Location _____ Equipment ID_____
Purpose of Entry & Description of Work _____
_____
_____
Authorized Entrant(s)_____
Will "HOT" Work be authorized for this Entry? ☐ No; ☐ Yes (describe)_____
_____

HAZARDOUS IDENTIFICATION

Indicate ALL potential Hazards of this Permit Space:	YES	N/A
a. Contains or may contain a hazardous atmosphere	☐	☐
b. Contains a material for potential engulfment	☐	☐
c. Has an internal configuration for potential entrapment	☐	☐

If "Yes", describe _____
_____

d. Contains the following serious safety or health Hazards:_____

PRE-ENTRY PREPARATION

		YES	N/A	Done			Removed		
				Date	Time	By	Date	Time	By
1. Lines broken and/or blanked:									
Line Contents	Location								
a.									
b.									
c.									
2. Drain or at a workable level									
3. Purge - flush and vent									
4. Force air to bottom & vent									
5. Lock out power feeds:									
Equip/Location of Lock out									
a.									
b.									

c.								
6. Shut-off heating systems								
7. Other:								

TEST TO BE TAKEN

	P.E.L.	Time / Tester Yes	Time / Tester N/A	Time / Tester Results	Time / Tester Results	Time / Tester Results
% of Oxygen	19.5% to 23%					
% of LEL	Any % over 10					
Carbon Monoxide	25 ppm					
Hydrogen Sulfide	10 ppm					
VOC						
Temperature	< 110ºF/43ºC					

PREVENTION OF UNAUTHORIZED ENTRY

	YES
1. Have Worker(s) to enter been trained for this specific entry?	☐
2. Have Attendants been trained for this specific space?	☐
3. Post "WORKER IN CONFINED SPACE" Sign	☐

4. Set-up the following additional barriers:

_____

_____

MANDATORY SAFETY EQUIPMENT REQUIRED

	YES	N/A
1. Fire Extinguisher	☐	☐
2. Retrieval Lines	☐	☐
3. Respirator	☐	☐
4. Goggles	☐	☐
5. Hearing Protection	☐	☐
6. Protective Clothing	☐	☐
7. Special Boots or Shoes	☐	☐
8. Gloves	☐	☐
9. Other Safety Equipment Required	☐	☐

_____ _____

_____ _____

_____ _____

_____ _____

COMMUNICATION PROCEDURES AND EQUIPMENT TO BE USED FOR THIS ENTRY

(Verify that chosen equipment is in place and operation.)

	Verified by:
1._____	_____
2._____	_____

RESCUE EQUIPMENT TO BE PROVIDED ON-SITE

		YES	N/A
a.	Two chest harnesses or two wristlets	☐	☐
b.	Two five minute supplied air escape respirators	☐	☐
c.	One 30 minute S.C.B.A.	☐	☐
d.	One emergency siren	☐	☐
e.	Man basket	☐	☐
f.	Retrieval wench	☐	☐
g.	Other necessary Rescue Equipment	☐	☐

_____

_____

_____

IN CASE OF EMERGENCY

Rescue Service	Phone Number or Ext.
1._____	_____
2._____	_____
3._____	_____

Confined Space Entry Supervisor or designee must sign below AFTER all the above actions are fully understood and conditions necessary for SAFE entry have been met.

Authorization of Entry

Signature (if not CSE Supervisor, add title)	Date	Time

Termination of Entry

Signature	Date	Time

Appendix L

Excavation Plan

A generic Excavation Plan has been inserted into this document. The actual Excavation Plan(s) shall be submitted as separate submittal approval to be added upon acceptance by USACE

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Excavation and Handling Plan

Syncon Resin Superfund Site

OU 2

South Kearny, New Jersey

Submitted by:

Sevenson Environmental Services, Inc.

2749 Lockport Road

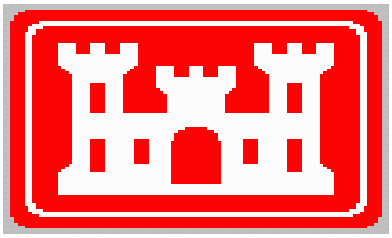
Niagara Falls, New York 14305

Prepared for:

U.S Army Engineer District

Corps of Engineers

Kansas City, Missouri



August 2016

Revision 0

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Syncon Resin Superfund Site

OU-2

South Kearny, NJ

Excavation & Materials Handling Plan

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VII. Preparation of Ground Surface for Fill 5

VIII. Backfilling 6

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Syncon Resin Superfund Site

OU-2

South Kearny, NJ

Excavation & Materials Handling Plan

I. Introduction

Sevenson Environmental Services, Inc. (Sevenson), Excavation and Materials Handling Plan will be implemented to ensure that remedial and construction procedures are performed in compliance with the plans and specifications under this contract. The excavation methods and procedures as presented herein will include general sequence of excavation activities; staffing; types of equipment to be used; methods of loading and hauling excavated soil; and descriptions of necessary excavation support systems.

Sevenson will be responsible for obtaining any and all permits necessary for removal of abandoned sand filled underground storage tanks (UST's), collection and offsite analysis of post-excavation verification soil samples.

II. Project Scope

The proposed project includes clearing and grubbing, the removal of a gravel cover, sheet pile installation, and excavation of contaminated soils.

III. Responsibilities

Project Manager – will ensure all necessary permits or permit equivalents are obtained and the New Jersey One Call ticket is maintained.

Project Superintendent – will be the excavation and trenching competent person.

IV. Excavation

Sevenson before the start of excavation will obtain a New Jersey-licensed surveyor to layout and document the limits of excavation for the purposes of measurement and payment, and for preparation of As-Built Drawings.

Excavation shall include areas and depths of the excavation as indicated on the Contract Drawings.

Excavation & Materials Handling Plan

Clearing and grubbing will be performed prior to any excavation. All excavation work will start following completion of staging areas and all of the control measures (surveys, soil erosion, fencing, CRZ's, air monitoring, etc. have been performed and installed. Odor control material will be on site in accordance with the approved odor control plan.

The excavation will be sequenced to start in areas A, B, C and D any water generated will be containerized or until the water treatment system is in operation. Areas F, G and H will follow while concurrently installing sheet piles in area I. Excavation will be accomplished by use of a excavator (Komatsu PC 300 or equal), excavating the soils to the depths indicated in the contract drawings. Direct loading will be used with the exception of area I where the materials will be loaded into an end dump trucks and stock piled in area E in separate characterized stock piles. Excavation in area I will begin when all conditions have been met including a hand-hole installed for electrical disconnect and control service in accordance with sheet E-4. Extraction well 124c will be locked out and tagged out and the existing groundwater system will be shut down temporarily during construction. A test pit will be installed to cut/cap the existing influent pipe. Extraction well C and the associated valve box will be disassembled and removed. The associated control panel will be disconnected, well pumps, valves, level transmitters; gauges will be kept intact for reinstallation following the completion of excavation. A slope will be installed to protect and maintain the integrity of the slurry wall during any shallow excavation (up to two feet below gravel). A minimum excavation slope ratio of 2H:1V will be maintained in accordance with NJDEP requirements for excavation in flood hazard areas. If the excavation remains open for an extended length of time the slope will be stabilized by backfilling to 3H:1V or flatter. If secondary excavation of the sloped soil abutting the slurry wall is required an approved trench box or slide rail system shall be used. Sheet piles will be installed in Area I in accordance with the approved sheet pile plan. Sevenson will inspect excavation bottoms and sidewalls for contamination using visual and olfactory observations, and field screening with photo ionization detector. Upon completion of the excavation to the lines and grades indicated a survey would be performed to ensure that excavation elevations have been achieved. Once backfill operations have commenced, excavation activities will be started at the next area to be remediated.

Excavation & Materials Handling Plan

Waste characterization sampling and analysis will be performed in accordance with Sevenson's Sampling and Analysis Plan (SAP). The final excavation area will be area E for the removal and complete load out of the stockpiles.

Soil erosion and sediment control measures will be implemented during excavation activities. Control measures include the installation of silt fences, hay bales and geotextile, as applicable. Spraying soils with a water mist, utilizing water obtained from local fire hydrants, will control dust. A water truck will be utilized to keep dust off of haul roads and as an additional source of water for excavation locations.

Sevenson will protect existing trees, shrubs, facilities, structures, etc., that are beyond the limits of excavation by use of temporary orange safety fencing, flagging, plywood or other means, as required.

Organic materials including stumps, roots, railroad ties, and debris encountered during excavation will be considered grubbed material and will be handled, stored and disposed of as contaminated material.

Open excavations will be barricaded, fenced, or flagged to delineate this hazard.

The contaminated material will be excavated by a track backhoe. Polyethylene will be utilized to cover the sidewalls of the vehicle to be loaded to prevent contamination coming into contact with the exterior sidewalls of the vehicle. Polyethylene will also be place on the ground where the truck is being loaded to prevent the ground surface coming into contact with contaminated material. If there are signs of contamination on the truck, the truck will be broom swept prior to moving to the scale for weighing. . Alternately, Sevenson will setup a decontamination station at the egress of the exclusion zone to decontaminate vehicles thus preventing contamination leaving the zone. An intermodal or roll-off truck (truck) will be placed in close proximity to the loading stockpile, on the polyethylene, and the backhoe will load the contaminated material directly into the truck. The backhoe operator will use caution while loading the vehicle to prevent the vehicle becoming contaminated. Sevenson will not excavate or load material in severe rain. Additionally, no material will be excavated in areas where water is standing. Once the truck is loaded, the truck will be weighed using a

portable site scale, manifested and released for shipping. Trucks will be tarped at the loading area prior to proceeding to the staging area. No vehicle will be shipped from the site that has free liquids in the container. Once the vehicle is weighed and covered/tarped, it will be transported to the disposal facility.

Surface surveying will be performed once the remedial excavation depths have been achieved, sampled *and released. Sevenson* will track quantities on site.

V. Dewatering

Sevenson will construct a water treatment system prior to excavation in area I. During excavation in areas A, B, C, D, F, G and H ground water can be pumped to area I or into a 21,00 gallon closed top tank to be used for temporary containment of water until the water treatment system is in operation. Area I and E (stock pile area) will be pumped into the temporary water treatment system. Sevenson will install berms, swales, and other measures necessary to prevent surface water from entering and exiting excavations. Surface water will be directed away from excavation and construction sites so as to prevent erosion and to prevent surface water run off from becoming contaminated by accumulating in excavations. Backfill surfaces will be protected to prevent erosion and sloughing. Excavations will be performed so that the site and the surrounding areas at the site will be drained.

VI. Existing Structures and Utilities

Sevenson will contact the New Jersey One Call System (1-800-272-1000), Public utilities, New Jersey American Water (NJA), and other local utility authorities to mark out underground utilities prior to performing any excavation activities. The locations of these lines are approximate on the Contract Drawings and will be field-verified by the utility authorities. Prior to any excavation work, utility clearances will be documented with a completed Field Safety Checklist. Sevenson will protect groundwater collection sumps, extraction wells and associated concrete pads identified on the contract drawings. A mark out of on-site utilities will be conducted to prevent damaging, or disturbing utilities during construction. During excavation activities, barricades, fencing, or flagging will be utilized to delineate the areas of underground utilities so that heavy machinery does not disturb the

utility. Precautions will be made to ensure that no damage occurs to existing structures such as fence to remain, the existing slurry wall and adjacent properties.

VII. Underground Storage Tanks

Two abandoned sand filled underground storage tanks UST's will be located by survey and test pits. UST's and piping will be removed and disposed of in accordance with the approved Underground Storage Tank Removal and Closure Plan. Disposal shall comply with the requirements specified in section 02120. All contents will be removed and atmosphere around the UST's will be tested for flammable and combustible vapor concentrations. Any flammable or toxic vapors using approved methods. Tanks will be removed from the excavation and placed on a lined level surface with wood blocks to prevent movement. In the event that additional UST's are encountered during excavation the USACE will be immediately notify. Additional UST's found shall be removed and disposed of in accordance with the approved Tank Removal and Closure Plan in accordance with all Federal, State and local requirements.

VIII. Decontamination of Subsurface Structures

Upon the completion of excavations where utilities or foundations are exposed the surface will be decontaminated prior to backfilling. Sevenson will remove all attached soil material and debris from the structures using trowels, scrapers, wire brushes, vacuuming, or other methods approved by the USACE.

IX. Preparation of Ground Surface for Fill

After contaminated material excavation has been completed, and prior to placement of fill material, the collection of post-excavation verification samples will be collect subsequent to primary and secondary excavation to confirm remediation goals have been met. Backfill operations will not commence until samples are confirmed in accordance with NJDEP post-remedial action requirements defined in NJAC 7:26F, Subchapter5.

Survey shall be performed after excavation to determine the volume of contaminated material removed. Survey will also be performed after the backfill has been completed to show final grade.

The exposed surface of the excavations will be examined to determine the presence of ruts, disturbed ground, wet spots, soft areas, organic matter, or other features undesirable in the sub-grade. Undesirable features will be removed and corrected before placing fill material.

Fill material will be moisture conditioned, as required, to obtain the specified moisture content and density for compaction.

Compaction over underground utilities will be performed by hand tamping techniques.

X. Backfilling

Backfill operations will take place simultaneously with excavation activities in areas indicated. Backfill material will be obtained from an off-site source. Prior to backfill being brought to the site, the material will be sampled and analyzed in accordance with the specifications ASTM D421 and ASTM D422 to ensure the material complies with the backfill requirements every 5,000 yards. Sevenson will coordinate the delivery of off site backfill material. Backfill will not be placed within excavations without the notification or approval of the USACE.

Direct loads of backfill shall be placed. In the event that direct loads are not possible Stockpile management will consist of preparing areas so that earthen berms encompass the stockpiles to prevent water running into the stockpiled material. Stockpiles will be covered daily, using 6 mil polyethylene, held down with sand bags. Sevenson will utilize the methods described in the Soil Erosion and Sediment Control Plan to manage the stockpiles.

Frozen materials will not be placed in the excavations, nor will fill be placed upon frozen material. All such materials will be removed from the excavations prior to backfilling.

Excavation & Materials Handling Plan

Scrap metal, wood, utilities, pipes, concrete, asphalt, or any other deleterious material will not be used as backfill.

Backfilling will not commence until the excavation has been approved, underground utilities systems have been inspected, tested, and approved, forms removed, and the excavation cleaned of trash and debris.

Backfill will be placed in eight- inch (8") loose lifts. A track bulldozer or utility backhoe will spread fill material. Fill material will be compacted by vibratory drum rollers. Vibratory Compaction using heavy equipment shall be kept at a safe distance, at a minimum of 25 feet, from the slurry wall and other existing structures. Heavy equipment will not be used within five feet (5') of an existing underground utility or foundation.

Fill material will be backfilled to the lines and grades shown on the Contract Drawings. Backfilling will not commence until excavations depths have been achieved, all temporary supports have been removed, and approval has been received from the USACE. Backfill will not be placed on snow, ice, standing water, or frozen ground surfaces. Backfill will not be placed when the temperature is below 32□ F, unless approval is received from the USCAE.

Prior to compacting, each fill layer will be plowed, tilled, or broken up; moistened or aerated; and thoroughly mixed, to obtain the moisture content for compaction.

Backfill areas, determined to be inadequately compacted, will be recompacted and retested until the specified criteria have been met.

The following minimum values, expressed as a maximum dry density in accordance with ASTM D1556, will be used for compaction of clean fill: 90%

All disturbed areas will be graded to provide a smooth and uniform condition/grade.

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Appendix M

Critical Lift Program

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Critical Lift Program

A critical lift is a non-routine crane lift that requires detailed planning and additional procedures and precautions. Critical lifts include:

a. Lifts involving hazardous materials (e.g., explosives, highly volatile substances);

b. Hoisting personnel with a crane or hoist;

c. Lifts made with more than one crane;

d. Lifts where the center of gravity could change;

e. Lifts the operator believes should be considered critical;

f. Lifts made when the load weight is 75% or more of the rated capacity of the crane load chart or more (not applicable to gantry, overhead, or bridge cranes);

g. Lifts without the use of outriggers using rubber tire load charts;

h. Lifts using more than one hoist on the same crane or trolleys;

i. Lifts involving non-routine or technically difficult rigging arrangement (to include lifts involving Multiple Lift Rigging);

j. Lifts involving submerged loads (Exception: lifts that were engineered to travel in guided slots throughout the lift and have fixed rigging and/or lifting beams, i.e., intake gates, roller gates, tailgates/logs);

k. Lifts out of the operator's view; **Exception: if hand signals via a signal person in view of the operator or radio communications are available and in use, load does not exceed two tons AND is determined a routing lift by the lift supervisor.**

Before making a critical lift, a critical lift plan shall be developed:

- The Critical Lift Plan shall be developed by a qualified person and shall include the crane operator, Superintendent or lift supervisor, and the rigger and signed by all involved personnel prior to the lift.
- For a series of lifts on one project or job, as long as the cranes, personnel, type of loads and configuration do not differ.
- And documented with a copy provided to the Client's Representative or Contracting Officers Representative.

At a minimum the Critical Lift Plan shall include:

1. The specific make and model of the crane(s), the line, boom and swing speeds;
2. The exact size and weight of the load to be lifted and all crane and rigging components that add to the weight. The manufacture's maximum load limits for the entire range of the lift, as listed in the load charts;
3. Shall specify the lift geometry and procedures, including the crane position, height of the lift, the load radius, and the boom length and angle, for the entire range of the lift;

Critical Lift Program

4. A site drawing is to be included to identify placement/location(s) of crane(s), adjacent equipment and/or facilities, etc.;
5. Shall designate the crane operator, lift supervisor, and rigger and include their qualifications;
6. A rigging plan must be included that shows lift points and describes rigging procedures and hardware requirements;
7. The plan shall include a description of ground conditions, outrigger or crawler track requirements, and if necessary , the design of mats, necessary to achieve a level, stable foundation of sufficient bearing capacity for the lift;
8. For floating crane or derricks, the plan shall describe the operating base or platform condition and any potential maximum list or trim calculations;
9. A list of environmental conditions (wind speed, visibility, severe weather, wave action, etc.) under which lift operations are to be stopped;
10. A description that specifies coordination and communication requirements during the lift operation;
11. If tandem or tailing crane lifts are performed, identify the requirements for an

General rules

- Only licensed crane operators will be assigned to make the lift.
- Only qualified riggers will be used to install rigging for the lift. Qualified riggers shall inspect all rigging prior to use.
- Only designated, qualified signalers will give signals to the operator. However, the operator will obey a STOP signal at all times, no matter who gives the signal.
- The procedure and rigging sketches will be reviewed and approved by the Superintendent and the Safety Officer prior to the lift. The rigging set up will be inspected by the lift supervisor
- A pre-lift meeting will be held with the affected personnel, and the plan and procedures will be reviewed. Any questions will also be resolved at this time.
- After the conclusion of the pre-lift meeting, the lift will be accomplished.

Environmental considerations

- Cranes shall not be operated when wind speeds at the site attain the maximum wind velocity recommendation of the manufacturer. At winds greater than 20 mph, the operator, rigger, lift supervisor, and safety officer shall cease all crane operations, evaluate conditions and determine if the lift shall proceed. The determination to proceed or not shall be documented in the crane operator’s logbook as well as the daily safety report.
- If a local storm warning is issued, the lift supervisor, superintendent, or crane operator shall determine whether it is necessary to implement manufactures recommendations for securing the equipment.

Critical Lift Program

- Critical lift operations are to be suspended during weather conditions that produce icing of the crane and hoisting equipment structure or reduced visibility.
- When lightning is observed all crane and hoisting equipment operations shall cease. A period of 30 minutes between subsequent observations shall be observed prior to resuming critical lift operations.
- Critical lifts may only be performed during non-natural light hours for emergency situations.

The following is an example of a Critical Lift Plan. This plan may be modified to site specific information or presentation. However, the required information must still be presented in the Critical Lift Plan.

Critical Lift Plan

Lift Identification	
Job Number:	Location:
Lift Supervisor Name:	
Date of Lift:	Time:
Lift Description:	
Approvals (Signatures Required)	
Lift Supervisor:	Date:
Rigging Supervisor:	Date:
Superintendent:	Date:
Operator 1:	Date:
Operator 2 (if applicable):	Date:
Rigger 1:	Date:
Rigger 2:	Date:
Signal Person:	Date:
If engineering Designs Are Used	
Drawing Numbers:	
Attachments (Insert Page Numbers)	
1. Lift Supervisor, Operator, and Rigger Certifications	
2. Load Charts	
3. Inspection Reports for all Lifting Equipment	
4. Inspection Reports for all Rigging Equipment	
5. Rigging Plan with drawings	
6. Site map showing crane area, adjacent equipment or facilities	

Critical Lift Plan

Critical Lift Load and Capacity Calculations

Lift Description: _____

Section A Weight of Load (Equipment) – Live Load		
1. Load/Equipment condition	New: ☐	Used: ☐
2. Weight of Load/Equipment Empty		Lbs
3. Weight of Attachments		Lbs
a. Platforms and Ladders		Lbs
b. Piping and Accessories		Lbs
c. Liquids Inside		Lbs
d. Dirt and Debris		Lbs
e. Internal Trays or Liners		Lbs
f. Other:		Lbs
g. Other:		Lbs
4. Total Amount of Load/Equipment Weight (A2 through A3g)		Lbs

Section B Total Lifted Weight (Weight of Load/Equipment + Rigging + (Main) Crane Deductions)					
1.	Load/Equipment weight plus contingency*	%	7.	Weight of Jib Erected	Lbs
2.	Amount of Equipment Weight	Lbs	7a.	Weight of Jib Stowed	Lbs
3.	Weight of Headache Ball	Lbs	8.	Weight of Jib Headache Ball	Lbs
4.	Weight of Main Block	Lbs	9.	Weight of Cable (Load Fail)	Lbs
5.	Weight of Spreader Bar	Lbs	10.	Auxiliary Boom Head	Lbs
6.	Weight of Slings and Shackles	Lbs	11.	Other:	Lbs

* Use 100% plus some percentage (example +10%) to multiply times number in Section A4 to allow for contingency to compute Section B2.

TOTAL LIFTED WEIGHT (Sum B2 through B11) Lbs

Source of Load Weight (A2):

(Name Plate, Drawings, Calculated, Weight Ticket, Etc.)

Weight and Calculations

Print Name	Signature	Date
By:		
Verified By:		

(See Page 2)

Critical Lift Plan

Critical Lift Load and Capacity Calculations

Section C Capacities of the (Main) Crane				
1.	Make and Model of Crane:			
2.	Counter Weight Size:	Type of Boom:		
3.	Lifting Arrangement			
a.	Max. Radius During Lift	Feet		
b.	Length of Boom	Feet		
c.	Angle of Boom at Pick	Degree		
d.	Angle of Boom at Set	Degree		
	Rated Capacity Under Most Severe Conditions			
1.	Over Rear	Lbs		
2.	Over Front	Lbs		
3.	Over Side	Lbs		
f.	Rated Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or rear)			Lbs
4.	Jib			
a.	Is the Jib to be used Yes ☐ No ☐			
b.	Length of Jib	Feet		
c.	Jib Angle	Degree		
d.	Rated Jib Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or rear)			Lbs
5.	Load Line/Fall Cable			
a.	Is Main Block to be used Yes ☐ No ☐			
b.	Number of Parts of Cable			
c.	Size of Cable	Inches		
d.	Maximum Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or rear)			Lbs
Section D Percent of Cranes Capacity				
1.	$\frac{Total\ Lifted\ Weight}{Rated\ Capacity} * 100$			%
Section E Size of Slings				
1.	Sling Selection			
a.	Type of Arrangement		(Spreader, Vertical Slings, etc.)	
b.	Number of Slings to Hook	Capacity		Lbs
c.	Sling Size	Inches		
d.	Sling Length	Feet		
e.	Sling Capacity (at angle used)	Lbs		
f.	Number of Slings to Load	#		
g.	Total Rigging Capacity (E1e x E1f)			Lbs
Comments:				
Sketch of rigging arrangements available Yes ☐ No ☐ See page:				

(See Page 3)

Critical Lift Plan

Critical Lift Load and Capacity Calculations

Section F Total Lifted Weight to be Lifted by Tailing Crane Applicable - ☐ yes, ☐ no			
1.	Percent of Total Equipment Weight **	%	(** Generally 50+% based on CG and movement during up righting)
2.	Amount of Equipment Weight (A4 x F1)	Lbs	
3.	Weight of Headache Ball	Lbs	
4.	Weight of Block	Lbs	
5.	Weight of Lifting Bar	Lbs	
6.	Weight of Slings and Shackles	Lbs	
7.	Weight of Jib Erected	Lbs	
8.	Weight of Jib Headache Ball	Lbs	
9.	Weight of Cable Load (Load Fall)	Lbs	
10.	Auxiliary Boom Head	Lbs	
11.	Other	Lbs	
12.	Total Weight of Load/Equipment Lifted by Tailing Crane (F2 through F11)	Lbs	
Source of Load Weight:			
(Name Plate, Drawings, Calculated, Scale Ticket)			

Weight and Calculations		
Print Name	Signature	Date
By:		
Verified By:		

Section G Capacities for Tailing Crane Based on Configuration			
1.	Make and Model of Crane:		
2.	Counter Weight Size:	Type of Boom:	
3.	Lifting Arrangement		
a.	Max. Radius During Lift	Feet	
b.	Length of Boom	Feet	
c.	Angle of Boom at Pick	Degree	
d.	Angle of Boom at Set	Degree	
	Rated Capacity Under Most Severe Conditions		
	1. Over Rear	Lbs	
	2. Over Front	Lbs	
	3. Over Side	Lbs	
f.	Rated Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or rear)		Lbs
4.	Jib		
a.	Is the Jib to be used Yes ☐ No ☐		
b.	Length of Jib	Feet	
c.	Jib Angle	Degree	
d.	Rated Jib Capacity for Lift Radius, Crane Configuration, and Orientation (over front, side, or rear)		Lbs
5.	Cable		
a.	Number of Parts	#	
b.	Size of Cable	Inches	
c.	Maximum Capacity	Lbs	

(See Page 4)

Critical Lift Plan

Critical Lift Load and Capacity Calculations

Section H Percent of Cranes Capacity Tailing Crane			
1.	$\frac{Total\ Lifted\ Weight}{Rated\ Capacity} * 100$		%
Section I Size of Slings for Tailing Crane			
1.	Sling Selection		
a.	Type of Arrangement	(Spreader, Vertical Slings, etc.)	
b.	Number of Slings to Hook	Capacity	Lbs
c.	Sling Size	Inches	
d.	Sling Length	Feet	
e.	Sling Capacity (at angle used)	Lbs	
f.	Number of Slings to Load	#	
g.	Total Rigging Capacity (Ie x If)		Lbs

Comments:

Sketch of rigging arrangements available	Yes ☐	No ☐	See page:

Critical Lift Plan

Pre –Lift Checklist

		Yes	No
1.	Crane operator meets company qualification requirements?	☐	☐
2.	Lift Calculations and rigging plan completed?	☐	☐
3.	Are all required approvals/permits signed?	☐	☐
4.	Crane inspections up to date (Annual/Monthly/Daily)?	☐	☐
5.	Weather conditions and wind speed acceptable?	☐	☐
6.	Has the stability of the ground been assured?	☐	☐
7.	Matting and/or outrigger pads inspected and approved?	☐	☐
8.	Electrical equipment and power lines at required distance?	☐	☐
9.	Rigging inspected for defects?	☐	☐
10.	Engineering lifting lugs fabricated and installed correctly?	☐	☐
11.	Connecting/disconnecting means been developed?	☐	☐
12.	Have the safety precautions been reviewed?	☐	☐
13.	Is survey equipment required?	☐	☐
14.	The total lifted weight is below 95% capacity?	☐	☐
15.	Signal person(s) assigned?	☐	☐
16.	Safe Plan of Action (SPA) completed?	☐	☐
17.	Pre-lift meeting/Activity Hazard Analysis held?	☐	☐
18.	Hoist area and load path cleared of non-essential personnel?	☐	☐
19.	Crane set up per the lift plan (radius, configuration, etc.)?	☐	☐
20	Rigging equipment and tag line(s) installed per plan?	☐	☐

Personnel Completing Check List			
Print	Signature	Title	Date

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Appendix N

Hearing Conservation Program

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Syncon Resin OU2 Superfund Sites
South Kearny, New Jersey

HEARING CONSERVATION PROGRAM

Prepared by:

Sevenson Environmental Services, Inc.
Niagara Falls, NY

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Sevenson Environmental Services, Inc.
Syncon Resin OU2 Superfund Sites
HEARING CONSERVATION PROGRAM

Purpose

To establish a hearing conservation and noise control program to protect employees from noise exposure exceeding 90 dBA, TWA for eight (8) hours, and, to conserve their hearing when exposed to noise levels between 85-90 dBA TWA for eight (8) hours. In doing so, this complies with the American Conference of Governmental Industrial Hygienists, ACGIH, Threshold Limit Values, TLV, and USACE EM 385-1-1 (30NOV2015), Section 5.C.

Scope

This policy and procedure establishes the minimum requirements for Sevenson's site specific hearing conservation and noise control program to be implemented at the Syncon Resin OU2 Superfund Site (Site).

Responsibility

It will be the responsibility of the Site Safety and Health Officer (SSHO), to train, inform and review the Site's Hearing Conservation Program with site personnel as part of the Site Specific Safety Training. All employees are charged with reviewing and complying with this policy. The site specific training for hearing protection will ensure the employees:

- are trained in the use of hearing protectors;
- wear the hearing protection in required areas or for required job assignments; and
- properly maintain the hearing protectors.

Employees are responsible for:

- wearing hearing protection in required areas, or, for required job assignments;
- caring for their hearing protectors; and
- replacing the protectors if lost or damaged.

It will be the specific responsibility of the superintendents of the affected areas/job classifications to enforce this Policy and Procedure as it pertains to their area of responsibility.

Monitoring and Identification of Noise Hazards

Noise levels at the Site shall be monitored to determine employee exposure upon initial startup, regularly throughout the duration of the project, annually, and at any time a change of equipment or conditions creates a hazardous noise area.

Also, if a worker expresses concern regarding the noise level in a work area, a sound level survey will be conducted by the SSHO.

Measurements shall be taken using personal noise dosimeters and/or sound level meters. All continuous, intermittent and impulsive sound levels from 80 dBA to 130 dBA shall be integrated into the computation.

Upon completion of the jobsite noise evaluation, a list of areas and job classifications required to be in this site specific hearing conservation program will be communicated to the Safety

and Health Manager in Niagara Falls, New York. The results of the sound level surveys performed will be kept on file in the safety officer trailer and will be maintained as part of the Site's project record.

Table 1 shows the duration of exposure and the allowable noise level for worker exposure.

Table 1 – Duration of Exposure

(OSHA Standard) Duration per day (hours)	Permissible sound-pressure level (dBA)
8	85
4	88
2	91
1	94
0.5 (30 min)	97
0.25 (15 min)	100

Policy

Where noise levels exceed the permissible exposure limit, PEL, feasible engineering and/or administrative methods shall be instituted to reduce noise exposures. All studies and expenditures shall be documented.

Purchase orders for new equipment shall specify construction or protection that will limit noise levels to 85 dBA or less for individual sources. Where suppliers cannot meet these specifications, they shall be required to submit sound level estimates so that the effects on the noise control program of the jobsite can be evaluated before purchase.

Where engineering controls fail to reduce noise levels below the established ACGIH action level, a continuing, effective hearing conservation program shall be administered for all employees whose work requires them to enter high noise level areas.

Work in areas with sound levels above 90 dBA will be posted as a *Hearing Protection Required* area and all employees will be required to wear hearing protection while working in these posted areas. Maintenance of hearing protection signs are the responsibility of the SSHO.

Assessment of Combined Effects

When the daily noise exposure is composed of two or more periods of noise exposure of different levels, the combined effects must be considered. Exposure to different levels for various periods of time shall be computed according to the following formula:

$$Cn = \frac{T1}{L1} + \frac{T2}{L2} + \ldots\ldots + \frac{Tx}{Lx}$$

Where: Cn = combined noise exposure factor;

T = the total time of exposure at a specified sound-pressure level (in hours), and

L = the total time of exposure permitted at that level (in hours), from

Table 1, as appropriate if the sum exceeds 1, the mixture of exposure periods exceeds the TLV.

Audiometric Testing Program

All employees will receive an audiogram as part of their pre-employment and annual physicals. The baseline audiogram will be used to compare subsequent audiograms for individuals exposed to 85 dBA or more.

Testing to establish an audiogram shall be preceded by at least fourteen (14) hours without exposure to work place noise. Hearing protectors may be used to provide the fourteen (14) hour quiet period, if necessary.

Employees exposed to a time weighted average at or above 85 dBA will be tested annually. The annual audiometric testing may be conducted at any time during the work shift. The SSHO will notify the Superintendent when an individual is scheduled for an annual exam.

Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if a significant threshold shift has occurred. This will be done by Sevenson's medical consultant, WorkCare, Inc..

If a comparison of the annual audiogram to the baseline audiogram indicates a significant threshold shift in that employee's hearing, the following steps will be taken:

1. The employee will be informed in writing, within twenty-one (21) days of the determination, of the existence of a significant threshold shift.
2. If not currently using hearing protectors, the employee shall be fitted with hearing protectors, trained in their use and care, and required to use them.
3. If already using hearing protectors, the employee shall be re-fitted and re-trained in their use and provided with hearing protectors offering greater attenuation, if necessary.
4. The employee will be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary, or if it is suspected that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.
5. The employee will be informed of the need for an otological examination if a medical pathology of the ear, which is unrelated to the use of hearing protectors, is suspected.

Personal Protective Equipment (PPE)

Workers will be provided hearing protection that will attenuate noise to acceptable levels (i.e., 85 dBA for continuous (steady-state) noise). In situations where a worker is required to respond to an audible alarm, the type of hearing protection provided shall not reduce sound levels to the point at which the worker cannot hear the alarm.

In situations where a worker is exposed to noise levels in excess of 115 dBA, double PPE, in the form of combining two devices (e.g. earplugs and earmuffs) may be used. Workers will

be reminded that the protection factor of two devices worn together does not equal the sum of the noise reduction rating, NRR, of both devices. Generally, a worker can expect to achieve an additional 5 dB increase in the NRR of the more protective device. For example, using earplugs having a NRR of 29 combined with earmuffs having a NRR of 27 would provide a NRR of approximately 34 decibels, not 56 decibels.

The attenuation of the specific hearing protection, except custom ear mold hearing protection, shall be determined using the NIOSH de-rating scheme. NIOSH recommends de-rating the NRR by a multiplicative factor of 75% for earmuffs, 50% for slow-recovery foam earplugs and custom earplugs, and 30% for all other earplugs. This variable de-rating scheme considers the real-world performance of most different types of hearing protector (NIOSH, 1998).

Ear insert devices, to include disposable, pre-formed, or custom-molded earplugs, shall be fitted to the exposed individual by an individual trained in such fitting and able to recognize the difference between a good and poor fit. Plain cotton is not an acceptable hearing protection device.

Training

All employees who are exposed to noise at or above a time weighted average of 85 dBA shall participate in the hearing conservation training program. Site specific training, as it pertains to the noise levels at the Site will be conducted by the SSHO upon the arrival of new workers to the jobsite. Periodic review of Sevenson's Hearing Conservation Program will be provided by the SSHO. This training must be documented and maintained by the SSHO to comply with recordkeeping requirements of Section 5.C of USACE EM385-1-1. A copy of this training documentation shall be submitted to the Director of Health and Safety.

The training program shall consist of the following:

1. The effects of noise in hearing.
2. The purpose of hearing protectors (PPE).
3. The advantage/disadvantage and attenuation of various types of hearing protectors.
4. The instructions on selection, fitting, use and care of hearing protectors.
5. The purpose of audiometric testing and an explanation of the test procedure.

Recordkeeping

Various exposure measurement records shall be retained for two (2) years.

Audiometric test records shall be retained for the duration of the affected employee's employment.

Appendix O

Perimeter Air Monitoring Plan

Submitted as separate submittal approval to be added upon acceptance by USACE

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Appendix P

Fatigue Management Plan

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FATIGUE MANAGEMENT PLAN

Syncon Resins Operable Unit 2 (OU 2) Superfund Site
Remedial Activities
South Kearny, New Jersey
CONTRACT No.
W912DQ-15-3002
TASK ORDER: 0002

Prepared by:
SEVENSON ENVIRONMENTAL SERVICES, INC.
2749 Lockport Road
Niagara Falls, New York 14305

Paul Jung, CIH, CSP
Director of Health and Safety
Sevenson Environmental Services, Inc.

July 2016
Revision 0

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Introduction

This Fatigue Management Plan (FMP) has been prepared by Sevenson Environmental Services, Inc. (Sevenson) to provide guidance on how to systematically manage fatigue risks at the site. The FMP is required to be implemented at the Site whenever work hours:

1. Exceed 10-hours a day for more than 4 consecutive days;
2. Exceed 50-hours in a 7 day work week;
3. Exceed 12-hours a day for more than 3 consecutive days; or
4. Exceed 58-hours a week for sedentary (to include office) work

Purpose

Fatigue has been identified as a contributory factor in many work accidents. The following aims to give some information about the risks associated with fatigue and some guidance on how to avoid, manage, and control fatigue so that workers are less likely to be harmed by the effects. All employees shall receive training concerning fatigue management, initially at the time of hire and thereafter as a minimum annually. Likewise this program shall be reviewed at least annually by the Safety and Health Manager and Site Safety and Health Officer for effectiveness.

Fatigue Factors:

- Prior sleep and wakefulness – the amount of sleep they have had prior to work and the duration of their work period.
- Working without a rest break to meet critical deadlines/milestones.
- Sleep patterns affected by frequent call outs over a limited period and extended hours of work.
- Work tasks/activities requiring concentration or high levels of muscular exertion for extended periods of time.
- Tedious and monotonous work.
- Heavy or exhausting physical activity.
- Working in high risk situations.
- Inadequate recovery from interrupted or poor quality sleep.
- Working successive shifts, frequently on call out, and regular emergency work outside standard work hours.
- Working in high heat or cold temperatures or humid conditions.
- Driving vehicles while tired.
- Accepting work which results in exceeding working hour limits.
- External factors that affect a person's fatigue risk level while at work.
    - Excess hours/Overtime.
    - Extended Shiftwork and Rostering Arrangements with early starts or late finishes over successive days.
    - Rest Breaks and Rotation of Tasks.

- Contractors and Outages.

- Emergency Works/Time of day – incidents are more likely to happen in circadian low points (such as night time, especially between the hours of 2am to 6am).
- Length of shifts worked – the effects of fatigue are cumulative, workers are more likely to feel fatigued in the final hours of a shift, than in the first few hours of a shift.
- Lack of opportunity to recover from fatigue – incidents are more likely to occur if workers are not given a sufficient opportunity to recover from fatigue.
- How often the situation occurs – generally, the more often a worker is fatigued, the greater the likelihood is that an incident will occur.
- How many people are fatigued – generally, the greater the number of people who are fatigued, the more likely an incident is to occur.
- The skills and experience of persons fatigued – consider training and competency both to perform work related tasks and manage fatigue.
- Any special characteristics of the people involved – for example if a worker is on medication for a medical condition that is affected by circadian rhythms and night shift work (such as asthma, depression or diabetes).
- The duration of exposure to fatigue - generally, the longer a person is fatigued, the more likely an incident will occur.
- The level of risk inherent in the work – incidents are more likely to occur in work that is generally hazardous, such as when operating heavy machinery or plant.
- Number of consecutive night shifts worked.
- Commuting – time spent travelling reduces time available for recovery.
- Shift rotation – relevant shift changes and start/finish times.
- Sleep inertia – drowsiness after being woken.
- Rest breaks – the number and duration of breaks taken.
- Occupational exposure levels – extended exposure on longer shifts to noise, dusts, chemicals.
- Manual tasks – forces used to push, pull, lift, carry, reach or dexterity required for work and ergonomics – body position and location – confined or cramped work spaces.
- Proximity of workers residence or accommodation – method of travel to and from work and the risk of commuting incidents.
- Ability to access food and refreshments for a balanced diet.

Responsibilities

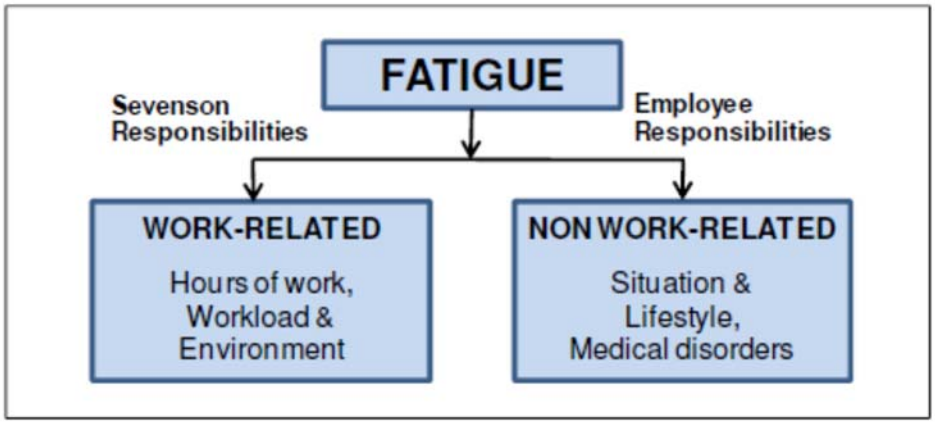
Everyone at the site has a responsibility to ensure that fatigue does not affect their own or other's health and safety at the site or when traveling to and from the work place.

Shared Responsibility

The management of fatigue is considered a shared responsibility between Sevenson and it personnel as illustrated in Figure 1. Sevenson is responsible for providing a safe system of work which includes the development, implementation and management of working time schedules, work schedules and the establishment of a safe work place and work practices.

Personnel are responsible for ensuring they are fit for duty by taking into account their lifestyle and medical factors that could influence fatigue, and managing these appropriately.

Figure 1 Shared Responsibility Model



Sevenson

Sevenson will:

- Educate our Employees about the impacts of fatigue;
- Provide leadership and commitment through the allocation of resources and personnel for the establishment, implementation, evaluation an review of the FMP;
- Review, monitor and track all aspects of the FMP to ensure compliance across the whole site and personnel as well as identifying areas for improvement;
- Ensure that the fatigue assessment process is utilized and documented;
- Provide appropriate fatigue management training;
- Ensure that if a person's capacity to work safely is reduced by fatigue they can notify their supervisor without fear of adverse repercussions;
- Ensure that privacy and confidentiality is maintained;

Project Manager

Project Manager is responsible for:

- Implementing the FMP at the workplace
- Investigate apparent breaches of the provisions of this Plan

- Take appropriate actions where breaches of the FMP have occurred;
- Ensure that privacy and confidentiality is maintained;
- Ensure that employs are advised that a FMP is in place;
- Ensure that the workers and workplace induction process includes education on the standards, obligations and responsibilities of the FMP;
- Ensure that investigations of incidents asses the effects of fatigue;

Project Superintendents and Supervisors

Project Superintendents and Supervisors are responsible for:

- Assisting in and implementing this procedure to minimize the causes of work related fatigue;
- Ensuring that, to the extent possible, fatigue is considered in planning working rosters, work allocation and scheduling, taking into account the range of matters set out in the **Fatigue Factors** section;
- Identifying and advising the relevant Site/General Manager about issues with the practical application and operation of this procedure and any areas for improvement;
- Consulting with appropriate Personnel, arranging suitable alternate duties (where possible) and/or a safe location for a person impaired by fatigue;
- Ensuring that fatigue is considered in the investigation of any incident;
- Maintaining privacy and confidentiality, including acting on reports of concern about privacy and confidentiality;
- Facilitating other actions as defined under this procedure; and
- Recognizing and assessing the signs, symptoms and management of fatigue (refer to **Figure 2**).

Site Safety and Health Officer

The Site Safety and Health Officer(s) are responsible for the following:

- Ensuring that information and education regarding this procedure are provided in Employee and workplace inductions;
- Offering to arrange support, counselling and medical advice for Employees;
- Providing advice on establishing suitable alternate duties (where possible); and
- Maintaining records and reporting fatigue matters and statistical data.
- Maintaining privacy and confidentiality

Workers

Workers Must:

- Not willfully place their own or others health and safety at risk;
- Make every reasonable effort to be fit for work whilst:
  - at work;
  - on call;
  - driving a company vehicle; or
  - operating company equipment.
- Notify their Supervisor if:
  - their work performance is likely to be affected by fatigue; or
  - there is any risk to themselves or others due to the effects of fatigue;
- Notify their Supervisor or other responsible person immediately (if a person will not self- manage their potential impairment) where there a potential risk to health and safety if they suspect others in the workplace are behaving in a manner that suggests fatigue related impairment exists (refer to signs and symptoms, Figure 2;
- Encourage other Personnel to comply with this procedure;
- Participate in fatigue assessments, if requested;
- Report any actual or potential fatigue risks; and
- Fulfil their obligation to arrive at work fit for duty.

All Personnel are encouraged to use time away from work to obtain sufficient restorative sleep to ensure fatigue related risks are managed to an acceptable level.

Figure 2 Signs and Symptoms of Fatigue

PHYSICAL	MENTAL	EMOTIONAL
Yawning	Difficulty concentrating on a task	More quiet than usual
Heavy Eyelids	Lapses in attention	Lacking energy
Eye-rubbing	Difficulty remembering what you are doing	Mood changes, decrease tolerance
Head drooping	Failure to communicate important information	Emotional outburst, aggressive, rage
Micro sleeps	Failure to anticipate events or actions	
	Accidentally doing the wrong thing (error)	
	Accidentally not doing the right thing (omission)	

Prevention – worker responsibilities.

- Get 8 hours sleep before starting work and try to sleep at the same time each day.
- Find a healthy balance between work and personal life.
- Always seek medical advice about sleep disorders.
- All employees shall receive initial fatigue management training at the time of hire and annually thereafter or sooner as warranted by program updates, employ requests, inspection, audit or incident recommendations.
- Avoid chronic use of over the counter or prescription medication that may impair a worker from working safely.
- Employees are responsible for notifying their supervisor if they are fatigued to the point of not being able to perform their duties safely.
- All employees have the authority to stop work whenever safety is a concern which includes fatigue which can impair a workers ability to work safely. If fatigue is a concern, report it to your supervisor so appropriate action can be taken to correct the issue.

Work Hour Limitations

Equipment Operators

Operators of equipment, such as hoisting equipment and draglines, mobile construction equipment, electrical power systems, hydropower plants, industrial manufacturing systems, hydraulically operated equipment, powered vessels, and boats, shall not be permitted to exceed 12-hours of duty time in a 24-hour period, including time worked at another occupation. A minimum o f8 consecutive hours of rest between shifts in a 24-hour period is required.

Motor Vehicle Operators

Operators of motor vehicles, while on duty, shall not operate vehicles for a continuous period of more than 10-hours in any 24-hour period; moreover, no employee, while on duty, may operate a motor vehicle after being in a duty stats of more than 12-hours during any 24-hour period. A minimum of 8 consecutive hours shall be provided for rest in each 24-hour period.

Floating Plant

All floating plant personnel shall be scheduled to receive a minimum of 8-hours rest in any 24-hour period.

Control Measures

The following controls should be considered to help minimize fatigue on the job.

- Scheduling low risk work during periods of high fatigue in the latter half of shifts.
- Scheduling complex tasks to be performed only during the first 8-hours of the shift.
- Sufficient supervision, particularly during periods of high fatigue (the latter half of shift) and especially for hazardous work.
- Contingency plans if workers become fatigued – this would involve removing fatigued workers from work activities where there is a considerable risk to health and/or safety (eg operating heavy machinery, boat operations).
- Effective emergency responses.
- Job rotation for repetitive or monotonous work, or work that involves heavy physical demands.
- Identify workers who have extended commutes to and from work that could prevent them from receiving at least 8 hours of rest between shifts.
- Managing breaks within shifts to assist in managing fatigue.

Training

Sevenson will provide employees with an education program on fatigue management including their responsibilities under this procedure.

This education will give workers the knowledge and ability to manage their own fitness for work.

The education program will be on-going and flexible. It will respond to fatigue related trends identified through policy and procedure reviews and audits.

All impacted workers will participate in training to recognize symptoms and behaviors associated with the effects of fatigue including support mechanisms and the application of the procedure. Supervisors, Managers and Health and Safety Personnel will participate in more detailed training.

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Appendix Q

Asbestos Abatement Plan

A generic Asbestos Abatement Plan has been inserted into this document. The actual Asbestos Abatement Plan shall be submitted as separate submittal approval to be added upon acceptance by USACE.

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Generic
Asbestos Work Plan

for

Syncon Resin Superfund Site
Kearny, New Jersey

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1.0 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

1. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

a.	ANSI Z87.1	(2003) Standard for Occupational and Educational Eye and Face Protection
b.	ANSI Z88.2	(1992) Respiratory Protection
c.	ANSI Z9.2	(2001) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

2. ASTM INTERNATIONAL (ASTM)

a.	ASTM D 1331	(1989; R 2001) Surface and Interfacial Tension of Solutions of Surface-Active Agents
b.	ASTM D 4397	(2002) Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
c.	ASTM E 1368	(2003) Visual Inspection of Asbestos Abatement Projects

3. COMPRESSED GAS ASSOCIATION (CGA)

a. CGA G-7 (2003) Compressed Air for Human Respiration

4. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

a. NFPA 701 (2004) Fire Tests for Flame Propagation of Textiles and Films

5. NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

a. NIOSH 94-113 (1994; 4th Ed) NIOSH Manual of Analytical Methods

6 NEW JERSEY ADMINISTRATIVE CODE (NJAC)

a.	NJAC 5:16	Asbestos Licenses and Permits
b.	NJAC 5:23-8.5	(2014) Asbestos Hazard Abatement Subcode
c.	NJAC 7:26-1 et seq.	(2002) Solid Waste Regulations – Asbestos
d.	NJAC 7:26C-1 et seq.	(2003) Hazardous Waste Regulations

7 NEW JERSEY STATUTES ANNOTATED (NJSA)

a. NJSA 34:5A-32 et seq. The Asbestos Control and Licensing Act

8 U.S. ARMY CORPS OF ENGINEERS (USACE)

a.	EM 385-1-1	(2014) Safety - Safety and Health Requirements
b.	EP 1110-1-11	(1999) Asbestos Abatement Guideline Detail Sheets

9 U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90/018 (1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance

10 U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

a.	29 CFR 1910.134	Respiratory Protection
b.	29 CFR 1910.141	Sanitation
c.	29 CFR 1910.147	Control of Hazardous Energy (Lock Out/Tag Out)
d.	29 CFR 1926.1101	Asbestos
e.	29 CFR 1926.32	Safety and Health Regulations for Construction - Definition
f.	40 CER 61	National Emission Standards for Hazardous Air Pollutants

g.	40CFR	763 Asbestos
h.	42CFR	84 Approval of Respiratory Protective Devices
i.	49CFR	107 Hazardous Materials Program Procedures
j.	49 CFR 171	General Information, Regulations, and Definitions
k.	49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
l.	49 CFR 173	Shippers - General Requirements for Shipments and Packaging

11 UNDERWRITERS LABORATORIES (UL)

a. UL 586 (1996; Rev thru Apr 2000) High-Efficiency, Particulate, Air Filter Units

2.0 DEFINITIONS

Abatement. "Abatement" shall mean any and all procedures physically taken to control fiber release from asbestos-containing materials. This includes removal, encapsulation, enclosure and repair.

Abatement activities. "Abatement Activities" shall mean all activities from the initiation of work area preparation through successful clearance air monitoring performed at the conclusion of an asbestos project or minor project.

Aggressive sampling. "Aggressive Sampling" shall mean a method of sampling in which the individual collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and simulate activity in that area of the building.

AIHA. "AIHA" shall mean the American Industrial Hygiene Association.

Airlock. "Airlock" shall mean a system for permitting entrance and exit while restricting air movement between a contaminated area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least three feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.

Air sampling. "Air sampling" shall mean the process of measuring the fiber content of a known volume of air collected during a specific period of time. The procedure utilized for asbestos follows the NIOSH Standard Analytical Method 7400 or the provisional transmission electron microscopy methods developed by the USEPA and/or National Institute of Science and Technology which are utilized for lower detectability and specific fiber identification.

Ambient air monitoring. "Ambient air monitoring" shall mean measurement or determination of airborne asbestos fiber concentrations outside but in the general vicinity of the worksite.

Amended water. "Amended water" shall mean water to which a surfactant has been added.

ANSI. "ANSI" shall mean the American National Standards Institute.

Area air sampling. "Area air sampling" shall mean any form of air sampling or monitoring where the sampling device is placed at some stationary location.
Asbestos. "Asbestos" shall mean any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cumingtonite-grunerite), crocidolite (riebeckite), tremolite, anthrophyllite and actinolite.

Asbestos-containing material. "Asbestos-containing material" (ACM) shall mean asbestos or any material containing more than one percent asbestos.

Asbestos-containing waste material. "Asbestos-containing waste material" shall mean asbestos-containing material or asbestos-contaminated objects requiring disposal.

Asbestos-contaminated objects. "Asbestos-contaminated objects" shall mean any objects which have been contaminated by asbestos or asbestos-containing material.

Asbestos handler. "Asbestos handler" shall mean an individual certified by the Department who disturbs, removes, encapsulates, repairs, or encloses friable asbestos material.

Asbestos handler supervisor. "Asbestos handler supervisor" shall mean an individual certified by the Department who supervises the handlers during an asbestos project and ensures that proper asbestos abatement procedures as well as individual safety procedures are being adhered to.

Asbestos Inspection. Report. "Asbestos Inspection Report" shall mean a report on the condition of a building or structure in relation to the presence and condition of asbestos therein.

Asbestos investigator. "Asbestos investigator" shall mean an individual certified by the Commissioner as having satisfactorily demonstrated his or her ability to identify the presence and evaluate the condition of asbestos in a building or structure.

Asbestos project. "Asbestos project" shall mean any form of work performed in connection with the alteration, renovation, modification or demolition of a building or structure which will disturb (e.g., remove, enclose, encapsulate) more than *25* linear feet or more than 10 square feet of friable asbestos-containing material.

ASTM. "ASTM" shall mean the American Society For Testing and Materials.

Authorized visitor. "Authorized visitor" shall mean the building owner and his/her representative, and any representative of a regulatory or other agency having jurisdiction over the project.

Boiler room equipment. "Boiler room equipment" or "fuel-burning equipment" shall mean equipment designed to burn fuel for the purpose of generating hot water, steam, and/or heat, including all ancillary equipment and associated piping. For boiler rooms other than those located in electric and steam utility generating stations, the ancillary equipment and associated piping shall be limited to that within the room containing the main equipment; or where there is no such room, located on the floor where the main equipment is located.
Building owner. "Building owner" shall mean the person in whom legal title to the premises is vested unless the premises are held in land trust, in which instance building owner means the person in whom beneficial title is vested.

Certified Industrial Hygienist. "Certified Industrial Hygienist" (CIH) shall mean an individual with a minimum of five years experience as an industrial hygienist and who has successfully completed both levels of the examination administered by the American Board of Industrial Hygiene and who is currently certified by that Board.

Certified Safety Professional (CSP). "Certified Safety Professional" (CSP) shall mean an individual having a bachelor's degree from an accredited college or university and a minimum of four years experience as a safety professional and who has successfully completed both levels of the examination administered by the Board of Certified Safety Professionals and who is currently certified by that Board.

Clean room. "Clean room" shall mean an uncontaminated area or room which is part of the worker decontamination enclosure system with provisions for storage of workers' street clothes and protective equipment.

Clearance air monitoring. "Clearance air monitoring" shall mean the employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers, and shall be performed as the final abatement activity.

Contractor. "Contractor" shall mean a public authority or any other governmental agency or instrumentality thereof, self-employed person, company, unincorporated association, firm, partnership or corporation and any owner or operator thereof, which engages in an asbestos project or employs persons engaged in an asbestos project.

Curtained doorway. "Curtained doorway" shall mean a device which consists of at least three overlapping sheets of plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall have weights attached to the bottom to ensure that the sheets hang straight and maintain a seal over the doorway when not in use.

Decontamination enclosure system. "Decontamination enclosure system" shall mean a series of connected rooms, separated from the work area and from each other by air locks, for the decontamination of workers, materials, waste containers, and equipment.

Demolition. "Demolition" shall mean the dismantling or razing of a building, including all operations incidental thereto (except for asbestos abatement activities), for which a demolition permit from the New York City Buildings Department is required.
Department or DEP. "Department" or "DEP" shall mean the New York City Department of Environmental Protection.

Disturb. "Disturb" shall mean any action taken which may alter, change, or stir, such as but not limited to the removal, encapsulation, enclosure or repair of asbestos-containing material.

Encapsulant (sealant) or encapsulating agent. "Encapsulant (sealant) or encapsulating agent" shall mean pigmented (non-transparent) liquid material which can be applied to asbestos-containing material or the bare surfaces exposed after an abatement which temporarily controls the possible release of asbestos fibers from the material or surface either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).

Encapsulation. "Encapsulation" shall mean the coating or spraying of asbestos-containing material or the bare surfaces exposed after an abatement with a pigmented (nontransparent) sealant.

Enclosure. "Enclosure" shall mean the construction of airtight walls and ceilings between the ACM and the facility environment, or around surfaces coated with ACM, or any other appropriate procedure as determined by the Department which prevents the release of asbestos fibers.

EPA. "EPA" or "USEPA" shall mean the United States Environmental Protection Agency.

Equipment Room. "Equipment room" shall mean a contaminated area or room which is part of the worker decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.

Fiber. "Fiber" shall mean an acicular single crystal or a similarity elongated polycrystalline aggregate which displays some resemblance to organic fibers by having such properties as flexibility, high aspect ratio, silky luster, axial lineation, and others, and which has attained its shape primarily through growth rather than cleavage.

Fixed object. "Fixed object" shall mean a unit of equipment or furniture in the work area which cannot be removed from the work area.

Friable asbestos material. "Friable asbestos material" shall mean any asbestos or any ACM that can be crumbled, pulverized or reduced to powder when dry, by hand or other mechanical pressure.

Glovebag technique. "Glovebag technique" shall mean a method for removing friable asbestos-containing material from heating, ventilation and air conditioning (HVAC) ducts, short piping runs, valves, joints, elbows, and other nonplanar surfaces. The glovebag assembly is a manufactured device consisting of a large bag (constructed of at least 6-mil transparent plastic), two inward-projecting long sleeve gloves, one inward-projecting water and sleeve, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers released during the removal process.

HEPA filter. "HEPA filter" shall mean a high efficiency particulate air filter capable of trapping and retaining 99.97 percent of particles (asbestos fibers) greater than 0.3 micrometers mass median aerodynamic equivalent diameter.

HEPA vacuum equipment. "HEPA vacuum equipment" shall mean vacuuming equipment with a HEPA filter.

Holding area. "Holding area" shall mean a chamber in the equipment decontamination enclosure located between the washroom and an uncontaminated area.

Homogeneous work area. "Homogeneous work area" shall mean a portion of the work area which contains one type of asbestos-containing material and/or where one type of abatement is used.

Industrial hygiene. "Industrial hygiene" shall mean that science and art devoted to the recognition, evaluation and control of those environmental factors or stresses, arising in or from the work place, which may cause sickness, impaired health and well being, or significant discomfort and inefficiency among workers or among the citizens of the community.

Industrial hygienist. "Industrial hygienist" shall mean an individual having a college or university degree or degrees in engineering, chemistry, physics, or medicine or related biological sciences who, by virtue of special studies and training, has acquired competence in industrial hygiene. Such special studies and training must have been sufficient in all of the above cognate sciences to provide the abilities:

(1) To recognize the environmental factors and to understand their effect on people and their well being; and
(2) To evaluate, on the basis of experience and with the aid of quantitive measurement techniques, the magnitude of these stresses in terms of ability to impair people's health and well being; and
(3) To prescribe methods to eliminate, control or reduce such stresses when necessary to alleviate their effects.

Isolation barrier. "Isolation barrier" shall mean the construction of partitions, the placement of solid materials, and the plasticizing of apertures to seal off the work place from surrounding areas and to contain asbestos fibers in the work area.

Large asbestos project. "Large asbestos project" shall mean an asbestos project involving the disturbance (e.g., removal, enclosure, encapsulation) of 260 linear feet or more of friable asbestos-containing material or 160 square feet or more of friable asbestos-containing material.

Log. "Log" shall mean an official record of all activities that occurred during the project and it shall identify~' the building owner, agent, contractor, and workers, and other pertinent information (e.g., equipment malfunctions, contamination beyond the work area, etc.).

Minor project. "Minor project" shall mean a project involving the disturbance (e.g. removal, enclosure, encapsulation, repair) of 25 linear feet or less of friable asbestos containing material or 10 square feet or less of friable asbestos containing material.

Movable object. "Movable object" shall mean a unit of equipment or furniture in the work area which can be removed from the work area.

Negative air pressure equipment. "Negative air pressure equipment" shall mean a portable local exhaust system equipped with HEPA filtration. The system shall be capable of creating a negative pressure differential between the outside and inside of the work area.

NIOSH. "NIOSH" shall mean the National Institute for Occupational Safety and Health.

Occupied Area. "Occupied area" shall mean an area of the worksite where abatement is not taking place and where personnel or occupants normally function or where workers are not required to use personal protective equipment.

OSHA. "OSHA" shall mean the United States Occupational Safety and Health Administration.

Outside air. "Outside air" shall mean the air outside the work place.

Person. "Person" means any individual, partnership, company, corporation, association, firm, organization, governmental agency, administration or department, or any other group of individuals, or any officer or employee thereof.

Personal air monitoring. "Personal air monitoring" shall mean a method used to determine employees' exposure to airborne fibers. The sample is collected outside the respirator in the worker's breathing zone.

Personal protective equipment. "Personal protective equipment" (PPE) shall mean appropriate protective clothing, gloves, eye protection, footwear, head gear.

Phase contrast microscopy. "Phase contrast microscopy" (PCM) shall mean the measurement protocol for the assessment of the fiber content of air. (NIOSH Method 7400). Physician. "Physician" shall mean an individual licensed or otherwise authorized under Article 131 §65.22 of the New York State Education Law.

Plasticize. "Plasticize" shall mean to cover floors and walls with plastic sheeting as herein specified.

Polarized light microscopy. "Polarized light microscopy" (PLM) shall mean the measurement protocol for the assessment of the asbestos content of bulk materials. (Interim Method for the Determination of Asbestiform Materials in Bulk Insulation Samples- 40 CFR Part 763, Subpart F, Appendix A as amended on September 1, 1982)

Professional engineer. "Professional engineer" (PE) shall mean an individual licensed or otherwise authorized by the New York State Department of Education, Division of Professional Licensing Services, to practice engineering and use the title Professional Engineer.

Qualitative fit test. "Qualitative fit test" shall mean the individual test subject's responding (either voluntarily or involuntarily) to a chemical challenge outside the respirator face piece. Three of the most popular methods include:

(1) Irritant smoke test;
(2) Odorous vapor test;
(3) Taste test.

Quantitative fit test. "Quantitative fit test" shall mean exposing the respirator wearer to a test atmosphere containing an easily detectable, nontoxic aerosol, vapor or gas as the test agent. Instrumentation, which samples the test atmosphere and the air inside the face piece of the respirator, is used to measure quantitatively the leakage into the respirator. There are a number of test atmospheres, test agents, and exercises to perform during the tests.

Registered architect. "Registered architect"(RA) shall mean an individual licensed or otherwise authorized by the New York State Department of Education, Division of Professional Licensing Services, to practice architecture and use the title Registered Architect.

Removal. "Removal" shall mean the stripping of any asbestos-containing materials from surfaces or components of a facility or taking out structural components in accordance with 40 CFR 61 Subparts A and M.

Renovation. "Renovation" shall mean an addition or alteration or change or modification of a building or the service equipment thereof, that is not classified as an ordinary repair as defined in §27-125 of the Administrative Code of the City of New York.

Repair. "Repair" shall mean corrective action using specified work practices e.g. glovebag, plastic tent procedures, etc. to minimize the likelihood of fiber release from minimally damaged areas of ACM.
Replacement material. "Replacement material" shall mean any material used to replace ACM that contains less than .01 percent asbestos.

Shift. "Shift" shall mean a worker's, or simultaneous group of workers', complete daily term of work.

Shower room. "Shower room" shall mean a room between the clean room and the equipment room in the worker decontamination enclosure with hot and cold running water controllable at the tap and arranged for complete showering during decontamination.

Small asbestos project. "Small asbestos project" shall mean an asbestos project involving the disturbance (e.g., removal, enclosure, encapsulation) of more than 25 and less than 260 linear feet of friable asbestos-containing material or more than 10 and less than 160 square feet of friable asbestos-containing material.

Staging area. "Staging area" shall mean the work area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.

Strip. "Strip" shall mean to remove friable asbestos materials from any part of the facility.

Structural member. "Structural member" shall mean any load-supporting member of a facility, such as beams and load-supporting walls, or any nonload-supporting member, such as ceiling and nonload-supporting walls.

Surface barriers. "Surface barriers" shall mean the plasticizing of walls, floors, and fixed objects within the work area to prevent contamination from subsequent work.

Surfactant. "Surfactant" shall mean a chemical wetting agent added to water to improve penetration.

Transmission Electron Microscopy (TEM). "Transmission electron microscopy (TEM)" shall mean the measurement protocol for the assessment of the asbestos fiber content of air. (Interm Transmission Electron Microscopy Analytical Methods-40 CFR Part 763, Subpart E, Appendix A).

Visible Emissions. "Visible emissions" shall mean any emissions containing particulate material that are visually detectable without the aid of instruments.

Washroom. "Washroom" shall mean a room between the work area and the holding area in the equipment decontamination enclosure system where equipment and waste containers are wet cleaned and/or HEPA vacuumed prior to disposal.

Waste Decontamination Enclosure System. "Waste decontamination enclosure system" shall mean the decontamination enclosure system designated for the controlled transfer of materials and equipment, consisting of a washroom and a holding area.

Wet cleaning. "Wet cleaning" shall mean the removal of asbestos fibers from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water.

Wet methods. "Wet methods" shall mean the use of amended water or removal encapsulants to minimize the generation of fibers during ACM disturbance.

Work area. "Work area" shall mean designated rooms, spaces, or areas of the building or structure where asbestos abatement activities take place. For glovebag procedures, the work area shall also include the areas contiguous to where the procedure takes place.

Worker. "Worker" shall mean asbestos handler and/or asbestos handler supervisor.

Worker decontamination enclosure system. "Worker decontamination enclosure system" shall mean that portion of a decontamination enclosure system designed for controlled passage of workers, and other individuals and authorized visitors, consisting of a clean room, a shower room, and an equipment room separated from each other and from the work area by airlocks and curtained doorways.

Work place. "Work place" shall mean the work area and the decontamination enclosure system(s).

Work site. "Work site" shall mean premises where asbestos abatement activity is taking place, and may be composed of one or more work areas.

3.0 NOTIFICATIONS, PERMITS, LICENSES AND CERTIFICATES

1. Incinia Contracting Inc. will notify the following agencies in writing 10 days prior to the start of an asbestos removal project. The written notice will include the following: a copy of the completed application for a construction permit for asbestos abatement, a copy of the permit if the administrative authority is a municipal enforcing agency and not the department (N.J.A.C. 5:23-8.6 g).

   a. USEPA _ Air Compliance Branch
   290 Broadway
   New York, New York 10007-1866
   (212) 637-4042

   b. New Jersey Department of Community Affairs
   Asbestos Contractor/Worker Program
   PO Box 816
   Trenton, NJ 08625-0816
   (609) 984-5508
   (609) 633-2158

   c. New Jersey Department of Labor
   Office of Asbestos Control and Licensing
   28 Yard Avenue, Station Plaza 4
   Trenton, New Jersey 08625-0360

   d. New Jersey Department of Health
   Asbestos Control Service.
   CN 360
   Trenton, New Jersey 08625-0360

2. This notification will include the following information:
   a. Name and address of Contractor.
   b. Address and description of the building, including size, age, and prior use of the building or area, the amount of friable asbestos material present (square feet). Designated room numbers or other location information unless entire building is involved.
   c. Scheduled starting and completion dates for removal.
   d. Procedures and equipment (including ventilation systems) that will be employed to comply with the C.F.R., Title 40, Part 61 of the United States Environmental Protection Agency.
   e. The name and address of the carting company and of the waste disposal site where the asbestos waste will be deposited.
   f. The name and address of the testing laboratory who will perform the required analysis, the name and address of the air monitoring firm and the Industrial Hygiene Technician working on behalf of the Owner, and the name and address of the testing laboratory who will perform OSHA compliance air monitoring on behalf of the asbestos abatement contractor.
   g. The asbestos abatement contractor will pay any applicable Notification / permit fees

3. The asbestos abatement contractor will notify the following agency in writing ten (10) days prior to the removal and the disposal of asbestos waste from the job site. All asbestos waste materials destined for disposal will be in accordance with 40 C.F.R. 61.20 -25 before it can be legally transported and disposed of.

   a. New Jersey Department of Environmental Protection
      Division of Hazardous Waste Management
      Twin River Professional Building
      East Windsor, New Jersey 08520

4. The notification will include the following-
   a. Name, address, and telephone number of the removal location.
   b. Quantity in cubic yards and nature of the waste to be disposed (I.D. #27 for Asbestos).
   c. Name, address, and New Jersey Department of Environmental Protection registration number of the collector-handler.
   d. Name and address of the landfill at which disposal will occur.
   e. Date and time of disposal.
   f. A copy of any written notification required by 40 C.F.R. 61.22 to 61.25.
   g. The asbestos abatement contractor will pay any applicable Notification / permit fees

5. Permits, licenses and certificates which will be required include, but are not limited to:

Supervisor	EPA AHERA Asbestos Supervisor License
	EPA AHERA Asbestos Handler License
	New Jersey Department of Labor
Worker	EPA AHERA Asbestos Handler License
	New Jersey Department of Labor

   All workers will have the appropriate federal and state, licenses and certificates (EPA& NJ).

   All removal and decontamination work will bee performed in accordance with federal and state guidelines (EPA& NJ).

4.0 PRE-ABATEMENT STATE REQUIREMENTS

1. It is unlawful to undertake a large asbestos hazard abatement job unless The asbestos abatement contractor first files an application in writing with the Administrative Authority having jurisdiction and obtains the required permit. This permit will serve as notice for public record in the office of the administrative authority having jurisdiction. All work will be monitored and controlled by the Industrial Hygiene Technician, who will advise the administrative authority having jurisdiction of its findings (N.J.A.C. 5:28-8.6a).

2. The application for a construction permit for asbestos abatement projects will include the following [N.J.A.C. 5:23-81.
   a. The name, address and license number of the asbestos Contractor pursuant to N.J.A. C. 12:120 Asbestos Licenses and Permits under the jurisdiction of the New Jersey Department of Labor.
   b. The asbestos hazard assessment prepared by the New Jersey Department of Health, County or local Health Department, or a private business entity, authorized by the New Jersey Department of Health unless the requirement for an assessment has been waived by any of the above.
   c. The name and address of the private air monitoring firm hired by the Building Owner, who will act as the Asbestos Safety Control Monitor. They will be authorized by the New Jersey Department of Community Affairs and will be responsible for the continuous monitoring during the asbestos abatement project.
   d. The name and address of the analytical testing laboratory approved by the New Jersey Department of Health.
   e. The name and address of the New Jersey Department of Environmental Protection registered waste hauler, including the New Jersey Department of Environmental Protection Number and the New Jersey Department of Environmental Protection registered landfill, where the asbestos waste will be deposited.

5.0 PROTECTIVE CLOTHING AND EQUIPMENT FOR ASBESTOS REMOVAL

1. Listed below are materials, equipment, and tools generally used in asbestos removal operations. It is not inferred, however, that all materials listed are necessarily required in every asbestos removal project and, in some instances, materials required to complete the work may not be listed.
   a. Protective clothing.
      1) Will consist of full body coveralls, headcovers, boots and gloves as required by the most stringent OSHA standards applicable to the work. These items will be disposable.
      2) In addition, Eye protection and hard hats will be available. These items will be decontaminated and reused.
   b. Plastic Film: At a minimum; Provide fire retardant, clear six (6) mil. thickness polyethylene sheeting. The plastic sheeting will be taped securely in place or stapled or fastened by spray-on adhesives, glue beads, horizontal wood battens, or the equivalent.
      1) Walls - two (2) layer of six (6) mil. polyethylene.
      2) Floors - two (2) layers of six (6) mil. polyethylene.
   c. Adhesives: Tape will be high quality tape (Asbestos tape, duct tape, or approved equal) in 2" or 3" widths with an adhesive formulated to aggressively stick.
   d. Support Structures constructed of Polyvinyl Chloride Pipes (P.V.C.) and/or aluminum or wood studs.

e. Disposal bags will be six (6) mil. polyethylene bags of a sufficient size for the application. The bags will be printed with letters of sufficient size and contrast to be readily visible and legible. The label will state as a minimum:

Contains Asbestos Fibers
Avoid Creating Dust
Cancer and Lung Disease Hazard

f. In addition, the Disposal bags will be labeled with the generators name and address, in accordance with NESHAP requirements. See Section 16.

2. Signs:
   a. Provide Danger signs (14" x 20") red background, lettered in black. It will be displayed at all routes of access and all visual and physical barriers as follows as a minimum:

Danger
Asbestos
Cancer and Lung Disease Hazard
Authorized Personnel Only
Respirators and Protective Clothing is Required in this Area

   b. The sign will meet OSHA Standards 29 C.F.R. 1926.1101 as follows;

LEGEND	NOTATION
Danger	1” Sans Serif Gothic or Block
Asbestos	1” Sans Serif Gothic or Block
Cancer and Lung Disease Hazard	3/4” Sans Serif Gothic or Block
Authorized Personnel Only	½” Gothic
Respirators and Protective Clothing is Required in this Area	¼” Gothic

   c. At all areas of direct access to the work area (decontamination unit, etc.) display signs (10” x 14”) yellow background, lettered in black as follows:

LEGEND	NOTATION
No Food, Beverages or Tobacco Permitted	¾” Block
All Persons Will Don Protective Clothing (Coverings) Before Entering the Work Area	¾” Block
All Persons Will Shower immediately after leaving Work Area and Before Entering the Changing Area	¾” Block

3. Amended water or removal encapsulant will be approved for the particular type and concentration of asbestos dealt with in each circumstance by the Project Manager.
   a. Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the material which equals or surpasses the wetting resulting from the use of one (1) ounce of a surfactant consisting of fifty percent (50%)

polyoxyethylene ester and fifty percent (50%) polyoxyethylene ether mixed with five (5) gallons of water.

b. Removal Encapsulant: Provide a penetrating- type encapsulant designed specifically for removal of asbestos-containing material. Use a material which results in wetting of the asbestos-containing material and retardation of fiber release during disturbance of the material equal to or greater than that provided by amended water as described above.
   1) Encapsulant: Tinted which meets all fire and building codes

4. Filters of sufficient quantity and type (HEPA, etc.) for use in respirators and other air filtering equipment .
   a. Respirator protection will be in accordance with OSHA Regulation 29 CFR 1926.1101, 29 CFR 1910.134, and ANSI Z88.2-1980. There will be NO EXCEPTIONS to these requirements.
   b. For Air Personnel Filtering Equipment see Incinia Contracting Inc. to corroborate Safety & Health Plan.
   c. For HFPA Vacuum and Negative Pressure Air filtering equipment see Incinia Contracting Inc. equipment list.
   d. Shower Head and Controls:
      1) Provide one showerhead per every 6 workers.
      2) Provide a factory made showerhead producing a spray of water, which can be adjusted for spray size and intensity.
      3) Feed shower with water mixed from hot and cold supply lines. Arrange so that control of water temperature, flow rate and shut off is from inside shower without outside aid.
   e. Filters: Provide cascaded filter units on drain lines from showers or any other water source carrying asbestos-contaminated elements as indicated below. Connect so that discharged water passes primary filter and output of primary filter passes through secondary filter.
      1) Primary Filter - Pass particles 20 microns and smaller.
      2) Secondary Filter - Pass particles 5 microns and smaller.
   f. Shower Stall: For Wash Down Station provide leak tight shower enclosure with integrated drain pan fabricated from fiberglass or other durable waterproof material, approximately 3' x 3' square with minimum 6' high sides and back. Structurally support as necessary for stability. Equip with hose bib, as specified in this section, mounted at approximately 4' - 0" above drain pan. Connect drain to a reservoir, pump water from reservoir through filters to a drain or store and use for amended water. Mount filters inside shower stall on back wall beneath hose bib.
   g. Sump Pump: Provide totally submersible, waterproof sump pump with integral float switch. Provide unit sized to pump 2 times the flow capacity of all showers or hoses supplying water to the sump, through the filters specified herein when they are loaded to the extent that replacement is required. Provide unit capable of pumping debris, sand, plaster or other materials washed off during decontamination procedures without damage to mechanism of pump. Adjust float switch so that a minimum of 3" remains between top of liquid and top of sump pan.
   h. Lumber: Provide kiln-dried lumber of any grade or species.
   i. Scaffold: Provide all scaffolding and/or staging as necessary to accomplish the work of this contract
   j. Hand Tools: Hand tools of sufficient quantity to implement the work at hand and the work schedule submitted including ancillary materials (e.g. staples, nails, wire, etc.).
      1) Spray Equipment: Spray equipment capable of mixing wetting agent with water and capable of generating sufficient pressure, volume, and having ample hose length to reach all areas of asbestos.

5. Incinia Contracting, Inc. will have available sufficient inventory of these materials and equipment to accomplish the job, protect the workers, and protect all authorized visitors to each facility. Only visitors with current EPA/NJ asbestos licenses will be authorized.
6. In procuring all items in this work, it is the asbestos abatement contractor responsibility to verify the detailed requirements of this guideline and all codes, standards, and regulations to verify that the items procured for use in this work meet or exceed the specified requirements.
7. The Owner reserves the right to reject items incorporated into the work that fail to meet the requirements of this guideline or any applicable codes, standard or regulation.
8. The mention of any produce or manufacturer's name or equipment name does not imply endorsement by the Owner/ Owner's Representative or Project Manager.
9. "Approved equal" or "equal" will mean as approved by the Owner/Owner's Representative or Project Manager only. They will be the sole judge as to whether or not a substitute item is equal, and any item specified will be submitted for approval.

6.0 RESPIRATORY PROTECTION

1. Powered Air-Purifying Respirators

   a. Powered air-purifying, positive pressure, full or half-face respirators will be worn during all phases of the project. At the discretion of the Certified Industrial Hygienist (CIH), full or half-face, negative pressure respirators may be worn during preparation and final cleaning. If air monitoring results show that fiber counts meet or exceed an action level defined as half (1/2) the respirator use limit concentration (20 f/cc), then Type "C" respirators will be used.

   b. Supply a sufficient quantity of high efficiency respirator filters approved for asbestos so that workers can change filters at any time that flow through the face piece decreases to the level at which the manufacturer recommends filter replacement. Require that HEPA elements in filter cartridges be protected from wetting during showering. Require entire exterior housing of respirator including blower unit, filter cartridges, hoses, battery pack, facemask, belt, and cord to be washed each time a worker leaves the work area. Caution should be used to avoid shorting battery pack during washing. Provide an extra battery pack for each respirator so that one can be charging while one is in use.

   c. Respirator Bodies: Provide half-face or full-face type respirators. Equip full-face respirators with a nose cup or other anti-fogging device as would be appropriate for use in air temperatures less than 32 degrees Fahrenheit.

2. Filter Cartridges.

   Provide, at a minimum,

   - HEPA type filters labeled with NIOSH Certification for
     - "Radionuclides, Radon Daughters, Dust, Fumes, Mists including Asbestos-Containing Dusts and Mists"
   - Color coded in accordance with ANSI Z228.2 (1980).
   - In addition, a chemical cartridge section may be added, if required, for solvents, etc., in use. In this case, provide cartridges that have each section of the combination canister labeled with the

appropriate color code and NIOSH Certification.

7.0 CONSTRUCTION AIDS

1. General
   a. Provide all scaffolding, ladders, or staging equipment, etc. as necessary to accomplish the work of this contract '. Scaffolding may be of suspension type; or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding will comply with all applicable OSHA provisions.
   b. During the erection and/or moving of scaffolding, care will be exercised so that the polyethylene floor covering is not damaged.
   c. The rungs of all metal ladders, etc., will be equipped with an abrasive nonslip surface.
   d. All surfaces subject to foot traffic will have a nonskid surface. Surfaces will be cleaned as required to remove slippery materials.
   e. At the completion of the removal work, all construction aids will be cleaned within the work area and wrapped in one (2) layer of six (6) mil. polyethylene sheet and sealed before removal from the work area.

8.0 ELECTRICAL COMPONENTS

1. Electrical components will be approved by the National Electrical Manufacturers Association (N.E.M.A.) and Underwriter's Laboratories (UL).
2. Each unit will be equipped with overload protection, sized specially for the equipment. The motor, fan, fan housing, and cabinet will be grounded.
3. Abatement Contractor to hook up separate GFI Electrical Panel which shall serve as sole source for electrical requirements for this project.

9.0 PROTECTION OF WORKERS AND SITE VISITORS

1. Respirators, disposable coveralls, head covers and footwear covers will be provided by the asbestos abatement contractor for the Owner/Owner's Representative, Project Manager and other authorized representatives who may inspect the job site. Provide two (2) respirators and six (6) complete coveralls and, where applicable, six (6) respirator, filter changes per day. Sufficient HEPA cartridges for both half-face air-purifying and powered air-purifying respirators will be provided for the workers to change during the work shift. No HEPA cartridges will be used longer than three (3) work shifts (work shifts denote eight (8) hours). The respirators will be worn at all times when in the contaminated area. THERE WILL BE NO EXCEPTIONS.

2. In accordance with NIOSH, OSHA, and ANSI regulations, the asbestos abatement contractor will have a formal respirator-use program that will, at a minimum, consist of the following:
   a. Establish written standard operating procedures governing the selection and use of respirators.
   b. Select respirators on the basis of the hazards to which the worker is exposed.
   c. Instruct and train the user in the proper use of respirators and their limitations. Where practical, assign respirators to individual workers for their individual use. These will be specifically fit tested.
   d. Regularly clean and disinfect respirators.
   e. Store respirators and filters in a convenient, clean and sanitary location.
   f. Maintain and inspect respirators.
   g. Maintain appropriate surveillance (monitoring) of work area and degree of employee exposure

of stress.

h. There will be a regular inspection and evaluation procedure to determine the continued effectiveness of the program.
i. Do not assign workers to tasks requiring use of respirators unless it has been determined they are physically able to perform the work and use the equipment.

3. The asbestos abatement contractor will guarantee that all employees have participated and are currently participating in this respirator use program.
4. The asbestos abatement contractor will provide full body protective clothing (See Section 9.0) to workers and visitors, which will be worn at all times when in the contaminated area.
5. Protective clothing will be disposed of when leaving the contaminated area and a new set used upon return.

10.0 EMERGENCY PRECAUTION

1. The asbestos abatement contractor will provide barricades and adequate protection to safely prevent passage of persons to the area of removal. Must prevent accidental entrance to the abatement area by any building occupants.
2. Before the asbestos abatement contractor starts actual abatement of asbestos material, the local fire department and ambulance crews will be notified as to the dangers of entering the work area. The asbestos abatement contractor will make every effort to help these agencies and form plans of action should their personnel need to enter the contaminated area.
3. Local medical emergency personnel, both ambulance crews and hospital emergency room staff, will be notified as to the possibility of having to handle injured work persons who are contaminated with asbestos dust. They will be advised on safe decontamination procedures.
4. First aid will comply with the governing regulations and all recognized recommendations within the industry.
5. General: Except as otherwise indicated, submit special reports directly to Owner within one (1) day of occurrence requiring special report, with copy to Owner's Representative, Project Manager and others affected by occurrence.
   a. Reporting unusual Events: When an event of unusual and significant nature occurs at site (examples: failure of negative pressure system, rupture of temporary enclosures), prepare and submit a special report listing chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise the Owner in advance at earliest possible date.
   b. Reporting Accidents: Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document data and action; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

11.0 ASBESTOS HANDLER DECONTAMINATION ENCLOSURE SYSTEM

The following procedures shall be followed during the conduct of removal/abatement activities under Full Containment.

1. Asbestos Handler Decontamination Enclosure Systems shall be located inside the Containment Area. The systems will be double boxed with plywood and framing. The systems will then be plasticized on the inside and the outside.

2. The Asbestos Handler Decontamination Enclosure System shall consist of a Clean Room, a Shower Room, and a Contaminated Equipment Room, in series, respectively, and separated from each other by airlocks and from the Work Area and non-work place by airlocks.

3. Asbestos Handler Decontamination Enclosure Systems shall be fully lined utilizing two layers of 6-mil opaque plastic sheeting at a minimum, or the equivalent. Decontamination Unit floors shall additionally be plasticized with one-(1) layers of nylon-reinforced, polyethylene sheeting.

4. The Clean Room shall contain;
   a. Secure Asbestos Handler lockers or shelves, and clean sealable plastic bags for storage of street clothes; and
   b. Shelves or appropriate facilities for storage of respirators; and
   c. Clean disposable clothing, replacement filters for respirators, towels and other necessary personal protection equipment.
   d. It shall not be used for storage of tools, equipment or materials other than personal protection equipment, nor used as office space.
   e. It shall be equipped with a lockable door to secure the work place during off-shift hours.

5. The Shower Room shall be constructed of black polyethylene or equivalent and shall be constructed to ensure against water leakage. A minimum of one shower per 6 Asbestos Handlers, calculated on the basis of the largest shift, shall be provided. Showerheads shall supply hot and cold water, adjustable at the shower. Liquid bath soap, shampoo and clean, dry towels in sufficient quantity for each Asbestos Handler for each showering.

6. Shower water shall be drained, collected and filtered through a system with at least 2-stage 5.0-micron particle size collection capability. A system containing a series of several filters, with progressively smaller pore sizes, shall be used to avoid rapid clogging of the filtration system by contained particles. Filtered wastewater shall be discharged either to a sewer or drummed and then properly disposed. Used filters shall be disposed of as ACM.

7. The Contaminated Equipment Room shall be used for storage of equipment and tools used on the job in the Work Area. It may contain a limited supply of replacement filters (in sealed containers until used) for HEPA vacuums and pressure ventilation equipment, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement activity. Labeled (as previously specified) 6-mil plastic bags for collection of disposable clothing shall be stocked in this room, along with contaminated footwear (e.g., rubber boots and other reusable footwear) and contaminated clothing for reuse for the duration of the abatement activity or until disposed.

8. A walk off pan located in the work area and immediately adjacent to the decontamination unit shall be employed.

9. When the Decontamination Enclosure System is constructed outdoors, it shall be fully framed and plywood sheathed, or equivalent, to prevent unauthorized entry. It shall be waterproof and windproof.

12.0 WORK AREA PREPARATION

1. The work area is the location where asbestos abatement work occurs. This is an abatement of approximately 50 l/ft of ACM pipe insulation which will be abated in accordance with Federal and New Jersey State abatement regulations.

2. Should the area beyond the work area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, clean those areas. Contractor shall perform all such required cleaning or decontamination at no additional cost to the Owner.

3. Place all tools, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to erection of the plastic sheeting and temporary enclosure.

4. Employees of the asbestos abatement contractor permitted pursuant to N.J.A.C. 8:60 and N.J.A.C. 12:120 or persons employed by the owner, who have successfully completed maintenance / custodial / worker training course approved by the New Jersey Department of Health, unless the room and objects within it are shown to be uncontaminated by asbestos in which case other employees of the building owner or Contractor may be used, will clean with wet cloths and / or with HEPA vacuums as appropriate. All items that can be removed from the work area without disrupting the asbestos material. This will include furniture, equipment, drapes, and curtains. The cloths used for cleaning will be disposed of as asbestos contaminated waste.

5. Clean and remove all uncontaminated removable merchandise, equipment, and/or supplies from the work area before commencing work or completely cover with two (2) layers of polyethylene sheeting at least six (6) mil. in thickness securely adhered to in place with tape. Such merchandise and equipment will be considered outside the work area unless the covering plastic or the seal is breached.

6. Provide warning signs at each visual and physical barrier (see Section 9.0).

7. Alternate methods of containing the work area may be submitted to the Contracting Officer or his representative for approval. Do not proceed with any such method(s) without prior written approval of the Owner's Representative and Project Managers.

8. Primary Seal/Critical Barriers

    a. Individually seal all ventilation openings (supply and exhaust), lighting fixtures, doorways, windows, skylights, convectors and floor drains, and other openings into the work area with polyethylene sheeting at least six (6) mil. in thickness taped securely in place. Maintain the seal until all work, including project decontamination, is completed. Take care in sealing off lighting fixtures to avoid melting or burning of sheeting.

b. Mechanically support sheet plastic independently of tape or spray cement seals so that seals do not support the weight of the plastic. Following are acceptable methods of supporting sheet plastic barriers. Alternative support methods may be used if approved in writing by the Contracting Officer or his representative.

1. Plywood squares 6" x 6" x 3/8" held in place with one 6d smooth masonry nail or electra galvanized common nail driven through the center of the plywood and tape on plastic so that plywood clamps plastic to the wall. Locate plywood squares at each end comer at maximum four (4) feet on centers.

2. Nylon or polypropylene rope minimum one-quarter (1/4) inch in diameter suspended between supports securely fastened on either side of opening at maximum one (1) foot below the ceiling. Tighten rope so that it has two (2) inches maximum dip. Drape plastic over rope from outside work area so that a two (2) foot flap of plastic extends over rope into work area. Staple or wire plastic to itself one (1) inch below rope at maximum six (6) inches on centers to form a sheath over rope. Lift flap and seal to ceiling with duct tape or spray cement. Seal loop at bottom of flap with duct tape. Erect entire assembly so that it hangs vertically without "shelf' upon which debris could collect.

9. Remove or properly seal with two (2) layers of six (6) mil. fire-rated polyethylene all electrical and mechanical items such as lighting fixtures, clocks, diffusers, registers, electric panels, escutcheon plates, etc. which cover any part of the surface to be worked on with the work.

   At any point should the enclosure barrier be breached in any manner that could allow the passage of asbestos debris or airborne fibers, then the affected area will be added to the work area and be subjected to enclosure as required by this Section of the specification and decontamination as described in Section 11.0.

13.0 WET REMOVAL OF ASBESTOS-CONTAING AND ASBESTOS-CONTAMINATED MATERIALS

1. This section outlines the procedures, which are to be used in the wet removal of all asbestos containing and asbestos-contaminated materials as indicated on the Contract Drawings.
2. Any changes to this procedure will be in writing from the Environmental Project Manager.
3. The asbestos abatement contractor will certify that all asbestos containing and asbestos-contaminated materials have been removed from the work area.
4. Prior to and during actual abatement work, mist with amended water all asbestos containing and asbestos-contaminated materials. This will aid in minimizing fiber release during work activities.
5. The asbestos-containing and asbestos-contaminated materials will be sufficiently saturated to prevent emission of airborne fibers. The amended water or removal encapsulant will be sprayed for as long and as often (before, during, and after removal) as necessary in order to ensure that the asbestos material is adequately wetted throughout.
6. A fine, low-pressure spray of amended water or removal encapsulant will be applied to prevent fiber disturbances preceding removal. The use of high revolutions per minute (R.P.M.) power equipment, pressure washers, or hydro-blasters is not acceptable. The additive will be the manufacturers.

7. Asbestos-containing material will be manually removed by scraping or cutting the saturated material from the base material. (Caution will be taken not to damage the base material.)
   - Removal of the asbestos material will be done in small sections by two-person (2) teams, on staging platforms if needed.
   - The wet material from each section will be packed and sealed into labeled six (6) mil. plastic bags.
   - When possible, one (1) worker will remove and hand sections of asbestos material to the other worker who will then place the material into labeled six (6) mil. plastic bags.

8. In all cases, the asbestos-containing materials will be handled carefully and deliberately. No asbestos is permitted to drop directly to the floor. Any unnecessary agitation of the material is strictly prohibited.
   a. Asbestos-containing and asbestos-contaminated materials will not be dropped or thrown from a height of fifteen (15) feet or greater.
   b. This includes inclined chutes and/or dropped onto scaffolding, or containerized at that height for eventual disposal. Asbestos-containing materials will not be dropped or thrown from fifteen (15) feet or greater.

9. Operations will be continuous so that once an area is started it will be worked on to the first wet wipe. The wet material from each section will be packed and sealed into labeled six (6) mil. plastic bags and double bagged with visible labels prior to starting the next section. Water-soaked fallen material will be picked up while wet to prevent water loss due to evaporation.
   a. Maintain good housekeeping so as not to accumulate loose asbestos.
   b. Reach the clean wipe state as quickly as possible.
   c. Remove the residues as quickly as possible so as not to walk or track through it, thus grinding it to smaller, more potentially dangerous sizes.
   d. Trap the asbestos in six (6) mil. plastic bags as quickly as possible so as not to allow asbestos to dry out and become airborne. Bags will be handed or chuted down carefully from one worker to another.
   e. Contaminated material containing sharp edged items will be cut to size while adequately wet, placed in small cardboard boxes and double bagged, or singly bagged and then placed in temporary fiber drums. 40 C.F.R. 0) prescribes a leak-tight container, the integrity of which is the asbestos abatement contractor responsibility (N.J.A.C. 5:23-8.10f'5).
   f. Bags and drums will be marked with the label prescribed by Section 61.22(c) of the E.P.A. regulations. The outside of all containers will be wet cleaned or HEPA vacuumed before leaving the work area.
   g. If at any time the airborne fiber level outside the isolated work area or the clean room of the decontamination unit rises above 0.01 f/cc (action level), the work will stop immediately and air cleaning equipment and clean up procedures will be used to reduce fiber level to less than 0.01 f/cc.
   h. If at any time the airborne fiber level inside the isolated work area exceeds 0.2 f/cc (action level), the work will stop immediately and air cleaning, wetting, and surface cleaning procedures will be necessary.

14.0 CLEANUP PROCEDURES

1. A New Jersey Asbestos Safety Control Monitor will perform a visual inspection of the work area to ensure that it is dust free.
2. After approval by the New Jersey Asbestos Safety Control Monitor, the asbestos abatement contractor will spray coat all dried exposed surfaces with a sealant. The surfaces to be coated will include the polyethylene which has been used to cover walls, floors and non-removable fixtures and equipment.
3. After the encapsulation of the polyethylene, it will be carefully removed and rolled up with the contaminated portion.
4. All equipment, machinery, scaffolding, tools, etc., within the work area will be cleaned with amended water, moved to the equipment room and properly removed from the work area.
5. Final Cleaning
   a. Wet clean, with amended water, all floors, windows, etc.
   b. Allow for all surfaces to dry and repeat the procedures.
   c. Used cloths and sponges will be disposed of as contaminated.

6. Re-occupancy Sampling
   a. Air Filtration System will not be shut down until the final clearance criteria is met.
   b. After the work area is found to be visually clean by the NJ Asbestos Safety Control Monitor he/she will perform re-occupancy sampling.
   c. If the PCM standard of <0.01f/cc or the TEM standard of (<70 S/MM2) **is not met**,
      1) Repeat final cleaning and continue decontamination procedures from that point.
   d. If the final clearance criteria **is met**, the asbestos abatement contractor will:
      1) Remove the critical barriers separating the work area from the rest of the building,
      2) Clean with amended water all covering and areas where the barrier was attached and
      3) Shut down and remove the Air Filtration System.

15.0 Post-Removal Sampling

1. After the work area is found to be visually clean by the NJ Asbestos Safety Control Monitor, he/she will perform post-removal sampling. This test is required to establish safe conditions for removal of critical barriers and to permit reconstruction activity to begin. Sufficient time following clean-up activities will be allowed so that all surfaces are dry during monitoring. Negative air filtration units will be in use during monitoring.

2. If the PCM standard of <0.01 f/cc or the TEM standard of (<70 structures per square millimeter, Transmission Electron) is not met, repeat final cleaning and continue decontamination procedures from that point.

3. If the final clearance criteria are met, the asbestos abatement contractor will remove the critical barriers separating the work area from the rest of the building. Clean with amended water all areas where the barrier was attached and covering and shut down and remove the air filtration system.

16.0 DISPOSAL OF ASBESTOS-CONTAINING WASTE

1. All wastes generated within the isolated work area, including but not limited to, asbestos, materials, plastic sheeting, tape, cleaning materials, protective clothing, all filers, brushes, pails, brooms and all other disposable material or items used in the work area will be packed, sealed and disposed of according to this section.

2. The asbestos abatement contractor will not allow asbestos materials to dry out or collect on the floors. Removed material will be immediately placed in approved bags and sealed.

3. The material collected in each bag is to be sealed by twisting the open end and then tying an overhand knot in the twisted material (or other approved method, which will form a leak-tight seal). The bag is then placed in another bag, which is also sealed for transport to the disposal site. Broken bags will be rebagged a third time.

4. Disposal of asbestos waste shall be in accordance with 40 CFR Subpart A (Revised 11/20/90).
   a. Only licensed asbestos transporters will be used for the transportation of asbestos waste

5. All Asbestos contaminated materials shall be double bagged in 6 mil bags, which are labeled as follows;
   1) DOT warning label
   2) Name & address of contractor and owner,

6. All bagged asbestos containing materials will be placed in a dumpster. The dumpster will be;
   a. Completely lined with 6 mil ploy, enclosed and locked.
   b. It will be posted with warning labels, meeting OSHA requirements Labels will be conspicuous and legible and will contain the following warning ;

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

   c. It is to be opened only for materials from the removal area. Warning signs will be posted on the dumpster.
   d. When the dumpster container is full, it will be immediately removed from the site.

7. The asbestos abatement contractor will maintain a bag disposal log numbering each bag of waste with an indelible black ink pen. Copies of this log will be submitted to the Owner for final payment.

8. The asbestos abatement contractor will transport all sealed bags to an approved sanitary landfill disposal site. Disposal will be in accordance with the Environmental Protection Agency and New Jersey Department of Environmental Protection.

9. The asbestos abatement contractor will be responsible for obtaining approval of an asbestos waste disposal site in compliance with Section 61.25 of the E.P.A. regulations and all other Federal, State and Local regulations. All transportation will be performed by a registered waste hauler. The asbestos abatement contractor will arrange with the transporter to obtain copies of receipts from the disposal site, indicating that the asbestos waste was disposed. The asbestos abatement contractor in turn, will forward copies of such receipts to the Owner/Owner's Representative.

17.0 QUALITY ASSURANCE AIR MONITORING

1. Air monitoring on this project will be conducted by the Industrial Hygiene Technician to furnish testing and reports of test results. See Attachment C for forms to be used.
2. The Abatement Contractor will fully cooperate with the Industrial Hygiene Technician, and all others responsible for testing and inspecting the worksite.
3. Air monitoring will be conducted prior to the abatement procedures, daily throughout the asbestos abatement project and during the initial phases of clean up by the Industrial Hygiene Technician in order to verify the quality and effectiveness of the job being done.
4. It is the responsibility of the the asbestos abatement contractor personnel to cooperate fully with the efforts of the Industrial Hygiene Technician at all times and ensure the ease of access to and from the work area for the effective completion of the monitoring program.
5. Please be advised that tampering with any equipment involved with these tests or inspections will be considered an attempt at falsifying reports and records to Federal and State agencies, and each offense will be prosecuted under applicable State and Federal laws to the fullest extent possible.
6. The following area samples will be collected during the removal phase:
   a. Area Sampling of Work Area
      For the purpose of determining if fibers are escaping into adjacent areas, the sampling device will be placed inside and outside locations where potential contamination could occur and will be moved periodically to assess the contamination potential of adjacent areas at critical points as determined by the Industrial Hygiene Technician. If fiber levels exceed .0.01 f/cc, the Industrial Hygiene Technician has the authority to stop work and have the problem corrected. A Rotameter, referenced to a Bubble Meter will be used to calibrate equipment in the field.
   b. Post-Removal Sampling.

      The purpose of this test is to establish the final clearance criteria when analyzing by Polarized Contrast Microscopy (PCM). The final clearance criteria will be five PCM samples all having a reading of <0.01 f/cc. If Transmission Electron Microscopy (TEM) is necessary, then the final clearance criteria will be <70 s/mm^2 by the average concentration of asbestos of five (5) air samples collected within the affected functional space. The Transmission Electron Microscopy (TEM) Method in Appendix A of Subpart E of 40 CFR, Part 763 - "Asbestos-Containing Materials in Schools" will be followed.
   c. Filter cassettes and sampling train will be assembled as specified in NIOSH #7400.
   d. The flow rate will be between 5 and 10 liters per minutes the total volume will be a volume sufficient to achieve a detection limit of <0.01 F/cc for PCM and < 70 structures per square millimeter for TEM.
   e. Pumps will be calibrated before and after sampling, using a Rotameter which has been

calibrated to a Bubble Meter. A record will be kept of the Bubble Meter Calibration and the Rotameter readings taken in the field.

f. Blanks. A minimum of two (2) blanks or 10%, whichever is greater, will be taken. Blanks will be divided by the work shift. One (1) or more blanks will be taken with the first round of samples and one (1) or more blanks will be taken with the second round of samples.

18.0 SCOPE OF WORK

1. Abate approximately 75 l/ft of ACM pipe insulation in the Basement.

A. Removal of Asbestos Containing Pipe Insulation

Asbestos Abatement Tent Procedures:

1. A remote decontamination unit will be constructed at least 20 feet from the work area.
2. A six sided tent enclosure with a change room will be erected around the asbestos containing pipe insulation.
3. A negative pressure air filtration device will be installed and operated throughout the removal procedures.
4. Asbestos materials will be thoroughly wetted prior to and during removal.
5. Asbestos waste will be double-bagged, labeled and processed through the remote decontamination facility and properly disposed of.
6. After abatement has been completed all surface within tent enclosure will be HEPA vacuumed and wet cleaned.
7. After the work area has passed a visual inspection, the entire work shall be encapsulated.
8. Tents will be broken down upon approval by the environmental consultant assigned to the project
9. ACM waste will be picked up by a licensed waste hauler. Waste trucks leaving the site will proceed to licensed waste transfer station where the waste will be processed for transport and disposal at the licensed designated landfill.

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on the reverse side prior to initiating this form)*	DATE **December 6, 2016**	TRANSMITTAL NO. **02080-1A**

TO: **Sevenson Environmental Services, Inc.** **1405B North Mill Road** **Vineland, New Jersey 08360**	FROM: **USA Environmental Management, Inc.** **8436 Enterprise Avenue** **Philadelphia, Pennsylvania 19153-3802**	CONTRACT NO. **G2883008**	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☒ THIS IS A RESUBMITTAL OF TRANSMITTAL 02080-1
SPECIFICATION SEC. NO. *(Cover only one section with each transmittal)* **02080**	PROJECT TITLE AND LOCATION **Syncon Resin Superfund Site, 77 Jacobus Avenue, South Kearny, New Jersey 07032**		CHECK ONE: THIS TRANSMITTAL IS FOR ☐ INFO ONLY ☐ APPROVAL

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED *(Type, size, model, number / etc.)* b.	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See instruction no. 8) c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT SPEC. PARA. NO. e.	CONTRACT REFERENCE DOCUMENT DRAWING SHEET NO. f.	FOR CONTRACTOR USE CODE g.	VARIATION *(See instruction No. 6)* h.	FOR ENGINEER USE CODE i.
1	Asbestos Abatement and Disposal Plan *(Revised per comments on orginal submittal 02080-1)*		1	1.3.1				
2	Asbestos Waste Shipment Records *(Revised per comments on orginal submittal 02080-1)*		1	1.3.2				
3	Exposure Assessment and Air Monitoring *(Revised per comments on orginal submittal 02080-1)*		1	1.3.3				
	See notes under original comments attached to this Transmittal.							

REMARKS	**I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the Contract Drawings and specifications except as otherwise stated.** **James E. Harris** NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED *(List by Item No.)*	NAME,TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

For use of this form, see ER 415-1-10; the proponent agency is CECW-CE.

DATE: 11/17/2016

TRANSMITTAL NO.: 02080-66

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor)

TO: Environmental Residency
US Army Corps of Engineers
214 State Highway 18
East Brunswick, NJ 08816

FROM: Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, NY 14305-2229

CONTRACT NO.: W912DQ-15-D-3002 0002

CHECK ONE:
[X] THIS IS A NEW TRANSMITTAL
[ ] THIS IS A RESUBMITTAL OF TRANSMITTAL _____

SPECIFICATION SEC. NO. (Cover only one section with each transmittal)
02080 Asbestos Hazard Control Activities

PROJECT TITLE AND LOCATION 01-Main Register
Syncon Resins Superfund Site OU2 77 Jacobus Ave, Kearny, NJ

THIS TRANSMITTAL IS FOR: (Check one) [ ] FIO [X] GA [ ] DA [ ] CR [ ] DA/CR [ ] DA/GA

ITEM NO. (See Note 3) a.	DESCRIPTION OF SUBMITTAL ITEM (Type size, model number/etc.) b.	SUBMITTAL TYPE CODE (See Note 8) c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT: SPEC. PARA. NO. e.	CONTRACT REFERENCE DOCUMENT: DRAWING SHEET NO. f.	CONTRACTOR REVIEW CODE g.	VARIATION Enter "Y" if requesting a variation (See Note 6) h.	USACE ACTION CODE (Note 9) i.
4	Asbestos Abatement Plan - US Environment	SD-01	0	1.3.1		A		C*

REMARKS

Also included in this Plan:

Asbestos Waste Shipment Records
Asbestos Assessment and Air Monitoring
Asbestos Equipment certificates
Asbestos Licenses, permits and Notifications

*See attached comments.

I certify that the above submitted items have been reviewed in detail and are correct and in the strict conformance with the contract drawings and specifications except as otherwise stated.

NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by item No.)

NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY

Matthew T. Creamer
Contracting Officer's Representative (COR)

DATE: 28 Nov 2016

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE		DATE	TRANSMITTAL NO. 02080-66
PROJECT TITLE	Syncon Resins Superfund Site OU2	CONTRACT NO. W912DQ-15-D-3002 0002	PAGE 1 of 1
LOCATION	77 Jacobus Ave, Kearny, NJ		

Item	*Description*	*Variation*	*QA Code*
4	Asbestos Abatement Plan - US Environment	No	C

SECTION III - GOVERNMENT REVIEW REMARKS

1. General - The plan should clearly state which locations/materials/quantities are to be abated. The plan should reference the TTI Asbestos & LBP Survey dated 10/20/16 which contains these details. The locations of the ACM should be clearly described or shown.

2. General - The plan does not address the ACM/presumed ACM in buildings deemed structurally unsafe. If not described here, those procedures should be included in the Demolition Plan and referenced here (this includes the boiler insulation in Building 6A, which TTI did not have access to but recommended to be sampled prior to demolition).

3. HASP - The Scope of Work listed in the HASP lists all materials in the 2006 materials assessment. Based on the State Notification included, not all of these materials will be abated. This section should be updated with the information from the TTI Survey.

4. Notification - The State Notification lists 120 SF of Roofing Material to be abated from Building 7. This should be "Building 7 Small Room"; Building 7 was deemed structurally unsafe to enter.

5. Waste/Material Handling Plan - It is not clear what the proposed waste disposal facility is. The plan lists both Tullytown Landfill and GROWS Landfill (PA); the State notification form provided lists Minerva Landfill (OH)

6. Section 3.H - Language implies samples may be analyzed in the field as opposed to the proposed laboratory (EMSL Cinnaminson). Please clarify.

7. Section 3/Air Monitoring Statement - Section 3 gives general descriptions of area monitoring, but later states that USAEMI will only perform personal monitoring. The plan should indicate what entity is performing area monitoring.

USA Environmental Management, Inc. (USAEMI)

Responses to US Army Corps of Engineers comments on USAEMI Transmittal 02080-1
USAEMI response to comments noted as Section III – Government Review Remarks to Sevenson Transmittal No. 02080-66

Our revised Transmittal No. is 02080-1A

RESPONSE: USAEMI has made deletions/corrections as noted in 1. Above to our Asbestos Abatement and Disposal Plan. Deletions are noted in ~~**BOLD**~~ and Additions are noted in **BOLD**.

1. General - The plan should clearly state which locations/materials/quantities are to be abated. The plan should reference the TTI Asbestos & LBP Survey dated 10/20/16 which contains these details. The locations of the ACM should be clearly described or shown.

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Abatement and Disposal Plan:

Table of Contents pagination has been adjusted per changes
Page 10

---

2. General - The plan does not address the ACM/presumed ACM in buildings deemed structurally unsafe. If not described here, those procedures should be included in the Demolition Plan and referenced here (this includes the boiler insulation in Building 6A, which TTI did not have access to but recommended to be sampled prior to demolition).

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Abatement and Disposal Plan:

Page 38
Page 46

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3. HASP - The Scope of Work listed in the HASP lists all materials in the 2006 materials assessment. Based on the State Notification included, not all of these materials will be abated. This section should be updated with the information from the TTI Survey.

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Abatement and Disposal Plan:

Table of Contents pagination has been adjusted per changes
Page 108

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4. Notification - The State Notification lists 120 SF of Roofing Material to be abated from Building 7. This should be "Building 7 Small Room"; Building 7 was deemed structurally unsafe to enter.

Item No. 2 on the 1st page of the Notification of Asbestos Abatement should indicate that the 120 SF of roofing material to be removed is found on Building 7A instead of Building 7. A revision of the notification will be made as required.

---

5. Waste/Material Handling Plan - It is not clear what the proposed waste disposal facility is. The plan lists both Tullytown Landfill and GROWS Landfill (PA); the State notification form provided lists Minerva Landfill (OH)

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Abatement and Disposal Plan:

Page 95
Pages 97-98
Page 100

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Waste Shipment Records:

Page 3
Pages 6-7
Page 9

---

6. Section 3.H - Language implies samples may be analyzed in the field as opposed to the proposed laboratory (EMSL Cinnaminson). Please clarify.

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Abatement and Disposal Plan:

Page 18

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Exposure Assessment and Air Monitoring Data:

Page 3

---

7. Section 3/Air Monitoring Statement - Section 3 gives general descriptions of area monitoring, but later states that USAEMI will only perform personal monitoring. The plan should indicate what entity is performing area monitoring.

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Exposure Assessment and Air Monitoring Data:

Page 3

ASBESTOS ABATEMENT and DISPOSAL PLAN

SD-01 Pre-Construction Submittal

GA

CONTRACTOR: **USA ENVIRONMENTAL MANAGEMENT, INC.**
8436 Enterprise Avenue, Philadelphia, PA 19153-3802

_____ Approved

_____ Approved with corrections noted on submittal data and/or attached sheet(s).

SIGNATURE: _____

TITLE: _____

DATE: _____

CERTIFIED INDUSTRIAL HYGIENIST

PLAN REVIEW SIGN OFF

ASBESTOS ABATEMENT and DISPOSAL PLAN

SD-01 Pre-Construction Submittal

GA

CONTRACTOR: **USA ENVIRONMENTAL MANAGEMENT, INC.**
8436 Enterprise Avenue, Philadelphia, PA 19153-3802

I have reviewed the following Asbestos Abatement and Disposal Plan and have found it satisfactory for the scope of work on this project and therefore have indicated approval below.

_____ Approved

Mark Schlager
Certified Industrial Hygienist

SIGNATURE: _____

CIH NUMBER: 5024

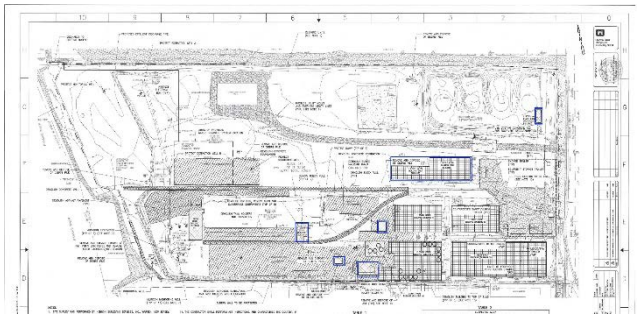
DATE: November 15, 2016

ASBESTOS ABATEMENT and DISPOSAL PLAN

Environmental Management, Inc.
Environmental Engineering Construction
8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Office: 215-365-5810 FAX: 215-365-5870

ASBESTOS ABATEMENT and DISPOSAL PLAN

SYNCON RESINS SUPERFUND SITE



Prepared for:

Sevenson Environmental Services, Inc.

1405B North Mill Road
Vineland, NJ 08360

Since 1985 TTI Environmental, Inc.

1253 North Church Street
Moorestown, NJ 08057-1136

US Army Corps of Engineers

REVISION NO. 1

December 6, 2016

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1. GENERAL INFORMATION

1.A SCOPE OF WORK

This Asbestos Abatement plan specifies the requirements applicable to the removal, handling and disposal of Asbestos-Containing Materials. The project specifications identify the exact locations any quantities of materials to be removed. All work involving the removal and disposal of asbestos-containing materials shall be accomplished in conformance with the general requirements herein and specifications prepared for the Asbestos Abatement at the former Syncon Resins Superfund site – OU2 located at 77 Jacobus Avenue, South Kearny, New Jersey 07032. USA Environmental Management, Inc. (USAEMII) is subcontracted to Sevenson Environmental Services, Inc. to perform the required asbestos abatement site in buildings on this complex. Work is being performed for the US Army Corps of Engineers (USACE). ***TTI Environmental, Inc. (TTI) performed an asbestos and lead-based paint survey of the structures that were accessible on this site. Some properties were structurally unsound and asbestos abatement will have to be addressed during demolition.***

The following asbestos-containing materials have been identified for abatement in the TTI Environmental, Inc. Asbestos and Lead-Based Paint Survey report dated October 28, 2016:

Non Friable Materials Abatement

Location	Asbestos Containing Material	Approximate Quantity
Building 6A, Building 7 (Small Room), Building 7A,	Transite Switch Gears	60 Square Feet
Building 7 (Small Room)	Roofing Material	120 Square Feet
Building 6A	Boiler Gasket	40 Linear Feet
Red Metal Building	Window Glazing	400 Linear Feet

Non Sub 8 Tented Glove Bag Pipe Insulation Abatement

Location	Asbestos Containing Material	Approximate Quantity
Building 7 (Small Room)	Pipe Insulation	15 Linear Feet

1.B DESCRIPTION OF WORK

Asbestos abatement procedures described herein include the handling of asbestos-containing friable and non-friable materials which are encountered prior to or during removal operations; the work consists of furnishing all plant, labor, materials, and equipment and performing all work for the removal of asbestos-containing materials. List materials to be removed are noted in the notification submitted to the regulatory agencies.

1.C REFERENCE STANDARDS

Asbestos Abatement shall be performed in compliance with Federal, State, and Local requirements. This includes, but is not limited to, the following:

A. Occupational Safety and Health Administration (OSHA)

1. 29 CFR 1910, Occupational Safety and Health Standards for General Industry
2. 29 CFR 1926.1101 OSHA Asbestos Standard for Construction
3. 29 CFR 1910-134 OSHA Respiratory Protection Standard

B. Environmental Protection Agency (EPA)

1. NESHAP 40 CFR Part 61 Subparts A, B, and M, Asbestos Standards

C. American Society for Testing and Materials (ASTM)

1. E849-82, Safety & Health Requirements Relating to Occupational Asbestos Exposure

D. American National Standards Institute (ANSI)

1. Publication Z29-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems
2. Publication Z88.2-1980, Practices for Respiratory Protection

E. State of New Jersey Department of Labor and Workforce Development
Title 12 of the Asbestos Control and Licensing Act

F. US Army Corps of Engineers
Safety and Health Requirements Manual – EM 385-1-1
3 November 2003

2. GENERAL PRACTICES

2.A DESCRIPTION

This section covers the furnishing of all labor, materials, facilities, equipment, services, employee training, permits and agreements necessary to perform the work required for asbestos abatement in accordance with these specifications, EPA and OSHA Regulations and any other applicable Federal and State Asbestos Regulations. Whenever there is a conflict or overlap of the above references the most stringent provisions are applicable.

2.B STANDARD OPERATING PROCEDURES

USAEMI shall develop and implement a written standard procedure for abatement work to ensure maximum protection and safeguard from asbestos exposure to workers, visitors, general public, and the environment.

USAEMI shall:

A. Provide evidence of a valid State Asbestos Contractor's License prior to abatement operations.
B. Permit only STATE-Licensed Workers and Supervisors within the asbestos regulated areas. Evidence of valid badges must be available at all times.
C. Maintain on-site a copy of USAEMI's current respiratory protection program including evidence of respirator fit testing which must be performed on a semi-annual basis in accordance with OSHA Regulations 29 CFR 1910.134.
D. Maintain tight security of each job site to avoid unauthorized entry into work area(s). Asbestos warning signs shall be posted in highly visible locations, typically 20 feet from the periphery of the work area(s). Where the area is to be cordoned off, Asbestos Warning Tape will be used. Warning signs shall be in vertical format conforming to 29 CFR 1910 and 29 CFR 1926, and shall be at minimum 20 by 14 inches in size.
E. All individuals entering the work area shall sign in and out on the supervisor's daily entry log and shall be wearing personal protective equipment as described herein.
F. Shutdown HVAC system prior to disturbing any ACM; disconnect electrical services and provide temporary electrical service protected by ground fault circuit interrupter.
G. Provide proper protective clothing and respiratory protection to supervisors, and monitors prior to try into containment
H. Ensure safe work practices including the exclusion of eating, drinking, and smoking within the designated work areas.
I. Ensure proper exit practices from the work space to the outside through the Personnel Decontamination Unit (PDU).
J. Remove asbestos in ways that minimize release of fibers techniques and immediate bagging of ACM is required.

K. Pack, label, load, transport, and dispose of contaminated material (and Equipment) in a way that minimizes potential for fiber release. All equipment will be decontaminated (or bagged) before removal of enclosure.
L. Clearly identify, at the job site, an evacuation plan for medical or safety emergency situations (e.g. fire, smoke, heat exhaustion).
M. Provide a safe work environment safe from accidents, especially from electrical shocks, slippery surfaces, proper identification and enclosure of holes, ladders and scaffolding, and entanglements in loose hoses and equipment.
N. Administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated without delay for Personal decontamination.
O. When an injury occurs, USAEMI shall stop work and implement fiber reduction techniques (e.g., amended water spraying) until the injured person has been removed from the work area.
P. Assume responsibility for the proper disposal of all building materials incident to abatement, unless otherwise specified by the Contracting Officer.
Q. Perform abatement without damage or contamination of adjacent work areas, supplies or equipment. Where damage or contamination occurs, restore or replace to the original condition.
R. Ensure that workers use non-metallic tools for scraping while working near energized lighting or other electrical equipment
S. Be responsible for identifying all areas where energized equipment or circuits are located. These areas shall be demarcated with signs measuring no smaller than 81/2 X 11 inches. Signs shall be placed within every 100-feet section of removal area with energized lighting or circuits.
T. Not use power tools to remove ACM unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation capture and collection system or otherwise be approved by the Contracting Officer.
U. Have employees wearing electrically insulated boots and gloves while working near energized lighting or other equipment in the removal area to prevent electrical shock. All other protective foot covering shall be disposed of as ACM.
V. Mark all electrical outlet boxes located in the removal zone with an identifying number and the location of the circuit breaker protecting that circuit. Extension cords and temporary power lines shall be marked every 15 feet.
W. Have all energized electrical outlets, panels, or equipment in the removal zone tightly wrapped and taped in such a manner that water spray will not contact them.
X. Have transformers or other electrical boxes which may release heat wrapped in a manner so that proper cooling is provided.

2.C PRE-CONSTRUCTION INSPECTION

A. Prior to area preparation activities, an inspection of work areas shall be made in accordance with the prime contractor's approved Contractor Quality Control Plan. Existing site condition shall be documented and agreed upon by the Contracting Officer and USAEMI.

B. Upon completion of abatement activities, any damages to finishes, floors, walls or any other items or fixture that has been the result or actions by USAEMI or their subcontractors shall be repaired to their original condition without any additional cost, except for damages to materials, which will be demolished as part of building activities. A comparison of the pre-construction inspection report shall be the basis for the assessment of damages to be addressed

2.D PRE-CONSTRUCTION SAFETY MEETING

A. The Contractors designated Competent Person/Supervisor shall meet with the Contracting Officer prior to beginning work for a safety pre-construction conference to discuss the details of the specific site.

B. The Site-Specific Accident Prevention Plan shall include work procedures and safety precautions. Once accepted by the Contracting Officer, the submitted plans will be enforced along with the specifications.

3. WORK PRACTICES

3.A LICENSING/CERTIFICATIONS

A. Asbestos abatement operations will be performed only by those workers and industrial hygienists who have been identified in USAEMI's Submittals. Moreover, they shall have a valid State Department of Labor Asbestos License pertinent to their function on the job site.

B. Asbestos abatement contractors specified shall only use asbestos workers/supervisors which an EPA-AHERA trained and certified within the previous 12 months, or at least annually after their original training.

C. Within one year prior to assignment to asbestos work, each employee shall be instructed as to the hazards of asbestos, necessary safety and health precaution, the use and requirements for protective clothing, equipment and respirators, engineering and all hazard control techniques and procedures, the correlation between cigarette smoking and asbestos related diseases and all additional requirements set forth by 29 CFR 1926.1101.

D. USAEMI has a training program for all employees determined to have been exposure to asbestos airborne concentrations in excess of the action level (0.1 f/cc). USAEMI requires their participation in the program.

E. USAEMI workers shall be trained for an 8-hour period by an IH or Competent Person, regarding safety precautions and work procedures specific to the job.

3.B PERMITS/NOTIFICATIONS

A. USAEMI shall secure necessary permits in conjunction with asbestos removal, hauling, storing, transporting, and disposal and provide timely notification of such actions as may be required by Federal, State, regional and local authorities.

3.C INTERFACING WITH TRADES

A. In conformance with OSHA 1926.1101, USAEMI shall inform other employers (i.e. trades) on the site of the nature of USAEMI's work with asbestos and of the existence and requirements pertaining to regulated areas.

B. Entrance to regulated area shall be cordoned off approximately 20 feet around the perimeter and asbestos warning signs posted. Access shall be restricted to properly trained, licensed, and protected personnel.

C. Should any aspect of the work be in violation of the asbestos plan requirement or fiber level in outside trade locations exceed 0.01 f/cc, work shall cease and corrective course actions employed until fiber levels are below 0.01 f/cc. The Contracting Officer will issue a stop work order under these circumstances which will take effect immediately.

3.D RECORD KEEPING

3.d.1 Medical Records

A. Before exposure to airborne asbestos fibers, workers shall have a comprehensive medical examination as required by 29 CFR 1926.1101 and other pertinent state and local directives. This requirement must have been satisfied within the past six months. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving asbestos and within 30 calendar days before or after termination of employment in such occupation.

B. USAEMI shall an accurate record of all measurements taken to monitor employees to asbestos exposure, as prescribed in paragraph (f) of 29 CFR1926.1101.

C. USAEMI shall maintain and establish medical surveillance records for at least 30 years, in accordance with 29 CFR 1910.20.

3.d.2 Training Records

A. USAEMI maintains all employee training records for one year beyond the last date of employment

3.d.3 Transfer of Records

A. Upon written request, USAEMI shall make all records required by 29 CFR 1926.1101 to be available for examination and copying in accordance with 29 CFR 1910.20.

B. USAEMI complies with the requirements set forth in 29 CFR 1910.20(h) concerning transfer of records.

3.E CERTIFIED INDUSTRIAL HYGIENIST

A. A CIH shall be designated by the Contractor to oversee the Contractor's overall Health & Safety Plan implemented for the project.

B. The CIH shall be independent (not directly employed by) the Contractor and shall be certified by the American Board of Industrial Hygiene (ABIH) and have a minimum of two years of asbestos abatement experience.

C. The contractor’s Asbestos Hazard Abatement Plan, perform training, direct air monitoring, provide guidance to the on-site Industrial Hygiene Technician, and assist contractor’s competent person supervisor in implementing and ensuring safety and health requirements during the performance of asbestos abatement work.

D. The CIH will be responsible for the following work

1. The Asbestos Hazard Abatement Plan shall be prepared/approved, signed and sealed by a ABIH Certified Industrial Hygienist and be approved by the Contracting Officer, prior to start of any work.
2. The CIH and IH Technician have the authorization to halt abatement activities at any time, irrespective of airborne fiber levels, if the provisions of asbestos removal plan are not being followed by the abatement contractor or the general contractor.
3. The CIH shall approve that the proposed IH Technician is properly trained and capable of on-site asbestos project monitoring and air sampling.
4. Air Monitoring results and daily log entries by the IHT shall be reviewed at least weekly or within 24 hours of termination of the project.

3.F SUPERVISION

A. All projects shall have at least one qualified Foreman or Competent Person on site throughout the duration of the project. He shall have at least completed training for and be certified as an Asbestos Supervisor.

B. The Competent person shall be responsible for the following:

- Setting up Isolation Barriers
- Ensuring integrity of enclosures
- Controlling entry to and exit from regulated areas
- Monitoring job site asbestos contamination levels
- Verifying that the scope of work conforms to plans
- Maintain all job site records
- Ensuring that all employees are properly using protective equipment and respirators

3.G TEMPERATURE MONITORING METHOD

A. Thermometers will be placed at the two end of the building opposite each other.

B. Thermometer temperatures will be read and recorded in the mornings and in the afternoon.

C. Average temperature in the building $[(T_1+T_2)/2]$ must be at least 45°F or abatement to be performed without any heating system.

D. If temperatures fall under 45°F, then the Contractor has the option to do one of the following:

1. Not Work for that day, or until temperature reaches at least 45°F; or
2. Install a heating system in the work area sufficient enough to bring the temperature to at least 45°F. The Contractor must propose the type and method of the heating system and obtain the approval of the Contracting Officer or his designated representative prior to the installment.

3.H AIR MONITORING

A. Air samples will be collected by the Industrial Hygiene Technician (3rd party) under the supervision of the Certified Industrial Hygienist, CIH. Air sampling and analysis shall be performed in accordance with 29 CFR 1926.1101 and the NIOSH 7400 method. Sampling results shall be reviewed by the CIH within sixteen hours. If area monitoring shows samples with concentrations greater than 0.01 f/cc, work will be stopped and corrective measures taken before resuming abatement activities. The IH Technician will notify the Contractor, Contracting Officer and any other designated parties of the results immediately. In order to ensure the integrity of samples analyzed, a minimum of two or 10%, whichever is greater, of each set of samples will be Quality Control Blanks (one field and one sealed) will be analyzed and the average fiber count of these will be subtracted from the fiber counts of regular samples. ~~**Moreover, 10% of samples read in the field will be sent to the laboratory for analysis. Rereading will also been done to 10% of samples by the on-site analyst and laboratory. Samples to be reread are to be chosen at random.**~~ ***All samples shall be analyzed at the laboratory of EMSL Analytical, Inc., 200 Rt. 130 North, Cinnaminson, New Jersey, Office: 1-800-220-3675/Fax: (856) 786-5974.***

3.h.1 Personal Air Monitoring

A. Worker's (Personal) exposure monitoring shall be conducted for the full shift and for the entire project duration by the IH Technician. Personal air samples are taken to insure that control methods area effective and that respirator protection factor are sufficient in order to keep the time-weighted avenge, TWA, of asbestos exposure below the Permissible Exposure, PEL.

B. Workers will be monitored at least every four hours (twice a day) to establish the TWA for the full shift. At a minimum, 25% of all workers in group or two, whichever is greater, will be monitored to represent that group's exposure. Note: Workers chosen for monitoring will be those representing the greatest exposure in their respective group.

C. At least one Short Term Excursion Limit sample will be collected daily. STEL's should last no more than half an hour.

D. The minimum required respirators are:

Half-Face for (TWA < 1 f/cc)
Full-Face for (1 f/cc < TWA < 5 f/cc)
PAPR for (5 f/cc < TWA < 100 f/cc)
Type C for (TWA > 100 f/cc)

E. A personal air sample pump should be attached to the employee's belt with the tubing draped over his shoulder, with the cassette attached and facing down (approx. 45 degrees) within the breathing zone (approx. 6" to 9" from

the mouth). The top piece of the cassette must be removed to obtain an "open face" sample.

F. Prior to starting the air sampling, the pump should be calibrated (with a rotometer) and adjusted to the desired flow-rate (typically 1 to 25 liters/minute), then noted and logged on the Air Sampling/Analysis Data form.

G. Upon completion of the air sample, the actual flow-rate should again be measured with a rotometer and noted on the Air Sampling/Analysis Data form. The average of the pre-sample and post-sample flow-rates will be used as the actual flow-rate during the sampling period. If the flow-rates differ by more than 10%, the will not be valid.

H. The results of the worker monitoring shall be posted at the job site and made available to the Contracting Officer within 24 hours

3.h.2 Area Monitoring

1. Pre-Abatement Monitoring

   a. Prior to initiation of abatement operations, background samples of airborne asbestos shall be collected inside and outside the work area, and at least two shall be collected outside the building. Sampling shall be performed 1 day prior to initiation of abatement work. If fiber concentrations exceed 0.01 f/cc as per PCM analysis, then these samples shall be confirmed by NIOSH 7402 (TEM) at the project owners expense.

2. During-Abatement Monitoring

   a. Environmental monitoring during abatement shall be performed inside and outside the work area during removal operations, in accordance with 29 CFR 1926.1101, State, and Local requirements. Samples shall be changed at a frequency not less than once every four hours. Should perimeter results exceed 0.01 f/cc, as per PCM NIOSH Method 7400, all work shall stop. Work will not be allowed to restart until corrective measures taken and authorization is given by the Contracting Officer.

      a) Typical sampling locations will be:

      b) Negative Air Pressure Unit Exhaust

      c) In the vicinity of occupants immediately adjacent, above, or below work area

      d) Outside the Personnel Decontamination Unit (PDU)'s Clean Room

b. Inside the work area

c. An area air sample pump should be placed in a strategic sampling location to monitor possible fiber release from contained work area. Area air sampling pumps' hoses shall be fixed 4’ to 5’ from ground level by a tripod, with the cassette attached and facing down (approx. 45 degrees).

d. Prior to staring the air sampling, the pump should be calibrated (with a rotometer) and adjusted to the desired flow-rate (typically 5 to 12 liters/minute), then noted and logged on the Air Sampling/Analysis Data form. Area air samples shall draw a minimum of 800 liters.

e. Upon completion of the air sample, the actual flow-rate should again be measured and noted on the Air Sampling/Analysis Data form. Sample flow-rate to be used will be the average between the pre and post-sample flow-rates.

f. The results of the worker monitoring shall be posted at the job site and made available to the Contracting Officer within 24 hours.

3. Post-Abatement Monitoring

a. Final air clearance and visual inspection shall be performed by the On-site Industrial Hygienist Technician. Aggressive Air Sampling techniques shall be used as defined in the EPA 560/5-85-024 or as otherwise required by federal or state requirements Sampling and analytical method to be used for clearance shall be NIOSH 7400 (PCM) with optional confirmation, at the expense of the Contractor, by NIOSH 7402 (TEM) utilizing the EPA AHERA Air Sampling Protocol. Should air clearance sample results exceed the 0.01 f/cc clearance criteria, re-cleaning and re-sampling to meet the above criteria shall be required. After final air samples pass the clearance criteria, the perimeter barrier and the Personnel Decontamination Unit (PDU) system may be dismantled and disposed of as asbestos waste.

3.I WETTING AGENT

A. The wetting agent (surfactant) to be used to wet the ACM during removal and bagging operations will be a product manufactured specifically for this purpose. The product will be as submitted previously.

3.J ENCAPSULANT

A. The encapsulant to be used to seal surfaces from which ACM have been removed or which have been cleaned/decontaminated therefrom will be a product manufactured specifically for this purpose. The product will be as submitted previously.

3.K PROTECTIVE CLOTHING AND EQUIPMENT

A. USAEMI shall provide to all workers, foreman, superintendents and authorized visitors and inspectors protective disposable clothing consisting of full-body coveralls, foot coverings, head covers, eye protection, respiratory devices, and gloves. Disposable underwear shall also be provided and worn next to skin or cloth under clothing. Contractors IH and Competent Person/Supervisor shall select and approve the whole body protection to be used.

NOTE: Protective clothing and gloves shall be of the nonporous type, with front zippers unless otherwise agreed upon by the Contracting Officer.

B. USAEMI shall provide fog protective eye wear, hard hats, shoes, cloth socks, and gloves on all work, in accordance with ANSI Z87.1.

C. Reusable footwear, hard hats and eye protection devices shall be left in the "Contaminated Equipment Room" until they can be completely decontaminated at the end of the asbestos abatement work, or bagged for transport to and use in another contained area. Eye protection may either be left in the Personnel Decontamination Unit (PDU) equipment room or thoroughly washed upon departure through shower room.

D. Disposable protective clothing shall be discarded and disposed of as asbestos waste every time the wearer exits from the enclosure work space to the outside through the Personnel Decontamination Unit (PDU).

E. USAEMI shall furnish the Contracting Officer with 2 sets of personal protective equipment, as required herein, for each entry into and inspection of the asbestos control area.

F. The enforcement of the utilization, maintenance, and proper sanitation of personal protective equipment by all employees shall be the responsibility of all levels of supervision.

G. It shall be required of all employees to wear safety shoes or boots to prevent injury to the feet. Sandals, shoes with holes or slits, or shoes with worn heels or soles shall not be permitted to be worn inside the work area.

H. Employees shall be provided with eye and face protection equipment when machines or operations present potential eye or face injury from physical, chemical, or radiation agents. Eye and face protection equipment shall meet the requirements specified in the American National Standards Institute (ASTM), Practice for Occupational and Educational Eye and Face Protection.

I. Persons whose vision requires the use of corrective lenses like spectacles should wear goggles that can be worn over corrective spectacles without disturbing the adjustment to the spectacles.

J. Persons working in areas where there is a danger of head injury from impact or from falling objects, or from electrical shock and burns, shall be protected by helmets

meeting the specifications of the American National Standards Institute (ASTM), Safety Requirements for Industrial Head Protection.

K. Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in the table below, when measured on the A-scale Type # sound level meter at slow response:

L. Exposure to impulsive or impact noise shall not exceed 140 dB peak sound pressure level. Ear Protective devices inserted in the ear shall be fitted or determined individually by Competent Persons.

M. Plain cotton is not an acceptable protective device.

3.L TEMPERATURE MONITORING

A. Thermometers will be placed at the two far ends of the building opposite to each other.

B. Thermometer temperatures will be read and recorded in the mornings and in the afternoon.

C. Average temperature in the building $[(T_1+T_2)/2]$ must be at least 45^oF for abatement to be performed without any heating system.

D. If temperatures fall under 45^oF, then the Contractor has the option to do one of the following

1. Not work for the day, or until temperature reaches at least 45^oF; or
2. Install a heating system in the work area sufficient enough to bring the temperature to at least 45^oF. The Contractor must propose the type and method of the heating System and obtain the approval of the Contracting Officer or his representative prior to the installment.

3.M RESPIRATORY PROTECTION

A. USAEMI shall provide all workers, foreman, superintendents, authorized visitors and inspectors personally issued and marked respiratory equipment in accordance with OSHA regulations 29 CFR 1910.134, and 29 CFR 1926.1101, 29 CFR 1910.1001. When respirators with disposable filters are employed, provide a sufficient inventory of HEPA filters for replacement as necessary by the worker. All respiratory equipment shall be NIOSH/MSHA approved.

B. USAEMI shall require that each person entering the work area wear an approved respirator when the level of airborne asbestos is likely to be above the Action Level of 0.1 f/cc. There shall be no exceptions to this rule.

C. All respiratory equipment shall be inspected by USAEMI's project supervisory personnel at the beginning of each work period. Moreover, workers are required to perform positive and negative pressure checks whenever respirators are put on.

D. Respirator type shall be selected to provide the regulatory level of protection required for specific background and/or environmental conditions. All recommendations made by the Contractor's IH to downgrade the respirator type shall be submitted in writing to the Contracting Officer for acceptance. Upgrading respirator type need only be communicated verbally. The minimum required respirators are:

Half-Face for TWA < 1 f/cc
Full-Face for 1 f/cc < TWA <5 f/cc
PAPR for 5 f/cc < TWA < 100 f/cc
Type C for TWA > 100 f/cc

E. The IH may certify that initial/background air monitoring is not required in the following two instances

1. The Contractor has data from monitoring work operations conducted under workplace conditions closely resembling the processes, type of material being removed, control methods, work practices, and environmental conditions prevailing in the contractor's current operation.
2. The Contractor can demonstrate that workers are below the action level by providing objective data indicating that the material containing asbestos cannot release, under the conditions being employed, airborne fibers in excess of the action level.

F. At no time in the project shall disposable dust masks be utilized for respiratory protection against the inhalation of airborne asbestos fibers.

G. All personnel engaged in asbestos removal procedures requiring a respirator shall have an unobstructed face/mask seal (i.e., no facial hair) and shall have received required qualitative or quantitative fit testing every 6 months and medical screening as mandated in OSHA Regulations 1926.1101 and its appendixes.

H. Where type "C" respirators are worn, a belt shall be used to minimize possibility of dislodging the face mask when the hose is snagged in the work area and provide a minimum of two spare hoses to be available at all times to the consultant and/or authorized visitors and to inspectors to connect to their assigned type "C" respirator without having to wait for removal of the worker from the area to obtain a hose connection.

I. Where type "C" respirators are employed, the air supply system shall provide grade "D" breathing air in accordance with OSHA.

J. The compressed air system for type "C" respirators shall be high pressure, with a compressor capacity to satisfy the respiratory manufacturer's recommendations. The face mask separate escape shall have sufficient filters to allow a 15 minute escape time from enclosure in the event of compressor failure or malfunctions. The compressed air system shall have compressor failure alarm, and suitable in-line air-purifying sorbent beds and filters to assure grade "D" breathing air.

3.N FIT TESTING

A. Qualitative fit testing for a respirator shall be accomplished for each employee at the time of issuance and every six months thereafter using an irritant fume, in accordance with 29 CFR 1926.1101, Appendix C. The following protocol will be used.

1. Employee must be clean shaven.
2. Employee must be familiarized with irritant smoke odor.
3. Employee wears respirator for at least 10 minutes prior to fit test
4. Employee performs a positive and negative pressure fit check.
5. Test conductor directs a stream of irritant smoke from the tube toward the face seal, moving gradually from 12" to 1" away from the face around the perimeter of the mask. (Volume shall be 200 ml per minute).
6. Employee shall breathe normally, then deeply, and rotate head from side to side, up and down, then talk aloud for several minutes.
7. If no irritant smoke is detected during this process, the employee has passed the Fit Test upon final sensitivity testing without use of the respirator.

B. An approximately administered fit test may be substituted for a qualitative fit test.

C. Each employee must perform a positive and negative air pressure fit test each time a respirator is put on, whenever the respirator design so allows.

D. Documentation of adequate respirator Fit Tests shall be kept.

4. PRE-ABATEMENT PROCEDURES

4.A WORK AREA PREPARATION

A. Prior to removal/clean-up activities, the Contracting Officer will notify USAEMI of items which require special attention and cannot be moved out of the designated work area. These items must be HEPA vacuumed and/or wet-wiped (with amended water) and covered (i.e., sealed) in a minimum of two independent layers of 6 mil plastic sheeting to prevent surface contamination and water damage.

Note: Sensitive equipment such as electrical panels shall be contained in plywood enclosures prior to establishment of work area containment.

B. Any items to be removed (desks, chain, rugs, fixtures, furniture etc.) shall be thoroughly cleaned with HEPA vacuuming and/or wet-wiping (with amended water) techniques and stored in a location designed by the Contracting Officer. Moreover, all surfaces to remain inside the containment shall be cleaned by HEPA vacuum prior to establishment of containment. All cloths used for cleaning shall be disposed of as contaminated waste.

C. USAEMI shall post required OSHA asbestos warning signs at all entrances to the work area and along the work limit of site or along the perimeter sections of the site at intervals of 20 feet or less where abatement operations are to be performed or where asbestos-containing waste material was deposited. These signs shall remain in place until the successful completion of visual inspection and final clearance testing. The signs shall be posted in such a manner and locations that a person easily may read the legend.

Note: Should an area be considered politically sensitive, the CIH and the Contracting Officer may decide to strategically place the warning signs for others to see only when approaching/entering the work area.

D. Building HVAC system shall be shut down prior to any activities involving the potential for disturbing asbestos. The air supply and return registers/openings shall be cleaned (if needed) and sealed by USAEMI with two independent layers of 6 mil plastic sheeting to prevent contamination and fiber dispersal to other areas of the buildings.

E. The work area shall include all contained areas as well as a 20 feet radius all around the enclosure.

F. A viewing inspection window shall be installed on the wall of the containment enclosure. This shall be a plexiglass window of a minimum dimension of 1.5’x2’. NOT REQUIRED.

G. Power to the asbestos regulated area shall be locked out by switching off all breakers in accordance with 29 CFR 1910.

H. Tools, scaffolding, staging, etc. necessary for the work shall be placed in the area to be isolated prior to the erection of the work area enclosure containment an air-tight manner prior to work commencement in accordance with 29 CFR 1910.147.

I. Electricity shall be de-energized where necessary for wet removal methods. Where this is not possible, USAEMI shall seek a variance from the Contracting Officer.

J. All criticals (e.g., doorways, windows and openings to other areas) shall be sealed with two layers of 6 mil plastic sheeting. Building structures, electrical boxes, etc. which are not subject to removal will also be sealed with two layers of 6-mil plastic sheeting. All plastic will be sealed with duct tape and seams will be overlapped and sealed in both places.

4.B PERSONNEL DECONTAMINATION UNIT (PDU)

A. Location of Personnel Decontamination Unit (PDU) chamber facility shall be determined by USAEMI and shall have the approval of the CIH and the Contracting Officer before assembly. It shall be located in such a manner as to provide a minimum of inconvenience to the building occupants. The facility shall consist of a clean room large enough to accommodate a full crew. Utilization of prefabricated Personnel Decontamination Unit (PDU) units must have the approval of the Contracting Officer.

B. USAEMI shall provide a Personnel Decontamination Unit (PDU) facility which shall consist of separate chambers directly attached to each other and the work area. The chambers shall be arranged so that the clean room precedes the shower room which precedes the equipment room. The equipment room is directly attached to the work area. The Personnel Decontamination Unit (PDU) unit shall be in compliance with 29 CFR 1910.141. Two airlock chambers shall also be constructed: one between the equipment and shower rooms and the other between the shower and clean rooms.

C. Waste shower water shall be filtered with a first stage pore size of 20 microns and second stage size of 5 microns and then to a sanitary drain. USAEMI shall provide a foot bath to clean shoes and boots.

D. USAEMI shall provide all temporary electrical fixtures for lighting, heating etc. of Personnel Decontamination Unit (PDU) facilities, work areas, and storage areas.

E. Should sufficient hot water be unavailable, the Contractor shall provide a minimum of a 40 gallon electric hot water heater with a minimum recovery rate of 20 gallons per hour. There should be a minimum of 2 showers. The waste water pump shall be sized for 1.25 times the shower heads and be capable of supplying a minimum flow of 25 gallons per minute.

F. The Industrial Hygiene Technician shall be monitoring the clean room of the Personnel Decontamination Unit (PDU) system. If at any time airborne concentrations exceed 0.010 f/cc. USAEMI shall halt all abatement operations and shall be required to completely clean all affected areas as directed by the on-site Industrial Hygienist Technician.

G. Personnel Decontamination Unit (PDU) Clean room and Shower will be cleaned twice each shift.

H. Removal operations will not begin until the work area and Personnel Decontamination Unit (PDU) Systems have been inspected and approved by a representative of Contracting Officer. Personnel Decontamination Unit (PDU) should be set up early and before pre-cleaning and Negative Air pressure (where required) is established.

I. Whenever feasible, a separate 2- or 3-stage waste/equipment decontamination facility should also be constructed for bag out and equipment decontamination activities.

4.C ISOLATING WORK AREA

A. To prevent airborne asbestos from escaping into areas outside the work area and/or lodging into to the outside of the building will be sealed with 2 layers of 6-mil polyethylene sheeting.

B. Double layers of plastic sheeting shall be sealed at all joints with water-resistant duct tape (and spray adhesive if necessary) to provide a continuous isolation which will prevent any fiber escape.

C. All entrances and exits to the work area shall be sealed as a critical with plastic sheeting and tape, with the exception of the Personnel Decontamination Unit (PDU) Facility.

D. Certain work areas may be isolated in a variety of ways as follows based on the surrounding area, location of material to be removed and type of material to be removed and the method chosen for removal.

4.c.1 WORK AREA PREPARATION (Full Containment Areas)

This method shall be utilized for the removal of all ACM.

A. Construct critical barriers on all windows, doors and HVAC openings. Criticals to have 2 layers 6 mil plastic sheeting taped all around.

B. Any HVAC and other appropriate mechanical or electrical system shall be shut down for the duration of abatement and until final air clearance.

C. All wall sockets, light sockets, light switches, and other small fixtures shall be either taped or covered with 6 mil plastic.

D. Seal all joints using sprayed adhesive or duct tape.

E. Negative air HEPA ventilation system should already be installed, test run and operated in accordance with ANSI Z9.2, 29 CFR 1926, and UL 586 filters standard. All Air Filtration Devices (AFDs) shall be vented outside the building. AFDs shall be in sufficient quantity to provide a minimum of 4 air exchanges per hour and a pressure differential of 0.02 inches of water

column continuously, 24 hours a day, until the enclosure of the asbestos control area is moved.

Note: Pressure differential recordings for each work day shall be reviewed by the Industrial Hygienist and submitted to the Contracting Officer within 24 hours from the end of each work day. The Industrial Hygienist shall notify USAEMI and the Contracting Officer immediately of any variance in the pressure differential which would cause exposure of adjacent unsealed areas to asbestos fiber concentration in excess of the action level. Pressure differential to be recorded mechanically on a disc or manually read & recorded every two hours.

F. A three stage Personnel Decontamination Unit (PDU) system shall be constructed for each work area. The Personnel Decontamination Unit (PDU) should already have been installed with pre-cleaning.

G. Construct a separate 2- or 3-stage waste/equipment Decontamination facility system (where feasible).

H. Removal of all asbestos material shall be performed in accordance with paragraph 1.03 above.

4.c.2 WORK AREA PREPARATION (Friable Floor Tile and/or Mastic Removal Areas)

A. Friable removal means removal methods such as hand scraping or other mechanical removal techniques, which would pulverize and/or break up tiles during the removal and/or shot-blasting for the removal of mastic.

B. Completely isolate the work area from other portions of the building and the outside by installing critical barriers at all openings, doorways, windows (operable portion only!), ducts, grilles, grates, diffusers, and any other such openings and/or penetrations.

C. Protect any and all heating units and cabinets found along the walls or inside the work area with a single layer of 6 mil polyethylene

D. Install a single layer of 4-mil polyethylene to the underside of the existing ceiling inside all abatement work areas.

E. Install a single layer of 6-mil polyethylene on all wall surfaces (full height).

F. The work area shall be placed under a negative pressure condition.

G. Removal procedures shall be as indicated in the Section Removal of Asbestos-containing Materials for friable methods.

4.c.3 WORK AREA PREPARATION (Non-Friable Floor Tile and/or Mastic Removal Areas)

A. Non-friable removal means removal without breakage of tiles or a minimum of breakage and no damage to mastics, which would render airborne contamination.

The use of heat (infrared) machines, water and/or dry ice, or any combination thereof would constitute non-friable removal techniques for floor tile.

B. The preparation of the work area for non-friable floor tile removal shall include the following:

1. Completely isolate the work area from other portions of the building and the outside by installing critical barriers at all openings, doorways, windows (operable portion only!), ducts, grilles, grates, diffusers, and any other such openings and/or penetrations.

2. Protect any and all heating units and cabinets found along the wall or inside the work area with a single layer of 6-mil polyethylene.

3. Where chemical removal techniques are to be used for removal of the mastic, all walls, fixtures, cabinets, floor – mounted book shelves, heating units, etc., in the work are shall be protected with a single layer of 6 mil plastic sheeting to extend a minimum of three (3) feet above the floor.

4. The work area shall be placed under a negative pressure condition using HEPA equipped negative air filtration machines.

5. Removal procedures shall be as indicated in the Section on Removal of Asbestos-containing Materials for non-friable methods.

4.c.4 WORK AREA PREPARATION (Glove Bag Areas)

A. A minimum of two persons is required to perform a glove bag removal project.

B. The work area where the technique is to be utilized shall be isolated with critical barriers and/or appropriate barrier tape with required OSHA asbestos warning signs posted.

C. Contractor shall protect the floor immediately beneath the glove bag

removal area with one (1) layer of 6-mil polyethylene plastic sheeting.

D. Contractor to protect any fixed items immediately adjacent to the glove bag removal operation with a minimum of one (1) layer of 6-mil polyethylene plastic as a precaution.

E. Contractor shall establish negative pressure in all areas of glove bag removal or use the negative pressure glove bag technique.

F. All necessary materials and supplies shall be brought into the work area before any removal begins.

4.c.5 WORK AREA PREPARATION (Localized Isolation Areas)

A. Contractor shall HEPA vacuum or wet wipe all surfaces contaminated with residual asbestos-containing material (Initial Cleaning).

B. All of the procedures as indicated in 5.a.1 and 5.a.3 shall be followed. A complete three (3) stage Personnel Decontamination Unit (PDU) constructed in accordance with the OSHA regulation may be required depending on the nature of the asbestos abatement activity undertaken and if required, shall be functional and used at a remote, central location within the building.

C. The perimeter of the abatement area shall be isolated through the use of asbestos barrier warning tape and OSHA asbestos warning signs sufficient to keep unprotected, unauthorized personnel away from the control area and not be exposed to asbestos during the abatement activity.

D. Workers shall wear double sets of disposable uniforms during the abatement and/or Decontamination work, HEPA vacuum the outer garment off when done within the perimeter of the protected work area, remove and dispose of the outer garment in this area, and then proceed, with respiratory protection still in place, to the remote, central Personnel Decontamination Unit (PDU) for showering and full Decontamination upon completion of work.

E. All temporary protection shall be removed upon completion of the asbestos abatement/cleanup activity and successful air monitoring by the IH Technician.

4.c.6 WORK AREA PREPARATION (Mini-Enclosure Areas)

A. Contractor shall HEPA vacuum or wet wipe all surfaces contaminated with residual asbestos-containing material (Initial Cleaning).

B. All of the procedures as indicated in 5.a.1, 5.a.2, 5.a.3, 5.a.4 and 5.a.5 shall be followed except that a one (1) stage change chamber shall be attached directly to the Mini-Enclosure work area, constructed as indicated below, and a complete three (3) stage Personnel Decontamination Unit (PDU) chamber as required by OSHA shall be functional and used at a remote, central location within the building.

C. Floors inside the mini-enclosure shall be covered with two (2) layers of 6-mil (minimum) sheeting.

D. Walls shall be covered with one (1) layer of 6-mil (minimum) sheeting except where such walls of the mini-enclosure are free-standing, in which case they shall be appropriately supported by 2" x 3" wood studs, metal studs or PVC tubing, on maximum 48" centers, and be constructed with two (2) layers of 6-mil sheeting.

E. A small chamber, a minimum of 3' x 3' in size shall be constructed using 2" x 3" studs, metal studs or PVC tubing, and two (2) layers of 6 mil sheeting for ceilings, floors and walls, and attached directly to the mini-enclosure. The change room shall be separated from the work area by three (3) weighted crossover sheets of polyethylene (curtained doorway). A similar curtained doorway will allow passage from the change room to non-work areas.

F. Workers shall wear double sets of disposable uniforms, step into the change room, HEPA vacuum the outer garment, remove and dispose of same in this room, and then proceed the remote, central Personnel Decontamination Unit (PDU) for showering and full decontamination upon completion of work.

G. Negative pressure-air filtration engineering controls shall be installed in all mini-enclosure work areas used for removal and/or handling of asbestos-contaminated materials.

4.D WARNING SIGNS AND LABELS

A. The Contractor shall provide signs at all approaches to the asbestos controlled work areas. Signs will be located at such a distance that personnel may read the sign and take the necessary protective steps required before entering the work area.

B. The Contractor shall provide labels and will affix them to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos.

C. Warning signs shall have a vertical format conforming to 29 CFR 1910.145 (d) (4).and 29 CFR 1926 1101 (k), and 29 CFR 1910.120, and be 20 X 4 inches, displaying the following information:

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD

AUTHORIZED PERSONNEL ONLYRESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

D. Warning labels shall be printed in large bold letters, and shall contain the following information:

DANGER

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE HAZARD

4.E WORK AREA ENTRY AND EXIT/DECONTAMINATION PROCEDURES

A. The following are procedures and sequence to be followed by ALL who enter and exit the contained work area. These procedures shall be posted inside (or immediately outside) the clean room. There shall be no drinking, eating, chewing gum or tobacco, or any smoking inside the containment. To do any of the above, persons shall leave the containment using the proper sequence described below. In order to prevent contamination of the environment, the Contractor shall be responsible for controlling access to contained work area and shall maintain and post a daily log of all entry to and exit from the work area. This log will contain: names, signatures, entry and departure times.

4.e.1 Work Area Entry Procedures

A. All workers and authorized personnel shall enter the work area through the Personnel Decontamination Unit (PDU) Facility's clean room.

B. All persons entering the work area shall sign an entry/exit log located in the clean room.

C. Street clothes shall be removed, placed in a locker, and personal protective clothing and respirator shall be donned at this point.

D. Proceed through the Shower and Equipment rooms and then to the contained work area.

4.e.2 Work Area Personnel Decontamination and Exit Procedures

A. Manually remove and HEPA vacuum gross contamination and debris from disposable clothing before entering the Personnel Decontamination Unit (PDU) Facility's Equipment room.

B. Equipment and clothes not to be disposed of (reusable) shall be stored in the Equipment room in a safe manner so as not to be tripped over or injured by. If these clothes or equipment need to be taken out of work site, they must be washed and decontaminated or placed in sealed container/bag for transport to and usage in another contained area.

C. Enter the Equipment room, remove contaminated clothing and place them in a suitable container/bag for disposal. Note: Respirators must still be worn at this point.

D. Enter shower room and rinse entire body, while still wearing respirator.

E. Once whole body and head are rinsed from debris, proceed to remove respirator while rinsing the face. Note: Caution should be exercised against inhaling asbestos debris and/or contaminated water.

F. Wash entire body including face and hair.

G. Seal the exterior of the respirator filter cartridge and wash the respirator.

H. Proceed to clean room and change into street clothes.

4.e.3 Emergency Evacuation

A. Prior to commencing asbestos removal, the Contractor's Competent Person shall clearly identify to all workers the emergency and fire exits from the work area. These exits will be maintained on a routine basis. Workers shall be trained for these emergency exit procedures.

B. In case of a medical emergency, aid shall be rendered to a seriously injured worker without delay. Pathway shall be cleared for medical personnel, and someone should be instructed to guide the medical team to the scene. Moreover, proper personnel decontamination procedures to exit from the work area is not required, but recommended whenever possible.

C. During fire evacuations and other such emergencies, an attempt should be made to properly decontaminate oneself whenever possible.

D. When an emergency should occur, abatement will cease, but engineering control methods such as wet-methods and negative air pressure shall resume to prevent the potential of fiber release into non-contaminated areas.

4.F PRE-ABATEMENT INSPECTION

A. The IHT and a representative of Contracting Officer shall visually inspect the containment prior to any ACM removal. Work area must be contained and a Personnel Decontamination Unit (PDU) Facility installed as prescribed above.

B. All necessary equipment and tools needed for abatement clean-up and disposal of asbestos must be on job site.

C. Prior to removal, negative air HEPA ventilation system should already be installed and test run and operated in accordance with ANSI Z9.2, 29 CFR 1926, and UL 586 filters standard. All air filtration devices (AFDs) shall be vented outside the building. AFDs shall be in sufficient quantity to provide a minimum of 4 air exchanges per hour and a pressure differential of 0.02 inches of water column continuously 24 hours a day, until the enclosure of the asbestos control area is removed.

D. Each AFD must be equipped with HEPA filters to ensure that air is filtered before being exhausted. HEPA filters should be replaced after every 700 hours of use, or when negative pressure becomes insufficient.

E. Pressure differential shall be recorded automatically by the manometer recorder at least every two hours through the use of manometer. Recordings for each work day will be made available to the Contracting Officer for review upon request. The IHT shall notify the Contractor and Contracting Officer immediately of any variances in the system's negative pressure which would cause exposure of adjacent areas to asbestos fibers contamination in excess of the Action Level.

F. Each AFD shall be periodically inspected for air flow velocity and filtering efficiency every 2000 hours of use and a log shall be kept documenting all inspections and results thereof.

4.G CONTINGENCY PLANS

4.g.1 Power Failure

A. Should a loss of power occur, all work will be stopped and the occupants evacuated until power can be restored. An attempt will be made to restore power by resetting electrical circuit breakers, replacing fuses, and checking extension cord connections.

B. If power cannot be restored within one hour, an emergency generator will be brought on line, and an electrician called to restore power.

Note: All power to the work area must be from a GFIC (Ground Fault Interrupt Circuit).

C. Removed ACM is to be misted with amended water to keep from drying and becoming more friable and should be bagged if possible.

D. The air inside the work area will also be misted with amended water.

E. Containment is to remain intact, and the flaps of the Personnel Decontamination Unit (PDU) entrance sealed after last person leaves the work area.

4.g.2 Failure of Negative Air

A. In the case of power failure to the negative air filtration machines, follow power failure responses above.

B. For occupied buildings, if power is not restored in 30 minutes, an emergency generator will be brought on line until power is restored.

C. Removed ACM is to be misted with amended water to keep from drying and becoming more friable, and should be bagged if possible.

D. The air inside the work area will also be misted with amended water.

E. At least one backup air filtration machine must be on job site, in case a machine fails to provide its required negative pressure.

4.g.3 Emergency Exit Plan

The Emergency Exit Plans for each building will be developed in accordance with 29 CFR 1910.37 and 29 CFR 1910.38.

A. Emergency and fire exit plans will be made for each work area of the project. Personnel will be trained and drilled on proper emergency exit procedures. These procedures and routes in a simple sketch of the building will be posted in the clean room of the Personnel Decontamination Unit (PDU) chamber along with emergency telephone numbers. Prior to commencing asbestos removal, the Contractors Competent Person shall clearly identify and train all workers on the emergency and fire exits from the work area. These exits will be maintained on a routine basis.

B. Mark exits from work area and post directional arrows according to plan when exits are not visible from remote work areas. This can easily be done by using duct tape on the polyethylene walls and barriers.

Note: Some emergencies are considered greater than an asbestos hazard, thus, Personnel decontamination procedures may be bypassed and containment breached for the health and safety of the workers during a fire emergency.

C. The supervisor will establish a system for alerting workers of a fire or other emergencies requiring evacuation of the work area. All persons entering the work area should be familiar with this evacuation alarm signal and the primary and secondary exits.

D. In case of a medical emergency, aid shall be rendered to a seriously injured worker without delay. Pathway shall be cleared for medical personnel, and someone should be instructed to guide the medical team to the scene. Moreover, proper Personnel decontamination procedures to exit from the work area is not required, but recommended whenever possible.

E. When an emergency should occur, abatement will cease but engineering control methods such as wet-methods and negative air pressure shall resume to prevent the potential of fiber release into non-contaminated areas.

4.g.4 Fire Response Emergency

This Fire Response Plan has been developed in accordance with 29 CFR 1926.130,29 CFR 1926.131, and 29 CFR 1910.38.

A first aid kit along with a fire extinguisher will be located in the clean room of the Personnel Decontamination Unit (PDU) chamber at all times.

A. In case of fire emergency, cease all work activities and pull the nearest fire alarm, alert your fellow workers and evacuate the work site in an orderly fashion through the nearest emergency/fire exit.

   Note: A fire hazard is considered greater than an asbestos hazard; thus, personnel decontamination procedures may be bypassed and containment breached for the health and safety of the workers during a fire emergency.

B. Contact the fire department immediately (Emergency numbers will be posted in the clean room of Personnel Decontamination Unit (PDU). Dial 911 if necessary.

4.g.5 Medical Emergency Response

This Medical Emergency Plan has been developed in accordance with 29 CFR 1926.150.

A first aid kit along with a fire extinguisher be located in the clean room of the Personnel Decontamination Unit (PDU) chamber at all times.

A. In the case of life-threatening emergency, pull the nearest fire alarm, alert your fellow workers and take the nearest exit out, disregarding all critical barriers.

B. In case of injury, assist your fellow worker through the Personnel Decontamination Unit (PDU) chamber. Then call the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU).

C. In the case of life-threatening injury, disregard critical barriers and take injured person through the nearest exit out. Then call the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU).

D. In case of heat stroke or exhaustion, assist your fellow worker through the Personnel Decontamination Unit (PDU) chamber. Instruct someone to call

the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU), and proceed by first aid procedures aimed to decrease body temperature.

4.g.6 Breech in the Enclosure and Emergency Clean-Up

A. Breech in the enclosure shall be repaired immediately after acknowledgment.

B. Affected area shall be evacuated, if occupied, by and at the direction of the CIH and the Contracting Officer.

C. All HVAC Systems servicing the affected area will be shut down or temporarily modified as instructed by the CIH and/or Contracting Officer.

D. USAEMI shall respond immediately to the directions of the CIH and the Contracting Officer.

E. All personnel entering the affected area shall be required to wear full body protective coveralls and respiratory protection as described in this asbestos abatement plan.

F. USAEMI shall seal off the area by closing all doors and posting warnings signs along the perimeter of the area, and allow entrance to the area only to necessary personnel.

G. USAEMI shall install HEPA negative air units (vented to the outside) in the affected area during clean-up operations.

H. Any damaged ACM shall be repaired to the satisfaction of the CIH, IHT and/or the Contracting Officer, or USAEMI shall remove the asbestos to the extent indicated.

I. The entire area shall be cleaned via HEPA vacuum and wet-wiping techniques starting from the uppermost areas and working down to ground level. All items in the affected area are to be thoroughly cleaned and decontaminated, including all light fixtures, HVAC system, books, personal items, etc. to the satisfaction of the CIH, IHT and/or the Contracting Officer.

J. Dispose of all debris, filters, mop-heads, and cloths in sealed, leak-tight, appropriately labeled containers as asbestos-containing materials.

K. The IHT will provide air monitoring during and after clean-up operations. This will include air sampling and surface dust sampling to ensure that all asbestos fibers have been removed from the area. Airborne concentrations shall not exceed 0.010 fiber/cc of air when analyzed by NIOSH Method 7400. Should analysis show concentrations above this level or surface dust samples reveal the presence of asbestos, USAEMI will re-clean the entire work area immediately until it meets the standards listed herein.

5. SPECIFIC ASBESTOS ABATEMENT PROCEDURES

5.A ENGINEERING CONTROL METHODS

The following procedures shall be followed where asbestos-containing materials are located within buildings/structures that are structurally sound and able to be safely entered by workers to perform the abatement.

This site does have numerous structures and/or areas of structures that are not structurally sound to allow workers to enter and perform the abatement work as with normal, structurally sound buildings. The procedures to be followed for buildings/structures of this nature on this site are addressed in section 5.b.1 below.

5.a.1 PROCEDURES FOR ASBESTOS ABATEMENT IN STRUCTURALLY SOUND BUILDINGS/STRUCTURES

A. The work area is the location where asbestos abatement work occurs. It is a variable of the extent of work of the contract. It may be a portion of a room, a single room, or a complex of rooms. A "work area" is considered contaminated during the work, and must be isolated from the balance of the building, and decontaminated at the completion of the asbestos-control work.

B. Completely isolate the work area from other parts of the building so as to prevent asbestos-containing dust or debris from passing beyond the isolated area. Should the area beyond the work area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, clean those areas in accordance with the procedures indicated in section on decontamination. Perform all such required cleaning or decontamination at no additional cost to owner.

C. Place all tools, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to erection of plastic sheeting temporary enclosure.

D. Pre-clean using worker Personal Protective Equipment (PPE), all movable objects within the work area using HEPA filtered vacuum and/or wet cleaning methods as appropriate. After cleaning, these objects shall be removed from the work area and carefully stored in an un-contaminated location. The abatement contractor shall return all objects to the original areas after completion and approval of the final air monitoring.

E. Carefully remove, using worker Personal Protective Equipment (PPE), items necessary to access any asbestos-containing materials herein required to be removed, HEPA vacuum same and store in a clean, secure

area for re-installation after the successful completion of clearance air monitoring after asbestos removal. The abatement contractor will be responsible for reinstallation of any and all items removed in order to perform the abatement work.

F. Pre-clean using worker Personal Protective Equipment (PPE), all fixed objects in the work area, as well as the work area itself (Initial Cleaning), using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery, behind grilles or gratings where access may be difficult but contamination significant. Also pay particular attention to wall, floor and ceiling penetrations behind fixed items. After pre-cleaning, enclose fixed objects in two (2) layers of 6-mil polyethylene sheeting and seal securely in place with duct tape.

G. Shut down and lock out all heating, cooling and air conditioning system (HVAC) components that are in, supply or pass through the work area. Seal all intakes and exhaust vents in the work area with tape and 6-mil polyethylene. Also seal any seams in system components that pass through work area using duct tape at a minimum. Remove all HVAC system filters and place in labeled 6 mil polyethylene bags for staging and eventual disposal as asbestos contaminated waste.

H. Lockout power to circuits running through the work area wherever possible by switching off all breakers or removing fuses serving these circuits. Contractor shall draw power from outside the work area and connect to a ground fault circuit interrupter (GFCI).

I. Emergency exits shall be provided for each work area. Exits shall be arranged so that the door is secure from outside the work area but permits exiting from the work area. These exits shall be marked in all locations with the words "Emergency Exit", clearly visible within the work areas.

J. Abatement contractor shall provide and maintain access to fire extinguishers throughout the course of all abatement work. One (1) extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of protected building area. Travel distances to nearest available extinguisher shall not exceed 100 feet.

CONTROL ACCESS

A. Permit access to the work area only through the Personnel Decontamination Unit (PDU). All other means of access shall be closed off and sealed and warning signs displayed on the clean side of the sealed access.

B. Where the area adjacent to the work area is accessible to the public, Contractor shall construct a solid barrier to ceiling level. Construct barrier with 2" x 3" wood or metal studs, 16" on center securely anchored and covered with a minimum of 1/2" (fire-rated) plywood sheathing on work area side. **Each** side of this barrier shall be covered with two (2) individual layers of 6-mil polyethylene secured with duct tape.

WARNING SIGNS

A. Contractor shall supply and post caution signs meeting the requirements of OSHA 29 CFR 1926.1101 (k) (l) at any location and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures. Signs shall be multi-lingual if necessary.

CRITICAL BARRIERS

A. Completely isolate the work area from other portions of the building and the outside by installing barriers consisting of two (2) sheets of 6-mil polyethylene taped securely in place as a minimum.

B. Seal off all windows (operable portion only!), doorways, corridor entrances, drains, ducts, grills, grates, diffusers, and any other openings between the work area and uncontaminated areas outside of the work area with two (2) layers of 6 mil polyethylene sheeting taped in place.

C. Fire-rated expandable foam may be used to seal any irregular penetrations from the work area to non-work areas. This foam may be left in place upon completion of the abatement work.

ADDITIONAL CONTROLS

A. Provide negative air pressure system to ensure a minimum of one (1) complete air change within the work areas isolation every fifteen (15) minutes, at a minimum.

B. Provide Personnel Decontamination Unit (PDU) complete with showering facility as required by OSHA 29 CFR 1926.1101 (j) (l) (i).

NEGATIVE AIR PRESSURE

A. Prior to removal, negative air HEPA ventilation system should already be installed and test run and operated in accordance with ANSI Z9.2, 29 CFR

1926 and UL 586 filters standard. All air filtration devices (AFDs) shall be vented outside the building.

B. All critical openings (i.e. windows, doors, ducts, etc.) to the outside of the building will be sealed with 2 layers of 6 mil polyethylene sheeting. Wall, ceilings, floors will not require covering with plastic sheeting since these are significantly contaminated and will be demolished after removal of ACM. However, all surfaces in the regulated work areas will be encapsulated with a sealant after removal of the ACM. This will ensure that asbestos fibers on said surfaces are locked and will not be released during demolition operations.

WET METHODS

A. In order to avoid excessive fiber release, asbestos-containing materials should be removed in a careful, deliberate manner. Prior to removal, the material should be wetted, using water that has been amended with the wetting agent, ”Serpifactant” by International Protective Coatings, that enhances penetration and surface tension of the water.(Note: When working around high temperature steam piping or live electrical equipment, material may be removed dry). Unless otherwise designated by the manufacturer, three ounces or more of wetting agent (e.g. fabric softener will do) should be mixed with five gallons of water. The material shall be thoroughly wet and removed in small sections before having a chance to dry. While still wet, the material should be promptly placed into a bag/container for disposal (refer to the Waste Disposal Procedures) and not left on the floor to accumulate. Inside the bag/container, waste shall be further wet, double bagged, and goose-neck tied.

CONTAINMENT BAG TECHNIQUE (GLOVE BAG)

A. The removal of asbestos by use of the glove bag shall be limited to the removal of asbestos-containing insulation from piping.

B. The preparation of the work area for glove bag removal shall include the following:

1. A minimum of two persons is required to perform a glove bag removal project. A third person may be required to conduct personnel air monitoring and assist with supplies.

2. The work area where the technique is to be utilized shall be sealed with critical barriers and warning signs posted on the perimeter to prevent unauthorized personnel from entering the work area. The work area shall then be placed under negative pressure for the duration of the work.

3. A mini-enclosure consisting of a single layer of six-mil polyethylene sheeting shall be installed on all surfaces immediately adjacent to the insulation being removed, as well as over any fixed equipment or items which may become contaminated upon failure of a glove-bag. Contractor will be responsible for the proper decontamination of anything contaminated due to this operation. Negative pressure and a one-stage change chamber shall also be required for this operation.

4. The Contractor shall additionally prepare each work area as follows:

   a. Construct a localized containment (tent) to be sealed with one layer of six-mil polyethylene. Polyethylene sheeting shall be supported as indicated in the Section covering Isolation Procedures.

   b. Localized negative air pressure shall be established inside the glove bags by use of HEPA vacuum at a minimum.

5. All necessary materials and supplies shall be brought into the work area before any removal begins.

C. The following is a list of recommended equipment and tools for the removal of asbestos by the glove bag technique:

1. The glove bag, which consists of a six-mil bag, fitted with long sleeve gloves, a tool pouch, and a two-inch opening used for water application;

2. A pump-up sprayer (garden type) with a two or three gallon capacity;

3. Amended water (water mixed with a surfactant);

4. Six-mil polyethylene disposal bags with the proper markings for asbestos waste;

5. A HEPA filtered vacuum with a capillary tube for insertion into the glove bag;

6. Tools such as: a small scrub brush; a utility knife for cutting the insulation; a stapler; wire cutters; smoke tubes with aspirator bulb; tin snips; duct tape; wettable cloths; and a bone saw (a serrated heavy-gauge wire with ring-type handles at each end);

7. A roll of six-mil polyethylene;

8. An encapsulant (tinted).

D. Removal procedures shall be conducted as follows:

1. A visual inspection of the pipe where the work will be performed shall be made to determine if any damaged pipe covering (broken lagging, hanging, etc.) exists. If there is, the pipe shall be wrapped in polyethylene plastic and fully secured with duct tape. This procedure will prevent high airborne fiber concentrations caused by the damaged pipe lagging, hanging several feet or yards away, from occurring during the glove bag work activity. Debris on the floor and other surfaces that have accumulated and contain asbestos must be cleaned up as necessary. If the pipe is undamaged, one layer of duct tape shall be placed around the pipe at each end of where the glove bag will be attached. This permits a good surface to which the ends of the glove bag may be sealed, and minimizes the chance of releasing fibers when the tape at the ends of the glove bag is peeled off at the completion of the job.

2. Slit the top of the glove bag open (if necessary) and cut down the sides to accommodate the size of the pipe (about two inches longer than the pipe diameter).

3. Place the necessary tools into the pouch located inside the glove bag. This will usually include the bone saw, utility knife, rags, scrub brush, wire cutters, tin snips and pre-cut wettable cloth. Cut out a donut shape in the cloth with the inner diameter one-half-inch smaller than the diameter of the pipe beneath the insulation. The outer diameter of the donut should be three inches longer than the diameter of the pipe insulation being removed. Finally, cut a slit in each of the two donuts so they can be slipped around the pipe.

4. One strip of duct tape shall be placed along the edge of the open top slit of the glove bag for reinforcement.

5. Place the glove bag around the section of material to be worked on and staple the top together through the reinforcing duct tape. Staple at intervals of approximately one inch. Next, fold the stapled top flap back and tape it down with a strip of duct tape. This should provide an adequate seal along the top. Next, duct tape the ends of the glove bag to the pipe itself, previously covered with plastic or duct tape (see step 1 above). The bottom seam of the glove bag shall be sealed with high quality duct tape or equivalent to prevent any leakage from the bag that may result from a defect in the bottom seam.

6. Using the smoke tube and aspirator bulb, place the tube into the

water sleeve (two-inch opening to glove bag). By squeezing the bulb, fill the bag with visible smoke. Remove the smoke tube and twist the water sleeve closed. While holding the water sleeve tightly, gently squeeze the glove bag and look for smoke leaking out, especially at the top and ends of the glove bag. If leaks are found, they shall be taped closed using duct tape and the bag shall be re-tested.

7. Insert the wand from the water sprayer through the water sleeve. Using duct tape, tape the water sleeve tightly around the wand to prevent leakage.

8. One person places their hands into the long-sleeved gloves while the second person directs the water spray at the work.

9. If the section of pipe is covered with an aluminum jacket, this is removed first using the wire cutters to cut any bands and the tin snips to remove the aluminum. It is important to fold the sharp edges in to prevent cutting the bag when it is placed in the bottom. A box may be put in the bottom of the bag when the tools are placed in, and the metal placed in the box to further protect the bag from being cut.

10. With the insulation exposed, using the bone saw, cut the insulation at each end of the section to be removed. Throughout this process, water is sprayed on the cutting area to keep dust to a minimum.

11. Once the ends are cut, the section of insulation should be slit from end to end using the utility knife. The cut should be made along the bottom of the pipe and water continuously supplied. Again, care should be taken when using the knife not to puncture the bag. Some insulation may have wire to be clipped as well. Again, a box may be used here as in step nine above to protect the bag from puncture.

12. Rinse all tools with water inside the bag and place back into pouch.

13. The insulation can now be lifted off the pipe and gently placed in the bottom of the bag, while the side of the insulation adjacent to the pipe is being thoroughly wetted.

14. Using the scrub brush, rags and water, scrub and wipe down the exposed pipe.
15. Wet the donut-shaped pieces of wettable cloth over the exposed ends of the insulation remaining on the pipe. An encapsulating sealer shall be applied to the substrate at this time.

16. Remove the water wand from the water sleeve and attach the small nozzle from the HEPA-filtered vacuum. Turn on the vacuum only briefly to collapse the bag.

17. Remove the vacuum nozzle, twist the water sleeve closed, and seal with duct tape.

18. From outside the bag, pull the tool pouch away from the bag. Place duct tape over the twisted portion and then cut the tool bag from the glove bag, cutting through the twisted/taped section. In this manner, the contaminated tools may be place directly into the next glove bag without cleaning. Alternatively, the tool pouch with the tools can be placed in a bucket of water, opened underwater, and the tools cleaned and dried without releasing asbestos into the air. Rags and the scrub brush cannot be cleaned in this manner and should be discarded with the asbestos waste.

19. With removed insulation in the bottom of the bag, twist the bag several times and tape it to keep the material in the bottom during removal of the glove bag from the pipe.

20. Slip a six-mil disposal bag over the glove bag (still attached to the pipe). Remove the tape and open the top of the glove bag and fold it down in to the disposal bag.

21. All surfaces in the work area shall be cleaned using disposable cloths wetted with amended water. These cloths shall be disposed of or rinsed thoroughly to eliminate visible accumulation of debris. Then, when these surfaces have been allowed to dry, all surfaces shall be cleaned again using a HEPA filtered vacuum.

22. Place any contaminated articles, debris, etc. into the bag with the waste.

23. Twist the top of the bag closed, fold this over, and seal with duct tape. Place this bag into a second six-mil disposable bag, and seal as in the above manner. Label the bag with a warning label.

24. Asbestos containing material shall be disposed of in accordance with regulatory requirements.

25. Air sampling shall be performed after completion of glove bag operations to determine if undetected leakage occurred. Once the area has been found to be safe for re-entry by unprotected personnel, the barriers may be removed.

5.a.2 PROCEDURES FOR ASBESTOS ABATEMENT IN STRUCTURALLY UNSOUND BUILDINGS/STRUCTURES

As a result of the condition of many of the buildings/structures on this site being structurally unsafe to enter, many of the convention asbestos-abatement work area isolation and engineering controls will not be able to be followed. It will be virtually impossible in many instances to create a full, negative-pressure enclosure to perform much of the asbestos abatement work.

This will apply to certain materials identified by TTI Environmental, Inc. as being asbestos-containing as well as any suspect asbestos-containing building materials, such as the suspect boiler insulation material identified in Building 6A, that may be found during the demolition process of structurally unsound buildings/structures.

USAEMI licensed asbestos workers will need to work in conjunction with the demolition contractor to segregate potential or previously identified asbestos-containing materials in these building/structures to properly containerize and dispose of these materials to the greatest extent possible.

This may involve the loaded of possible asbestos-contaminated debris directly into lines containers (lined with special bladder bags) for disposal as asbestos-contaminated. This will need to be determined on a case-by-case basis per location.

The following procedures as stated previously will still be followed:

1. ***Personnel Decontamination Unit (PDU) – a function unit shall be constructed at a remote location but in close proximity to the abatement work being performed for worker decontamination.***

2. ***Workers will use Personal Protective Equipment (PPE) as noted previously, including proper respiratory protection.***

3. ***Work areas shall be locally isolated using asbestos warning tape and OSHA asbestos warning signs to the greatest extent possible and as required.***

4. ***Identified and suspect asbestos-containing and/or contaminated materials shall be wetted during removal and remain wet while placed into disposal containers.***

5. ***All asbestos-containing waste materials shall be properly disposed and waste shipment records provided for each load.***

5.B WASTE DECONTAMINATION UNIT (WDU)

A. Water to be decontaminated will be pumped by a sump pump.

B. Water to be decontaminated will be filtered in two phases. The first phase will consist of filtering out particles 50 micrometers and larger. The second and final phase will filter the contaminated water of particle 5 micrometers and larger.

C. Water filtration equipment and procedures shall comply with 29 CFR 1910.14 (d) (3).

5.C WORK AREA DECONTAMINATION & CLEANUP

A. Gross removal shall be considered complete when no visible clumps of asbestos-containing material remain on the surface. All surfaces from which ACM was removed shall be thoroughly scrubbed with a scrub pad and mild soap solution, and wet-wiped with amended water. Special attention should be given to small horizontal surfaces, cracks and penetrations. After cleaning and successfully passing a final visual inspection by a representative of Contracting Officer, the surface will be coated with a penetrating sealant that locks all invisible residual fibers in place. Plastic sheeting on critical openings shall also be coated with a mist of the sealant.

B. Only upon receipt of final clearances report from the TEM analysis laboratory, can the containment barrier, Personnel Decontamination Unit (PDU) unit, and negative air pressure units may be removed.

C. The following decontamination procedures must be accomplished utilizing Personal Protective Clothing:

1. Air filtration system shall continue to operate to provide air changes as specified and exhausted air shall be monitored.
2. All unnecessary equipment and supplies shall be properly cleaned (or bagged for transporting to another containment and removed from the containment area).
3. After completion of cleaning operation, but before the final air clearance tests, a representative of Contracting Officer will conduct a complete visual inspection of the work area to ensure that it is dust free in accordance with ASTM E 1368. The Contracting Officer may choose to be present. If visual inspection fails, then the Contractor shall re-clean as necessary and conduct more inspections until all has passed.
4. After passing of the visual inspection, USAEMI shall spray coat all surfaces with a bridging encapsulant. The surfaces to be coated shall include, but are not limited to, surfaces from which asbestos containing materials have been removed and polyethylene which has been used to cover critical barriers, and furnishing and non-removable fixtures.
5. Upon passing of the final visual inspection, the IHT shall perform aggressive final air testing. The concentration of asbestos fibers shall not exceed 0.005 fibers per structures when analyzed via by TEM, Transmission Electron Microscopy.
6. Aggressive air sampling will be used. If the test results exceed the limits specified clean-up and test results repeated until compliance is achieved. The negative air units must be operated during re-cleaning.

7. The IHT shall certify, in writing, that the concentration of airborne fibers in control area is less than 0.01 f/cc. Do not remove the asbestos control area enclosure or roped off perimeter and caution signs prior to the Contracting Officer’s receipt of the Industrial Hygienist certification.
8. After final clean-up, remove filters on the buildings' HVAC system and provide new filters. Dispose of filters as asbestos contaminated materials. Re-establish HVAC, mechanical and electrical systems in proper working order.

6. WASTE TRANSPORTATION, DISPOSAL & PROJECT CLOSE-OUT

6.A BAGGING AND STORAGE

A. During removal, all asbestos waste (and other contaminated materials such as disposable clothing, polyethylene sheeting, etc.) must be accumulated and placed into sealed impermeable bags/containers of 6 mil thickness. The bags/containers must be pre-printed, or labeled, with the required labeling information that clearly identifies the waste as "ASBESTOS", and informs the reader of associated hazards. The DOT asbestos identification number NA 2212, as well as the name and address of the generator must also be indicated on the label.

B. All materials must be placed into the bag, while still being wet to avoid release of excessive fibers during the bagging process; and once inside the bags, materials should be further wetted.

C. Effort should be made to eliminate air pockets inside sealed bags to prevent rupture under pressure. Special caution to packing of sharp-edged materials should be exercised; drums may be used and/or sharp materials may be encapsulated and then wrapped in plastic sheeting.

D. An enclosed area for bag removal (waste/equipment Personnel Decontamination Unit (PDU)) must be constructed, when feasible, adjacent to the regulated work area. In this area, all asbestos waste, contaminated water, scrap, debris, bags, containers, equipment and contaminated clothing, shall be collected and placed in sealed leak-tight containers (e.g. double 6 mil poly plastic bags), sealed 6 mil double poly sheets, sealed fire-board boxes, drums, barrels or other approved containers.

E. Materials will be double bagged (and/or placed in containers), sealed with goose-neck ties and tape, and decontaminated (by vacuuming and/or wet-wiping) prior to being passed into the ambient atmosphere.

F. Workers bagging and loading bags shall be fully suited in disposable clothing and must wear respiratory protection.

G. Pre-filters from the buildings HVAC shall be changed (and disposed of as ACM) after removal and clearance but before the HEPA Negative Air Machines are turned off.

H. Any debris or residue observed on containers or surfaces outside of the work area resulting from clean-up or disposal activities shall be immediately HEPA vacuumed and/or wet-wiped as appropriate.

I. The container used for the storage of contaminated waste shall be an enclosed 30 cu. yd. dumpster. The dumpster shall have a solid metal roofing, solid metal door with padlock; open top dumpsters will not be permitted. The container shall be layered with 6 mil plastic sheeting all around.

J. The location of the dumpsters shall be at the direction of the BCE and the Contracting Officer.

K. No materials shall be thrown from the windows or the doors of buildings.

L. Interim storage of asbestos waste bags/drums shall not be permitted outside the work area (with the exception of a dumpster) without the prior approval of the BCE and the Contracting Officer.

6.B WASTE TRANSPORTATION

A. Where applicable laws exist, asbestos waste must be transported from the job site to the landfill by a licensed Asbestos Transporter/Hauler. The transporter must possess a valid Hauler permit, obtainable from the Department of Health or other appropriate agency. Additionally, each hauling vehicle must, wherever applicable, be registered as an Asbestos-Hauling vehicle. A warning and Department of Transportation (DOT) label shall be affixed or preprinted on each bag.

B. Procedure for hauling of asbestos waste shall comply with 40 CFR 61, Subpart M, 40 CFR 241 and 257, and State, regional and local standards.

C. When moving bags/containers, the Contractor shall utilize hand trucks, carts and proper lifting techniques to avoid injuries.

D. All routes through the building (hallways, elevators, stairways, etc.) to be used for the transportation of contaminated waste shall be at the direction of the BCE and/or the Contracting Officer.

E. Personnel loading asbestos shall wear personal protective clothing, half-face air-purifying HEPA-equipped respirators.

6.C WASTE DISPOSAL

A. Procedure for disposal of asbestos waste shall comply with 40 CFR 61, Subpart M, 40 CFR 241 and 257, and State, regional and local standards.

B. All asbestos waste shall be taken to a landfill that is licensed and qualified to accept asbestos for final burial. For small loads and wherever applicable, asbestos waste may be hauled to a branch location to be individually manifested, but accumulated with other loads. Eventually, but within 100 hours, the waste will be transported to the landfill.

C. Upon reaching the landfill, trucks/haulers shall approach the dump location as closely as possible for unloading of the asbestos containing waste.

D. Personnel unloading containers at the disposal site shall wear personal protective clothing and respiratory protection.

E. All non-asbestos debris generated at the site shall be segregated from the asbestos waste. Non-asbestos waste shall be removed daily and the premises left neat and

cleaned at the end of each work shift Special attention shall be given to restricting the spread of dust and debris within the regulated work area.

6.D MANIFESTING

A. For every load of asbestos waste, copies of delivery ticket, shall be prepared, signed and dated by an agent of the landfill, certifying the amount of asbestos materials delivered. The Contracting Officer shall receive copies of this within 3 working days after delivery.

B. The manifest shall indicate the names and addresses of the facility owner (generator), the transporter, and landfill, the specific identification numbers to each of the above, as well as the DOT identification number NA 2212 and the contract number, and the type, percentage of asbestos and quantity of waste.

6.E CLOSING DOCUMENTATION

A. The following items must be submitted to the Contracting Officer before payment is made to USAEMI and approved post submittal.

B. Copies of the daily log beginning on commencement of the work through final clearance showing: the name of the person, the date, entering and leaving time and type respirator used for all persons who enter the work area (submitted weekly).

C. Manifest(s) signed by the landfill operator with date or information on the material delivered and quantity.

D. Air sampling sheets and laboratory results from OSHA compliance sampling on workers, areas and backgrounds.

E. Any other documents required by the Contract Documents and Contracting Officer.

7. EMPLOYEE TRAINING PROGRAM

A. USAEMI Employees are trained in the proper handling of and protection against Asbestos Containing Materials are currently certified under US EPA-AHERA.

B. All USAEMI workers and supervisors hold appropriate asbestos State certifications and valid licenses.

C. All USAEMI employees will receive at least an 8 hour refresher course annually for the original and appropriate certification obtained.

D. All USAEMI employees understand the health implication and risks involved in the handling of Asbestos-Containing Materials, and have signed a Worker's Risk Acknowledgment form.

E. All USAEMI employees are given a Respiratory Fit Test at least every six months by a company designated Competent Person.

8. EMERGENCY PROCEDURES

8.A POWER FAILURE

A. Should a loss of power occur, all work will be stopped and the occupants evacuated until power can be restored. An attempt will be made to restore power by resetting electrical circuit breakers, replacing fuses, and checking extension cord connections.

B. If power cannot be restored within one hour an emergency generator will be brought on line, and an electrician called to restore power.

NOTE: All power to the work area must be from a GFIC (Ground Fault Interrupt Circuit).

C. Removed ACM is to be misted with amended water to keep from drying and becoming more friable, and should be bagged if possible.

D. The air inside the work area will also be misted with amended water.

E. Containment is to remain intact, and the flaps of the Personnel Decontamination Unit (PDU) entrance sealed after last person leaves the work area.

8.B FAILURE OF NEGATIVE AIR

A. In the case of power failure to the negative air filtration machines, follow power failure responses above.

B. For occupied buildings, if power is not restored in 30 minutes, an emergency generator will be brought on line until power is restored.

C. Removed ACM is to be misted with amended water to keep from drying and becoming more friable, and should be bagged if possible.

D. The air inside the work area will also be misted with amended water.

E. At least one backup air filtration machine must be on job site, in case a machine fails to provide its required negative pressure.

8.C EMERGENCY EXIT PLAN

The Emergency Exit Plans for each building will be developed in accordance with 29 CFR 1910.37 and 29 CFR 1910.38.

A. Emergency and fire exit plans will be made for each work area of the project. Personnel will be trained and drilled on proper emergency exit procedures. These procedures and routes in a simple sketch of the building will be posted in the clean room of the Personnel Decontamination Unit (PDU) chamber along with emergency

telephone numbers. Prior to commencing asbestos removal, the Contractor's Competent Person shall clearly identify and train to all workers on the emergency and fire exits from the work area. These exits will be maintained on a routine basis.

B. Mark exits from work area and post directional arrows according to plan when exits are not visible from remote work areas. This can easily be done by using duct tape on polyethylene walls and barriers.

C. NOTE: Some emergencies are considered greater than an asbestos hazard; thus, Personnel decontamination procedures may be bypassed and containment breached for the health and safety of the workers during a fire emergency.

D. The supervisor will establish a system for alerting workers of a fire or other emergencies requiring evacuation of the work area. All persons entering the work area should be familiar with this evacuation alarm signal and the primary and secondary exits.

E. In case of a medical emergency, aid shall be rendered to a seriously injured worker without delay. Pathway shall be cleared for medical personnel; and someone should be instructed to guide the medical team to the scene. Moreover, proper Personnel decontamination procedures to exit from the work area is not required, but recommended whenever possible.

F. When an emergency should occur, abatement will cease, but engineering control methods such as wet-methods and negative air pressure shall resume to prevent the potential of fiber release into non-contaminated areas.

8.D FIRE EMERGENCY RESPONSE

This Fire Response Plan has been developed in accordance with 29 CFR 1926.150, 29 CFR 1926.151, and 29 CFR 1910.38.

A first aid kit along with a fire extinguisher will be located in the clean room of the Personnel Decontamination Unit (PDU) chamber at all times.

A. In case of fire emergency, cease all work activities and pull the nearest fire alarm, alert your fellow workers and evacuate the work site in an orderly fashion through the nearest emergency/fire exit.

B. NOTE: A fire hazard is considered greater than an asbestos hazard; thus, Personnel decontamination procedures may be bypassed and containment breached for the health and safety of the workers during a fire emergency.

C. Contact the fire department immediately (Emergency numbers will be posted in the clean room of Personnel Decontamination Unit (PDU). Dial 911 if necessary.

8.E MEDICAL EMERGENCY RESPONSE

This Medical Emergency Plan has been developed in accordance with 29 CFR 1926.150.

A first aid kit along with a fire extinguisher will be located in the clean room of the Personnel Decontamination Unit (PDU) chamber at all times.

A. In the case of life-threatening emergency, pull the nearest fire alarm, alert your fellow workers and take the nearest exit out, disregarding all critical barriers.

B. In case of injury, assist your fellow worker through the Personnel Decontamination Unit (PDU) chamber. Then call the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU).

C. In the case of life-threatening injury, disregard critical barriers and take injured person through the nearest exit out. Then call the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU).

D. In case of heat stroke or exhaustion, assist your fellow worker through the Personnel Decontamination Unit (PDU) chamber. Instruct someone to call the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU), and proceed by first aid procedures aimed to decrease body temperature.

8.F BREECH OF THE ENCLOSURE AND EMERGENCY CLEAN-UP

A. Breech in the enclosure shall be repaired immediately after acknowledgment.

B. Affected area shall be evacuated, if occupied, by and at the direction of the CIH and the Contracting Officer.

C. All HVAC systems servicing the affected area will be shut down or temporarily modified as instructed by the CIH and/or Contracting Officer.

D. USAEMI shall respond immediately to the directions of the CIH and the Contracting Officer.

E. All personnel entering the affected area shall be required to wear full body protective coveralls and respiratory protection as described in this asbestos abatement plan.

F. USAEMI shall seal off the area by closing all doors and posting warnings signs along the perimeter of the area, and allow entrance to area only to necessary personnel.

G. USAEMI shall install HEPA negative air units (vented to the outside) in the affected area during clean-up operations.

H. Any damaged ACM shall be repaired to the satisfaction of the CIH, IHT and/or the Contracting Officer, or USAEMI shall remove the asbestos to the extent indicated.

I. The entire area shall be cleaned via HEPA vacuum and wet-wiping techniques starting from the uppermost areas and working down to ground level. All items in the affected

area are to be thoroughly cleaned and decontaminated (or properly disposed as asbestos contaminated), including all light fixtures, HVAC system, books, personal items, etc., to the satisfaction of the CIH, IHT and/or the Contracting Officer.

J. Dispose of all debris, filters, mop-heads, and cloths in sealed, leak-tight, appropriately labeled containers as asbestos-containing materials.

K. The IHT will provide air monitoring during and after clean-up operations. This will include air sampling and surface dust sampling to ensure that all asbestos fibers have been removed from the area. Airborne concentrations shall not exceed 0.010 Fiber/cc of air when analyzed by NIOSH Method 7400. Should analysis show concentrations above this level or surface dust samples reveal the presence of asbestos. USAEMI will re-clean the entire work area immediately until it meets the standards listed herein.

APPENDICES

SITE/HAUL ROUTE PLAN

ACCESS AND HAUL ROAD PLAN

1. All areas of the project including doorways, stairs, garages, grounds, driveways and rooms are to be kept clear of debris at all times. Danger - Hard Hat Areas signs will be posted.

2. All roadways and sidewalks are to be kept clear and open. Speed limits will be strictly observed.

3. The Contractor will be responsible for snow removal and/or ice removal within his work area while under construction.

4. During work hours all doors in each unit under construction is to be kept unlocked and in working order.

5. Roof is to be accessed well away from all overhead utilities. Special conditions are to be observed at utility and service runs.

It will be the Superintendent and Project Safety Officer's responsibility to maintain this plan.

Safe means of access and egress shall be provided and maintained to all working places. All passageways, stairways, gangways and access ways shall be kept free of materials, debris, and obstructions at all times.

Appropriate signage will be posted to inform employees of particular hazards throughout the project. Following each Phase-Hazard Analysis review, other notices will be posted as necessary.

Under the direction of the Project Safety Officer each superintendent and foreman will have the responsibility of observing any safety deficiencies regarding access/egress and taking what measures are necessary to remove these hazards in a timely fashion. Housekeeping is considered to be a cooperative effort.

In addition to the specific sections of EM385-1-1 Manual, OSHA Standards, BOCA and other pertinent codes, the following standards will be highlighted.

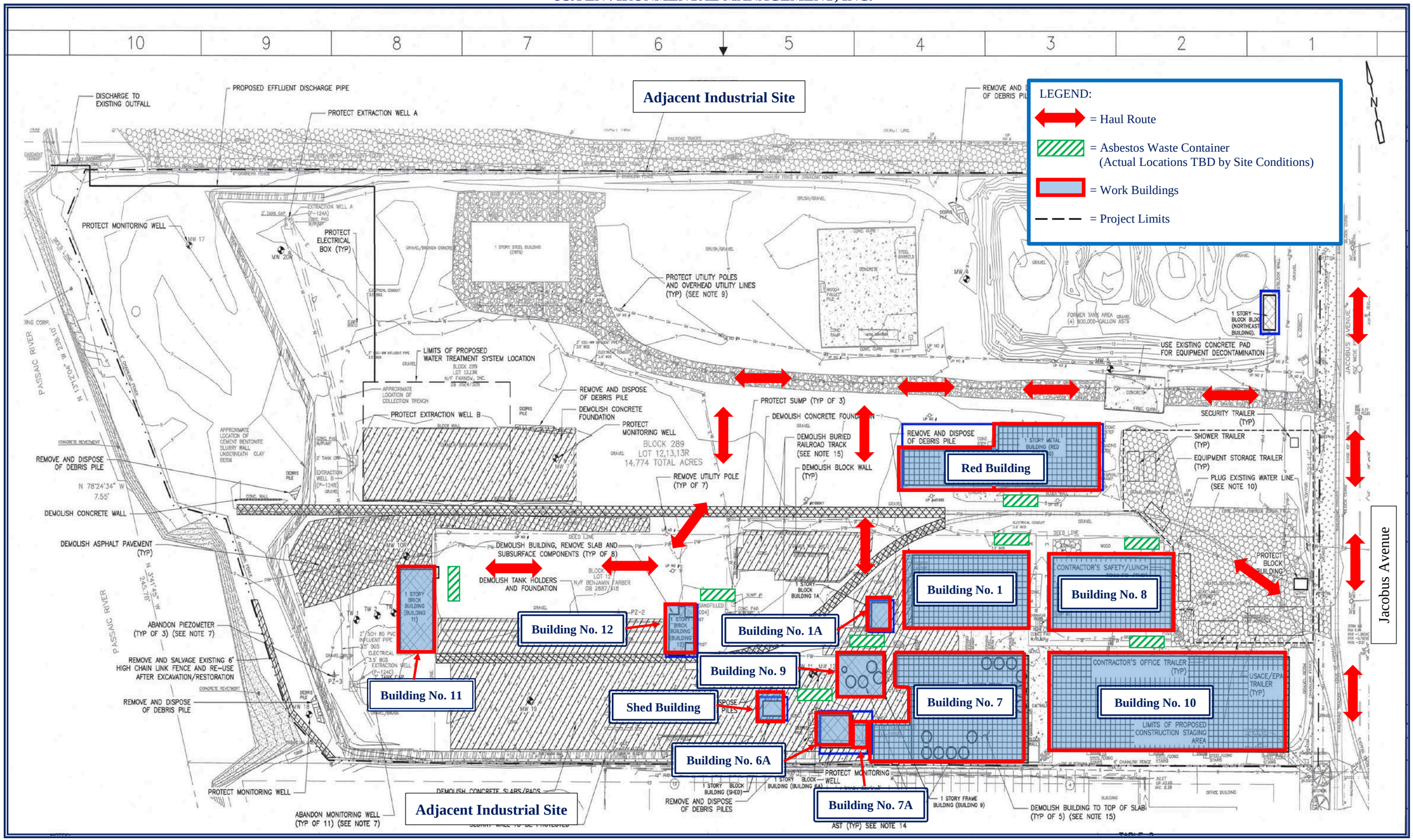
> Self-propelled equipment that is to be used on the project will be inspected upon arrival at the project to determine that it is in a safe operating condition, will meet the required safety standards and is approved for use by the Contracting Officer.
>
> Equipment shall be inspected daily by the Project Safety Officer. Equipment defects affecting safety will be noted and shall be corrected before the equipment is used. This determination shall be made by the Project Safety Officer or his designee.

Operators shall be certain, by signal or other means that all persons are clear before starting or moving equipment.

Equipment operating speeds shall be consistent with conditions of roadways, grades, clearance, visibility, traffic, and the type of equipment used. Mobile equipment operators shall have full control of the equipment while it is in operation.

Mobile equipment will be equipped with an automatic back-up alarm warning devices.

Roll-over protective structures (ROPS) will be used in accordance with the appropriate standards referenced in OSHA Standards.



Syncon Resins Superfund Site – Site Plan/Haul Routes for Asbestos Abatement Work

Typical Asbestos Work Area Isolations

and/or Control Area Statement

USA Environmental Management, Inc.
Environmental ♦ Engineering ♦ Construction

TYPICAL ASBESTOS WORK AREA ISOLATIONS AND/OR CONTROL AREAS

USA Environmental Management, Inc. (USAEMI) has included in the Asbestos Abatement and Disposal Plan diagrams of potential work area isolations and/or control areas that may be applicable to certain areas of asbestos abatement on this project.

While the diagrams show a schematic of a typical full work area isolation enclosure (Diagram No. 1), it should be noted here that this type of setup may in fact be impossible to create based upon the existing condition of the structures on this site.

It will be more likely that the localized work control area approach (Diagram No. 2) will be the method of choice given the working conditions. This approach could be used not only for miscellaneous pipe/fitting insulation abatement work using the Glove Bag removal technique but also for the areas involving the removal of asbestos-containing roofing material and window glazing as well.

Each approach will be modified as necessary based on the condition of the structure as well as the location within the structures and types of asbestos-containing material to be abated.

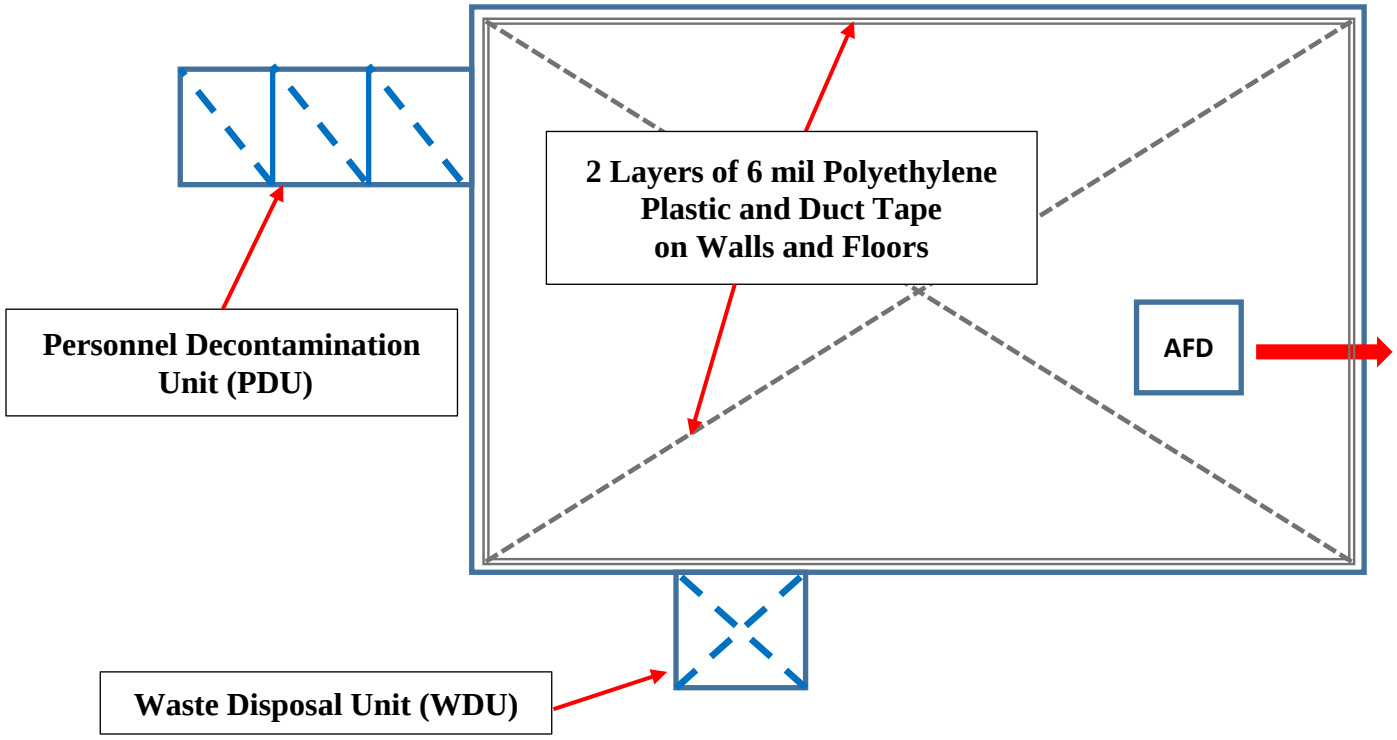
8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Tel: (215) 365-5810 ♦ Fax: (215) 365-5870 ♦ Web: www.usaemi.com

Typical Asbestos Work Area Isolations

and/or Control Area Diagrams

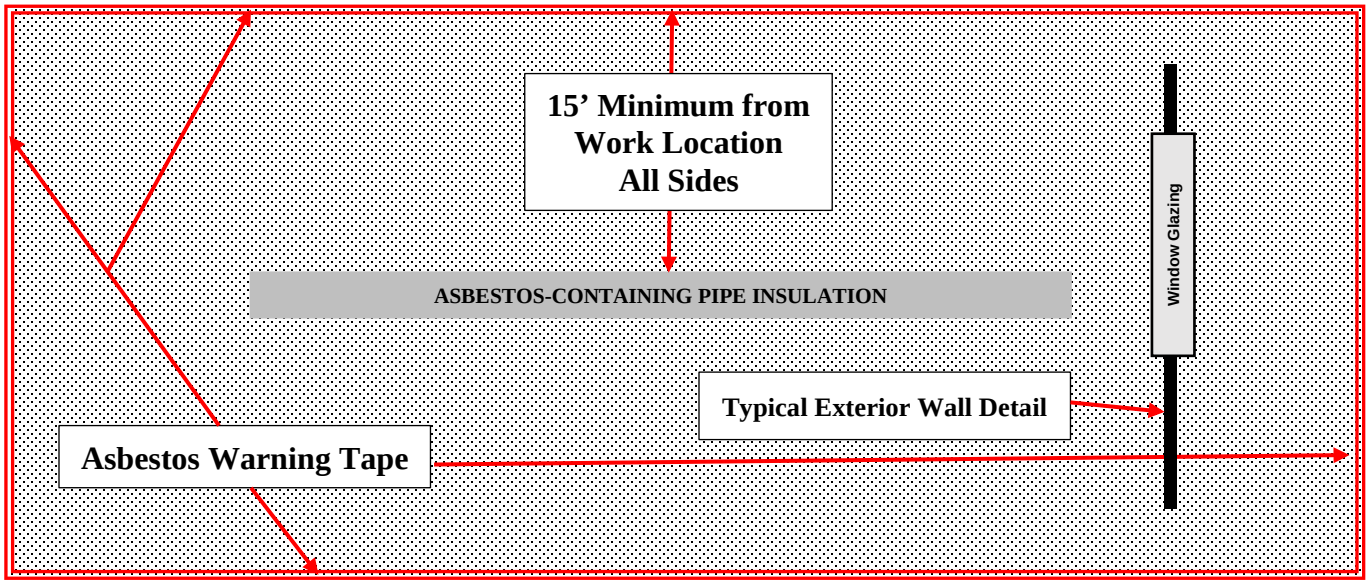
Full Enclosure Work Area (Schematic Diagram)

Diagram No. 1



Localized Asbestos Abatement Control Area

Diagram No. 2



Pipe/Fitting Insulation -
Roofing Material -
Window Glazing -

FIRE PREVENTION PLAN

Fire Prevention and Protection Plan:

Recommendations of NFPA shall be complied within situations not covered by EM 385-1-1 Safety Manual. Local BOCA Building Code is referenced for further protective measures. The more stringent codes shall apply.

Prior to the start of work, arrangements shall be made for fire protection, ambulance service, medical facilities to be available for prompt attention to the injured and consultation on occupational health.

Emergency medical response teams and full treatment hospital facilities are available within approximately seven miles of the project and response time is considered to be less than twenty minutes.

Fire and rescue response team is available within approximately .5 miles with minimal emergency response time. Notification will be given to the appropriate response crews as to location and expectations at the project site.

Emergency rescue crews will be apprised of emergency circumstances and will be met and directed at the site access for further direction.

Fire fighting equipment, which is provided on the project site, shall be strategically located, and readily accessible, plainly marked, properly maintained and inspected periodically. Records shall be kept of such inspections. Equipment shall be of the appropriate type, adequate in number and size for the particular fire hazard involved.

Flammable and combustible liquids shall be in a storage building. They shall be in a posted NO SMOKING area and separated from combustible construction and other stored materials by 50 feet.

Accumulation of flammable and combustible liquids on floors, walls, etc., shall be cleaned up immediately.

Air Monitoring Protocol

Air Monitoring Statement

USA Environmental Management, Inc.
Environmental ♦ Engineering ♦ Construction

OSHA WORKER EXPOSURE MONITORING

USA Environmental Management, Inc. (USAEMI) will self-perform all OSHA required personal exposure monitoring for workers performing asbestos abatement work on this project.

Samples will be acquired per OSHA requirements and a Chain-of-Custody (COC) completed for each sample group. Samples along with the COC will be submitted to a 3rd party analytical laboratory specializing in asbestos air sample analysis.

The laboratory to be used for this purpose on this contract is as follows:

EMSL Analytical, Inc.
200 Rt. 130 North
Cinnaminson, New Jersey

Office: 1-800-220-3675
Fax: (856) 786-5974

USAEMI will perform all required initial exposure assessments and ongoing exposure assessments as required by the OSHA regulation 29 CFR 1926.1101 Asbestos Standard on this project.

Please note that all other monitoring of the asbestos abatement being performed by USA Environmental Management, Inc. on this project, other than our required OSHA Worker Exposure Monitoring/Analysis, shall be performed by OTHERS.

Employee Exposure Monitoring Program

EMPLOYEE EXPOSURE MONITORING PROGRAM

Any time fiber concentrations do exceed or will most likely exceed the PEL, USAEMI will establish a regulated work area in order to control airborne concentrations of fibers. Persons entering the area are required to wear personal protective clothing and proper respiratory protection. Employee exposure monitoring will be performed in accordance with Section A below.

Personal monitoring measures the airborne fibers in the worker's breathing zone. Area monitoring measures the airborne fibers inside an enclosure as well as outside the enclosure to ensure that contaminated fibers do not enter the "clean" areas.

1. Definitions

a) The Permissible Exposure Limit (PEL) means airborne concentrations of asbestos of 0. 1 fibers/cubic centimeter as measured over an 8-hour, time-weighted average (TWA). Note: this was changed from 0.2 f/cc under the revised asbestos standards in the August 12, 1994 Federal Register;

b) The Excursion Limit (EL) means airborne concentrations of asbestos of 1.0 f/cc as averaged over a 30-minute period.

Note: The Action Level which was 0.1 f/cc, was eliminated under the revised asbestos standards in the August 12, 1994 Federal Register.

2. Employee Air Monitoring Program

Personal samples shall be collected with a low constant-flow pump and open-face filter cassette. Air flow rates shall be between 0.5 liters/min. and 2.5 liters/min. when using a 25-ram cassette. The cassette shall be attached to the pump with a length of plastic tubing. The cassette will be pinned, clamped or otherwise securely attached on the forward part of the shoulder of a worker in an acceptable manner. The person being monitored shall be the person with the greatest risk of encountering asbestos fibers. The sample will be taken in the breathing zone of the worker, six (6) to nine (9) inches forward of the shoulders. The cassette's exposed filter surface shall be positioned so that it points downward. The pump shall remain attached to the body of the worker and shall run until conditions as described are met to produce a filter fiber density of 100 to 1,300 fibers per square millimeter in accordance with 29 CFR 1926.1101, Appendix B, which follows.

At a minimum*, 5 samples will be run:

- 2 work area (1 sample for each shift, for each employee in each job classification in each work area)

- 1 short term exposure limit (EL or ST.EL.) (30 mins.)
- 2 field blanks

*if fiber concentrations are higher, 2 cassettes per shift are recommended.

A. Sampling is performed as follows:

1. *Initial Monitoring:* At the initiation of each asbestos job, to accurately determine the airborne concentrations of asbestos fibers, USAEMI will perform initial monitoring. The exception is when employee exposure limits obtained during workplace operations conducted under workplace conditions closely resembling the processes, type of ACM, control methods, removal procedures and environmental surroundings, etc., indicate limits acceptable for respiratory protection used; and if product or material information of ACM demonstrates that airborne fibers cannot exceed the EL.

2. *Periodic Monitoring* USAEMI will perform daily monitoring that is representative of the exposure of each employee within the regulated area. Periodic monitoring is not required when using supplied-air respirators in the positive-pressure mode.

3. *Termination of Periodic Monitoring* when the periodic monitoring indicates that employee exposure is below the exposure level, employee monitoring may be halted, only the for the employees whose exposures are represented by data gathered.

4. *Additional Monitoring* whenever there is a change in the process or control methods/equipment used during abatement, periodic monitoring must be initiated again, until representative data is gathered indicating airborne fibers are under the and EL.

5. *Method of Monitoring all* samples taken under this employee monitoring program are personal samples, collected following procedures set forth in 29 CFR 1926.1101, Appendix B. Only those portions associated with Method of Sampling are provided, as follows:

3. Detailed Procedure for Asbestos Sampling and Analysis-Non Mandatory.

Asbestos Sampling

Technique: Microscopy, Phase Contrast.

Analyte: Fibers (Manual count)
Sample Preparation: Acetone/triacetin method.
Calibration: Phase-shift detection limit about 3 degrees.
Range: 100 to 1300 fibers/ram-2 filter area.

Estimated Limit of Detection: 7 fibers/mm-2 filter area.
Sampler: Filter (0.8-1.2 um mixed cellulose ester membrane, 25-mm diameter).
Flow rate: 0.5 L/min to 2.5 L/min (25-mm cassette); 1.0 L/rain to 2.5 L/min (3 7-mm cassette).
Whenever a 37-mm cassette is used, a written justification must accompany the test results. Sample Volume: Adjust to obtain 100 to 1300 fibers/ram-2. Shipment: Routine.
Sample Stability: Indefinite.
Blanks: 10% of samples (minimum 2).
Standard Analytical Error: 0.25.

Applicability: the working range is 0.02 f/cc (1920-L air sample) to 1.25 f/cc (400-L air sample). The method givens an index of airborne asbestos, fibers but may be used for other materials such as fibrous glass by inserting suitable parameters into the counting rules. The method does not differentiate between asbestos and other fibers. Asbestos fibers less than ca. 0.25 um diameter will not be detected by this method.

Interferences: any other airborne fiber may interfere since all particles meeting the counting criteria are counted. Chain-like particles may appear fibrous. High levels of nonfibrous dust particles may obscure fibers in the field of view and raise the detection limit. Reagents:

1. Acetone.
2. Triacetin (glycerol triacetate), reagent grade.

Special Precautions

Acetone is an extremely flammable liquid and precautions must be taken not to ignite it. Heating of acetone must be done in a ventilated laboratory fume hood using a flameless, spark-free heat source.

Equipment

1. Collection device: 25-mm cassette with 50-mm electrically conductive extension cowl with cellulose ester filter, 0.8 to 1.2 nun pore size and backup pad.

   NOTE: Analyze representative filters for fiber background before use and discard the filter lot it more than 5 fibers/100 fields are found.

2. Personal sampling pump, greater than or equal to 0. 5 L/min, with flexible connecting tubing.

3. Microscope, phase contrast, with green or blue filter, 8 to 10 X eyepiece, and 40 to 45X phase objective (total magnification ca 400X); numerical aperture=0.65 to 0.75.

4. Slides, glass, single-frosted, pre-clean, 25 X 75 mm.

5. Cover slips, 25X25 mm, no. 1-1/2 unless otherwise specified by microscope manufacturer.
6. Knife, #1 surgical steel, curved blade.

7. Tweezers.

8. Flask, Guth-type, insulated neck, 250 to 500 ml (w/single-nosed rubber stopper and elbow-jointed glass tubing, 16 to 22 cm long).

9. Hotplate, spark-free, stirring type; heating mantle; or infrared lamp and magnetic stirrer.

10. Syringe, hypodermic, with 22-gauge needle.

11. Graticule, Walton-Beckett type with 100 um diameter circular field at the specimen plane (area-0.00785 mm-2). Type G-22. The graticule is custom-made for each microscope.

12. HSE/NPL phase contrast test slide, Mark II. 13. Telescope, ocular phase-ring centering. 14. Stage micrometer (0.01 mm divisions).

Sampling

1. Calibrate each personal sampling pump with a representative sampler in line. Flow rates shall be between 0.5 liters/min. and 2.5 liters/mm. when using a 25-mm cassette. A 37-mm cassette may be used if necessary, but written justification must accompany the sampling results.

2. Fasten the sampler to the worker's lapel as close as possible to the worker's mouth. Remove the top cover from the end of the cowl extension (open face) and orient face down. Wrap the joint between the extender and the monitor's body with shrink tape to prevent air leaks.

3. Each set of samples taken will include 10% field blanks or a minimum of 2 field blanks. These blanks will come from the same lot as the filters used for sample collection. The field blank results will be averaged and subtracted from the analytical results before reporting. A set consists of any sample or group of samples for which an evaluation is made. Any samples represented by a field blank having a fiber count in excess of the detection limit of the method Being used will be rejected. Remove the caps from the field blank cassettes and store the caps and cassettes in a clean area (bag or box) during the slumped period. Replace the caps in the cassettes when sampling is completed.

4. Sample at 0. 5 L/min or greater. Do not exceed 1 mg total dust loading on the filter. Adjust sampling flow rate, Q (L/min), and time to produce a fiber density, E (fibers/mm-2), of 100 to 1300 fibers/m-2 [3.85 X 10-4 to 5 X 10-5 fibers per 25-ram filter with effective collection area (Ae=385 mm-2)]. Calculate the minimum slumped time at the EL (f/cc) of the fibrous aerosol being sampled.
5. Remove the field monitor at the end of sampling, replace the plastic top cover and small end caps, and store the monitor.

6. Ship the samples in a rigid container with sufficient packing material to prevent jostling or damage. Do not use polystyrene foam in the shipping container because of electrostatic forces, which may cause fiber loss from the sample prefilter.

B. Reporting is performed as follows:

(a) Affected employees are notified as soon as possible following receipt of monitoring results, in writing, as follows:

(i) individually;
(ii) job-site posting; or
(iii) centrally located place accessible to all affected employees.

(b) If the monitoring results indicate fiber levels at or exceeding either the PEL or the excursion limit, the written notification will include the corrective action being taken to reduce the exposure levels to or below the PEL or excursion limit.

(c) Samples of Personnel Monitoring Reports for Asbestos and Lead exposure follow.

C. Observation of Monitoring

1. Any affected employee or his/her designated representative has an opportunity to observe USAEMI's employee exposure monitoring. USAEMI will provide all necessary personal protective clothing and respiratory equipment.

Asbestos Personal Exposure Monitoring Report

SAMPLE

USA Environmental Management, Inc. Run Date: 1/20/2004

Personnel Monitoring Record

ASBESTOS

Contract No. : DACW61-00-C-0044
Project Name : Roof Replacement - Bldg. 52
Project Phase/Location : Fort Mifflin Distribution Center, Philadelphia, PA

Sampling Date: 12/16/1998 **Certificate of Analysis Date:** 1/6/1999
Employee : John Doe SS # : 000-00-0000 Crew Size: 6

Sample No.	Activity	Analysis Result (f/cc)	Time (minutes)	Calculation
0-1-1	Boiler Ins. Rem.	0.240	30	7.200
0-1-2	Boiler Ins. Rem.	0.040	120	4.800
0-1-3	Boiler Ins. Rem.	0.023	180	4.140
-	Lunch	0.000	45	0.000
-	Suitups Outside	0.000	105	0.000
				0.000
		Total Time:	[illegible] TOTAL	16.140
	TWA Divisor =	480	TWA	**0.034** f/cc
			30 Minute Excursion	**0.240** f/cc

Sampling Date: 12/17/1998 **Certificate of Analysis Date:** 1/6/1999
Employee : John Doe SS # : 000-00-0000 Crew Size: 6

Sample No.	Activity	Analysis Result (f/cc)	Time (minutes)	Calculation
1-1-1	Removal Cleanup	0.360	30	10.800
1-1-2	Removal Cleanup	0.021	150	3.150
1-1-3	Removal Cleanup	0.013	240	3.120
-	Lunch	0.000	45	0.000
-	Suitups Outside	0.000	15	0.000
				0.000
		Total Time:	480 TOTAL	17.070
	TWA Divisor =	480	*TWA*	**0.036** f/cc
			30 Minute Excursion	**0.360** f/cc

Sampling Date: **Certificate of Analysis Date:**
Employee : SS # : Crew Size:

Sample No.	Activity	Analysis Result (f/cc)	Time (minutes)	Calculation
				0.000
				0.000
				0.000
				0.000
				0.000
				0.000
		Total Time:	0 TOTAL	0.000
	TWA Divisor =	480	*TWA*	**0.000** f/cc
			30 Minute Excursion	**0.000** f/cc

SAMPLE

Page 1 of 1

Worker Personal Exposure Sampling Methodology/ Analytical/TWA Calculation Procedures

Worker Personal Exposure Sampling Methodology/Analysis/TWA Calculation Procedures

Personal samples reveal the level of workers' exposure during each stage of asbestos abatement work. The results are used to determine proper respiratory protection and engineering methods. Low-Volume pumps with properly attached cassettes are used to take samples from the workers breathing zone.

Usually, most of the information regarding fiber concentration within the work area comes from the personal monitoring of the workers. OSHA Standards 29 CFR 1910.1001 and local and federal regulations require monitoring of all employees exposed to airborne asbestos fibers. Typically, personal monitoring of workers on an abatement project is **not** one of the responsibilities of the third party Industrial Hygienist (IH) hired by the owner. However, you may be asked to perform personal monitoring by the building owner. Therefore, it is important for the Industrial Hygienist to understand the purpose and proper procedures for conducting OSHA worker exposure sampling.

OSHA worker exposure sampling requires the determination of the Permissible Exposure Limit (PEL). The PEL is defined as follows: "The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fibers per cubic centimeter (f/cc) of air as an eight (8) hour Time Weighted Average (8hr-TWA)." OSHA also requires the determination of the Short Term Exposure Limit (STEL). The current STEL is defined in as follows: "The employer shall insure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 f/cc of air as averaged over a sampling period of thirty (30) minutes." These samples are collected at times when employee exposure is expected to be highest.

A 25mm cassette should be fixed inside a worker's "breathing zone" as close to the mouth and nose as possible without interference between the cassette and the openings of the respirator tract. The cassette is attached by a section of clear flex tube to a low volume pump located at the worker's waist area. Changing cassettes must be done in the work area. No cutting of critical barriers in order to change cassettes is permitted. The change of the cassettes and the start/finish of sampling must be done by the IH personally. Pump flow rate during personal monitoring should be between 0.5 and 2.5 liters per minute (LPM). Pump flow rate must be checked at least twice for each cassette. In case flow rate fluctuations exist, the pump must be checked at least every hour and any variations logged.

The IH must check the flow rate initially, when removing a cassette and when inserting a new cassette. The flow rate of a pump should be checked with a secondary calibration device (rotometer), such as a Dwyer rotometer. A log containing dates and times of calibration for each rotometer must be maintained and made available upon request for inspection by any regulatory inspector. See Section VI.H. - Rotomer Calibration for more detail.

An 8hr-TWA concentration is needed to establish workers' personal exposure to airborne asbestos fibers. Therefore, all the measurements and calculations must be performed accurately and by using the following formula:

FORMULA 1:

The TWA formula for a work day is as follows:

$$TWA = \frac{Ca*Ta+Cb*Tb+\ldots\ldots Cn*TN}{480}$$

Where:
- Ta = The time of the first exposure period
- Ca = The concentration in period "a'
- Tb = Another time period
- Cb = The concentration during period "b'
- Tn = The final time period
- Cn = The concentration during period 'n"

EXAMPLE 1

A worker arrived on site at 8:00 AM., entered the work area at 8:20 A.M., left the work area for a lunch break at 11:20AM, came back to the work area at 12:20 p.m. and finished working at 3:00 p.m. He was monitored when working inside the containment The concentrations were from: 8:20 a.m. to 11:20a.m., 2.40 f/cc: from 12:20 p.m. to 3:00 p.m., 1.62 f/cc. Calculations:

$$TWA = \frac{0x20+2.40x180+0x60+1.62x\ 160}{480} = 1.44 f/cc$$

NOTE: Exposure is assumed to be zero (0) to take account for rest periods, meal break, etc.

EXAMPLE 2

A worker was exposed for:

20 minutes to concentration 0.0 f/cc
150 minutes to concentration 0.95
60 minutes to concentration 0.0
150 minutes to concentration 1.06
60 minutes to concentration 0.0
200 minutes to concentration 1.24

$$TWA = \frac{0x20 +0.95x150+0x60+ 1.06x150 +0x60+1.24x200}{480} = 1.14 f/cc$$

NOTE: Even if the time that the worker spent inside the containment was longer than 480 minutes, we still use the denominator 480.

NOTE: Exposure is assumed to be zero (0) to take account for rest periods, meal break, etc.

If the flow rates, when checked vary, do not try to adjust the flow rate to the initial reading. Write the new flow rate instead, and calculate the time – weighted average using the following formula:

EXAMPLE 3

Time 8:20-flowrate 2.00 LPM
Time 9:20-flow rate 1.95 LPM
Time 10:20-flow rate 1.80 LPM

$$\text{Volume} = \frac{(2.0 + 1.95)\text{x } 60}{2} + \frac{(1.95 + 1.80)\text{x } 60}{2} = 231.0 \text{ liters}$$

1.975x60 + 1.875x60 = 231 liter
Or
237 + 225 =462 \2 = 231.0 liters

The calculated volume will be used in determining the concentration for the exposure period.

Remember, every time you change the cassette, check and log the flow rate. Collect at least 10 percent blank samples or a minimum of two (2) blank samples.

Every two days fully discharge the battery in a personal pump by running it until it stops and then recharge.

It is important to establish a TWA for each job classification, not just for those performing the actual asbestos abatement work. Examples of other job classifications include: Workers Applying Surfactant, Picking up Debris and Placing in Bags, Vacuuming and Placing Bags in the Dumpster. As a rule of thumb, 25 percent of the workers in each classification should be monitored during each shift. OSHA requires that both the PEL and the STEL be determined for these different job classifications.

Once the TWA has been determined for each job classification, you can use this information to check if the level of protection provided by the respirators being used by the workers is adequate. To check the level of protection, the concentration outside respirator (your TWA value) should be divided by the respirator's protection factor. The respirator protection is adequate if the concentration inside the respirator is less than or equal to the PEL of 0.l f/cc over an 8hr-TWA period as established by OSHA.

If the concentration inside the respirator is higher than 0.1 f/cc, the respirator should be substituted for a more efficient one. See example 4 below. Upgrading the respirator protection should take place in the clean room after the worker has completed the decontamination procedure.

EXAMPLE 4

TWA: Total fiber concentration 2.03 f/cc
We assume workers exposure to be 3.00 f/cc

RESPIRATORY PROTECTION: Half-Mask Air Purifying Respirator Protection Factor. (OSHA 1910.1001, Table 1) 10x

ACTUAL WORKERS EXPOSURE: 3.00: 10=0.3 f/cc

PERMISSIBLE EXPOSURE LIMIT: 0.1 F/CC over an 8-hour TWA

CONCLUSION: The Respiratory Protection was not adequate.

RESPONSE ACTION: Provide full face AP Respirator with a protection factor of 50x or provide PAPR with a protection factor of 100x.

EMSL Analytical, Inc.

State of New Jersey
Department of Environmental Protection
Certifies That

EMSL Analytical Inc

Laboratory Certification ID # 03036

is hereby approved as a

Nationally Accredited Environmental Laboratory

to perform the analyses as indicated on the Annual Certified Parameter List which must accompany this certificate to be valid

having duly met the requirements of the

Regulations Governing the Certification of Laboratories and Environmental Measurements N.J.A.C. 7:18 et. seq.

and

having been found compliant with the 2009 TNI Standard approved by the

The NELAC Institute

Expires June 30, 2017

Michele M. Potter
Interim Manager

NJDEP is a NELAP Recognized Accreditation Body

This certificate is to be conspicuously displayed at the laboratory with the annual certified parameter list in a location on the premises visible to the public. Consumers are urged to verify the laboratory's current accreditation status with the State of NJ, NELAP.

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 09/21/2016 until 06/30/2017

Laboratory Name: EMSL ANALYTICAL INC Laboratory Number: 03036 Activity ID: NLC160006
200 RT 130 NORTH
Cinnaminson, NJ 08077

Category: AE01 -- Inorganics - Non-Metals Analysis

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	AE01 .00310	AE	Gravimetric	[EPA 40 CFR Part 50, App. J]	Particulate Matter

Category: AE02 -- Inorganics - Metals Analysis

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	AE02 .00750	AE	ICP/MS	[EPA 40CFR50, 2013, App. G]	Lead

Category: AE03 -- Asbestos Analysis

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	AE03 .00010	AE	Phase Contrast Microscopy	[OTHER NIOSH 7400]	Asbestos
Certified	Yes	NJ	AE03 .00020	AE	Transmission Electron Microscopy	[ASTM D6281]	Asbestos
Certified	Yes	NJ	AE03 .00030	AE	Transmission Electron Microscopy	[ASTM D6480]	Asbestos
Certified	Yes	NJ	AE03 .00040	AE	Transmission Electron Microscopy	[EPA 540/2-90-005a]	Asbestos
Certified	Yes	NJ	AE03 .00050	AE	Transmission Electron Microscopy	[OTHER 40CFR763, Sub. E, App. A]	Asbestos
Certified	Yes	NJ	AE03 .00070	AE	Transmission Electron Microscopy	[OTHER AHERA]	Asbestos
Certified	Yes	NJ	AE03 .00080	AE	Transmission Electron Microscopy	[OTHER NIOSH 7402]	Asbestos

Category: AE04 -- Organics Analysis

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	AE04 .02000	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1016
Certified	Yes	NJ	AE04 .02010	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1221
Certified	Yes	NJ	AE04 .02020	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1232
Certified	Yes	NJ	AE04 .02030	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1242
Certified	Yes	NJ	AE04 .02040	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1248
Certified	Yes	NJ	AE04 .02050	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1254
Certified	Yes	NJ	AE04 .02060	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1260

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

WASTE/MATERIAL HANDLING PLAN

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APPENDICES

A. Landfill Statement

B. Asbestos Waste - Landfill Information

C. Waste Management Information

D. Asbestos Waste – Waste Manifest SAMPLE

1.0 INTRODUCTION

USA Environmental Management, Inc. (USAEMI) has prepared this Asbestos Abatement/Disposal and Material Handling Plan to identify the potential waste streams of regulated materials that may be generated during work on the former Syncon Resins Superfund site OU2, 77 Jacobus Avenue, South Kearny, New Jersey and to detail the techniques to be implemented to safely accomplish the handling of these materials. This MHP presents an overview for the management of the waste streams that will be encountered during the course of the construction activities, and describes how the materials will be segregated, stockpiled, classified and properly disposed.

2.0 PROJECT DESCRIPTION AND LOCATION

The project includes the complete environmental abatement and demolition (by others) of all structures located on the former Syncon Resins site. The physical address of the site is 77 Jacobus Avenue, South Kearny, New Jersey. The site is located on the west side of Jacobus Avenue at 3rd Street which comes into the site from the east. The site is bordered to the west by the Passaic River and other industrial sites to the north and south and Jacobus Avenue to the east.

Asbestos abatement work will be performed in the following buildings identified as part of our contractual scope of work:

Building 1
Building 1A
Building 6A
Building 7
Building 7A
Building 8
Building 9
Building 11
Building 12
Red Building
Shed

The Scope of Work for this project includes the removal of various types of asbestos-containing building materials (ACBMs) from various areas of the buildings identified above.

3.0 WASTE STREAM

The waste stream anticipated by our current scope of work would be a variety of asbestos-containing building materials. The list of potential waste streams is identified in Section 3.1. Should other waste streams be encountered other than those described below, this Material Handling Plan will be amended accordingly.

3.1 Material Identification and Segregation

Table 1 – Material Identification and Definitions		
MATERIAL	**DEFINITION**	**DISPOSAL**
Asbestos-Containing Waste Materials – ID-27	Non-Hazardous asbestos-containing waste materials.	GROWS Landfill – Morrisville, PA
Free Product/LNAPL	Any free phase petroleum product collected from the Above Ground Storage Tank will be transported to and recycled at an approved facility.	Monarch Environmental, Inc., 108 East Lake Road, Woodstown, NJ 08098

3.2 Asbestos-Containing Waste Materials

All asbestos-containing waste material will be removed and collected by asbestos workers licensed by the State of New Jersey within the asbestos abatement work area. Materials will be thoroughly wetted and placed into double 6-mil polyethylene plastic waste disposal bags and sealed with duct tape. Disposal bags shall have the required OSHA and EPA warning labels visible on the exterior as required for labeling of asbestos-containing waste material.

A. All waste material shall be containerized in one (1) of the following methods:

1. Two (2) 6-mil disposal bags.
2. Two (2) 6-mil disposal bags and fiberboard drums.
3. Wrapped with two (2) layers of 6-mil polyethylene.

Floor tiles shall first be placed into cardboard boxes, burlap or nylon bags before placement into two (2) 6-mil disposal bags.

B. Carefully load containerized waste on enclosed trucks, enclosed dumpsters, or other appropriate vehicles for transport. Exercise care before and during transport, to insure that no unauthorized persons have access to the material.

The Contractor shall cover the floor of trucks or dumpsters with a sheet of 6-mil polyethylene. This sheet shall continue up each sidewall approximately six (6) feet.

C. Do not store bagged or containerized asbestos-containing waste material outside of the work area. Take bags and/or containerized material from the work area directly to a secure and sealed truck or dumpster. When transporting bagged material through buildings, it must be done in enclosed utility type carts with lids.

D. Do not transport disposal bagged materials on open trucks.

E. Any items or materials, which could compromise the integrity of the polyethylene bags shall be double bagged and then packaged in fiber drums or placed into boxes, burlap bags, etc. for loading, transport, and unloading operations.

F. Advise the landfill operator, at least twenty-four hours in advance of transport, of the quantity of material to be delivered.

G. At the burial site, sealed plastic bags shall be carefully unloaded from the truck.

H. Maintain records of waste shipments in accordance with NESHAPS 40 CFR Part 61, Section 61.150, (d) 1-5 and (e).

H. Retain Waste Shipment Records (manifests) from the landfill for materials disposed. The manifests shall be signed by the hauler and landfill operator and shall indicate the amount of material being disposed and the location where the waste was generated per EPA NESHAPS requirements.

I. Provide completed Waste Shipment Records (manifests) to the New Jersey Schools Development Authority for this project for their project records.

4.0 LOAD OUT AND TRANSPORTATION

Prior to loading and transporting any asbestos-containing waste materials offsite, a copy of the completed application and acceptance notification from the disposal facilities will be provided. Shipping documents will be created and will be utilized to track each load that is transported to the facility. Shipping documents will be signed by the generator or an authorized agent of the generator before being transported to the designated facility.

The transportation will be performed by licensed haulers with current and valid permits in accordance with applicable federal, state and local regulations. Asbestos-containing waste materials will be placed in completely enclosed roll-off waste containers and removed from the site as soon as practical after being completely filled.

Trucks will follow the haul routes are pre-determined by a site logistics plan approved by the owner. This plan will be developed after the pre-construction conference so that the routes of ingress/egress shall take into consideration the access requirements of Sevenson and other project subcontractors.

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5.0 STOCKPILING

Asbestos-containing wastes may be stockpiled within enclosed abatement work areas for short periods of time only until such time as enough material is accumulated to allow for the full loading of the roll off container. Otherwise, properly containerized materials will directly loaded into the enclosed roll off container and the container will be secured by locking the door with a padlock. Proper asbestos warning signs shall be posted on the roll off containers on site.

6.0 RECORD KEEPING AND REPORTING

Tracking the transportation of impacted soil will be performed utilizing an approved Waste Shipping Document. This manifest will be utilized to track each load that is transported to the disposal facility and will be signed by the generator or an authorized agent of the generator before being transported to the designated facility.

The shipping document will have information of the generator, trucker, the receiving facility and weight of the material transported. Copies of the shipping documents and all records regarding the removal and disposal of the asbestos-containing wastes shall be monitored and maintained by the USAEMI and will be made available to Sevenson when received by USAEMI from the landfill.

Information on the landfill to be used, the Waste Hauler and a sample of the waste shipment record (manifest) is included in Appendices which follows.

APPENDICES

LANDFILL STATEMENT

LANDFILL FOR DIPOSAL OF ASBESTOS-CONTAINING WASTE

USA Environmental Management, Inc. (USAEMI) will be using the following landfill for disposal of all asbestos-containing waste materials generated on this project:

~~**WASTE MANAGEMENT, INC.**~~
~~**Tullytown Landfill**~~
~~**200 Bordentown Rd**~~
~~**Tullytown, PA 19007**~~
~~**Phone: 215-736-1700**~~

Minerva Landfill
P.O. Box 709
8955 Minerva Road S.E.
Waynesburg, Ohio 44688
Phone: 330-866-3435
FAX: 330-866-3488

Minerva Enterprises, LLC Permits

Construction & Demolition Debris Landfill Permit
Asbestos Permit
Compost Permit
Storm water Discharge Permits
Air Emission Permits:

- **Asbestos Handling**
- **Material Handling**
- **Road Management**

ASBESTOS WASTE

Landfill Information

MINERVA LANDFILL

Waynesburg, Ohio

History

In 1991 Minerva Enterprises, LLC's property was permitted to allow construction of a Construction & Demolition Debris Landfill.

From 1958 to 1972, the property was a Coal strip mine. The property is ideal for a Construction & Demolition Debris landfill due to the large quantities impermeable clay reserves, which protect the ground water from landfill activities.

Experienced Management Team

President: Mr. Frank Stufano

30+ Years Environmental and Hazardous Waste Disposal Management Experience

Operations & Financial Consultant (Partner): Per-Olof Soderberg

30+ Years Multinational Background-Managed $2 Billion Operation.

Minerva Advantages:

1. **Centralized Location to Eastbound Trucking Freight provides Backhauls for disposal trucks.**
2. **Low Environmental Risk:**
   a. **Best Available Design Technology(BAT)**
   b. **Built under most stringent Regulations**
   c. **Highly Inspected Waste Screening Program**
   d. **Experienced Staff**
3. **Close Proximity to Rail**
4. **Many "grandfathered landfills" Closing (5 in 2004-05)**
5. **Price Competitive**
6. **Asbestos Disposal Permit**

MINERVA LANDFILL

Waynesburg, Ohio

Minerva is permitted to dispose of construction & demolition material and friable and non-friable waste material from your facility. Waste must conform to Ohio State & Federal regulations. Asbestos material must be placarded, labeled, packaged and wetted in accordance with the local responsible agency and State & Federal guidelines.

A primary reason for Minerva's selection by different companies is that the source selection of waste materials to be disposed of at Minerva: construction debris and asbestos materials; result in little long term risk.

Minerva's liner and leachate collection systems are protecting very "clean" leachate compared to many of our Municipal Solid Waste (MSW) (i.e.: trash) competitors. This is caused by the lack of methane, liquid waste and high organic values of MSW. Therefore the potential offsite leakage risk is monumentally lower than MSW facilities. C&D debris is very dry compared to MSW and readily desorbs most of the leachate generated for dust control, compaction and re-injection into the waste material.

ASBESTOS WASTE

Waste Manifest

SAMPLE

SERVICE TRANSPORT GROUP, INC.

58 PYLES LANE, NEW CASTLE, DE 19720 PHONE: (877) 999-9559

Nº 414017

WASTE SHIPMENT RECORD

S.T.G. # _____

SAMPLE

GENERATOR

1. Material Origin Site	Generator: Name/Address	Generator: Phone #

2. Removal Contractor: Name/Address	Contractor: Phone #
Contact:	

3. Responsible Agency: Name/Address	4. US DOT Class - FRIABLE ASBESTOS ONLY NA2212, Asbestos, 9, PG III, RQ	
5. Description of Materials Specify Friable or Non-Friable	Containers No. Type	Total Quantity
IF Friable (enter required information)		
IF Non-Friable (check one): ☐ Category I ☐ Category II		

6. Special Handling Instructions

7. Generator Certification:

This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transport by highway according to the applicable regulations of the Department of Transportation, US E.P.A., and any other state government agency. I certify that the foregoing is true and correct to the best of my knowledge. If the waste shipment is not as I stated, I accept the RETURN of the COMPLETE LOAD to the generator's service location at the generator's expense.

Printed/Typed Name & Title	Signature	Date

TRANSPORTER

8. Transporter 1 (Acknowledgement of Receipt of Materials) If blank, see Transporter 2 or 3 below.

Company Name & Address	Signature: _____ Printed Name: _____ Title: _____	Telephone No. Date:

9. Transporter 2 (Acknowledgement of Receipt of Materials) If Transporter 1 & 2 are blank, Transporter 3 servers as sole transporter.

Company Name & Address	Signature: _____ Printed Name: _____ Title: _____	Telephone No. Date:

10. Transporter 3 (Acknowledgement of Receipt of Materials)

Company Name & Address Service Transport Group, Inc. 58 Pyles Lane New Castle, DE 19720	Signature: _____ Printed Name: _____ Title: _____	Telephone No. 877-999-9559 Date:

DISPOSAL SITE

11. Discrepancy Indication Space:

12. Waste Disposal Site Owner or Operator's Certification (Receipt of above Waste except as noted in 11)

Waste Disposal Site (Check One)		STG USE ONLY		
Sanitary Landfill ☐ 901 Tyrol Blvd. Belle Vernon, PA 15012 724-929-7694 Ext. 14 Permit No. 100277	Minerva Landfill ☐ 8955 Minerva Rd. Waynesburg, OH 44688 330-866-3435 Permit No. P0104984	☐	Signature: _____ Printed Name: _____ Title: _____	Date:

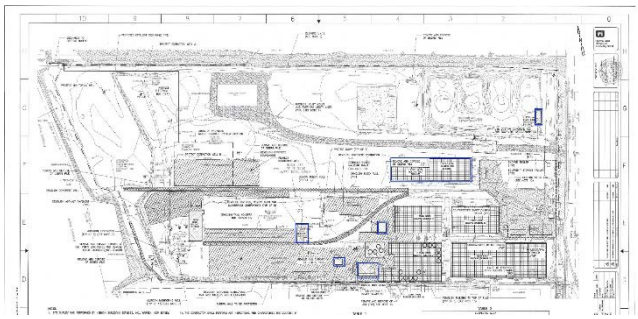
WHITE-Generator • GREEN-S.T.G. • YELLOW-Contractor • PINK-Landfill • GOLD-Pick Up Receipt

Health & Safety Plan (HASP)

Environmental Management, Inc.
Environmental Engineering Construction
8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Office: 215-365-5810 FAX: 215-365-5870

SITE SPECIFIC HEALTH & SAFETY PLAN

SYNCON RESINS SUPERFUND SITE



Prepared for:

Sevenson Environmental Services, Inc.

1405B North Mill Road
Vineland, NJ 08360

Since 1985 TTI Environmental, Inc.

1253 North Church Street
Moorestown, NJ 08057-1136

US Army Corps of Engineers

November 4, 2016

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ADDENDA

APPENDICES

1.0 INTRODUCTION

1.1 Purpose

This site-specific Health and Safety Plan (HASP) has been developed to establish the health and safety procedures required to minimize any potential risk to personnel who will perform activities associated with the environmental remediation/demolition scope of work along with site restoration all in accordance with the project plans and specifications for the asbestos abatement at the former Syncon Resins Superfund site OU2. The address of the work location is 77 Jacobus Avenue, South Kearny, New Jersey 07032.

The project includes the complete environmental abatement and demolition (by others) of all structures located on the former Syncon Resins site. The physical address of the site is 77 Jacobus Avenue, South Kearny, New Jersey. The site is located on the west side of Jacobus Avenue at 3rd Street which comes into the site from the east. The site is bordered to the west by the Passaic River and other industrial sites to the north and south and Jacobus Avenue to the east.

1.2 Scope

All activities performed by USA Environmental Management, Inc. (USAEMI) workers at this site will be covered by the Occupational Safety and Health Administration's (OSHA) Respiratory Protection standard in 29 CFR 1910.134; Exposure to Asbestos in Construction standard 29 CFR 1926.1101; Exposure to Lead in Construction standard 29 CFR 1926.62, and Specifications for Accident Prevention, Signs and Tags standard 29 CFR 1910.145. All workers involved in the environmental remediation work will also meet the requirements of OSHA 1910.120 App E for Hazardous Materials training and for asbestos work they shall meet the requirements specified in 40 CFR Part 61, General Provisions and National Emission Standard for Asbestos, the State of New Jersey Asbestos Licensing regulation, the State of New Jersey Department of Labor and Workforce Development Title 12 of the Asbestos Control and Licensing Act, US Army Corps of Engineers Safety and Health Requirements Manual – EM 385-1-1 - 3 November 2003, in addition to safety standards and requirements included herein. Workers involved in the general demolition work and site restoration work activities shall perform this work in accordance with the applicable requirements of the OSHA General Industry (29 CFR 1910), American National Standards Institute (ANSI) Publication Z29-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems and Publication Z88.2-1980, Practices for Respiratory Protection and Construction Industry (29 CFR 1926) standards as well as the plans and specifications for the project.

1.3 Application

The provisions of this HASP and the Corporate Health & Safety Program apply to USAEMI personnel and all subcontractor personnel who will potentially be exposed to safety and/or health hazards associated with any of the work activities associated with the contract for Asbestos Abatement of structures associated with the former Syncon Resins Superfund site OU2. The address of the work location is 77 Jacobus Avenue, South Kearny, New Jersey 07032. Personnel or visitors to whom this HASP applies, who cannot, or will not comply with its requirements will be excluded from site activities by the Project Manager (PM) or Project Superintendent (PS).

1.4 Approval and Distribution of the HASP

Prior to being issued, this HASP must be reviewed and approved by SEVENSON ENVIRONMENTAL SERVICES, INC. AND THE US ARMY CORPS OF ENGINEERS, the owner's representative for the project. A copy of this HASP must be made available to all Contractor/Subcontractor and supervisory personnel to whom it applies.

1.5 Documentation of HASP Receipt by Site Personnel

Prior to performing site activities, all personnel to whom this HASP applies, must complete and sign a copy of the HASP Acceptance Form and submit it to the USAEMI Project Superintendent (PS) who is responsible for the overall Safety program daily onsite. The main purpose of this form is to provide documentation that all site personnel have read and agree to abide by the HASP for this project.

1.6 Modification of the HASP

The procedures in this HASP have been developed based on current knowledge regarding the specific chemical and physical hazards that are currently known or anticipated for the operations that are to be conducted at this site. Should additional information become available regarding site hazards or should operations at the site change, it may be necessary to modify this HASP.

Whenever the HASP is modified, USEMI will:

- Physically amend the available copies of the HASP at the site.
- Notify the SEVENSON AND ARMY CORPS OF ENGINEERS
- Project Manager of the changes.
- Explain the changes to the affected employees (usually during the morning daily safety meeting).

Any significant modifications must be incorporated into the written document as addenda and the HASP must be reissued. The Project Superintendent (PS) will ensure that all personnel covered by this HASP receive copies of all issued addenda. Sign-off forms will

accompany each addendum and must be signed by all personnel covered by the addendum. Sign-off forms will be submitted to the owner's Project Representative as required. The HASP addenda should be distributed during the daily safety meeting so that they can be reviewed and discussed. Attendance forms will be collected during the meeting.

1.7 Organization and Responsibilities

The implementation of health and safety at this site will be the responsibility of the USAEMI Project Superintendent (PS), and all other contractor site personnel.

1.7.1 USAEMI Project Superintendent

The USAEMI PS is, by designation, the individual who has the primary responsibility for ensuring the overall health and safety of this project. The PS therefore has the primary responsibility for ensuring the implementation of the requirements of this HASP. Some of the PS's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies have reviewed a copy of it and have submitted a completed copy of the HASP sign-off form.
- Assuring that all personnel to whom this HASP applies have attended a pre-entry briefing prior to entering an isolation area.
- Maintaining a high level of health and safety consciousness among employees at the work site.
- Maintaining regular communications with the SEVENSON ENVIRONMENTAL SERVICES, INC. AND THE US ARMY CORPS OF ENGINEERS'S Project Manager and other USAEMI/Subcontractor project supervisory personnel, as necessary.

1.7.2 USAEMI Project Foremen/Site Supervisor(s)

The USAEMI Project Foremen/Site Supervisor(s) (PF/SS) will be on site during removal, decontamination and demolition/general construction activities covered by this HASP. The PF/SS is/are responsible for enforcing the requirements of this HASP once on-site work begins. By design, the PF/SS has/have the authority, and the responsibility, to immediately correct all situations where noncompliance with this HASP is noted and to immediately stop work in cases where an immediate danger is perceived.

1.7.3 Other Site Personnel

All Contractor/Subcontractor/Project Oversight personnel are responsible for following the health and safety procedures specified in this HASP and for performing

their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

* Reading the HASP in its entirety prior to the start of on-site work.
* Submitting a completed HASP Acceptance Form and documentation of medical surveillance and training to the Project Superintendent prior to the start of work.
* Attending the required HASP briefing.
* Bringing forth any questions or concerns regarding the content of the HASP to the PS or the PF/SS prior to the start of work.
* Reporting all accidents, injuries, and illnesses, regardless of their severity, to the PF/SS and PS.
* Complying with the requirements of this HASP and the requests of the PS and PF/SS.
* Any and all accidents shall be reported and documented as required by the Corporate Health & Safety Program.

2.0 SCOPE OF WORK

The following are the activities by line item included in the current scope of work for this project along with the quantities where applicable:

ASBESTOS

Non Friable Materials Abatement

Location	Asbestos Containing Material	Approximate Quantity
Building 6A, Building 7 (Small Room), Building 7A,	Transite Switch Gears	60 Square Feet
Building 7 (Small Room)	Roofing Material	120 Square Feet
Building 6A	Boiler Gasket	40 Linear Feet
Red Metal Building	Window Glazing	400 Linear Feet

Non Sub 8 Tented Glove Bag Pipe Insulation Abatement

Location	Asbestos Containing Material	Approximate Quantity
Building 7 (Small Room)	Pipe Insulation	15 Linear Feet

All environmental remediation activities shall be performed in accordance with the requirements of any applicable federal, state and local regulations as mentioned previously, the project plans and specifications prepared by the owner's representative CDM SMITH on behalf of the US ARMY CORPS OF ENGINEERS and any approved procedures presented to and approved by the owner's representative.

3.0 HAZARD ASSESSMENT

The following chemical and physical hazard assessment applies only to the proposed activities covered by this HASP. As the project progresses, revisions will be issued as necessary to address the hazards associated with tasks not specifically covered in this document.

3.1 Chemical/Airborne/Contact Hazards

The most significant *potential* routes of chemical exposure for project personnel during the performance of this project will be the inhalation of contaminated dusts (asbestos and lead, for example) and the ingestion of contaminated dusts.

Inhalation and ingestion of contaminated dusts, which would occur through inadvertent hand-to-mouth transfer, will be avoided through the required personal hygiene practices, as well as using wet abatement methods, proper work practices, PPE and decontamination techniques. To further reduce the potential for transfer of contaminants, under no circumstances, will smoking and eating will not be allowed in the work areas of the building.

In addition to the potential exposure to hazardous dusts, the project scope of work presents potential exposure to Chlorinated Volatile Organic Compounds (CVOC); dissolved phase petroleum (benzene) and/or free-phase petroleum product and sediments.

Proper use of personal protective equipment (PPE) will be enforced at all times, where and when applicable.

General exposure hazards identified on this project include the following:

Asbestos

Asbestos is a naturally occurring fibrous inorganic mineral consisting of hydrated magnesium or calcium silicates. A popular additive in thousands of construction products because of its non-flammability, high tensile strength, insulating and acoustical qualities, asbestos is found throughout our environment.

Asbestos is toxic by ingestion and inhalation of dust. Chronic overexposure to asbestos has been shown to adversely affect the respiratory system and may induce development of pulmonary fibrosis (lung scarring), carcinoma in the lungs, pleura, stomach, intestine and

other organs. Long term symptoms of asbestos related illness include fatigue, shortness of breath, abdominal and/or chest pains.

Lead

As noted above, lead coatings and/or paint may be found on some of the structural and/or finish components of the buildings to be demolished.

Based on the fact that no bulk sampling and analysis or X-Ray Fluorescence (XRF) testing (in situ testing) was accomplished on painted structures/surfaces throughout these buildings, an initial walk through visual assessment was made of the painted surfaces throughout the buildings. All painted surfaces that were visual observed evidenced relatively minor damage. There were no areas of extensive paint flaking or damage observed.

Based on these observations along with the fact that the structures are going to undergo complete demolition using heavy equipment, as well as from previous experience with performing structure demolition using the means and methods to be employed on this project, it was determined that the likelihood of exposure to workers using this equipment to lead at or above the Action Level of 30 micrograms per cubic centimeter of air over an 8 hour Time Weighted Average (TWA) exposure period would be negligible.

However, as and additional precaution, USAEMI will have air sampling performed periodically, if necessary, during the demolition activities by a third party monitoring firm specializing in this type of exposure monitoring.

Chlorinated Volatile Organic Compounds (CVOC); Dissolved Phase Petroleum (Benzene) and/or Free-phase Petroleum Product and Sediments

USAEMI's current scope of work does not include the remediation of any of the above-noted hazardous materials on this project.

Chlorinated Volatile Organic Compounds can be found at most of the hazardous waste sites across the country. These forms of halogenated organics, once released to the environment, present several unique challenges to the owners of contaminated sites as well as to the environmental remediation industry. Dissolved Phase Petroleum (benzene) and/or Free-phase Petroleum Product and Sediments can be encountered

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator at a minimum is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice.

Skin Protection: Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H ™ or Silver Shield ™ to avoid prolonged skin contact.

Eye Protection: Safety glasses with side shields or safety goggles.

An eye wash station and safety shower should be available.

IF ENCOUNTERED AND MADE PART OF OUR SCOPE OF WORK:

USAEMI's current scope of work does not include the remediation of any of the following Universal Wastes that may be found on this project.

Fluorescent Light Tubes

All personnel associated with the removal of all fluorescent light tubes shall use appropriate Personal Protective Equipment (PPE) to protect themselves from potential exposure to mercury.
All tubes shall be removed intact and packaged as required for transport and recycling.

Light Ballasts

Light ballasts present a potential exposure to PCB fluids during the removal and disposal process. The ballasts shall be removed using full Personal Protective Equipment appropriate for protection from exposure to PCB-containing waste materials.

All ballasts shall be removed intact and placed into fiber drums for proper hauling and disposal. Care shall be taken to avoid rupturing the casing of the ballasts and releasing the PCB-containing fluid within.

Mercury Thermostats and Thermometers

All personnel associated with the removal of all mercury-containing devices shall use appropriate Personal Protective Equipment (PPE) to protect themselves from potential exposure to mercury.

All devices shall be removed intact and packaged as required for transport and recycling.

Backup Batteries

Devices such as backup emergency lighting, exit lighting and fire panel contain batteries that are to be removed and recycled as part of the environmental remediation work on this project.

All batteries shall be removed by personnel using appropriate Personal Protective Equipment, packaged properly and transported for recycling.

Other Hazardous Materials - A safety data sheet (SDS) shall be presented for any hazardous materials that USAEMI brings to the site, including petroleum products. Each

SDS must be reviewed by the PS and the PF/SS and filed on site for reference. The material cannot be used if a MSDS is not presented. All containers must be properly labeled. If a label is not on the containers, it will not be allowed on site. When new materials are brought on site, the MSDS will be reviewed by PS, the PF/SS, and those employees who must use it.

3.2 Physical Hazards

Below is a list of some of the physical hazards that may be encountered during the performance of work on this project:

3.2.1 Operating Heavy Equipment

Heavy equipment such as backhoes, excavators, loaders, dump trucks/trailers, skid steer loaders, etc., as well as powered hand tools like demolition saws, may be used during work on this contract. The use of such equipment poses a potential hazard to site employees, underground utilities, and also poses a potential for employee overexposure to noise.

Use of heavy equipment concrete demolition and disposal, soil removal and disposal debris and to lift and haul the removed debris will require all personnel in the vicinity of the operating machinery to wear steel-toed footwear, hard hats, hearing protection, and safety glasses. Personnel involved in the cleanup should handle the debris carefully and avoid sharp edges. Do not lift heavy objects without assistance.

All heavy equipment will be equipped with reverse gear alarms.

3.2.2 Exposure to Noise

Exposure to occupational noise in the construction industry is regulated by 29 CFR 1926.52. The standard requires protection from the effects of noise exposure be provided when exposures exceed 90 dB(A) for an 8-hour day. Exposure to impact or impulse noise should not exceed 115 dB(A) peak sound pressure level. Depending upon the noise levels generated, USAEMI may choose to perform noise monitoring of its personnel to determine when, and during what activities, hearing protection will be required and to determine the appropriate noise reduction rating (NRR) that the protection must provide.

Exposure to noise can result in the following:

* Temporary hearing losses where normal hearing returns after a rest period;
* Interference with speech communication and the perception of auditory signals;

* Interference with the performance of complicated tasks; and
* Permanent hearing loss due to repeated exposure resulting in nerve destruction in the inner ear.

3.2.3 Electrical Hazards

Ground fault circuit interrupters will be used on all portable, electrically operated equipment. Equipment which has the potential to come in contact with overhead power lines, such as excavators, etc., shall not be positioned or operated so that they may come within 10 feet of energized power transmission lines.

All equipment and lines with a potential electrical exposure will be verified and tagged as being out of service. This will be accomplished before any demolition operations are initiated. All lines must be traced to the main electrical panel or nearest junction box to verify the lines have been de-energized.

If electrically powered equipment is used to facilitate the collection of samples, the following safety precautions must be followed:

* Confirm that electrical outlets used to supply power during field operations are of the three wire grounding type.
* Extension Cords used for field operations should be of the three wire grounding type and designed for hard or extra-hard usage.
* **NEVER** remove the ground plug blade to accommodate ungrounded outlets. If a cord is missing the grounding prong, it shall be marked and taken out of service.
* Do not use extension cords as a substitute for fixed or permanent wiring. Do not run extension cords through openings in walls, ceilings, or floors.
* Protect the cord from becoming damaged if the cord is run through doorways, windows, or across pinch points.
* Examine extension and equipment cords and plugs prior to each use. Damaged cords with frayed insulation or exposed wiring and damaged plugs with missing ground blades **MUST BE REMOVED** from service immediately.
* All portable or temporary wiring to be used outdoors or in other potentially wet or damp locations must be connected to a circuit that is protected by a ground fault circuit interrupter (GFCI). GFCIs are available as permanently installed outlets, as plug-in adapters and as extension cord outlet boxes. **DO NOT CONTINUE TO USE A PIECE OF EQUIPMENT OR EXTENSION CORD THAT CAUSES A GFCI TO TRIP**.

* When working in flammable atmospheres, be sure that the electrical equipment being used is approved for use in Class, Division I atmospheres.

* Do not touch a victim who is still in contact with current. Separate the victim from the source using a dry, nonmetallic item such as a broomstick or cardboard box. Be sure your hands are dry and you are standing on a dry surface. Turn off the main electrical power switch and then begin rescue efforts.

3.2.4 Slip, Trip, and Fall Hazards

Employees should be aware of slip, trip, and fall hazards on site. In the presence of heavy equipment requires all personnel on site to wear steel-toed footwear and hard-hats. Personnel in the immediate work vicinity should maintain a safe distance from operating machinery. In addition, in any environmental remediation/ decontamination in any level of PPE, it can be expected that the ground may be slippery, the surface may be unreliable, surface debris may be present, and wet or dusty areas may exist. All personnel should therefore be aware of the variability of the work surfaces in their work area.

3.2.5 Ladders

Ladders may be used to access excavations during work on this project. The following steps should be employed when using ladders:

a. Workers should face the ladder when climbing up, down, or working from it.

b. All ladders used to gain access to the excavation shall extend at least 3 feet beyond the edge of the excavation and be tied off or otherwise secured from falling at the top of the excavation.

c. Workers should not carry objects in their hands while ascending or descending ladders. While working from a ladder, they should hold on with at least one (1) hand.

d. An elevated workstation is defined as off-the-ground work at a level of 6+ feet. The use and erection of ladders will comply with all OSHA regulations.

e. Ladders should not be used as a substitute for planks, runways, or walkboards.

f. Ladders should be maintained in good condition. Defective ladders should be destroyed so that no one uses them by mistake.

g. Ladders should have safety feet in good condition to keep the ladder from slipping and cutting through polyethylene floor covers.

h. Ladder rungs/steps should be kept free of contaminates such as amended water and buildup of asbestos waste.

i. Employees should work no higher than the fourth step/rung from the top of the ladder.

j. Employees should not attempt to "reach" distant objects from a ladder; other platforms should be used.

k. Wood or fiberglass ladders should be provided to help control exposure to electrical hazards.

l. Employees should not straddle the space between a ladder and another object.

m. Employees should make a visual inspection of ladders before each shift.

3.2.6 Demolition

The scope of work requires the complete demolition (BY OTHERS) of the old building concrete floor slab, foundations at and below grade, and footings. These activities will incorporate procedures previously discussed such as cutting, concrete demolition using excavators with hammer attachments, material handling with heavy equipment, the use of PPE, associated slip, trip, and fall hazards and hazardous noise exposure.

All concrete demolished as part of this project will be separated into two (2) distinct categories. One would be Non-contaminated concrete (Non-ID27) and contaminated concrete (ID27).

Contaminated material shall be properly disposed while non-contaminated material may be recycled.

Employees handling contaminated concrete material shall use appropriate Personal Protective Equipment (PPE) at all times during this work.

3.2.7 Soil Excavation, Removal and Disposal/Stockpiling

The scope of work requires the removal (excavation) of potentially contaminated soil as well as non-contaminated soil. These activities will require the use of excavators, loaders, dump trucks/trailers for excavation/stockpiling and waste disposal, the use of PPE, associated slip, trip, and fall hazards and hazardous noise exposure.

All soil excavated as part of this project will be separated into two (2) distinct categories. One would be Non-contaminated concrete (Non-ID27) and contaminated concrete (ID27).

Contaminated material shall be properly disposed while non-contaminated material will be left onsite.

Employees handling contaminated soil shall use appropriate Personal Protective Equipment (PPE) at all times during this work.

4.0 TESTING

The primary potential inhalation hazard during this project will be from the generation of dusts from asbestos-containing materials and asbestos contaminated surfaces. Personal air samples will be used to assess worker exposure to asbestos particulate during asbestos abatement activities. All personal air sampling and analysis of samples will be performed in accordance with the requirements of the OSHA Asbestos Standard, 29 CFR 1926.1101. The requirements for personal monitoring are specified below. Personal exposure air monitoring will be performed by USAEMI. Sample analysis will be performed by a third party laboratory specializing in this type of analysis. The laboratory for this project is EMSL Analytical, Inc., 107 Haddon Avenue, Westmont, New Jersey 08108.

4.1 Personal Exposure Monitoring

Personal exposure monitoring will be conducted within the work areas or containment structures during the abatement and decontamination activities to document employee exposures to asbestos and lead when working inside the containment structure. Samples will be collected within the breathing zones of those individuals performing unique work tasks to determine the representative exposure for an employee involved in similar activities.

Applicable exposure levels to the anticipated hazards are as follows:

CONTAMINANT OF CONCERN	OSHA PEL	NIOSH REL	ACGIH TLV
ASBESTOS	0.10 f/cc	N/A	N/A
CONTAMINANT OF CONCERN	OSHA PEL	OSHA AL	ACGIH TLV
LEAD	0.50 ug/m3	0.30 ug/m3	N/A

4.2 Record Keeping

A USAEMI Industrial Hygiene Chain of Custody Form is to be completed for each air sample or batch of air samples collected. The form is to be filled out in its entirety on the day of sample collection. Calibration data for any sampling pumps utilized is to be recorded on the form.

Sample results shall be recorded on a USAEMI Sampling Results Report form using the results presented on the laboratory Certificate of Analysis. Appropriate TWA calculations shall be reported on this form for the exposure sampling performed.

Personnel will be notified as required, and sample results posted in the project office trailer onsite and included in employee records for all personal sampling results.

5.0 PERSONAL PROTECTIVE EQUIPMENT

Employees performing asbestos removal and associated activities will wear the following PPE. The wearing of such equipment is designed to reduce the potential for contact with contaminated materials and the tracking of contaminants off site. It is anticipated that work on this project would require Level C PPE. This is subject to modification following receipt of analytical data from initial air monitoring as discussed in Section 4.0.

5.1 Protective Clothing and Other Equipment

It is anticipated that environmental remediation work on this project will be accomplished using a Level A and Level B PPE that includes disposable outer garments and gloves, safety boots, hard hat and safety glasses and ½ face, Air-Purifying and/or Powered-Air Purifying respiratory protection.

Other PPE may include the following as appropriate:

- Steel-toed safety boots
- Hard hat
- Safety glasses
- Dedicated demolition work coveralls, if needed
- Disposable protective polypropylene coveralls
- Fall Protection Harness (as required)
- Cotton Gloves
- Latex Gloves
- Leather or Kevlar work gloves
- Hearing protection
- ½ face, air-purifying respiratory protection
- Powered-Air Purifying respiratory protection (when necessary)

5.2 Respiratory Protection

Based upon current analytical data, the nature of the required remediation work activities and the requirements of the project specifications, the use of respiratory protection for personal protection from exposures to asbestos will be required. Work activities will be conducted with half -face respirators. Based on the engineering controls anticipated to be used on this project and in consideration of previous similar work activities, it is not anticipated that respiratory protection beyond Level A will be required. If it is, this upgrade will be done.

5.2.1 Respirator Selection

Respiratory protection will be determined by the PS and/or PF/SS based on the following criteria:

- The contaminant concentration is in the range requiring respiratory protection, as determined by industrial hygiene monitoring information.
- The permissible exposure limit (PEL), threshold limit value (TLV), short-term exposure limit (STEL), ceiling value or maximum permissible concentration (MPC) for the contaminant may be exceeded.
- The contaminant is a gas, vapor, mist, dust, or fume.
- The contaminant concentration or absence of oxygen could be termed immediately dangerous to life or health (IDLH).
- The contaminant is flammable and the estimated concentrations may approach the Lower Explosive Limit (LEL).
- The contaminant has poor warning properties (i.e., odor, irritation, or taste).

5.2.2 Respirator Fit Testing

Each individual who must wear a respirator will be required to be clean-shaven in the sealing areas of the respirator face piece. Each respirator user will be fit tested using qualitative testing on initial assignment and at least every six (6) months thereafter in accordance with OSHA CFR 29, 1926.1101 (h)(4)(ii), OSHA CFR 29, 1926.62 Appendix B, paragraph IV (F), Appendix A of OSHA CFR 29, 1910.134 Respiratory Protection standard requirements and ANSI Z88-2-92. Upon donning the respirator device or before entering any remediation work area each respirator wearer of a negative pressure, air-purifying respirator will be required to perform a negative and positive pressure fit test. Qualitative fit test certificates for site personnel shall be maintained on-site by the PM and PF/SS.

5.2.3 Respirator Assignment

Respirators will be assigned on an individual basis. Respirators should be marked with the employee's name or identification number, if the respirator is to be reused by the same employee.

5.2.4 Respirator Cleaning, Inspection, Maintenance, Sanitization, and Storage

Respirators and supplied-air equipment that is used either occasionally or daily shall be cleaned, sanitized, inspected, assembled, and maintained ready for use on a daily basis. Each respirator will be sanitized and stored in a clean and sanitary container. Parts that require inspection include the valves, valve covers, nosepiece, straps, eye piece, the face piece and its snaps, cylinders, and canisters. The individual responsible for the cleaning, inspection, maintenance, sanitization, and storage of respirators and supplied-air equipment will be trained in the proper methods and procedures.

Each respirator user shall store his/her respirator in a clean, sealed plastic bag when not in use, unless it has been determined that the respirator and/or supplied-air equipment is contaminated, or is returned at the end of its use. If a respirator and/or supplied-air equipment becomes contaminated, it will be replaced with a clean and sanitized respirator and/or supplied-air equipment. The respirator wearer shall inspect it for defective parts and leaks.

5.2.5 General Considerations and Limitations for Respirator Use

The following criteria will be followed:

- Oxygen Deficient Atmospheres - atmosphere-supplying respirators shall be used in environments immediately dangerous to life or health (atmospheres containing less than 19.5 percent oxygen).
- Eye irritation - when working in contaminated environments or where there is a potential for eye irritation, a half face piece unit shall be used.
- Nuisance dust - any approved filter respirator can be used for nuisance dusts.
- Warning Properties of Contaminant - chemical cartridge respirators shall not be used for exposures to air contaminants that cannot be easily detected by odor or irritations.

  Chemical cartridges will be used only for those contaminants and the concentrations for which they are certified.

5.3 Other Required Safety Equipment

Basic emergency and first aid equipment will be available. The equipment will be placed in a pre-identified location within the zone. The following equipment will be available:

* First-aid kit
* Six-gallon, gravity fed emergency eye wash

* Portable, hand-held eyewash bottles with spare solutions
* Fire extinguisher (rated 20 A-B-C or higher) placed on each work floor level as required
* Basic spill kit
* Air horn (emergency use only)
* Safety harnesses
* Cutting/Welding helmets/glasses (if required)

6.0 SITE CONTROL AND SECURITY

To reduce the possibility of exposure of unprotected and unqualified personnel and off-site migration of contamination due to tracking by personnel or equipment, a site control program will be implemented during this project.

Only authorized personnel will be allowed to enter the containment area or work area. There will be separate sign-in and sign-out forms for USAEMI employees, any sub-contractor employees and any visitors. These forms will be located inside the jobsite office trailer located in the parking lot to the east of the work building.

Access to the active work area will be controlled by requiring authorized personnel sign in and out. No visitor will be permitted to enter unless accompanied by authorized personnel and with the consent of PM or PF/SS. Names and affiliation of each visitor will be recorded and maintained.

A daily Toolbox Safety Meeting form will be used for documentation and for site safety meetings. A copy of the site-specific, HASP will be kept on site for reference purposes and must be reviewed by all visitors as well as assigned personnel. Written acknowledgment of having reviewed the plan will be required by all persons working on the site.

A site map clearly delineating all work zones and all routes into and from the site will be posted at the entrance. The primary and alternate site evacuation routes will be designated on the site map and communicated verbally for each work area to assigned personnel.

6.1 Additional Site Control and Security Measures

The following measures are designed to augment the specific health and safety guidelines regarding the control of work areas.

* The "buddy system" will be used at all times by all field personnel. No one is to perform remediation/demolition work alone. Standby team members must be intimately familiar with the procedures for initiating an emergency response.
* Avoidance of contamination is of the utmost importance. Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces or materials.

* A designated area will be determined for eating and drinking on-site outside abatement work areas.
* Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in all work areas.
* Workers exiting from any friable abatement work area must decontaminate by showering in the decontamination unit.
* Hands and face must be thoroughly washed upon leaving non-friable work area and before eating, drinking, or any other activities.
* Beards or other facial hair that interfere with respirator fit are prohibited.
* The use of alcohol or illicit drugs is prohibited during the conduct of field operations.
* All equipment must be decontaminated or discarded before leaving the work area.
* Personal protective safety equipment described in Section 5.0 will be required for all field personnel unless otherwise approved by the PF/SS or PM.
* No open flame, cutting, welding, or grinding is allowed unless a proper burning permit is secured.

6.2 Dust Control Measures

Dust control techniques will be implemented to maintain dust levels as low as possible.

Dust is likely to be generated during the following decontamination/demolition activities:

* Remediation of Asbestos, Lead,
* Clean-up and decontamination activities
* Waste handling and disposal
* General demolition activities

Dust will be controlled with the use of wet methods and, in environmental abatement work areas, the use of temporary exhaust ventilation systems equipped with HEPA filtration devices.

7.0 HEAT STRESS

Sweating does not cool the body unless moisture is removed from the skin by evaporation. The wearing of personal protective equipment (PPE) reduces the body's ability to eliminate large quantities of heat because the evaporation of sweat is decreased. The body's efforts to maintain an acceptable temperature become impaired.

7.1 Definitions

The following terms have specialized definitions when used with respect to the heat stress program:

1. ***Air Temperature*** is the temperature measured with a standard mercury-in-glass thermometer with the bulb shielded from the sun and other radiant heat sources.

2. ***Heart Rate Monitor*** is an electronic instrument that measures the pulse as an indicator of heart rate.

3. ***Heat Disorder*** is a general term used to describe the illnesses associated with excessive heat exposure.

4. ***Heat Stress*** is the combination of environmental and physical work factors that constitute the total heat load imposed on the body. Environmental factors such as humidity air temperature can affect the body's heat transfer capability. If the worker than must perform strenuous work under unfavorable ambient conditions, heat stress conditions exist.

5. ***Heat Rash*** can be caused by continuous exposure to hot and humid air. The condition is characterized by a localized red skin rash and reduced sweating. Aside from being a nuisance, the ability to tolerate heat is reduced.

6. ***Heat Cramps*** are caused by profuse perspiration with inadequate fluid intake and salt replacement. The symptoms for heat cramps include muscle spasm and pain in the extremities and abdomen.

7. ***Heat Exhaustion*** is a mild form of shock caused by sustained physical activity in heat. Profuse perspiration without adequate fluid and salt replacement also contributes. The signs and symptoms of heat exhaustion include a weak pulse, shallow breathing, pale/cool/moist/clammy skin, profuse sweating, dizziness and fatigue.

8. ***Heat Stroke*** is the most severe form of heat stress. Immediate cooling is necessary to prevent injury or death. The signs of heat stroke include red/hot/dry skin, body temperature of 105°F or higher, no perspiration, nausea, dizziness and confusion, rapid pulse and loss of consciousness.

9. ***Impermeable Work Clothing*** includes semi-permeable or impermeable encapsulating ensembles such as disposable Tyvek coveralls, nitrile gloves, etc.

10. ***Normal Work Clothing*** is the permeable clothing made of cotton or synthetic cloth.

Heat related problems include heat fatigue, heat rash, fainting, heat cramps, heat exhaustion and heat stroke. Heat rash occurs because sweat isn't evaporating; making the skin wet most

of the time. Standing erect and immobile in the heat allows blood to pool to lower parts of the body. As a result, blood does not return to the heart to be pumped to the brain. Fainting may then occur.

Heat cramps are painful spasms of the muscles due to excessive salt loss associated with profuse sweating. The loss of large amounts of fluid and excessive loss of salt results in heat exhaustion. The skin will be clammy and moist and persons exhibit extreme wetness, giddiness, nausea and headache.

Heat stroke occurs when the body's temperature regulatory system has failed. Skin is hot, dry, red and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. **EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH**. A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling. **GET MEDICAL ATTENTION IMMEDIATELY!!**

Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

7.2 Early Symptoms of Heat Related Problems:

1. decline in task performance
2. uncoordination
3. decline in alertness
4. unsteady walk
5. excessive fatigue
6. insomnia
7. muscle cramps
8. dizziness

Susceptibility to Heat Stress Increases due to:

1. lack of physical fitness
2. lack of acclimation
3. increased age
4. dehydration
5. obesity
6. drug or alcohol use
7. sunburn
8. infection

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

7.2.1. Heat Stress Prevention

The first phase in addressing the heat stress problem is to take a number of preventive measures that do not interfere with the employee's job task to any significant degree. Training is an important first step in the process. The importance of the following factors should be reviewed with the employees in the daily site safety "tailgate" meeting:

7.2.2. Measures to Avoid Heat Stress:

* Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
* Identify a shaded, cool rest area.
* Rotate personnel, alternative job functions.
* Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink fewer fluids than needed because of an insufficient thirst. **DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK**. For an 8-hour workday, 50 ounces of fluids should be drunk.
* Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
* Save most strenuous tasks for non-peak hours such as the early morning or at night.
* Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.
* Avoid double shifts and/or overtime.

The implementation and enforcement of the above mentioned measures will be a joint responsibility of the project manager and the on-site foreman/supervisors. Potable water MUST be available each day for the work crew.

The second step is to concerning the best combination of preventive measures which suit the circumstances of the project including:

Acclimation of the workers so they become better able to deal with the rigors of working in hot environments. The degree to which a worker's body has physiologically adjusted or acclimatized to working under hot conditions affects his or her ability to do work. Acclimatized individuals generally have lower heart rates and body temperatures than un-acclimatized individuals and sweat sooner and more profusely. This enables them to maintain lower skin and body temperatures at a given level of environmental heat and work loads than un-acclimatized workers.

Acclimation can occur after just a few days of exposure to a hot environment. With fit or trained individuals, the acclimatization period may be shortened 2 or 3 days. However, workers can lose acclimatization in a matter of a few days and work regimens should be adjusted to account for this.

Reduction of manual labor by mechanization of tasks is another factor to be considered to help reduce heat stress situations. Uses of a backhoe instead of shoveling, and the use of a crane to lift or move drums, are examples of how mechanization can be used to reduce heat stress.

Modification of the thermal environment is also possible to a limited degree. Control of radiant heat gain is best accomplished by shielding. For example, umbrellas are available which can be used to shade equipment operators from the sun. Reducing heat gain from convection may be accomplished by supplying cooler air to the work environment.

Temperature reduction in the rest area is also a good preventive measure. As a minimum, break areas, locker rooms, and lunchrooms should be located in shaded areas. Ideally, the rest area will be maintained at a temperature of approximately 77° F.

Clothing modifications can reduce the amount of time an employee is in full protective clothing. While an adequate level of personal protective clothing is always required on a project, the impact of this clothing on the employee's heat balance should always be remembered.

Fluid replacement will always be provided. Adequate supplies of drinking water and drinks are always available to employees so that fluid loss by sweating is replaced. Employees should be encouraged to drink more fluids when working in hot environments. Increased dietary salt or lightly salted (0.2 percent) water is adequate to replace lost salt. Salt tablets are not to be used. If juice or electrolyte drinks are used, they should be diluted prior to drinking. Thirst is not an adequate indicator of body water loss. Workers are to drink at least small amounts of water on each break.

When enclosed in an impermeable suit, physically fit, acclimatized individuals sweat more profusely than unfit or un-acclimatized individuals and may therefore actually face a greater danger of heat exhaustion due to rapid dehydration. Consuming adequate quantities of water can prevent this.

Reduced time for employees' working in the hottest environment is another measure. Work/rest periods should be developed according to the results of the worker-monitoring program. Scheduling heavy workloads for a cooler part of the day is another successful method.

7.2.3. Monitoring Procedures

If the preventive measures outlined above are not effective in reducing heat stress in terms of the observed symptoms and the workers' complaints, then the second phase of the program will be required. These procedures are outlined in this section.

Weight loss monitoring is used as a direct measurement of the impact the hot environment is having on the employee fluid balance. The employee's weight is measured at the beginning of the day on a scale accurate to ± 0.25 pound. The employee is then measured at the end of the day and other appropriate times throughout the day to determine if adequate fluids are being taken in to prevent dehydration. Weights should be taken while the employee wears similar or no clothing. The body water loss should not exceed 1.5% of the total body weight loss in a workday.

Heart rate monitoring is also useful in determining the exposure of the employee to excessive heat. Workers wearing normal work clothing should be monitored whenever the dry bulb temperature exceeds 70° F. Workers wearing impermeable protective work clothing should be monitored whenever the dry bulb temperature exceeds 60° F.

The pulse rate is measured in the wrist as early as possible after the period of stress according to the frequency specified.

Heat Stress Pulse Monitoring

Working in Shade Dry Bulb Thermometer Temperature	**Working in Sunlight Bulb Thermometer (Shielded From Sun) Temperature**	**Frequency of Pulse Monitoring**	
		Impermeable Clothing	**Normal Work Clothes**
Greater than 90° F	Greater than 77° F	After each 15 minutes of work	After each 45 minutes of work
87.5° F - 90° F	74.5° F - 77° F	After each 30 minutes of work	After each 60 minutes of work
82.5° F - 87.5° F	69.5° F - 74.5° F	After each 60 minutes of work	After each 90 minutes of work
77.5° F - 82.5° F	64.5°F - 69.5° F	After each 90 minutes of work	After each 120 minutes of work
72.5° F - 77.5° F	60° F - 64.5° F	After each 120 minutes of work	After each 150 minutes of work

Oral temperature monitoring should also be used any time the heart rate exceeds 110 beats per minute. A clinical thermometer available from a drug store (3 minutes under the tongue) or similar device (IVAC digital thermometer) can be used to measure the oral temperature at the end of the work period. Oral temperatures should be taken before drinking cool fluids.

Worker monitoring shall be conducted until a work/rest cycle is established which controls work weight loss, heart rate, and oral temperatures to an acceptable level.

7.2.4. Control Measures

If the heart rate exceeds 110 beats per minute, shorten the next work cycle one-third and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

If the oral temperature exceeds 99.6° F, shorten the next work cycle by one-third without changing the rest period. If the oral temperature still exceeds 99.6° F at the beginning of the next rest period, shorten the following work cycle by one-third.

Employees should not be permitted to wear a semi-permeable or impermeable garment when his/her oral temperature exceeds 100.6° F.

The monitoring results shall be recorded. The records should be maintained in the project file for the active life of the project.

Response

The procedures presented herein are to be followed during an incident where an employee is adversely affected by an overexposure to heat. All employees are to remain alert to the symptoms of over-exposure to heat in themselves and their fellow employees. Treatment for over-exposure is recommended below:

* ***Heat rash*** treatment includes keeping the skin clean and allowing it to dry thoroughly after using chemical protective clothing.
* ***Heat cramps treatment includes removing the affected person to a cool place. Salted water or other electrolyte source, such as Gatorade, or similar electrolyte replacement product ingested slowly should help mitigate the cramps. Manual pressure may also be applied to the cramped muscles.***
* ***Heat exhaustion*** treatment includes removal of the affected person to the cool shade, removal of as much clothing as possible, sips of salted water or Gatorade, or similar electrolyte replacement product and fanning the person continually to remove heat by convection. Do not allow the affected person to become chilled. Treat for shock if necessary.
* ***Heat stroke*** treatment includes placing the individual in the shade, removing as much clothing as possible, pouring cool water on the person and fanning him vigorously. Summon emergency medical assistance since the transportation of the victim to a medical facility must not be delayed. Apply cold packs, if available; place under the arms, around the neck, or any other place where they can cool large surface blood vessels. If convulsions develop, prevent victim from biting his tongue. If transportation to a medical facility is delayed, reduce body temperature by immersing victim in an ice/water bath (however, be careful not to over chill the victim once

body temperature is reduced below 102° F). If this is not possible, keep victim wrapped in a sheet and continuously douse with water and fan.

The employee's pulse, breathing rate, and dilation of pupils should be noted immediately when the employees are overcome. This information should be made available to the emergency medical technicians when they arrive at the scene.

8.0 DECONTAMINATION

As previously described, it is anticipated that the remediation activities within the areas will be conducted with half mask/face respirators, which will include the use of disposable coveralls, hard hats, rubber safety boots, or rubber overboots over safety shoes. To reduce the possibility of migration of contamination due to off-site tracking by personnel exiting the work areas, personnel will be required to proceed through a complete remote three stage decontamination facility that will include a dirty room, multiple shower rooms and clean room. Showers will be required each time personnel exit the environmental remediation isolation work area. The main unit shall be located on the 1st floor of the building in proximity to a building exit.

A decontamination area will be established at the access/egress point of each separate and distinct remediation isolation work area (floor) in the building. These decontamination areas will consist of one stage change chambers. Workers will remove dirty protective coveralls, booties, gloves, etc. in the one-stage unit. Upon exiting the one stage unit, they shall proceed immediately to the full, 3-stage Personnel Decontamination Unit on the 1st floor and perform the following:

* Enter the dirty room of the decontamination unit.
* Vacuum off entire body
* Remove outer boots, gloves and disposable coveralls
* Cross into shower room
* Rinse respirator or airline mask.
* Remove and wash respirator or airline mask; hang to dry.
* Workers shall shower and proceed to clean room and dress.

8.1 Equipment Decontamination

All equipment, tools, etc. will be decontaminated before leaving the work areas in the one stage units. Decontamination shall be performed by HEPA vacuuming and/or wet wiping procedures

8.2 Personnel Hygiene

Smoking, eating, or drinking will not be permitted within the buildings.

Portable sanitary facilities will be provided. The number of facilities provided will be in accordance with the requirements of 1910.120(n). They will be maintained in clean condition at all times. These units will be located in the parking lot staging area adjacent to the office trailer to the east of the work building. These units will be serviced by the provider.

8.3 Disposal of Environmental/Contaminated Waste Streams

Shower water from the decontamination process will be filtered and discharged into the sanitary sewer system and/or re-cycled into the work area for wetting of abated materials. Solid waste such as disposable clothing, towels, and asbestos/lead-containing materials that have been abated will be generated as part of the abatement process.

Waste will be properly containerized and disposed per regulatory requirements and the requirements of the project specifications.

Any waste streams not previously characterized, must be characterized to determine how the waste is to be handled and disposed.

Documentation will be provided to the owner for all environmental wastes transported and disposed as a result of work under this contract.

8.4 Disposal of General Demolition Waste Streams

All concrete demolition materials, excavated soil wastes and/or liquids removed shall be disposed of as either ID 27 or General Construction/Demolition (C&D) waste, depending on sampling analysis.

Documentation will be provided to the owner for all wastes transported and disposed as a result of work under this contract.

9.0 TRAINING

9.1 General Training Requirements

All personnel covered by this HASP who will enter the regulated work areas on this site must meet the training requirements specified in OSHA 29 CFR 1926.1101(k) and US EPA Model Accreditation Plan training required by 40 CFR Part 763, Subpart E, Appendix C, for asbestos. In addition, such personnel must have in their possession a valid and current asbestos worker or supervisor license for the performance of asbestos abatement work and a lead worker or supervisor license to perform lead abatement work, all issued by the Commonwealth of Pennsylvania Department of Labor. Workers involved in the remediation of contaminated concrete/soil/liquid materials will be required to have training in accordance with the requirements of OSHA 29 CFR 1910.120 App E – Hazardous Materials.

Finally, the on-site Project Manager or foreman/supervisors of personnel who will be responsible for the asbestos abatement work must possess a valid and current asbestos abatement supervisor license, as appropriate, issued by the State of New Jersey Department of Labor.

Minimally, the following site personnel must have completed management training:

* Project Manager
* Site Supervisor

9.2 Pre-Entry Briefing Requirements

Prior to performing site work, all personnel (including subcontractor personnel and project oversight personnel covered by this HASP must attend a pre-entry briefing to apprise them of the contents of the HASP. This briefing is to be conducted by the Project Manager or his designee. A copy of the complete HASP will be available to all personnel in the site office trailer. The following information should be covered in this briefing:

* General Overview of the HASP
* Names of Personnel and Alternates Responsible for Site Safety and Health
* Lines of Authority
* Safety, Health and Other Hazards Present on the Site
* Personal Protective Equipment Required for Activities at the Site
* Safe use of Engineering Controls and Equipment at the Site
* Level and Degree of Potential Exposures
* Site Emergency Evacuation Procedures
* Medical Surveillance Requirements, Including Recognition of Symptoms and Signs of Heat Stress and Heat Stroke
* Training Requirements

9.3 Periodic Safety Meetings

A Daily Toolbox Safety Meeting will be held in the morning to reinforce the attention of the employees to health and safety issues pertinent to that day's activities and a safety meeting will be held during the day whenever the conditions change or situations warrant. These periodic meetings could be held right on the work floor.

9.4 Documentation of Training Requirements

Documentation of required general training, in the form of a copy of each appropriate abatement license for all USAEMI employees will be maintained on site.

Documentation that each site employee covered by this HASP has attended the required pre-entry briefing prior to performing project site activities will be through signing in on the Pre-

Entry Briefing Attendance Form. Each pre-entry briefing conducted must be documented on this form.

9.5 CPR/First Aid Training

USAEMI will assure that at least one individual, who is trained in cardiopulmonary resuscitation (CPR) and first aid will normally be present on site.

10.0 MEDICAL SURVEILLANCE

10.1 General Medical Surveillance Requirements - Asbestos

All employees covered by this HASP who will work in the established areas on this site must meet the medical surveillance requirements specified in OSHA 29 CFR 1926.1101(m) for asbestos. Therefore, such personnel must have completed a baseline occupational medical surveillance examination, or an annual occupational medical surveillance examination within the last 12 months.

The requirements for the medical surveillance examination should include the following components:

For Asbestos:

* Personal Medical Questionnaire
* Occupational Exposure History
* Physical Examination
* Spirometry
* Chest X-Ray (B Reader) (At Physician's Discretion)
* Electrocardiogram (At Physician's Discretion)

10.2 General Medical Surveillance Requirements - Lead

All employees covered by this HASP who will work in the established areas on this site must meet the medical surveillance requirements specified in 1926.62. Therefore, such personnel must have completed a baseline occupational medical surveillance examination, or an annual occupational medical surveillance examination within the last 12 months.

The requirements for the medical surveillance examination should to include the following components:

- Personal Medical Questionnaire
- Occupational Exposure History
- Physical Examination
- Vision Testing

- Spirometry
- Audiometry
- Chest X-Ray (At Physician's Discretion)
- Electrocardiogram (At Physician's Discretion)
- Initial biological blood lead level monitoring for Blood lead and zinc protoporphryin levels
- Periodic blood lead and zinc protoporphryin levels
- At least every 2 months for the first 6 months and every 6 months thereafter

11.0 EMERGENCY RESPONSE

The basic elements of an emergency evacuation plan include personnel training, alarm systems, escape routes, escape procedures, critical operations or equipment, rescue and medical duty assignments, designation of responsible parties, emergency reporting procedures and methods to account for all employees after evacuation. An area safely remote from the building will be designated as the personnel rendezvous location for all personnel involved in the project.
911 shall be used to notify emergency personnel in case of all emergencies.

Employee Training: All site personnel will be instructed in the specific aspects of emergency evacuation applicable to the site as part of the site safety meeting prior to the commencement of activities. Escape routes will be established for each working zone. They will be mapped and will be reviewed with all personnel as part of the safety meetings. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed.

The operations covered by this HASP have some potential to create emergency situations, such as spills of fuels or hydraulic fluids. Other emergency situations could occur such as fire, explosion, disruption of utility service, and accident or injury to field personnel. This section of the HASP has been written to address the procedures that will be followed in the event that such an emergency occurs within a regulated work area (i.e., on site).

11.1 Site Emergency Coordinators

The On-Site Emergency Coordinators are:

Primary – Project Manager – Kevin Meldrum – Cell No. 215-397-8168
Secondary – Contract Manager – James E. Harris – Cell No. 215-778-4061

The on-site Project Manager/Project Foremen/Site Supervisors shall implement the emergency plan whenever conditions at the site warrant such action. They will be jointly responsible for assuring the evacuation, emergency treatment, emergency transport of site personnel as necessary, and notification of emergency response units and the appropriate project management staff designated in the Emergency Reference Table.

11.2 Alarm Systems/Emergency Signals

11.2.1. Emergency Signals

The following alarms will indicate an emergency and the need for implementation of the evacuation procedure.

An emergency communication system must be in effect at this site. The most simple and most effective emergency communication system in many situations will be direct verbal communications. Verbal communications will be supplemented anytime voices cannot be clearly perceived above ambient noise levels (i.e., noise from heavy equipment, jackhammers, lift trucks, etc.) and anytime a clear-line-of-sight cannot be easily maintained amongst all site personnel because of distance, terrain, or other obstructions. When verbal communications must be supplemented, the following Emergency Signals (using hand held portable air horns) may be implemented:

1. ONE HORN BLAST: GENERAL WARNING

One horn blast is used to signal relatively minor, yet important events on-site. An example of this type of event would be a minor chemical spill where there is no immediate danger to life or health yet personnel working on-site should be aware of the situation so unnecessary problems can be avoided. If one horn blast is sounded, personnel must stop all activity and equipment on-site and await further instructions from the PM.

2. TWO HORN BLASTS: MEDICAL EMERGENCY

Two horn blasts are used to signal a medical emergency where immediate first aid or emergency medical care is required. If two horn blasts are sounded, all first-aid and/or CPR trained personnel should respond as appropriate, all other activity and equipment should stop and personnel should await further instructions from the PSO.

3. THREE HORN BLASTS FOLLOWED BY ONE CONTINUOUS BLAST: IMMEDIATE DANGER TO LIFE OR HEALTH

Three horn blasts followed by another extended or continuous horn blast signals a situation that could present an immediate danger to the life or health (IDLH) of all personnel on-site. Examples of possible IDLH situations could include fires, explosions, hazardous chemical spills or releases, hurricanes, tornadoes, blizzards or floods. If three horn blasts followed by a continuous blast are sounded, all activity and equipment must stop, all personnel must evacuate the site to an appropriately designated site located outside the site gate or further off-site if necessary. (Note: Unless otherwise specified, all decontamination procedures must be implemented).

All personnel must be accounted for by the PM or PF/SS and other response actions determined by the PM/PF/SS must be observed.

11.3 Emergency Management

A site emergency is considered to be a major event that has or threatens to have a detrimental physical impact on facilities, people and/or the environment and requires immediate action.

Emergencies can be grouped into three categories:

* Fire
* Medical
* Natural (hurricanes, flooding, etc.)

Fire Detection: If an employee discovers a fire:

Report the emergency to the USAEMI Project Foremen/Site Supervisor or PM.

Report your name, exact location, and the nature of the emergency. Use the emergency warning procedures defined in Section 11.2.

* Shut down and turn off all equipment.
* Leave the areas.

11.4 Emergency Reference

For personnel with less serious injuries that border being first aid cases that do require outside assistance (i.e., emergency transportation) the worker should contact the PF/SS or the PM to place the request for emergency ambulance services. USAEMI personnel will stabilize the injured person as much as possible within the work area. Injured personnel will be decontaminated to the extent possible and removed to a clean area for medical attention.

Prior to initiating work at the site, the PM will be appointed to activate emergency response actions. In the event an injury or illness requires more than first aid treatment, an escort person shall be provided to accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the PM.

The investigation should begin while details are fresh in the mind of anyone involved. The person administering first aid may be able to start the fact gathering process if the injured are able to speak. Pertinent facts must be determined. Questions beginning with who, what, when, where, and how are usually most effective to discover ways to improve job performance in terms of efficiency, quality of work, as well as safety and health concerns.

11.5 Accident/Incident Reporting and Investigation

All injuries or illnesses incurred at this site by employees covered by this HASP, regardless of their severity, must to be reported to the PF/SS and the PM. Serious injuries or illnesses must be reported directly to the PM immediately after their occurrence.

Any accident or incident (other than minor first aid treatment) resulting in an OSHA recordable injury or illness, treatment at a hospital or physician's office, property damage, or a near miss that could have resulted in any of the above requires that an accident/incident investigation be performed. The investigation will be initiated by the PM or the first line supervisor of the employee(s) involved as soon as emergency conditions are under control. The results of the accident investigation are to be documented. The incident shall be investigated and documented in accordance with the requirements of the Corporate Health & Safety Program.

11.6 Evacuation of Site Personnel

In the event of an emergency situation where evacuation of the area is necessary, all personnel in the area will evacuate the work area and assemble near a support area location determined prior to the beginning of the daily operating tasks. For efficient and safe site evacuation and assessment of the emergency situation, the PM will have authority to initiate proper action if outside services are required. Under no circumstances will incoming personnel or visitors, other than emergency personnel; be allowed to proceed into the area once the emergency signal has been identified. The site evacuation plan shall be included as part of the pre-entry briefing required for all site personnel.

11.7 Injury or Illness

Emergency first aid shall be applied on site as deemed necessary. If necessary and appropriate, cleanup of the affected individual will be performed prior to transportation to the hospital. In cases of emergency, the ambulance squad shall be contacted for transport to the hospital. In non-emergency situations, the individual may be transported to the hospital in a site vehicle.

11.8 Activity Hazard Analysis

This is a typical Activity Hazard Analysis form. Please refer to the complete Safety Program Addendum for Activity Hazard Analysis program applicable to this project and this plan.

Activity: _____ Analyzed By: _____ Date:_____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Elevated/Roof Work	Falls/Slips & Trips Heat Stress	Each worker to wear a safety harness with an energy absorbant lanyard. Establish work-rest cycles. Identify shaded, cool rest area. Alternative job function. Water intake to be equal to sweat produced. Drink salted drinks like Gatorade.
Articulating Boom Lift	Fall	Boom to be equipped with back up alarm. Bucket not to exceed the maximum rated capacity. Safety harness to be worn at all times while in the bucket.
Pipe Insulation Removal	Slips/Trips/Falls	Scaffolding to be erected on level ground. Guard rails to be provided around perimeter of work surface. Deck entire top portion of the work surface. Extend planks at least six inches over the supports. Train all employees in proper use of scaffolding. Inspect scaffolding to identify any defects.
Interior Transite Panels	Electric Hazards Slips/Falls	Suspend all air lines and electric cords when possible using a tape. Hard hats, safety glasses to be worn by all employees. Ladders and scaffold to be inspected before each use. Minimize debris on floor. Always face the ladder when climbing up, down or when working from it. Ladders not to be used as substitute for planks. Wood/fiber glass ladders to be used to help control exposure to electrical hazards.

Respiratory Protection Program

USA ENVIRONMENTAL MANAGEMENT, INC.

RESPIRATORY PROTECTION PROGRAM

Revised 10/12

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REASONS FOR HAVING A RESPIRATORY PROGRAM

Working and breathing in some environments can pose a hazard to workers' health. Inhalation of some substances can cause immediate injury to the respiratory system or other major organ systems of the body. Carbon monoxide and some paint solvents are examples of relatively quick acting substances. The injuries/illnesses caused by other contaminants may not be obvious for years or even decades. Asbestos and other cancer causing agents fall into this category of long latency (developing) periods.

Respirators are commonly used to help protect against these inhalation hazards, especially on asbestos abatement projects. However, the protection program is not nearly as simple as choosing a respirator, giving it to an employee, and expecting the employee to get adequate protection. There is a need to have and apply knowledge about lung structure and function, human characteristics, hazard recognition, evaluation and control, and government regulations.

Respiratory hazards are generally divided into two categories--oxygen deficiency and toxic contaminants. The potential for either or both must be considered when addressing respiratory protection.

Normal air containing about 21 percent (20.9%) oxygen. For breathing purposes, air should not contain less than 19.5 percent or more than 23.5 percent oxygen. Oxygen deficiency generates a variety of symptoms, ranging from increased breathing and pulse rate to unconsciousness and death.

Asbestos abatement projects generally do not pose oxygen deficiency hazards. However, since there are abatement projects and circumstances where it can be a problem, it must always be considered. For example, there could be an oxygen deficiency problem while working in confined spaces such as steam tunnels, mechanical chases, or boilers. ***Please note – there are no work areas in the scope of this contract work, which would present an oxygen deficient work environment.***

Toxic contaminants are the more common category of respiratory hazards on asbestos abatement jobs. Those toxic contaminants are generally subdivided into two categories, particulates and gaseous materials (or a combination of the two). Asbestos fibers are an example of the particulate category and carbon monoxide is an example of the gaseous category. It is possible to have both these hazardous substances plus others (such as encapsulant solvents) in a work area at the same time.

As mentioned earlier, the effects of these contaminants can develop quickly or slowly and they can be mild or fatal. For example, mesothelioma (cancer of the lung or abdominal linings) may take 20 to 45 years to develop, but once it is detected, it causes death within a year. Severe exposure to carbon monoxide can cause death within a few minutes or may not leave residual damage if promptly detected and treated.

Acceptable limits of exposure for respiratory hazards are based on values documented through research by such organizations as the American Conference of Governmental Industrial Hygienists (ACGIH), the National Institute for Occupational Health and Safety (NIOSH), the Occupational Safety and Health Administration (OSHA), and others. These organizations publish Permissible Exposure Limits (PELs) and Threshold Limit Values (TLVs) for a variety of toxic substances.

The limits are expressed for exposure durations, usually a full work shift. For example, the current OSHA limits for exposure to carbon monoxide are 50 parts per million (PPM) in work place air and 20 PPM in air supplied to Type C respiratory. The current limits and recommended guidelines for asbestos exposure range from 0.2 f/cc (OSHA) down to 0.01 f/cc (generally accepted "clearance level" in the asbestos abatement industry), or lower.

Asbestos abatement work has a likelihood for high personal exposure to asbestos, whether it is removal, encapsulation, or enclosure work. Thus, adequate procedures in assessing hazards, reducing hazards, and providing respiratory protection must be conscientiously applied.

Hazard assessment during abatement work involves a variety of visual inspections. For example, barriers must be frequently checked for leakage. Removed asbestos materials must be checked for adequate wetness and surfaces need to be carefully inspected for asbestos contamination. Personal and work area samples must be collected to document the asbestos fiber content of the workplace air. Sampling locations include outside the barrier, in the work area, and at the breathing zone of workers. The result of the samples from the work area and workers are necessary to establish proper hazard reduction/elimination techniques and to choose proper respirators for the workers.

Several hazard reduction techniques may be used inside the abatement area including wetting with amended water, using negative air machines, prompt bagging of removed materials, wet cleaning, and HEPA vacuuming. These techniques reduce the airborne fiber concentrations during removal projects, reduce the asbestos hazard to the worker, and ease clean-up efforts.

Respirators must be selected and a respirator program established based on OSHA standards, the actual or anticipated air sampling results, and other guidelines (i.e., respirator manufacturers'). ***Please note that the project specific respiratory, procedures are included in the appropriate sections of the project specific Asbestos Hazard Abatement Plan and the Lead-Based Paint Management Plan.***

Only respirators approved for use in asbestos atmospheres should be used. Both the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) test and approve respirators and assign a joint NIOSH/MSHA approval number for each specific respirator assembly. The following shows examples of approval labels that would be found on respirators.

The label below is for a respirator model with high efficiency filter cartridges that might be used for protection against airborne asbestos fibers. The approval number assigned by NIOSH for

this specific manufacturer and model is 21C-353 (see label The "TC" indicates "tested and certified", the "-21C" indicates what style/category of respirator it is, and the "-353" is a unique number assigned to this specific manufacturer and model.

Respirator selection must be based on the anticipated exposure level to asbestos. However, based on actual 8-hour TWA exposure sampling performed on similar type projects, it is anticipated that this project would allow for the use of ½ face, negative pressure, respiratory protection throughout.

TYPES OF RESPIRATORS

AIR PURIFYING RESPIRATOR

Air purifying respirators remove limited concentrations of air contaminants from the breathing air but do nothing to improve (or change) the oxygen content. Thus, they can only be used in atmospheres where there is enough oxygen and where air contaminants do not exceed the specified range of the respirator and cartridge.

These respirators generally consist of a soft, rubber face piece and some kind of replaceable filter or cartridge. Two major subcategories of air purifying respirators are the mechanical filter type and the chemical cartridge type. The mechanical filter variety is designed to protect against particulate matter such as dust and asbestos fibers. The chemical cartridge variety is used to protect against light concentrations of chemicals such as solvent vapors. There are combination models approved for both types of protection.

Respirator face pieces (including those for the air purifying category) are used to further describe specific subcategories based on the construction and face coverage. The major subcategories are:

-- Half Mask
-- Full Face

HALF MASK RESPIRATOR

It is called a half-mask because it covers half of the face from under the chin to the bridge of the nose. Most, but not all, half-mask respirators are NIOSH/MSHA approved. It is

still necessary to choose the correct approved model for the identified air contaminant. Note the respirator components and the correct position for the head and neck strap.

FULL FACEPIECE RESPIRATOR

Full-face types cover from under the chin to the forehead. This broader coverage provides a better face fit, higher degree of protection, and gives some eye protection. Many full-face respirators have four or more straps. Regardless of the number of straps, the respirator should be put on by placing the chin into the chin cup, then tightening the straps going from the bottom to the top.

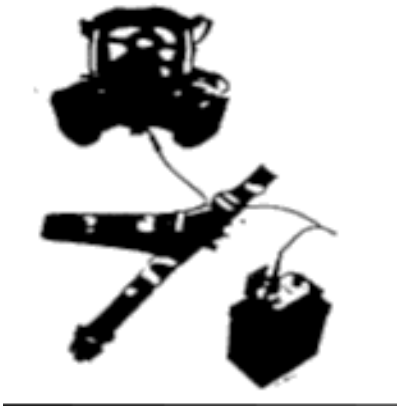
POWERED AIR PURIFYING RESPIRATOR (PAPR)

A subcategory of air purifying respirators is the powered Air Purifying (PAPR) type. It has received considerable use on asbestos abatement projects.

PAPR units use a battery-powered blower that passes the contaminated air through a cartridge or filter where the air is cleaned and forced through a hose to the face piece. The face covering can be a half-mask, full-face mask, helmet (hat), or hood.

An advantage of using a powered air-purifying respirator is that it supplies air at a positive pressure within the face piece, helmet, or hood. They provide a higher degree of protection than do half-mask and full-face air purifying respirators.

Powered respirators must deliver at least four cubic feet of air per minute (CFM) to a tight fitting face piece and at least seven CFM to a loose fitting helmet or hood. They are reportedly designed to operate a full eight-hour work shift, but after repeated rugged use some seem to need recharging or a new battery during the shift. If employees request PAP respirators, employers must provide them even if negative pressure respirators would provide adequate protection [29 CFR 1910.1001 (g)(2)(i)] & (29 CFR 1926.58 (h)(2)(iii)].



Another category of respirators is the Air Supplied respirator.

AIR SUPPLIED RESPIRATOR

Air-supplied respirators deliver breathing air through a supply hose connected to the worker's face piece (half mask or full face). This category of respirator is becoming the most important type on asbestos abatement jobs for several reasons:

-- The OSHA asbestos standards (29 CFR 1910.1001 and 1926.58) require jobs be started with them if exposure is unknown of greater than 1000 X PEL

-- They provide a very high degree of protection

-- They are often required by the contract specifications

The third and last major category is the Self-Contained Respirator.

SELF-CONTAINED RESPIRATOR

Self-contained respirators provide protection for various periods of time depending upon the amount of breathing air (air pressure and tank size) and the breathing demands of the wearer. The worker is independent of his/her surrounding atmosphere when using these devices. Therefore, they can be used in environments immediately harmful to life.

However, since they have several disadvantages, they are seldom used on asbestos abatement jobs except by some inspectors. They are heavy and awkward to wear. The air supply usually lasts only 30 to 60 minutes, thus requiring a large supply of filled tanks on-site. They require more worker training than the other types or respirators.

GENERAL MAINTENANCE

When not is use, dry respiratory equipment should be sealed in plastic bags and stored in a single layer with the face piece and exhalation valve in a non-distorted position. A metal cabinet with shelves is well suited for this purpose.

Repair or replacement of component parts must be done by qualified individuals. Substitution of parts from a different brand or type of respirator will invalidate the approval of the respirator and may adversely affect its performance.

Inspection for defects in respiratory equipment must be done before and after each use and during cleaning. The primary defects to look for in the inspection of component parts of the respirator and corrective actions where appropriate are itemized below:

1. Air purifying and powered air purifying respirators (half-mask, and full face piece)

a. Rubber face piece--check for:

--Excessive dirt (clean all dirt from face piece).

--Cracks, tears, or holes (obtain new face piece).

--Distortion (allow face piece to "sit" free from any constraints and see if distortion disappears. If not, obtain new face piece).

--Cracked, scratched, or loose-fitting lenses (contact respirator manufacturer to see if replacement is possible. Otherwise, obtain new face piece).

b. Head straps--check for:

--Breaks or tears (replace head straps).

--Loss of elasticity (replace head straps).

--Broken or malfunctioning buckles or attachments (obtain new buckles).

--Slipping face piece (replace head strap).

c. Inhalation valve/exhalation valve-check for:

--Detergent residue, dust particles, or dirt on valve or valve seat (clean residue with soap and water).

--Cracks, tears, or distortion in the valve material or valve seat (contact manufacturer for manufacturer instructions).

--Missing or defective valve cover (obtain valve cover from manufacturer).

d. Filter element(s)--check for:

--Proper filter for the hazard.

--Approval designation.

--Missing or worn gaskets (contact manufacturer for replacement).

--Worn threads--both filter threads and face piece threads (replace filter or face piece, whichever is applicable).

--Cracks or dents in filter housing (replace filter).

--Missing of loose hose clamps (obtain new clamps).

2. Atmosphere-supplying respirators (Air-supplied and Self-contained).

a. Check face piece, head straps, valves, and breathing tube, as for air purifying respirators.

b. Hood, helmet, blouse, or full suit, if applicable--check for:

--Headgear suspension (adjust properly for worker).

--Cracks or breaks in face shield (replace face shield).

--Protective screen to see that it is intact and fits correctly over the face shield, abrasive blasting hoods, and blouses (obtain new screen).

c. Air supply system--check for:

--Breathing air quality

--Breaks or kinks in air supply hoses and end fitting attachments (replace hose and/or fitting).

--Tightness of connections

--Proper setting of regulators and valves (consult manufacturer's recommendations).

--Correct operation of air purifying elements and carbon monoxide or high-temperature alarms.

ADMINISTRATION OF RESPIRATORY PROGRAM

Dilip Kumar will be the Program Administrator for USA Environmental Management, Inc. (USAEMI's) Respiratory Program. He will be responsible for making sure that each individual worker is properly fit tested with an appropriately sized respirator, that the respirators are maintained, and that each individual assigned to wear a respirator is medically monitored in accordance with OSHA standard 29 CFR 1926.58.

PROGRAM ADMINISTRATORS RESPONSIBILITIES

--Purchasing inventory

--Issuing respirators

--Controlling inventory, to include, a system of accounting and record keeping to track identification of users and to compile maintenance records for specific respirators.

Record keeping should include:

--Results of any pre- of post-training evaluation of workers' knowledge and hands-on skill.

Records of worker's exposure, medical exams, and air monitoring results will be kept a minimum of 30 years.

MEDICAL MONITORING

Free medical exams are provided to all employees required to wear a negative-pressure respirator, before employment and once annually after that or more frequently if deemed necessary by the physician, and after termination. Exams must include a standardized OSHA respiratory history form, pulmonary function tests, chest x-rays, a physical examination directed toward the pulmonary, cardio-vascular and gastro-intestinal systems and other tests the physician feels are necessary.

The physician and B-reader have been given copy of the OSHA standard, information about the employee's exposure, duties respirator use, and previous medical exams. The physician's opinion must be confined solely to medical conditions that may limit ability to work. X-rays must be read by a B-reader. A copy must be provided to the employee within thirty (30) days after receipt.

USAEMI keeps records on any historical data used for exemptions from monitoring (as long as relied on), exposure measurements (30 + years) medical examinations (30 + years after employment), employee training (one (1) year after employment). Records are available to employees and their representatives. Medical records require written consent for release.

USAEMI uses the occupational health component of Jefferson Health System, Healthmark, Inc., 2301 S. Broad Street, Philadelphia, PA 19148 for the required physical examination. The examination includes a complete physical examination by a physician, chest x-ray (read by a B reader), Pulmonary Function Test and ***Respirator Clearance Form***. After examination, a summary is given to the worker to be brought back to the office ***indicating whether or not the worker is capable of working with a respirator***. Within a few days complete detailed results are sent to the employee at his home address and appropriate information is sent to USAEMI to keep on file with employee records. If an employee is unable to function normally while using a respirator, he will be given the opportunity to be assigned to a different position not requiring the use of a respirator.

Copies of complete, current, medical program for each worker will be maintained at the project site throughout the course of all abatement activities.

PERMISSIBLE EXPOSURE LIMIT

As established by the OSHA Construction Standard, 1926.1101 the following will apply to individuals employed in potential asbestos exposure work activities:

--Permissible exposure limit (PEL) of 0.1 fibers/cc average over an 8-hour day.

--A short-term excursion limit based on 30 minutes of sampling has a maximum exposure level of 1.0 f/cc.

--USAEMI must inform other employers on the site of their asbestos work.

--Regulated areas must be set up to minimize the number of workers exposed whenever PEL may be exceeded. Activities in the area are strictly controlled.

--Negative-pressure enclosures must be set up wherever feasible.

--A competent person must supervise all activities and compliance with all applicable regulations.

--Exposures must be monitored initially and daily on representative workers in each work area, unless historical data or periodic monitoring can demonstrate levels not exceeding the action level.

--USAEMI notifies workers either individually or by posting of their exposures as soon as possible after results are received. Workers and their representatives have the right to observe monitoring.

--Engineering controls (e.g., local exhaust, HEPA vacuums) and work practices (e.g., wet methods), must be used to control exposures as much as possible.

--Workers using half of full-face masks can request PAPR. Respirators must be fit-tested and documented to ensure proper fit using qualitative or quantitative fit-testing initially and every six months.

--Protective clothing must be provided for exposures over the PEL. Proper laundering is re -quired. Torn or ripped work suits must be immediately mended or replaced.

--Decontamination areas, clean rooms, and showers must be provided for exposures over the PEL, except for small scale short-duration operations.

--Employees exposed above the Action Level must be trained at least once a year on the hazards of asbestos, their relationship to smoking, how to minimize exposure, the uses and limitations of respirators.

TABLE D-4 of 29 CFR 1926.58 prescribes the appropriate minimum respiratory protection needed according to the airborne concentration of asbestos in the area.

AIRBORNE CONCENTRATION OF ASBESTOS	**REQUIRED RESPIRATOR**
Not in excess of 1 f/cc (10 X PEL)	Half-mask air purifying respirator equipped with high-efficiency filters.
Not in excess of 5 f/cc (50 X PEL)	Full Face piece air purifying respirator equipped with high efficiency filters.
Not in excess of 10 f/cc (100 X PEL)	1. Any powered air purifying respirator equipped with high efficiency filters.

	2. Any supplied-air respirator operated in continuous flow mode.
Not in excess of 100 f/cc (1000 X PEL)	Full-face piece supplied-air respirator operated in pressure demand mode.
Greater than 100 f/cc (1000 x PEL) or Unknown Concentration	Full-face piece supplied-air respirator operated in pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus.

RESPIRATOR LIMITATIONS AND WARNINGS FOR AIR PURIFYING AND POWERED AIR PURIFYING RESPIRATORS

1. This respirator does not supply oxygen.

2. Use only in adequately ventilated areas containing at least 19.5% oxygen.

3. Do not use for respiratory protection when atmospheric contaminants are unknown or immediately dangerous to life or health or against contaminants, which generate high heats of reaction.

4. Leave work area immediately, check integrity of respirator, and replace parts if:

   a. they become damaged;
   b. breathing becomes difficult, increased breathing resistance occurs;
   c. dizziness or other distress occurs; or
   d. you taste or smell contaminants or an irritation occurs.

5. Use strictly in accordance with the face piece, cartridge and pre-filter instruction, labels and limitations pertaining to this respirator assemble. If you have any doubts about the applicability of this product to your job situation, it is recommended you consult the Respiratory Program Administrator.

6. Use of this or any respirator should be in accordance with applicable safety and health standards, respirator selection tables, or pursuant to the recommendations of an industrial hygienist.

7. The assembled respirator may not provide satisfactory face seal with certain physical characteristics (such as beards or sideburns) resulting in leakage in connection with the face piece, which voids or limits the protection. If such a condition exists, the user assumes all risks of bodily injury, which may possibly result.

8. Never modify of alter this device.

9. Only for use by trained qualified personnel.

10. Store this device in a sealed container away from contamination areas when not in use. Important: Failure to follow all instructions and warnings on the use of this product and/or failure to wear this respirator during all times of exposure may adversely affect the wearer's health.

STANDARD OPERATING PROCEDURES FOR FULL FACEPIECE POWERED AIR PURIFYING (RACAL™) RESPIRATOR

1.1 Battery Charging

A completely exhausted battery pack should be charged for 14-16hours with the single unit battery charger. A longer charging period will not normally damage the battery pack, but may reduce battery life if repeated regularly.

Charge the battery pack as follows:

a. Connect the battery pack to the charge by plugging the charger lead into the top of the battery pack. The position of the switch on the battery pack does not affect the ability of the charger to charge.

b. Plug the charger into a suitable source of AC power (110-120 volt).

c. Check that the LED indicator will gradually diminish. This does not imply that the battery pack is completely charged; the battery pack should be charged for the full 14-16 hours. Check the battery pack voltage after charging to be sure that it is above 5.0 volts.

In addition to single unit chargers, charging stations are available for use with the Powerflow System, Consult Chapter 4 for a complete listing.

1.2 Pre-Operational Inspection

Before beginning each work shift, perform the following Pre-operational Inspection to ensure proper operation. If any components are missing or damaged, replace them prior to using the Powerflow System. Make sure:

a. the head harness straps are not torn, and the visor is not cracked,

b. the inhalation valves are not worn, torn, bent, dry, or sticky, and there are no pinpoint holes in the facemask fabric,

c. the battery pack is fully charged (see Section 1.1),

d. the filter is an SP3 filter with part number 520-01-34 or 450-01-01,

e. the SP3 filter is appropriate for the environment of its intended use, as confirmed by your local safety professional, and

f. air flows properly through the system as determined by the following airflow check:

1. connect the filter to the motor/airflow unit as described in Section 1.3b,

2. insert the base of the airflow indicator into the outlet side of the motor/airflow unit. Turn the battery pack switch to the "ON" position,

3. hold the motor/airflow unit so the airflow indicator is in a vertical position. (See Figure 1.), and

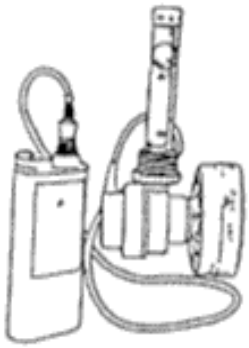


Figure 1: Position of the airflow indicator on the motor/airflow unit for an airflow check

4. Make sure the center of the airflow indicator float falls at or above the ten mark on the airflow indicator specified for power flow. If the float fails to reach this mark, install a new filter (see Section 3.10). Be sure to replace the plug and screw cap on the old filter and dispose of it according to local, state, or federal guidelines. If problems

still exist, check the charge of the battery pack (see Section 2.1) and examine the motor/airflow unit for problems.

> WARNING: MAKE SURE THE CENTER OF THE AIRFLOW INDICATOR FLOAT IS AT OR ABOVE THE ARROW MARK SPECIFIED FOR POWER-FLOW PRIOR TO ASSEMBLING THE SYSTEM AND ENTERING THE WORK AREA. FAILURE TO DO SO MAY RESULT IN INADEQUATE AIRFLOW.

1.3 System Assembly and Donning

Notes: For your protection, this Powerflow System must only be assembled in non-contaminated environments.

A. Connecting the Motor/Airflow Unit to the Facemask

Screw the motor/airflow unit into the threaded hole in the front of the facemask. Hand-tighten the motor/airflow unit to the facemask. The motor/airflow unit may be swiveled to a position of choice and comfort.

Note: When swiveling the motor/airflow unit, it may accidentally be loosened from the facemask. Double check to make sure the unit is properly and securely fastened to the facemask each time the unit is swiveled.

B. Connecting the Filter to the Motor/Airflow Unit

Read the User Instructions packed with the filter. Remove the packaging, screw cap, and plastic plug from the filter, retaining the cap and plug for use during decontamination, storage, and disposal. Check that a gray (or black) gasket has been installed in the filter inlet on the motor/airflow unit, (if a gasket is not in place, notify your supervisor and obtain a motor/airflow unity that has a gasket in place). Screw the filter into the filter inlet on the motor/airflow unit and hand-tighten to affect a good seal with the gasket.

> WARNING: DO NOT USE THE SYSTEM WITHOUT THE GASKET IN PLACE. FAILURE TO HAVE A GASKET IN PLACE MAY CAUSE INWARD LEAKAGE OR CONTAMINATED MATERIAL RESULTING IN SERIOUS INJURY OR LOSS OF LIFE.

C. Donning the System

Note: RACAL Health and Safety recommends wearing the Facemask underneath any protective outerwear that covers your head.

Remove the visor guard and fit the facemask as described below (fitting the facemask properly will yield designed protection):

1. Place the facemask's neck strap around your neck.

2. Loosen the facemask's straps and fit the facemask by placing your thumbs inside the facemask straps, placing your chin into the chin cup and pulling the head harness over your head. Tighten the lower straps first, then the upper side straps, and finally the top strap. A correct seal may be obtained without over tightening the facemask straps.

3. Confirm good facial fit of the facemask.

4. Attach the battery pack to your belt, using the belt clip. Insert the male plug of the motor/airflow unit into the battery pack. Turn the battery pack switch to the "ON" position and assure yourself of sufficient airflow. (See Section 1.2f).

Note: RACAL Airstream recommends facemask fit be checked in the positive-pressure mode. There are several good methods for confirming good facial fit. Check with your safety professional and/or a physician.

If this system will be exposed to large amounts of water, the battery pack must be placed in a water repellent battery cover (available from RACAL Airstream) or in a waterproof plastic bag prior to use to avoid corrosion, deterioration and possible battery failure.

1.4 Fault Location

In the event airflow over your face reduces or stops, leave the contaminated environment immediately and perform the following faultfinding procedures. Make sure:

a. there are no pinpoint holes in the facemask fabric, tears in the head harness straps, or cracks in the visor,

b. the inhalation valves are not worn, torn, bent, dry, or sticky,

c. the Powerflow System is turned on and the power cord is properly connected to the battery pack,

d. no damage has occurred to any part of the battery pack or the motor/airflow unit,

e. the battery pack voltage is greater than 4.4 volts, and

f. air is properly flowing through the system, as verified by performing the airflow check described in Section 1.f. If the system fails the airflow check, and the battery pack is above 4.4 volts, install a new filter (see Section 2.1). Make sure the new filter passes the airflow check. Always replace the plug and screw cap on any used or damaged filter and dispose of it according to local, state, or federal guidelines.

If any components are not functioning properly, remove and replace them, as described in Section 2 and perform the Pre-Operational Inspection described in Section 1.2. Always make sure sufficient airflow is maintained before re-entering the contaminated work environment.

Figure 2: Correctly Donned Powerflow System

1.5 Post-Operational Maintenance

Note: For your protection, the Powerflow System must only be removed in non-contaminated environments. Be sure to turn off the battery back before removing the system.

Take care of the Powerflow system after each use in the manner detailed below. Do not use abrasive cleaners.

WARNINGS: WATER MUST NOT BE PERMITTED TO ENTER THE BODY OF THE MOTOR/AIRFLOW UNIT; IT WILL DAMAGE THE MOTOR. UNDER NO CIRCUMSTANCES SHOULD THE MOTOR/AIRFLOW UNIT BE SUBMERSED IN WATER.

TO PRESERVE THE SYSTEM'S INTEGRITY, GASOLINE, ORGANIC-BASED SOLVENTS, OR CHLORINATED DEGREASING FLUIDS (SUCH AS TRICHLOROETHYLENE) MUST NOT BE USED TO CLEAN ANY PART OF THIS SYSTEM.

A. Unscrew the motor/airflow unit from the facemask and wash the facemask in a solution of warm water and mild detergent. Rinse the facemask and visor in clean, running water and shake excess water from the facemask. Wipe the visor dry with a clean, soft cloth. Handle the facemask care- fully to avoid unnecessarily scratching the visor.

B. Remove the filter from the motor/airflow unit and change, if necessary (See Section 2.1). Wipe all components with clean, damp cloths to prevent contaminants from entering

either the threaded side of the filter or the motor/airflow unit. If the filter does not need to be changed, the Powerflow System should still be disassembled, cleaned, and if necessary, decontaminated. If the filter is to be discarded, cover the threaded side of the filter with a screw cap and insert the translucent plastic plug into the filter inlet. Discard the used filter in accordance with local, state, or federal guidelines.

C. After all components have been cleaned, allow them to dry completely, away from sunlight and direct heat. Recharge the battery pack and place the facemask in a new plastic bag. Store the system in a clean area, away from moisture, heat, and direct sunlight. Storage temperatures must not exceed 120 degrees F.

NOTE: Certain operating conditions require decontamination procedures after using a system. The Powerflow motor/airflow unit is enclosed in a rubber shroud that helps prevent system contamination.

D. When preparing to go through decontamination showers, keep the battery pack in its water repellent battery cover to protect it from direct water contact. Swivel the motor/airflow unit so the filter inlet faces directly down (see Figure 3) and proceed through the shower.

Figure 3: Position of the Motor/Airflow Unit Prior to Entering the Decontamination Shower.

E. Upon exiting the shower, allow the motor/airflow unit to run for an additional fifteen minutes. This will permit the unit to dry and will drive out any moisture. Disconnect the motor/airflow unit from the battery pack. Remove the facemask. Cover the motor/airflow unit air outlet port with the screw cap that came with the filter and insert the plastic plug into the filter inlet. Keep the filter attached to the motor/airflow unit.

F. Rinse the facemask and motor/airflow unit with clean water. Remove the water repellent battery pack cover, decontaminate it, and store it fur future use. If a plastic bag has been used, dispose of the bag properly. Wipe the battery pack with clean cloths.

G. Remove the used filter from the motor/airflow unit. Change the filter, if necessary, as described in Section 2.1. Carefully wipe the motor/airflow unit with clean, damp cloths. Do not allow water to enter the motor/airflow unit.

2.1 Filter

The filter must be changed when the center of the airflow indicator float falls below the mark specified for power flow during an airflow check for the motor/airflow unit (see Section 1.2f), when the filter has been damaged by outside forces, when an excessive amount of water has been permitted to enter the filter, or in order to comply with local administrative procedures. Be sure to replace the plug and screw cap any used or damaged filter and dispose of it according to local, state, or federal guidelines. To install the filter, proceed as follows:

1. Confirm that the filter is an SP3 filter by reading the wrap around label and confirming Part No. 520-01-34 or 450-01-01. Also confirm with your local safety professional that the filter is appropriate for the environment of its intended use.

2. Read the User Instructions packed with the filter.

3. Remove ten packaging, plug, and cap. The plug and cap may be reinserted to protect the filter when not in use.

4. Discard any filter that is damaged (body, thread, and media).

5. Inspect the threaded hole in the motor/airflow unit to be sure that a gray (or black) gasket is in place. If a gasket is not in place, notify your supervisor and obtain a motor/airflow unit that has a gasket in place.

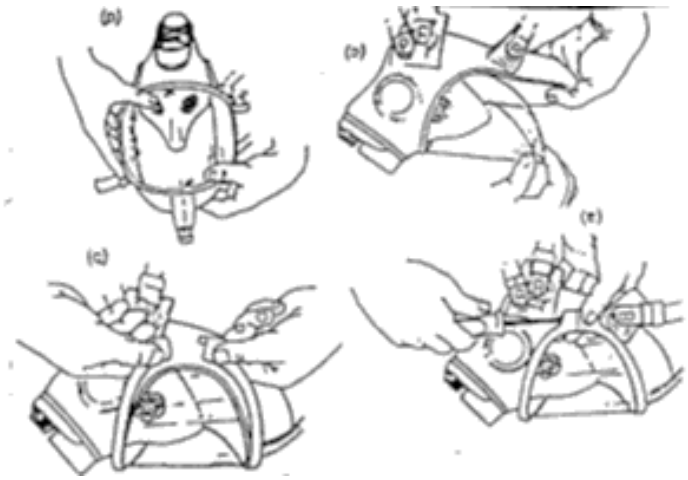
6. Screw the filter into the motor/airflow unit and tighten to affect a tight seal with the gasket.

2.2 Visor

A. Removal

Remove the screws on the visor clamps and pry the visor clamps apart. Lift the flange surrounding the visor and pull the visor from the facemask (See Figure 4).

Figure 4: Visor, Removal and Replacement



B. Replacement

Ensure the new visor is not damaged before proceeding. Replace the visor by reversing the order described above. Pay particular attention to the molded witness marks on the visor and clamps, aligning them with the center of the facemask (See Figure 4d). To facilitate reassembly, lubricate the inside groove of the visor clamps with silicone grease.

2.3 Valves and Valve Box Assembly

Inhalation and exhalation should be periodically checked. They should be replaced if they are worn, torn, or otherwise damaged only by experienced personnel with parts designed for the respirator. The area around the exhalation valve must be free of contaminants and dirt. Check frequently and wipe clean, if necessary.

2.4 Fuses

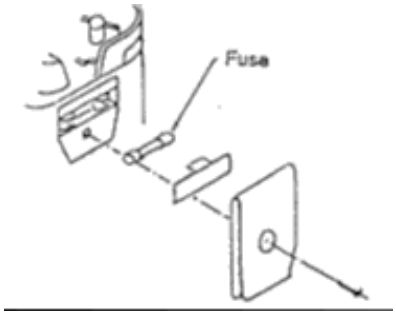
A. Removal

The fuse for the 520-01-17 battery pack is located behind the clothing clip. Remove the screw from the battery pack using a Phillips head Screwdriver and remove the clothing clip. Lift the fuse cover (now revealed) and its fuse from the battery pack.

B. Replacement

Replace the fuse with a 1.5 amp fuse (Part No. 520-01-14) by inserting the fuse into the fuse cover (See Figure 5). Replace the fuse cover into the battery pack. Attach the clothing clip to the battery pack.

Figure 5: Fuse Removal
and Replacement



CAUTION: Use exclusively 520-01-14 replacement fuses in 520-01-17 (1.5 amp) fuses are available only from authorized RACAL Airstream distributors. Other than fuse replacement, no dismantling or repair of battery packs should be attempted.

WORKER DECONTAMINATION

A. All workers without exception shall:

1. Remove street clothes in the change room and put on the disposable coveralls, head covers, foot covers, gloves, and respirators before proceeding to Work Area. All of these items will be supplied by USAEMI.

2. Remove contaminated garments and footwear before leaving the Work Area; while still wearing the respirator, proceed to the shower and remove it while showering with soap and water.

3. Shower every time you leave the Work Area and before entering change room. Following this decontamination, workers shall dress in new, clean disposable garments to eat, smoke of drink. These garments may be worn to re-enter the Work Area or workers may change into street clothes at the end of the workday.

4. Non disposable work footwear shall remain inside work area until completion of the project.

B. Workers shall not eat, drink, smoke, chew gum or chew tobacco in the Work Area.

1. To eat, drink of smoke, workers shall adhere to the entire decontamination procedure contained in Items 2 through 4 above.

2. Workers shall be clean-shaven.

3. Workers shall not wear contact lenses.

SACCHARIN SOLUTION AEROSOL PROTOCOL

A. Respirator Selection

1. The test subject shall be allowed to pick the most comfortable respirator from a selection including respirators of various sizes from different manufacturers. The selection shall include at least five sizes of elastomeric half face pieces from at least two manufacturers.

2. The selection process shall be conducted in a room separate from the fit-test chamber to prevent odor fatigue. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine a "comfortable" respirator. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This

instruction may not constitute the subject's formal training on respirator use, as it is only a review.

3. The test subject should understand the employee is being asked to select the respirator, which provides the most comfortable fit. Each respirator represents a different size and shape and, if fit properly and used properly will provide adequate protection.

4. The test subject holds each face piece up to the face and eliminates those, which obviously do not give a comfortable fit. Normally, selection will begin with a half-mask and if a good fit cannot be found, the subject will be asked to test the full-face piece respirators. (A small percentage of users will not be able to wear any half-mask).

5. The more comfortable face pieces are noted; the most comfortable mask is donned and worn at least five minutes to assess comfort. All donning and adjustments of the face piece shall be performed by the test subject without assistance from the test conductor or other person. Assistance in assessing comfort can be given by discussing the points in #6 below. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of the comfort shall include reviewing the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

    --Positioning of mask on nose.
    --Room for eye protection.
    --Room to talk.
    --Positioning mask on face and cheeks.

7. The following criteria shall be used to help determine the adequacy of the respirator fit:

    --Chin properly placed.
    --Strap tension.
    --Fit across nose-bridge.
    --Distance from nose to chin.
    --Tendency to slip.
    --Self-observation in mirror.

8. The test subject shall conduct the conventional negative and positive-pressure fit checks before conducting the negative or positive pressure test the subject shall be told to "seat" the mask by rapidly moving the head from side to side and up and down, while taking a few deep breaths.

9. The test subject is now ready for fit testing.

10. After passing the fit test, the test subject shall be questioned again regarding the comfort of the respirator. If it has become uncomfortable, another model of respirator shall be tried.

11. The employee shall be given the opportunity to select a different face piece and be retested if the chosen face piece becomes increasingly uncomfortable at any time.

B. Taste Threshold Screening

1. An enclosure about head and shoulders shall be used for threshold screening (to determine if the individual can taste saccharin) and for fit testing. The enclosure shall be approximately 12 inches in diameter by 14 inches tall with at least front clear to allow free movement of the head when a respirator is worn.

2. The test enclosure shall have a three quarter inch hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

3. The entire screening and testing procedure shall be explained to the test subject prior to conducting the screening test.

4. During the threshold-screening test, the test subject shall don the test enclosure and breathe with an open mouth with tongue extended.

5. Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

6. The threshold check solution consists of 0.83 grams of sodium saccharin, USP in water. It can be prepared by putting 1 cc of the test solution (see C 7 below) in 100 cc of water.

7. To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, than is released and allowed to fully expand.

8. Ten squeezes of the nebulizer bulb are repeatedly rapidly and then the test subject is asked whether the saccharin can be tasted.

9. If the first response is negative, ten more squeezes of the nebulizer bulb are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

10. If the second response is negative ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

11. The test conductor will take note of the number of squeezes required to elicit a test response.

12. If the saccharin is not tasted after 30 squeezes (Step 10), the saccharin fit test cannot be performed on the test subject.

13. If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

14. Correct use of the nebulizer means that approximately 1 cc of liquid is used at a time in the nebulizer body.

15. The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least every four hours.

C. Fit Test

1. The test subject shall don and adjust the respirator without the assistance from any person.

2. The fit test uses the same enclosure described in B.1 above.

3. Each test subject shall wear the respirator for at least 10 minutes before starting the fit test.

4. The test subject shall don the enclosure while wearing the respirator selected in Section Above. This respirator shall be properly adjusted and equipped with a particulate filter.

5. The test subject may not eat, drink (except plain water), or chew gum for 15 minutes before the test.

6. A second DeVilbiss Model 40 Inhalation Medication Nebulizer is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

7. The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 cc of warm water.

8. As before, the test subject shall breathe with mouth open and tongue extended.

9. The nebulizer is inserted into the hole in the front of the enclosure and the fit test solution is sprayed into the enclosure using the same technique as for the taste threshold screening and the same number of squeezes required to elicit a taste response in the screening (see B 8 through B 10 above).

10. After generation of the aerosol read the following instructions to the test subject. The test subject shall perform the exercises for one minute each.

    i. Breathe normally.

    ii. Breathe deeply. Be certain breaths are deep and regular.

    iii. Turn head all the way from one side to the other. Be certain movement is complete. Inhale on each side. Do not bump the respirator against the shoulders.

    iv. Nod head up and down. Be certain motions are complete. Inhale when head is in the full up position (when looking toward the ceiling).Do not bump the respirator on the chest.

    v. Talking. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages, which serve the same purpose, may also be used.

    vi. Jogging in place.

    vii. Breathe normally.

RAINBOW PASSAGE

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

11. At the beginning of each exercise, the aerosol concentration shall be replenished using one-half the number of squeezes as initially described in C 9.

12. The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected.

13. If the saccharin is detected the fit is deemed unsatisfactory and a different respirator shall be tried.

14. At least two face pieces shall be selected by the IAA test protocol. The test subject shall be given the opportunity to wear them for one week to choose the one, which is more comfortable to wear.

15. Successful completion of the test protocol shall allow the use of the half mask tested respirator in contaminated atmospheres up to ten (10) times the PEL of asbestos. In other works, this protocol may be used to assign protection factors no higher than ten.

16. The test shall not be conducted if there is any hair growth between the skin and the face piece sealing surface.

17. If hair growth or apparel interferes with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive pressure respirator such as powered air-purifying respirators, supplied air respirator, or self-contained breathing apparatus.

18. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

19. Qualitative fit testing shall be repeated at least every six months.

20. In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(1) Weight change of 20 pounds or more.

(2) Significant facial scarring in the area of the face piece seal.

(3) Significant dental changes: (i.e., multiple extractions without prosthesis, or acquiring dentures).

(4) Reconstructive or cosmetic surgery, or

(5) Any other condition that may interfere with face piece sealing.

D. Record keeping

A summary of test results shall be maintained in each office for three (3) years. The summary shall include:

(1) Name of test subject.
(2) Date of testing.
(3) Name of test conductor.
(4) Respirators selected (indicate manufacturer, model, size and approval number).
(5) Testing agent.

ANNUAL RESPIRATOR PROGRAM EVALUATION

1. Number of people participating in the program _____.

2. Number and types of respirators available to personnel:

_____ Half-mask _____ Full-face

_____ Powered-Air Purifying _____ Supplied Air

3. Have the number and types of respirators available been adequate to meet needs?

_____ Yes _____ No

4. How much money was spent this year for:

_____ Respirators _____ Cartridges

_____ Spare Parts _____ Cleaning Supplies

_____ Manpower

5. Was the budget adequate? _____ Yes _____ No

Comment _____

6. Did all employees in the respirator program receive an annual medical exam?

_____ Yes _____ No

Comment _____

7. Did all employees in the respirator program receive training on the use and limitations of the respirators?

_____ Yes _____ No

Comment _____

8. Have all respirator users been qualitatively fit tested?

_____ Yes _____ No

Comment _____

9. Have standard operating procedures been written and implemented for respirator selection, donning, fit testing and cleaning?

_____ Yes _____ No

Comment _____

10. Are only NIOSH/MSHA approved respirators used:

_____ Yes _____ No

Comment _____

11. Have all employees complied with the need to be clean-shaven in the sealing areas of the respirator?

_____ Yes _____ No

Comment _____

12. Are all employees correctly wearing their respirators while removing asbestos?

_____ Yes _____ No

13. Are there any areas for improvement in the program?

_____

_____

_____ _____

Date Respirator Program Administrator

USA Environmental Management Inc.

RESPIRATOR FIT TEST

_____ Social Security # _____ - _____ - _____
(Print Name)

has been fit tested on the following respirator:

RESPIRATOR NAME:_____ MODEL NO. _____

RESPIRATOR TYPE: _____ RESPIRATOR SIZE: (**S**) (**M**) (**L**)

TC NUMBER:_____
(Non-serialized, permanently issued to employee)

I, _____, have performed this fit test as
(employee name)

outlined in 29 CFR 1926.1101, Appendix C-Qualitative Fit Test Procedures.

_____ _____
(Signature of Person Administering Fit Test) (Print Name)

_____ _____
(Address) (Date)

[ ] Smoke Test

[ ] Isoamyl Acetate

[ ] Saccharin Aerosol

_____
(Employee Signature)

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FALL PROTECTION PLAN

Fall Protection Plan

Introduction

This Fall Protection Plan will address the use of conventional protection measures (guardrail systems, safety net systems, or personal fall arrest systems) as required by OSHA 1926.501 (refer to Attachment A), as well as the specific activities that require a non-conventional means of fall protection, Controlled Access Zone (CZA) Systems and Safety Monitoring Systems.

During the hand-demolition of buildings under forty-eight (48) feet high, while working in specific areas and/or performing specific tasks, it is sometimes impossible or may put the employee in danger of a greater hazard to use the conventional methods of fall protection. These areas or tasks may include, but are not limited to:

- demolition of floor sheathing and joists
- roof demolition
- demolition of exterior walls

In the above cases, the conventional methods of fall protection typically fail to be the safest. In consideration of this fact, the purpose of this plan is to allow the on-site employees to realize the fall hazards on each project site and to establish safe procedures that should be followed to prevent fall injuries to lower levels or through openings or holes in the work area. The ultimate goal of this safety plan is to inform the worker/s of how to achieve the optimum level of safety whether it is through conventional or non-conventional methods.

Therefore, in accordance with the requirements of OSHA 1926.501 and 1926.502(k), we have developed this Fall Protection Plan to be applicable to work on the NTI demolition project sites.

As part of our overall Company Health and Safety Program and in accordance with the requirements of our contract to perform demolition work under the Neighborhood Transformation Initiative (NTI) Program, Luzon, Inc. has a qualified individual perform a "Pre-Demolition Survey" of each and every demolition site under our contract ***prior*** to any work being performed onsite.

This survey documents numerous observations relative to the overall condition of the property, evaluates aspects of the work property as well as adjacent property or properties relative to Health and Safety issues, evaluates the property for environmental issues, and, most importantly, makes an initial evaluation of conditions as they exist in consideration of worker fall protection.

Following a hierarchal approach, the trained evaluator makes a judgment evaluating each OSHA approved fall protection methodology and its' possible use on the site. Evaluations are made for the potential use of Guardrail Systems, Safety Net Systems,

Personal Fall Arrest Systems, Controlled Access Zone (CZA) Systems, and Safety Monitoring Systems.

Demolition of roof rafters, exterior walls, roof sheathing, and joist/truss activities will be conducted only by employees who have been specifically trained to perform this type of work and have been trained to recognize the dangers and hazards of falling while involved in these tasks.

Every employee is to be trained in proper procedures prior to performing any on-site tasks. They will be required to strictly adhere to those standards, unless they feel they, or others, may be exposed to a greater danger or hazard as a result. If an employee or a subcontractor feels that the above is true, they are to inform the on-site job foreman and/or safety officer of their concerns. They are not to return to work until the issue/s has/have been resolved to the satisfaction of all parties involved.

The competent person in charge will assume the responsibility of enforcing this Fall Protection Plan and will constantly observe operations being undertaken and perform safety checks on the project. They will be required to enforce all safety policies and procedures and to immediately correct any condition that is deemed unsafe.

The employer bears the responsibility of ensuring that all employees and subcontractors understand the procedures and follow the instructions of the designated on-site supervisor. Likewise, it is the responsibility of the employee to bring any unsafe or hazardous condition that may arise to the attention of the supervisor immediately.

Fall Protection Systems to Be Used on Demolition Sites:

The following fall protection options will be evaluated on each site:

Guardrail System:

Guardrail systems shall be installed as required by OSHA 1926.502(b)(1) through 1926.502(b)(15). Refer to Attachment B – OSHA 1926.502 – subsection (b).

Safety Net System:

Safety Net systems shall be installed as required by OSHA 1926.502(c)(1) through 1926.502(c)(9). Refer to Attachment B – OSHA 1926.502 – subsection (c).

Personal Fall Arrest System:

Personal Fall Arrest systems shall be installed as required by OSHA 1926.502(d)(1) through 1926.502(d)(24). Refer to Attachment B – OSHA 1926.502 – subsection (d).

Positioning Device System:

Positioning Device systems shall be installed as required by OSHA 1926.502(e)(1) through 1926.502(e)(10). Refer to Attachment B – OSHA 1926.502 – subsection (e).

Warning Line System:

Warning Line systems shall be installed as required by OSHA 1926.502(f)(1) through 1926.502(f)(4). Refer to Attachment B – OSHA 1926.502 – subsection (f).

Controlled Access Zone (CAZ) System:

Controlled Access Zone systems shall be installed as required by OSHA 1926.502(g)(1) through 1926.502(g)(5). Refer to Attachment B – OSHA 1926.502 – subsection (g).

Safety Monitoring System:

Safety Monitoring systems shall be installed as required by OSHA 1926.502(h)(1) through 1926.502(h)(4). Refer to Attachment B – OSHA 1926.502 – subsection (h).

Covers:

Cover shall be installed as required by OSHA 1926.502(i)(1) through 1926.502(i)(4). Refer to Attachment B – OSHA 1926.502 – subsection (i).

Protection From Falling Objects:

Protection from falling objects shall be installed as required by OSHA 1926.502(j)(1) through 1926.502(j)(8). Refer to Attachment B – OSHA 1926.502 – subsection (j).

Issues Related to the use of Conventional Fall Protection Measures on Demolition Sites

The use of conventional fall protection measures during demolition of roof rafters as well as masonry walls and floor structure would likely cause a greater hazard to the workers. On this project conventional, methods such as guardrails, safety nets, or personal fall arrest equipment will not provide adequate fall protection. There are no structurally sound anchor points on the demolition buildings due to the condition of these structures and there is no way that anchor points can be found on adjoining properties such that the use of safety nets can take place. The nets will cause the walls to collapse and, therefore, create a greater safety hazard to the workers under these conditions spelled out above. Likewise, there are no suitable attachment or anchoring points for guardrails, personal fall arrest equipment or positioning device systems for similar reasons.

Furthermore, on this type of work, the workers will need to use both hands to remove the

truss and will not be able to use ladders in the proper manner. Ladders will cause a greater hazard since workers must stand on the ladder with their back or side to the front of the ladder.

Workers may also experience fatigue because of an increase in overhead work with heavy materials, which may cause a greater hazard.

Exterior scaffolds cannot be utilized on this project because the ground will not support the scaffolding correctly. In most cases, the erection and dismantling of the scaffolding would expose workers to a greater fall hazard than the actual demolition of the rafters and trusses.

In structures that have walls higher than six (6) feet and where scaffolds and ladders would be a greater hazard, safe procedures will be utilized when working on the top of plate. This work will be monitored by the on-site supervisor to ensure that all necessary safety steps have been or being taken. Only properly trained workers will be involved in this type of work.

Below is list of other fall protection measures available and an explanation of limitations for their use on demolition projects of this nature.

Scaffolds – Cannot be safely used in conjunction with demolition work on these sites and are not to be used in demolition phase. The leading edge of the building will be constantly changing and the scaffolding would have to be moved with a high level of frequency and erected on ground that would be extremely unstable. In addition, e~~E~~mployees erecting and dismantling the scaffolding would be exposed to too many risks. Power lines, terrain and other site conditions do not allow for safe use of scaffolding.

If a situation arises during the course of demolition of the buildings that shows the ability to be demolished in a safer manner by implementing one of the fall protection measures listed below, the on-site supervisor should be notified immediately.

Only qualified, experienced, workers will be able to work on the tasks involving the demolition or roof structures and joists, floor structures and joists and exterior walls.

Tools and debris shall be conveniently staged and stored to minimize fall hazards.

Minimum Fall Protection Methodology to be used at Demolition Sites

Where conventional fall protection methodologies are infeasible or would create a greater hazard to employees through their use, the following “Fall Protection Plan” shall be implemented in accordance with OSHA 1926.502(k), at a minimum.

Controlled Access Zones (CAZ):

When using this fall protection methodology, ~~plan~~, all workers must be protected through limited access to high hazard locations. Before any non-conventional fall protection system can be used as part of the work plan, the competent person (supervisor) must clearly define a controlled access zone (CAZ) as the area where a recognized hazard exists. The demarcation of the CAZ will be communicated by the competent person to all employees in a recognized manner, either through signs, wires, tapes, ropes, or chains.

The following steps will be taken to make the CAZ is clearly marked and controlled by the competent person in charge (supervisor):

- A painted line six (6) feet from the perimeter will be clearly marked prior to any wall demolition beginning as a precaution warning of the approach to an unprotected edge.
- Access to the CAZ will be restricted to authorized employees only.
- All workers will be notified by the competent person prior to working of their individual CAZ authorization status.
- The competent person will ensure that all protective elements of the CAZ be implemented prior to the beginning of work.

Safe Monitoring System:

In addition to establishing a Controlled Access Zone at each work level as work progresses from the roof to the lower floors and eventually to the ground, the site supervisor shall employ a separate individual on the worksite who will be located at the level that work using a Controlled Access Zone is being performed to act as a "Safety Watch".

This individual will be solely responsible for the observation of work activities at all times and shall be responsible for alerting workers who approach the edge of the perimeter work safety zone.

Enforcement

Constant awareness of and respect for falls hazards, and compliance with all safety rules, are considered conditions of employment. The on-site supervisor, as well as individuals in the safety and personnel department, reserves the right to issue disciplinary warnings to employees, up to and including job termination, for failure to comply with the guidelines set forth in this program.

Accident Investigation

All accidents that result in the injury of workers, regardless of their nature, must be reported immediately. It is an integral part of the safety program that documentation takes place as soon as possible so that means of prevention can be identified to prevent future recurrences.

This plan will be reviewed on a regular basis to determine if any additional practices, procedures, or training should be implemented in an effort to prevent similar types of incidents from occurring again. Employee input and feedback is encouraged.

Attachment A

OSHA 1926.501
Duty To Have Fall Protection

Regulations (Standards - 29 CFR)

Duty to have fall protection. - 1926.501

Regulations (Standards - 29 CFR) - Table of Contents

- **Part Number:** 1926
- **Part Title:** Safety and Health Regulations for Construction
- **Subpart:** M
- **Subpart Title:** Fall Protection
- **Standard Number:** 1926.501
- **Title:** Duty to have fall protection.

1926.501(a)

"General."

1926.501(a)(1)

This section sets forth requirements for employers to provide fall protection systems. All fall protection required by this section shall conform to the criteria set forth in 1926.502 of this subpart.

1926.501(a)(2)

The employer shall determine if the walking/working surfaces on which its employees are to work have the strength and structural integrity to support employees safely. Employees shall be allowed to work on those surfaces only when the surfaces have the requisite strength and structural integrity.

1926.501(b)

1926.501(b)(1)

"Unprotected sides and edges." Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

.1926.501(b)(2)

1926.501(b)(2)

"Leading edges."

1926.501(b)(2)(i)

Each employee who is constructing a leading edge 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems, safety net systems, or personal fall arrest systems. Exception: When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a fall protection plan which meets the requirements of paragraph (k) of 1926.502.

Note: There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the above-listed fall protection systems. Accordingly, the employer has the burden of establishing that it is appropriate to implement a fall protection plan which complies with 1926.502(k) for a particular workplace situation, in lieu of implementing any of those systems.

1926.501(b)(2)(ii)

Each employee on a walking/working surface 6 feet (1.8 m) or more above a lower level where leading edges are under construction, but who is not engaged in the leading edge work, shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system. If a guardrail system is chosen to provide the fall protection, and a controlled access zone has already been established for leading edge work, the control line may be used in lieu of a guardrail along the edge that parallels the leading edge.

1926.501(b)(3)

"Hoist areas." Each employee in a hoist area shall be protected from falling 6 feet (1.8 m) or more to lower levels by guardrail systems or personal fall arrest systems. If guardrail systems, [or chain, gate, or guardrail] or portions thereof, are removed to facilitate the hoisting operation (e.g., during landing of materials), and an employee must lean through the access opening or out over the edge of the access opening (to receive or guide equipment and materials, for example), that employee shall be protected from fall hazards by a personal fall arrest system.

..1926.501(b)(4)

1926.501(b)(4)

"Holes."

1926.501(b)(4)(i)

Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet (1.8 m) above lower levels, by personal fall arrest systems, covers, or guardrail systems erected around such holes.

1926.501(b)(4)(ii)

Each employee on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) by covers.

1926.501(b)(4)(iii)

Each employee on a walking/working surface shall be protected from objects falling through holes (including skylights) by covers.

1926.501(b)(5)

"Formwork and reinforcing steel." Each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet (1.8 m) or more to lower levels by personal fall arrest systems, safety net systems, or positioning device systems.

1926.501(b)(6)

"Ramps, runways, and other walkways." Each employee on ramps, runways, and other walkways shall be protected from falling 6 feet (1.8 m) or more to lower levels by guardrail systems.

1926.501(b)(7)

"Excavations."

1926.501(b)(7)(i)

Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier;

..1926.501(b)(7)(ii)

1926.501(b)(7)(ii)

Each employee at the edge of a well, pit, shaft, and similar excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

1926.501(b)(8)

"Dangerous equipment."

1926.501(b)(8)(i)

Each employee less than 6 feet (1.8 m) above dangerous equipment shall be protected from falling into or onto the dangerous equipment by guardrail systems or by equipment guards.

1926.501(b)(8)(ii)

Each employee 6 feet (1.8 m) or more above dangerous equipment shall be protected from fall hazards by guardrail systems, personal fall arrest systems, or safety net systems.

1926.501(b)(9)

"Overhand bricklaying and related work."

1926.501(b)(9)(i)

Except as otherwise provided in paragraph (b) of this section, each employee performing overhand bricklaying and related work 6 feet (1.8 m) or more above lower levels, shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or shall work in a controlled access zone.

1926.501(b)(9)(ii)

Each employee reaching more than 10 inches (25 cm) below the level of the walking/working surface on which they are working, shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system.

Note: Bricklaying operations performed on scaffolds are regulated by subpart L - Scaffolds of this part.

..1926.501(b)(10)

1926.501(b)(10)

"Roofing work on Low-slope roofs." Except as otherwise provided in paragraph (b) of this section, each employee engaged in roofing activities on low-slope roofs, with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or a combination of warning line system and guardrail system, warning line system and safety net system, or warning line system and personal fall arrest system, or warning line system and safety monitoring system. Or, on roofs 50-feet (15.25 m) or less in width (see Appendix A to subpart M of this part), the use of a safety monitoring system alone [i.e. without the warning line system] is permitted.

1926.501(b)(11)

"Steep roofs." Each employee on a steep roof with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems with toeboards, safety net systems, or personal fall arrest systems.

1926.501(b)(12)

"Precast concrete erection." Each employee engaged in the erection of precast concrete members (including, but not limited to the erection of wall panels, columns, beams, and floor and roof "tees") and related operations such as grouting of precast concrete members, who is 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail

systems, safety net systems, or personal fall arrest systems, unless another provision in paragraph (b) of this section provides for an alternative fall protection measure. Exception: When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a fall protection plan which meets the requirements of paragraph (k) of 1926.502.

Note: There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the above-listed fall protection systems. Accordingly, the employer has the burden of establishing that it is appropriate to implement a fall protection plan which complies with 1926.502(k) for a particular workplace situation, in lieu of implementing any of those systems.

..1926.501(b)(13)

1926.501(b)(13)

"Residential construction." Each employee engaged in residential construction activities 6 feet (1.8 m) or more above lower levels shall be protected by guardrail systems, safety net system, or personal fall arrest system unless another provision in paragraph (b) of this section provides for an alternative fall protection measure. Exception: When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a fall protection plan which meets the requirements of paragraph (k) of 1926.502.

Note: There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the above-listed fall protection systems. Accordingly, the employer has the burden of establishing that it is appropriate to implement a fall protection plan which complies with 1926.502(k) for a particular workplace situation, in lieu of implementing any of those systems.

1926.501(b)(14)

"Wall openings." Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet (1.8 m) or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches (1.0 m) above the walking/working surface, shall be protected from falling by the use of a guardrail system, a safety net system, or a personal fall arrest system.

1926.501(b)(15)

"Walking/working surfaces not otherwise addressed." Except as provided in 1926.500(a)(2) or in 1926.501 (b)(1) through (b)(14), each employee on a walking/working surface 6 feet (1.8 m) or more above lower levels shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system.

1926.501(c)

"Protection from falling objects." When an employee is exposed to falling objects, the employer shall have each employee wear a hard hat and shall implement one of the following

measures:

1926.501(c)(1)

Erect toeboards, screens, or guardrail systems to prevent objects from falling from higher levels; or,

..1926.501(c)(2)

1926.501(c)(2)

Erect a canopy structure and keep potential fall objects far enough from the edge of the higher level so that those objects would not go over the edge if they were accidentally displaced; or,

1926.501(c)(3)

Barricade the area to which objects could fall, prohibit employees from entering the barricaded area, and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced.

[59 FR 40732, Aug. 9, 1994; 60 FR 5131, Jan. 26, 1995]

Attachment B

OSHA 1926.502
Fall Protection Systems Criteria and Practices

UNITED STATES DEPARTMENT OF LABOR

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Regulations (Standards - 29 CFR) - Table of Contents

- **Part Number:** 1926
- **Part Title:** Safety and Health Regulations for Construction
- **Subpart:** M
- **Subpart Title:** Fall Protection
- **Standard Number:** 1926.502
- **Title:** Fall protection systems criteria and practices.

1926.502(a)

"General."

1926.502(a)(1)

Fall protection systems required by this part shall comply with the applicable provisions of this section.

1926.502(a)(2)

Employers shall provide and install all fall protection systems required by this subpart for an employee, and shall comply with all other pertinent requirements of this subpart before that employee begins the work that necessitates the fall protection.

1926.502(b)

"Guardrail systems." Guardrail systems and their use shall comply with the following provisions:

1926.502(b)(1)

Top edge height of top rails, or equivalent guardrail system members, shall be 42 inches (1.1 m) plus or minus 3 inches (8 cm) above the walking/working level. When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria of this paragraph.

Note: When employees are using stilts, the top edge height of the top rail, or equivalent member, shall be increased an amount equal to the height of the stilts.

1926.502(b)(2)

Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 21 inches (53 cm) high.

1926.502(b)(2)(i)

Midrails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level.

1926.502(b)(2)(ii)

Screens and mesh, when used, shall extend from the top rail to the walking/working level and along the entire opening between top rail supports.

1926.502(b)(2)(iii)

Intermediate members (such as balusters), when used between posts, shall be not more than 19 inches (48 cm) apart.

1926.502(b)(2)(iv)

Other structural members (such as additional midrails and architectural panels) shall be installed such that there are no openings in the guardrail system that are more than 19 inches (.5 m) wide.

1926.502(b)(3)

Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds (890 N) applied within 2 inches (5.1 cm) of the top edge, in any outward or downward direction, at any point along the top edge.

1926.502(b)(4)

When the 200 pound (890 N) test load specified in paragraph (b)(3) of this section is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 39 inches (1.0 m) above the walking/working level. Guardrail system components selected and constructed in accordance with the Appendix B to subpart M of this part will be deemed to meet this requirement.

1926.502(b)(5)

Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members shall be capable of withstanding, without failure, a force of at least 150 pounds (666 N) applied in any downward or outward direction at any point along the midrail or other member.

1926.502(b)(6)

Guardrail systems shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.

1926.502(b)(7)

The ends of all top rails and midrails shall not overhang the terminal posts, except where such overhang does not constitute a projection hazard.

1926.502(b)(8)

Steel banding and plastic banding shall not be used as top rails or midrails.

1926.502(b)(9)

Top rails and midrails shall be at least one-quarter inch (0.6 cm) nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for top rails, it shall be flagged at not more than 6-foot intervals with high-visibility material.

1926.502(b)(10)

When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section shall be placed across the access opening between guardrail sections when hoisting operations are not taking place.

1926.502(b)(11)

When guardrail systems are used at holes, they shall be erected on all unprotected sides or edges of the hole.

1926.502(b)(12)

When guardrail systems are used around holes used for the passage of materials, the hole shall have not more than two sides provided with removable guardrail sections to allow the passage of materials. When the hole is not in use, it shall be closed over with a cover, or a guardrail system shall be provided along all unprotected sides or edges.

1926.502(b)(13)

When guardrail systems are used around holes which are used as points of access (such as ladderways), they shall be provided with a gate, or be so offset that a person cannot walk directly into the hole.

1926.502(b)(14)

Guardrail systems used on ramps and runways shall be erected along each unprotected side or edge.

1926.502(b)(15)

Manila, plastic or synthetic rope being used for top rails or midrails shall be inspected as frequently as necessary to ensure that it continues to meet the strength requirements of paragraph (b)(3) of this section.

1926.502(c)

"Safety net systems." Safety net systems and their use shall comply with the following provisions:

1926.502(c)(1)

Safety nets shall be installed as close as practicable under the walking/working surface on which employees are working, but in no case more than 30 feet (9.1 m) below such level. When nets are used on bridges, the potential fall area from the walking/working surface to the net shall be unobstructed.

1926.502(c)(2)

Safety nets shall extend outward from the outermost projection of the work surface as follows:

Vertical distance from working level to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet.
More than 5 feet up to 10 feet	10 feet.
More than 10 feet	13 feet.

1926.502(c)(3)

Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified in paragraph (c)(4) of this section.

1926.502(c)(4)

Safety nets and their installations shall be capable of absorbing an impact force equal to that produced by the drop test specified in paragraph (c)(4)(i) of this section.

1926.502(c)(4)(i)

Except as provided in paragraph (c)(4)(ii) of this section, safety nets and safety net installations shall be drop-tested at the jobsite after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at 6-month intervals if left in one place. The drop-test shall consist of a 400 pound (180 kg) bag of sand 30 + or - 2 inches (76 + or - 5 cm) in diameter dropped into the net from the highest walking/working surface at which employees are exposed to fall hazards, but not from less than 42 inches (1.1 m) above that level.

1926.502(c)(4)(ii)

When the employer can demonstrate that it is unreasonable to perform the drop-test required by paragraph (c)(4)(i) of this section, the employer (or a designated competent person) shall certify that the net and net installation is in compliance with the provisions of paragraphs (c)(3) and (c)(4)(i) of this section by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification of the net and net installation for which the certification record is being prepared; the date that it was determined that the identified net and net installation were in compliance with paragraph (c)(3) of this section and the signature of the person making the determination and certification. The most recent certification record for each net and net installation shall be available at the jobsite for inspection.

1926.502(c)(5)

Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. Defective components shall be removed from service. Safety nets shall also be inspected after any occurrence which could affect the integrity of the safety net system.

1926.502(c)(6)

Materials, scrap pieces, equipment, and tools which have fallen into the safety net shall be removed as soon as possible from the net and at least before the next work shift.

1926.502(c)(7)

The maximum size of each safety net mesh opening shall not exceed 36 square inches (230 cm) nor be longer than 6 inches (15 cm) on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than 6 inches (15 cm). All mesh crossings shall be secured to prevent enlargement of the mesh opening.

1926.502(c)(8)

Each safety net (or section of it) shall have a border rope for webbing with a minimum breaking strength of 5,000 pounds (22.2 kN).

1926.502(c)(9)

Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than 6 inches (15 cm) apart.

1926.502(d)

"Personal fall arrest systems." Personal fall arrest systems and their use shall comply with the provisions set forth below. Effective January 1, 1998, body belts are not acceptable as part of a personal fall arrest system. Note: The use of a body belt in a positioning device system is acceptable and is regulated under paragraph (e) of this section.

1926.502(d)(1)

Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

1926.502(d)(2)

Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

1926.502(d)(3)

Dee-rings and snaphooks shall have a minimum tensile strength of 5,000 pounds (22.2 kN).

1926.502(d)(4)

Dee-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

1926.502(d)(5)

Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper by the connected member, or shall be a locking type snaphook designed and used to prevent disengagement of the snaphook by the contact of the snaphook keeper by the connected member. Effective January 1, 1998, only locking type snaphooks shall be used.

1926.502(d)(6)

Unless the snaphook is a locking type and designed for the following connections, snaphooks shall not be engaged:

1926.502(d)(6)(i)

directly to webbing, rope or wire rope;

1926.502(d)(6)(ii)

to each other;

1926.502(d)(6)(iii)

to a dee-ring to which another snaphook or other connector is attached;

1926.502(d)(6)(iv)

to a horizontal lifeline; or

1926.502(d)(6)(v)

to any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

1926.502(d)(7)

On suspended scaffolds or similar work platforms with horizontal lifelines which may become vertical lifelines, the devices used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.

1926.502(d)(8)

Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

1926.502(d)(9)

Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds (22.2 kN).

1926.502(d)(10) 1926.502(d)(10)(i)

Except as provided in paragraph (d)(10)(ii) of this section, when vertical lifelines are used, each employee shall be attached to a separate lifeline.

1926.502(d)(10)(ii)

During the construction of elevator shafts, two employees may be attached to the same lifeline in the hoistway, provided both employees are working atop a false car that is equipped with guardrails; the strength of the lifeline is 10,000 pounds [5,000 pounds per employee attached] (44.4 kN); and all other criteria specified in this paragraph for lifelines have been met.

1926.502(d)(11)

Lifelines shall be protected against being cut or abraded.

1926.502(d)(12)

Self-retracting lifelines and lanyards which automatically limit free fall distance to 2 feet (0.61 m) or less shall be capable of sustaining a minimum tensile load of 3,000 pounds (13.3 kN) applied to the device with the lifeline or lanyard in the fully extended position.

1926.502(d)(13)

Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet (0.61 m) or less, ripstitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 kN) applied to the device with the lifeline or lanyard in the fully extended position.

1926.502(d)(14)

Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses shall be made from synthetic fibers.

1926.502(d)(15)

Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as follows:

1926.502(d)(15)(i)

as part of a complete personal fall arrest system which maintains a safety factor of at least two; and

1926.502(d)(15)(ii)

under the supervision of a qualified person.

1926.502(d)(16)

Personal fall arrest systems, when stopping a fall, shall:

1926.502(d)(16)(i)

limit maximum arresting force on an employee to 900 pounds (4 kN) when used with a body belt;

1926.502(d)(16)(ii)

limit maximum arresting force on an employee to 1,800 pounds (8 kN) when used with a body harness;

1926.502(d)(16)(iii)

be rigged such that an employee can neither free fall more than 6 feet (1.8 m), nor contact any lower level;

1926.502(d)(16)(iv)

bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet (1.07 m); and,

1926.502(d)(16)(v)

have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (1.8 m), or the free fall distance permitted by the system, whichever is less.

Note: If the personal fall arrest system meets the criteria and protocols contained in Appendix C to subpart M, and if the system is being used by an employee having a combined person and tool weight of less than 310 pounds (140 kg), the system will be considered to be in compliance with the provisions of paragraph (d)(16) of this section. If the system is used by an employee having a combined tool and body weight of 310 pounds (140 kg) or more, then the employer must appropriately modify the criteria and protocols of the Appendix to provide proper protection for such heavier weights, or the system will not be deemed to be in compliance with the requirements of paragraph (d)(16) of this section.

1926.502(d)(17)

The attachment point of the body belt shall be located in the center of the wearer's back. The attachment point of the body

harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.

1926.502(d)(18)

Body belts, harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

1926.502(d)(19)

Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse.

1926.502(d)(20)

The employer shall provide for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves.

1926.502(d)(21)

Personal fall arrest systems shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service.

1926.502(d)(22)

Body belts shall be at least one and five-eighths (1 5/8) inches (4.1 cm) wide.

1926.502(d)(23)

Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists except as specified in other subparts of this Part.

1926.502(d)(24)

When a personal fall arrest system is used at hoist areas, it shall be rigged to allow the movement of the employee only as far as the edge of the walking/working surface.

1926.502(e)

"Positioning device systems." Positioning device systems and their use shall conform to the following provisions:

1926.502(e)(1)

Positioning devices shall be rigged such that an employee cannot free fall more than 2 feet (.6m).

1926.502(e)(2)

Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds (13.3 kN), whichever is greater.

1926.502(e)(3)

Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

1926.502(e)(4)

Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of this system.

1926.502(e)(5)

Connecting assemblies shall have a minimum tensile strength of 5,000 pounds (22.2 kN)

1926.502(e)(6)

Dee-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

1926.502(e)(7)

Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper by the connected member, or shall be a locking type snaphook designed and used to prevent disengagement of the snaphook by the contact of the snaphook keeper by the connected member. As of January 1, 1998, only locking type snaphooks shall be used.

1926.502(e)(8)

Unless the snaphook is a locking type and designed for the following connections, snaphooks shall not be engaged:

1926.502(e)(8)(i)

directly to webbing, rope or wire rope;

1926.502(e)(8)(ii)

to each other;

1926.502(e)(8)(iii)

to a dee-ring to which another snaphook or other connector is attached;

1926.502(e)(8)(iv)

to a horizontal lifeline; or

1926.502(e)(8)(v)

to any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

1926.502(e)(9)

Positioning device systems shall be inspected prior to each use for wear, damage, and other deterioration, and defective components shall be removed from service.

1926.502(e)(10)

Body belts, harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

1926.502(f)

"Warning line systems." Warning line systems [See 1926.501(b)(10)] and their use shall comply with the following provisions:

1926.502(f)(1)

The warning line shall be erected around all sides of the roof work area.

1926.502(f)(1)(i)

When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet (1.8 m) from the roof edge.

1926.502(f)(1)(ii)

When mechanical equipment is being used, the warning line shall be erected not less than 6 feet (1.8 m) from the roof edge which is parallel to the direction of mechanical equipment operation, and not less than 10 feet (3.1 m) from the roof edge which is perpendicular to the direction of mechanical equipment operation.

1926.502(f)(1)(iii)

Points of access, materials handling areas, storage areas, and hoisting areas shall be connected to the work area by an access path formed by two warning lines.

1926.502(f)(1)(iv)

When the path to a point of access is not in use, a rope, wire, chain, or other barricade, equivalent in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the work area, or the path shall be offset such that a person cannot walk directly into the work area.

1926.502(f)(2)

Warning lines shall consist of ropes, wires, or chains, and supporting stanchions erected as follows:

1926.502(f)(2)(i)

The rope, wire, or chain shall be flagged at not more than 6-foot (1.8 m) intervals with high-visibility material;

1926.502(f)(2)(ii)

The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 inches (.9 m) from the walking/working surface and its highest point is no more than 39 inches (1.0 m) from the walking/working surface;

1926.502(f)(2)(iii)

After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 N) applied horizontally against the stanchion, 30 inches (.8 m) above the walking/working surface, perpendicular to the warning line, and in the direction of the floor, roof, or platform edge;

1926.502(f)(2)(iv)

The rope, wire, or chain shall have a minimum tensile strength of 500 pounds (2.22 kN), and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions as prescribed in paragraph (f)(2)(iii) of this section; and

1926.502(f)(2)(v)

The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.

1926.502(f)(3)

No employee shall be allowed in the area between a roof edge and a warning line unless the employee is performing roofing work in that area.

1926.502(f)(4)

Mechanical equipment on roofs shall be used or stored only in areas where employees are protected by a warning line system, guardrail system, or personal fall arrest system.

1926.502(g)

"Controlled access zones." Controlled access zones [See 1926.501(b)(9) and 1926.502(k)] and their use shall conform to the following provisions.

1926.502(g)(1)

When used to control access to areas where leading edge and other operations are taking place the controlled access zone shall be defined by a control line or by any other means that restricts access.

1926.502(g)(1)(i)

When control lines are used, they shall be erected not less than 6 feet (1.8 m) nor more than 25 feet (7.7 m) from the unprotected or leading edge, except when erecting precast concrete members.

1926.502(g)(1)(ii)

When erecting precast concrete members, the control line shall be erected not less than 6 feet (1.8 m) nor more than 60 feet (18 m) or half the length of the member being erected, whichever is less, from the leading edge.

1926.502(g)(1)(iii)

The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.

1926.502(g)(1)(iv)

The control line shall be connected on each side to a guardrail system or wall.

1926.502(g)(2)

When used to control access to areas where overhand bricklaying and related work are taking place:

1926.502(g)(2)(i)

The controlled access zone shall be defined by a control line erected not less than 10 feet (3.1 m) nor more than 15 feet (4.5 m) from the working edge.

1926.502(g)(2)(ii)

The control line shall extend for a distance sufficient for the controlled access zone to enclose all employees performing overhand bricklaying and related work at the working edge and shall be approximately parallel to the working edge.

1926.502(g)(2)(iii)

Additional control lines shall be erected at each end to enclose the controlled access zone.

1926.502(g)(2)(iv)

Only employees engaged in overhand bricklaying or related work shall be permitted in the controlled access zone.

1926.502(g)(3)

Control lines shall consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:

1926.502(g)(3)(i)

Each line shall be flagged or otherwise clearly marked at not more than 6-foot (1.8 m) intervals with high-visibility material.

1926.502(g)(3)(ii)

Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches (1 m) from the walking/working surface and its highest point is not more than 45 inches (1.3 m) [50 inches (1.3 m) when overhand bricklaying operations are being performed] from the walking/working surface.

1926.502(g)(3)(iii)

Each line shall have a minimum breaking strength of 200 pounds (.88 kN).

1926.502(g)(4)

On floors and roofs where guardrail systems are not in place prior to the beginning of overhand bricklaying operations, controlled access zones shall be enlarged, as necessary, to enclose all points of access, material handling areas, and storage areas.

1926.502(g)(5)

On floors and roofs where guardrail systems are in place, but need to be removed to allow overhand bricklaying work or leading edge work to take place, only that portion of the guardrail necessary to accomplish that day's work shall be removed.

1926.502(h)

"Safety monitoring systems." Safety monitoring systems [See 1926.501(b)(10) and 1926.502(k)] and their use shall comply with the following provisions:

1926.502(h)(1)

The employer shall designate a competent person to monitor the safety of other employees and the employer shall ensure that the safety monitor complies with the following requirements:

1926.502(h)(1)(i)

The safety monitor shall be competent to recognize fall hazards;

1926.502(h)(1)(ii)

The safety monitor shall warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner;

1926.502(h)(1)(iii)

The safety monitor shall be on the same walking/working surface and within visual sighting distance of the employee being monitored;

1926.502(h)(1)(iv)

The safety monitor shall be close enough to communicate orally with the employee; and

1926.502(h)(1)(v)

The safety monitor shall not have other responsibilities which could take the monitor's attention from the monitoring function.

1926.502(h)(2)

Mechanical equipment shall not be used or stored in areas where safety monitoring systems are being used to monitor employees engaged in roofing operations on low-slope roofs.

1926.502(h)(3)

No employee, other than an employee engaged in roofing work [on low-sloped roofs] or an employee covered by a fall protection plan, shall be allowed in an area where an employee is being protected by a safety monitoring system.

1926.502(h)(4)

Each employee working in a controlled access zone shall be directed to comply promptly with fall hazard warnings from safety monitors.

1926.502(i)

"Covers." Covers for holes in floors, roofs, and other walking/working surfaces shall meet the following requirements:

1926.502(i)(1)

Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.

1926.502(i)(2)

All other covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.

1926.502(i)(3)

All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees.

1926.502(i)(4)

All covers shall be color coded or they shall be marked with the word "HOLE" or "COVER" to provide warning of the hazard.

Note: This provision does not apply to cast iron manhole covers or steel grates used on streets or roadways.

1926.502(j)

"Protection from falling objects." Falling object protection shall comply with the following provisions:

1926.502(j)(1)

Toeboards, when used as falling object protection, shall be erected along the edge of the overhead walking/working surface for a distance sufficient to protect employees below.

1926.502(j)(2)

Toeboards shall be capable of withstanding, without failure, a force of at least 50 pounds (222 N) applied in any downward or outward direction at any point along the toeboard.

1926.502(j)(3)

Toeboards shall be a minimum of 3 1/2 inches (9 cm) in vertical height from their top edge to the level of the walking/working surface. They shall have not more than 1/4 inch (0.6 cm) clearance above the walking/working surface. They shall be solid or have openings not over 1 inch (2.5 cm) in greatest dimension.

1926.502(j)(4)

Where tools, equipment, or materials are piled higher than the top edge of a toeboard, paneling or screening shall be erected from the walking/working surface or toeboard to the top of a guardrail system's top rail or midrail, for a distance sufficient to protect employees below.

1926.502(j)(5)

Guardrail systems, when used as falling object protection, shall have all openings small enough to prevent passage of potential falling objects.

1926.502(j)(6)

During the performance of overhand bricklaying and related work:

1926.502(j)(6)(i)

No materials or equipment except masonry and mortar shall be stored within 4 feet (1.2 m) of the working edge.

1926.502(j)(6)(ii)

Excess mortar, broken or scattered masonry units, and all other materials and debris shall be kept clear from the work area by removal at regular intervals.

1926.502(j)(7)

During the performance of roofing work:

1926.502(j)(7)(i)

Materials and equipment shall not be stored within 6 feet (1.8 m) of a roof edge unless guardrails are erected at the edge.

1926.502(j)(7)(ii)

Materials which are piled, grouped, or stacked near a roof edge shall be stable and self-supporting.

1926.502(j)(8)

Canopies, when used as falling object protection, shall be strong enough to prevent collapse and to prevent penetration by any objects which may fall onto the canopy.

1926.502(k)

"Fall protection plan." This option is available only to employees engaged in leading edge work, precast concrete erection work, or residential construction work (See 1926.501(b)(2), (b)(12), and (b)(13)) who can demonstrate that it is infeasible or it creates a greater hazard to use conventional fall protection equipment. The fall protection plan must conform to the following provisions.

1926.502(k)(1)

The fall protection plan shall be prepared by a qualified person and developed specifically for the site where the leading edge work, precast concrete work, or residential construction work is being performed and the plan must be maintained up to date.

1926.502(k)(2)

Any changes to the fall protection plan shall be approved by a qualified person.

1926.502(k)(3)

A copy of the fall protection plan with all approved changes shall be maintained at the job site.

1926.502(k)(4)

The implementation of the fall protection plan shall be under the supervision of a competent person.

1926.502(k)(5)

The fall protection plan shall document the reasons why the use of conventional fall protection systems (guardrail systems, personal fall arrest systems, or safety nets systems) are infeasible or why their use would create a greater hazard.

1926.502(k)(6)

The fall protection plan shall include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who cannot be provided with protection from the conventional fall protection systems. For example, the employer shall discuss the extent to which scaffolds, ladders, or vehicle mounted work platforms can be used to provide a safer working surface and thereby reduce the hazard of falling.

1926.502(k)(7)

The fall protection plan shall identify each location where conventional fall protection methods cannot be used. These locations shall then be classified as controlled access zones and the employer must comply with the criteria in paragraph (g) of this section.

1926.502(k)(8)

Where no other alternative measure has been implemented, the employer shall implement a safety monitoring system in conformance with 1926.502(h).

1926.502(k)(9)

The fall protection plan must include a statement which provides the name or other method of identification for each employee who is designated to work in controlled access zones. No other employees may enter controlled access zones.

1926.502(k)(10)

In the event an employee falls, or some other related, serious incident occurs, (e.g., a near miss) the employer shall investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and shall implement those changes to prevent similar types of falls or incidents.

[44 FR 8577, Feb. 9, 1979; 44 FR 20940, Apr. 6, 1979, as amended at 45 FR 75626, Nov. 14, 1980; 55 FR 47687, Nov. 14, 1990; 59 FR 40733, Aug. 9, 1994; 60 FR 5131, Jan. 26, 1995]

Next Standard (1926.503)

Regulations (Standards - 29 CFR) - Table of Contents

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U.S. Department of Labor | Occupational Safety & Health Administration | 200 Constitution Ave., NW, Washington, DC 20210
Telephone: 800-321-OSHA (6742) | TTY: 877-889-5627

www.OSHA.gov

Attachment C

Pre-Demolition Survey Form

USA Environmental Management, Inc.

Pre-Demolition Survey

Date: _____

Address: _____

_____

Type of Structure: _____

Description (stories/height): _____ Size of Structure: _____

Description of Site: _____ Basement: _____

Location of Party Walls: _____

Are Wall Ties Required? _____ How Many? _____ Types of Ties: _____

Structural Hazards: _____

_____

_____

Is Shoring of Walls/Floors required? _____

Type of Shoring & Location: _____

Protection Needed for Adjacent Structures: _____

Document existing damage to adjacent structures of areas not to be demolished. Photograph as necessary:

_____

_____

What public protection is needed? _____

_____

All demolition methods to be used: _____

_____

_____

Location of Power Lines: _____

_____

_____

Location of Tanks: _____

Contents of Tanks: _____

Luzon MSDS on site and owner's MSDS (if active facility): _____

_____

Asbestos survey or removal? _____

Open pits/holes delineate/located? _____

Demolition Personnel Fall Protection Evaluation:

Guardrail System: ☐ Yes ☐ No

If No, comments:

_____

_____

Safety Net System: ☐ Yes ☐ No

If No, comments:

_____

_____

Personal Fall Arrest System: ☐ Yes ☐ No

If No, comments:

_____

_____

Positioning Device System: ☐ Yes ☐ No

Comments:

Warning Line System: ☐ Yes ☐ No

Comments:

Controlled Access Zone System: ☐ Yes ☐ No

Comments:

Safety Monitoring System: ☐ Yes ☐ No

Comments:

Covers: ☐ Yes ☐ No

Comments:

Protection From Falling Objects: ☐ Yes ☐ No

Comments:

_____

_____

Special hazards and remedies for this specific location: _____

_____

_____

_____

_____

_____

Comments specific to this site: _____

_____

_____

_____

_____ _____

USA Environmental Management, Inc. Date

_____ _____

Date

_____ _____

Date

PROJECT SUPERINTENDENT INFORMATION

Kevin Meldrum

USA Environmental Management, Inc.

8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Tel: (215) 365-5810 ♦ Fax: (215) 365-5870

BIDDER'S KEY TEAM MEMBER RESUME

KEY TEAM MEMBER NAME: **Kevin Meldrum** **FIRM NAME:** **USA Environmental Management, Inc.**

KEY TEAM MEMBER TITLE:

Project Manager/Superintendent

YEARS OF EXPERIENCE:

28 Years

YEARS WITH FIRM:

8 Years

TECHNICAL SPECIALTIES:

Project Management
Field Superintendent
Asbestos Project Management/Superintendent

PROFESSIONAL HISTORY:

2016 – Present	Project Manager, Superintendent - USA Environmental Management, Inc.
2008 - 2016	Operations Manager, Superintendent - Luzon, Inc.
2004 - 2007	Operations Manager, Superintendent - USA Environmental Management, Inc.
1990 - 2004	Project Supervisor Delta-BJDS

EDUCATION:

North Catholic 1981-1985
Philadelphia Community College 1985-1986

PROFESSIONAL REGISTRATIONS & AFFILIATIONS:

Asbestos Abatement Safety Techniques
Laborers Training Academy/Asbestos Abatement Supervision, AHERA
Certified Asbestos Contractor & Supervisor – States of PA & NJ.
Certified Lead Abatement Supervisor – States of PA & NJ.
OSHA 10 Certified
First-Aide & CPR Trained
OSHA Trained in Demolition, Fall Protection Electrical Safety, and Personal Protective Equipment
Army Corps of Engineers Construction Management Planning Certified

REPRESENTATIVE PROJECT EXPERIENCE & QUALIFICATIONS:

Mr. Meldrum has over 20 years of experience in the construction industry with the last 17 in the remediation of asbestos; lead; and mold as well as demolition/renovation construction work. He has managed demolition and remediation projects for USA Environmental Management, Inc. In addition he has fulfilled the position of Operations Manager for the company for the last 11/2 years. Prior to that Mr. Meldrum supervised hundreds of abatement projects for Delta Removal Inc. over almost a 15 year employment period.

- Managed the remediation project of the Philadelphia Civic Center, which consisted of asbestos abatement and associated demolition while maintaining all safety guidelines and regulations. This project totaled in excess of 3 million dollars.
- Supervised projects for Philadelphia Housing Authority, School District of Philadelphia, and a number of public and private companies. Also managed multiple City of Philadelphia Asbestos, Lead, Mold and Demolition Projects in excess of a few million dollars.
- Managed the successful removal of lead based paint from over 300 Housing Urban Development (HUD) properties.
- Managed several hundred residential and commercial demolition projects.
- Managed (as Construction Superintendent) numerous renovation projects for USA Environmental Management, Inc.
- Managed (as Construction Superintendent) numerous renovation projects for Luzon, Inc.
- Managed a major asbestos abatement project for Merck, Sharpe and Dohme, Corp. in compliance with their stringent Health & Safety requirements on a fully occupied campus in Rahway, New Jersey.

GENERAL CONSTRUCTION:

Mr. Meldrum has over 25 years of experience in the construction industry with the last 17 in the remediation of asbestos; lead; and mold as well as demolition/renovation construction work. He has managed demolition and remediation projects for USA Environmental Management, Inc. for 3 years prior to his employment with Luzon, Inc. which lasted for 8 years. He has since returned to USA Environmental Management, Inc. as an Environmental Abatement Project Manager/Superintendent.

ASBESTOS ABATEMENT:

Mr. Meldrum has over 17 years of experience in the Asbestos Abatement industry. He has managed hundreds of projects involving work in both the governmental and private sector. These projects have involved work in federal, state and local governmental facilities as well as projects in most every kind of private sector environment.

He has managed numerous projects for the City of Philadelphia, the School District of Philadelphia, the Department of Housing and Urban Development as well as private entities such as the University of Pennsylvania, to name a few.

Mr. Meldrum was directly responsible for the management of a $ 3,000,000 + abatement project in the old City of Philadelphia Convention Hall in preparation for the demolition of this site for a new complex to be constructed by the University of Pennsylvania.

Projects managed have ranged in value between $ 10,000 to over $ 3,000,000.

LEAD REMEDIATION:

Mr. Meldrum has over 12 years of experience in the Lead Remediation industry. He has managed hundreds of projects involving work in both the governmental and private sector. These projects have involved work in federal, state and local governmental facilities including many projects in the public housing sector.

He was the Project Superintendent for over 300 separate projects involving lead remediation for public housing under a Housing and Urban Development contract.

MOLD REMEDIATION:

Mr. Meldrum has over 8 years of experience in the Mold Remediation industry. He has managed the remediation of mold contamination in schools, public housing, office environments, to name a few.

This experience includes government and private sector work

DEMOLITION:

Mr. Meldrum has been involved in the demolition industry for over 11 years and has been the Project Superintendent for projects ranging from interior demolition to single building structure demolitions to multi-building contracts requiring the demolition of numerous structures.

He has performed this work for government agencies; federal, state and local; as well as numerous private sector clients. His experience includes work in hundreds of buildings; both residential in size and commercial in size.

He has functioned as Project Superintendent for numerous USA contracts for the City of Philadelphia Neighborhood Transformation Initiative (NTI) program. These projects included, for the most part, the demolition of up to 3-story row type homes around the City. These projects presented challenges in that conventional equipment demolition could not be performed on most structures because they were attached to other structures on each side which were to remain. Project values in excess of $ 3,000,000 involved Mr. Meldrum's supervision.

Certificate of Completion

Kevin Meldrum

for successfully completing the prescribed course of study in

EPA/AHERA/New Jersey Asbestos Contractor/Supervisor Refresher Course

under TSCA Title II

presented by

ACCESS TRAINING SERVICES, INC.
7921 River Road, Pennsauken, NJ 08110
(856) 665-3449

7/7/16	**N/A**	**7/7/17**
Course Date	***Exam Date***	***Expiration Date***
N/A	**ACC-0716-2-002**	***Mark K. Schläger***
Social Security Number	***Certificate Number***	***Training Director***

STATE OF NEW JERSEY
DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
ASBESTOS CONTROL AND LICENSING

KEVIN MELDRUM
105 Arch Street

Delran NJ 08075

27757	SUPVR	
PERMIT	TYPE	CLASS
	12/03/1967	
	DATE OF BIRTH	
M	508	5	4
SEX	HEIGHT	WEIGHT	EYE COLOR
09/27/2016	09/27/2017	
ISSUE DATE	EXPIRES DATE	

118834

ASBESTOS SUPERVISOR/WORKER TRAINING

& PERMITS

ASBESTOS CONRACTOR/SUPERVISOR

Juan Pastor

Number 741867

DUPLICATE

Expiration Date:
02/04/2017

Certificate of Training

CRITERION LABORATORIES, INC.

HEREBY CERTIFIES THAT

Juan Pastor

HAS SUCCESSFULLY COMPLETED AN 8 HOUR COURSE ENTITLED

Asbestos Contractor/Supervisor Refresher

INCLUDING CLASSROOM INSTRUCTION

on this 4th day of February 2016

Exam passed on this 4th day of February 2016 - Score - 80

- Approved by the states of New York and New Jersey (EPA Region 2)
- Approved by the state of Pennsylvania (EPA Region 3)

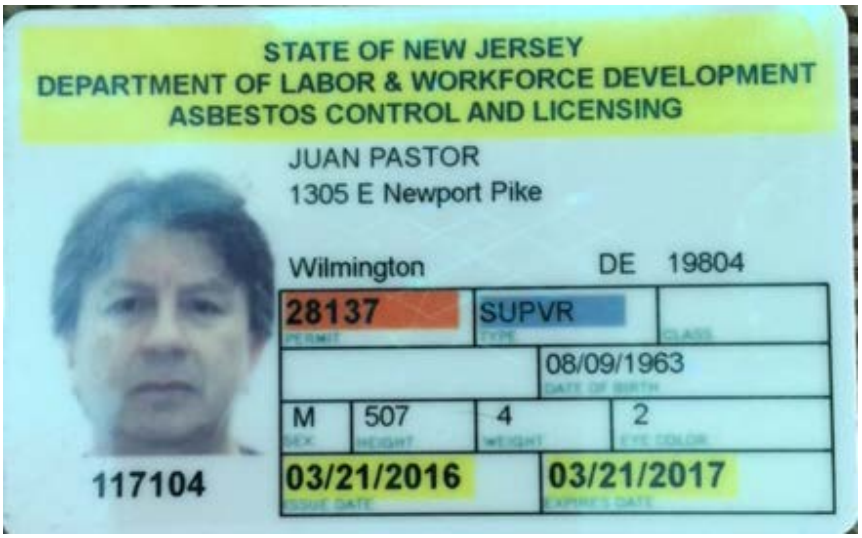
Approved for AHERA Accreditation Under TSCA Title II

3370 Progress Drive, Suite J
Bensalem, PA 19020
(215) 244-1300 - Phone
(215) 244-4349 - Fax
www.criterionlabs.com

Course is conducted in English

DIRECTOR: J. C. Weltz

James A. Weltz, CIH, President



STATE OF NEW JERSEY
DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
ASBESTOS CONTROL AND LICENSING

JUAN PASTOR
1305 E Newport Pike

Wilmington DE 19804

PERMIT	TYPE	CLASS
28137	SUPVR	

DATE OF BIRTH
08/09/1963

SEX	HEIGHT	WEIGHT	EYE COLOR
M	507	4	2

117104

ISSUE DATE	EXPIRES DATE
03/21/2016	03/21/2017

ASBESTOS CONTRACTOR/SUPERVISOR

Audie Pastor

Number 741775

Expiration Date:
01/21/2017

Certificate of Training

CRITERION LABORATORIES, INC.

HEREBY CERTIFIES THAT

Audie M. Pastor

HAS SUCCESSFULLY COMPLETED AN 8 HOUR COURSE ENTITLED

Asbestos Contractor/Supervisor Refresher

INCLUDING CLASSROOM INSTRUCTION

on this 21st day of January 2016

Exam passed on this 21st day of January 2016 - Score - 88

- Approved by the states of New York and New Jersey (EPA Region 2)
- Approved by the state of Pennsylvania (EPA Region 3)

Approved for AHERA Accreditation Under TSCA Title II

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Bensalem, PA 19020
(215) 244-1300 - Phone
(215) 244-4349 - Fax
www.criterionlabs.com

Course is conducted in English

DIRECTOR:

James A. Weltz, CIH, President

STATE OF NEW JERSEY
DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
ASBESTOS CONTROL AND LICENSING

117033

AUDIE PASTOR
24-02 Milltown Road
Apt. 6 A
Wilmington DE 19804

032273 PERMIT	SUPVR TYPE	CLASS
	02/06/1960 DATE OF BIRTH	
M SEX	507 HEIGHT	3 WEIGHT	2 EYE COLOR
03/21/2016 ISSUE DATE	03/21/2017 EXPIRES DATE	

ASBESTOS WORKER HANDLER

Emilio Pastor

ISES

INDUSTRIAL SAFETY AND
ENVIRONMENTAL SOLUTIONS

3300 Hudson Ave., Union City, NJ 07087
Tel: 201-325-0055 Fax: 201-325-0056

Certifies that:

Emilio Pastor

has successfully completed a 8 - hours NJ-DOH, NYS-DOH and US-EPA TSCA Title II

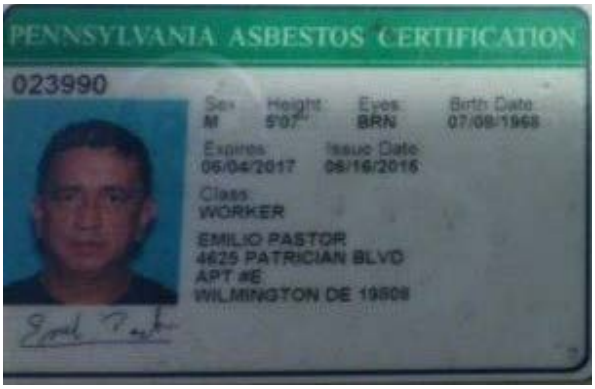
ASBESTOS HANDLER REFRESHER COURSE

Course language : Spanish Exam Grade : 96 % Exam date : 6/4/2016

Certificate Number : 24837 Course dates 6/4/2016 Expiration Date 6/4/2017

Brian Camacho Walsh
Program Director

Per 10NYCRR Part 73.2 (L) (1), DOH 2832 Certificate of Completion of Asbestos Safety Training is the *only* official record of training for New York State certification.
Per NJ Administrative Code Title 8 Department of Health Chapter 60 Asbestos Licenses and Permits, Form NJASB-24 is the *only* official record of training for New Jersey State certification.


PENNSYLVANIA ASBESTOS CERTIFICATION

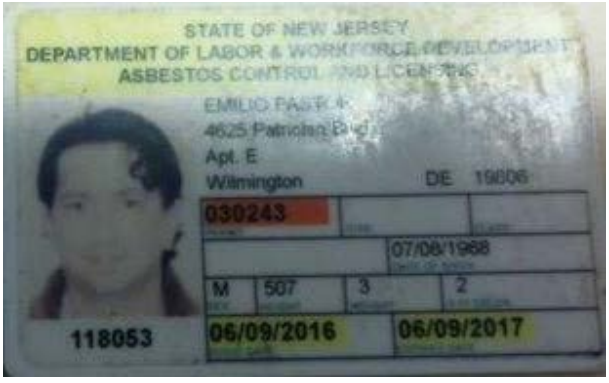
023990

Sex M | Height 5'07" | Eyes BRN | Birth Date 07/08/1968

Expires 06/04/2017 | Issue Date 06/16/2015

Class WORKER

EMILIO PASTOR
4625 PATRICIAN BLVD
APT #E
WILMINGTON DE 19808


STATE OF NEW JERSEY
DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
ASBESTOS CONTROL AND LICENSING

EMILIO PASTOR
4625 Patrician Blvd
Apt. E
Wilmington DE 19806

030243

07/08/1968

M | 507 | 3 | 2

118053 | 06/09/2016 | 06/09/2017

ASBESTOS WORKER/HANDLER

Mario Barrera

Expiration Date:
07/08/2017

Certificate of Training

CRITERION LABORATORIES, INC.

HEREBY CERTIFIES THAT

Mario Barrera

HAS SUCCESSFULLY COMPLETED A 8 HOUR COURSE ENTITLED

Asbestos Worker/Handler Refresher

INCLUDING CLASSROOM INSTRUCTION

on this 8th day of July 2016

Exam passed on this 8th day of July 2016 - Score - 72

- Approved by the states of New York and New Jersey (EPA Region 2)
- Approved by the state of Pennsylvania (EPA Region 3)

Approved for AHERA Accreditation Under TSCA Title II

3370 Progress Drive, Suite J
Bensalem, PA 19020
(215) 244-1300 - Phone
(215) 244-4349 - Fax
www.criterionlabs.com

Course is conducted in English

DIRECTOR:

James A. Weltz, CIH, President

STATE OF NEW JERSEY
DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
ASBESTOS CONTROL AND LICENSING

MARIO BARRERA
1314 West Newport Park

Wilmington DE 19804

26464		
	11/13/1957	
M	509	3	2
12/03/2015	12/03/2016	

116421

THIS PERMIT has been issued in accordance with and subject to the provisions of the Asbestos Control and Licensing Act N.J.S.A. 34:5A-32 et seq. You MUST have THIS PERMIT with you on the job.

THIS PERMIT may be revoked if you fail to follow established asbestos safety and health practices. THIS PERMIT may be revoked if it is loaned, abandoned or allowed to pass from the personal control of the owner.

THIS PERMIT is invalid if it is altered, defaced, mutilated, or tampered with in any manner.

Any person performing the duties of an asbestos worker or supervisor after this permit has expired shall be subject to the penalty provisions of N.J.S.A. 34:5A-32 et seq., as shall his employer.

For information, corrections, or changes, direct all inquires to the following:

New Jersey Department of Labor & Workforce Development, Division of Public Safety & Occupational Safety and Health.
Asbestos Control and Licensing Section
P.O. Box 949
Trenton, NJ 08625-0949
(609) 633-3760

THE GREAT SEAL OF THE STATE OF NEW JERSEY

COMMISSIONER

EMPLOYEE TRAINING STATEMENT

USA Environmental Management, Inc.
Environmental ♦ Engineering ♦ Construction

EMPLOYEE TRAINING

ADDITIONAL ASBESTOS SUPERVISORS/ WORKER/HANDLERS

USA Environmental Management, Inc. (USAEMI) is a UNION contractor and as such from time to time will supplement our existing workforce based on project load at the time with other certified Asbestos Supervisors and/or Worker-Handlers from the union.

If that becomes necessary on this project, USAEMI will provide all current training information for any of these employees at the time of assignment to work on the project.

8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Tel: (215) 365-5810 ♦ Fax: (215) 365-5870 ♦ Web: www.usaemi.com

Corporate Health & Safety Program Manual

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USA Environmental Management, Inc.

Environmental ♦ Subsurface ♦ Construction

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8436 Enterprise Avenue, Philadelphia, PA 19153 ◆ Off. (215) 365-5810 ◆ FAX (215) 365-5870

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Safety Data Sheets (SDS) Manual

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SAFETY DATA SHEETS MANUAL
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SECTION 1

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Remediation Protective Materials

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Flame Retardant Polyolefin	Tyco Plastics	2	2/20/09	J. Schmidt
2	Polyolefin (CH2-CH2)n	Tyco Plastics	2	2/20/09	J. Schmidt
3	StarTex Flame Retardant Film	Covalence Plastics	5	2/20/09	J. Schmidt
4	Eyesaline Concentrate	Fendall, Inc.	1	2/20/09	J. Schmidt
5	Polyethylene	Westlake Polymers, Corp.	2	2/20/09	J. Schmidt
6	Nashua Duct Tape	Covalence Adhesives	3	3/11/09	J. Harris
7	One Component Polyurethane Foam Sealant	FOMO Products	2	3/11/09	J. Harris
8	Trim-Tex 847 Spray Adhesive	Trim-Tex Inc.	4	3/11/09	J. Harris
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SECTION 2

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Asbestos Remediation Chemicals

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Serpiloc White	W.R. Grace	6	2/20/09	J. Schmidt
2	Chemsafe 100	ARAMSCO	3	2/20/09	J. Schmidt
3	Bull High Strength Low Odor Mastic Remover	Bullseye Environmental	1	2/20/09	J. Schmidt
4	Aramsco RAMTACK Adhesive	ARAMSCO	1	2/20/09	J. Schmidt
5	Chemsafe 400 Carpet Glue Remover	ARAMSCO	2	3/12/09	J. Harris
6	Grayling Low Odor Mastic Remover	Grayling Industries, Inc.	7	3/13/09	J. Harris
7	Chemsafe 800 Liquid Concentrate TSP	ARAMSCO	2	4/22/09	J. Schmidt
8	Childers CP-10 Coating	Specialty Construction Brands	5	4/22/09	J. Schmidt
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SECTION 3

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Lead Remediation Chemicals

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Peel Away 1	Dumond Chemicals, Inc.	2	2/20/09	J. Schmidt
2	Peel Away 7	Dumond Chemicals, Inc.	2	2/20/09	J. Schmidt
3	Barrier Coat II Flat	W.R. Grace	10	2/20/09	J. Schmidt
4	L-B-C Lead Barrier Compound Type III	Fiberlock Technologies, Inc.	1	2/20/09	J. Schmidt
5	Power Rust Stop White	Fiberlock Technologies, Inc.	2	2/20/09	J. Schmidt
6	Bull Wax	Bullseye	1	3/11/09	J. Harris
7	Ledizolv	Ledizolv	2	3/11/09	J. Harris
8	Black Beauty Abrasives and Roofing Products	Reed Minerals, Harsco Corp.	1	3/11/09	J. Harris
9	ShockWave (8310)	Fiberlock Technologies, Inc.	1	3/11/09	J. Harris
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SECTION 4

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Mold Remediation Chemicals

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Oxine	Bio-Cide International, Inc.	6	2/20/09	J. Schmidt
2	Sentinel 805 Envirowash	Sentinel Chemical Company	2	2/20/09	J. Schmidt
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Updated: 11/4/2016

SECTION 5

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Painting Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Survey Marking Paint	Aervoe Industries, Inc.	1	3/11/09	J. Harris
2	Crown Paint Thinner	Packaging Service Co., Inc.	3	3/11/09	J. Harris
3	YOLO Colorhouse Inside - Semi-Gloss White	YOLO Colorhouse	2	3/11/09	J. Harris
4	Safecoat Acrylacq	American Formulating & Manufacturing	1	3/11/09	J. Harris
5	Cover Stain	Zinsser Company, Inc.	3	3/11/09	J. Harris
6	YOLO Colorhouse Inside - Flat White	YOLO Colorhouse	2	3/11/09	J. Harris
7	Rust-Oleum Stops Rust Clean Metal	Rust-Oleum Corporation	3	3/12/09	J. Harris
8	YOLO Colorhouse Inside - Eggshell White	YOLO Colorhouse	2	3/12/09	J. Harris
9	Methyl Ethyl Ketone (MEK)	The Sherwin Williams Company	2	3/12/09	J. Harris
10	MAB Fresh Kote Interior Latex Semi-Gloss, White	M.A. Bruder & Sons, Inc.	2	3/12/09	J. Harris
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SECTION 6
USA ENVIRONMENTAL MANAGEMENT, INC.
SDS - Microscopy Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Acetone, ACS, HPLC	LabChem, Inc.	3	2/25/09	J. Harris
2	Triacetin Glycerol Triacetate	Fisher Scientific	3	2/25/09	J. Harris
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SECTION 7

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Building Materials

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Diamond Drill Bits and Blades	Diamond Products	3	2/20/09	J. Schmidt
2	Sakrete Cement Mix Accelerator	Bonsal American	3	2/20/09	J. Schmidt
3	Sakrete Sand Mix	Bonsal American	6	2/20/09	J. Schmidt
4	Bonsal Portland Cement	Bonsal American	6	2/20/09	J. Schmidt
5	Amstone Foundation Coating	Bonsal American	4	2/20/09	J. Schmidt
6	Series 1000 Acousticork NRT HPS	Amorim Reinvestmentos, S.A.	2	2/24/09	J. Harris
7	Safecoat Grout Sealer	American Formulating & Manufacturing	1	3/11/09	J. Harris
8	LevelQuik Latex Primer	Custom Building Products	2	3/11/09	J. Harris
9	Loctite Spray Adhesive General Purpose	Henkel Consumer Adhesives	2	3/11/09	J. Harris
10	Seal-Krete CLEAN-N-ETCH	Seal-Krete	2	3/11/09	J. Harris
11	Oatey 95/5 Lead-Free Plumbing Solder	Oatey, Co.	2	3/11/09	J. Harris
12	Oatey Silver Lead-Free Plumbing Solder	Oatey, Co.	2	3/11/09	J. Harris
13	440 SF Supreme Commercial Multipurpose Adhesive	All Purpose Adhesive Co.	1	3/11/09	J. Harris
14	Rapid Coat Joint Compound - White	Lafarge North America Inc.	3	3/11/09	J. Harris
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SECTION 8

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Building Maintenance Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	System Clean Vandelism Mark Remover	Lagasse Brothers, Inc.	1	3/11/09	J. Harris
2	Roundup Weed & Grass Killer	Monsanto Company	5	3/11/09	J. Harris
3	ORTHO Weed-B-Gone MAX	The Scotts Company LLC	2	3/12/09	J. Harris
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SECTION 9

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Vehicle Maintenance Products

Item	Product Name	Manufacturer	Pages	Date Inserted
1	Hess Conventional Gasoline	Hess Corporation	9	2/20/09
2	BP Autogas	BP Australia Pty Ltd.	5	2/20/09
3	BP Regular Unleaded Petrol	BP Australia Pty Ltd.	6	2/20/09
4	Diesel Fuel (All Types)	Hess Corporation	8	2/20/09
5	Hess 10W30 Motor Oil	Hess Corporation	7	2/20/09
6	Power Multigrade Diesel Engine Oil 15W40	BP Australia Pty Ltd.	5	2/20/09
7	GOJO Natural Orange Pumice Hand Cleaner	GOJO Industries, Inc.	1	3/11/09
8	Splash RV and Marine Antifreeze	SuperClean Brands, Inc.	2	3/11/09
9	Prestone Bug n Tar Remover	Honeywell Consumer Products Group	4	3/11/09
10	Prestone Bug Wash Windshield Cleaner	Prestone Products Corporation	4	3/11/09
11	Castrol Type F Automatic Transmission Fluid	BP Lubricants USA Inc.	3	3/11/09
12	Valvoline Power Steering Fluid	Ashland, Inc.	5	3/11/09
13	Diesel Fuel Supplement +Cetane Boost	Power Services Products	3	3/11/09
14	WD-40	WD-40 Company	2	3/11/09
15	Valvoline Premium Starting Fluid	Ashland, Inc.	5	3/11/09
16	Super XL Motor Oil - Multiviscosity	American Agip Co., Inc.	4	3/11/09
17	Ultralene Motor Oil - Multiviscosity	American Agip Co., Inc.	8	3/11/09
18	Zerex Antifreeze	Ashland, Inc.	5	3/12/09
19	Krystal Kleer Windshield Washer Fluid	South Win Ltd.	2	3/12/09
20	Prestone Hi-Temp Brake Fluid DOT 3	Honeywell Consumer Products Group	4	3/12/09
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SECTION 9
USA ENVIRONMENTAL MANAGEMENT, INC.
SDS - Vehicle Maintenance Products

Inserted By
J. Schmidt
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SECTION 10

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Equipment Maintenance Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Do All Heavy Duty Cleaner-Degreaser	Handy-Klenz Chemical	1	2/20/09	J. Schmidt
2	Stihl Bar and Chain Lubricant	Stihl, Inc.	2	2/20/09	J. Schmidt
3	Stihl 2-Cycle Ultra High Performance Eng. Oil	Stihl, Inc.	3	2/20/09	J. Schmidt
4	Titan LS-10 Wagner Easy Clean	D.K. Rosedale LLC	1	3/11/09	J. Harris
5	Stihl 2-Cycle High Performance Engine Oil	Stihl, Inc.	3	3/11/09	J. Harris
6	Air Compressor Oil - RARUS 427	Mobil Oil Corporation	2	3/12/09	J. Harris
7	Hydraulic Oil AW 46	Imperial Oil Products Division	4	3/12/09	J. Harris
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SECTION 11

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Office Cleaning Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Citrus Cleaner and Degreaser	ARAMSCO	1	2/24/09	J. Harris
2	Ant and Roach Killer 17 Country Fresh Scent	Raid	4	2/24/09	J. Harris
3	Acarosan Dust Mite Spray	Bissel	3	2/24/09	J. Harris
4	Murphy's Oil Soap Wood Cleaner-Orange	Colgate-Palmolive	2	2/24/09	J. Harris
5	Bona Hardwood Floor Cleaner	BonaKemi U.S.A., Inc.	2	2/24/09	J. Harris
6	Joy Liquid Detergent	Procter & Gamble	2	2/24/09	J. Harris
7	Lysol Brand II Disinfectant spray - crisp linen	Reckitt Benckiser N.A., Inc.	4	2/24/09	J. Harris
8	Softsoap brand Antibacterial Hand Soap	Colgate-Palmolive	1	2/24/09	J. Harris
9	Simple Green All-Purpose Cleaner	Sunshine Makers, Inc.	2	2/24/09	J. Harris
10	Clorox Clean-up Cleaner with Bleach	The Clorox Company	1	2/24/09	J. Harris
11	AirWick Ultra Freshmatic Spray	Reckitt Benckiser N.A., Inc.	5	2/24/09	J. Harris
12	Sweet Orange Liquid Castile Soap	Vermont Soap	1	2/25/09	J. Harris
13	Orange Plus RTU	Earth Friendly Products	1	2/25/09	J. Harris
14	Toilet Kleaner	Earth Friendly Products	1	2/25/09	J. Harris
15	Window Kleen	Earth Friendly Products	1	2/25/09	J. Harris
16	Orange Plus Complete	Earth Friendly Products	1	2/25/09	J. Harris
17	Wave - Auto Dish Powder	Earth Friendly Products	1	2/25/09	J. Harris
18	Wave Gel	Earth Friendly Products	1	2/25/09	J. Harris
19	EFP Bathroom Tissue	Earth Friendly Products	1	2/25/09	J. Harris
20	Paper Towels - White	Earth Friendly Products	1	2/25/09	J. Harris
21	Stain Remover with Peroxide	Zep Inc.	2	3/11/09	J. Harris
22	Mop & Glo Multi-Surface Floor Cleaner	Reckitt Benckiser, Inc.	3	3/11/09	J. Harris
23	Soilax Bathroom Cleaner	Ecolab, Inc.	1	3/11/09	J. Harris
24	Totally Awesome All Purpose Cleaner/Degreaser/Spot Remover	Awesome Products, Inc.	4	3/12/09	J. Harris
25	Mr. Clean Multi-Surfaces Antibacterial Spray	The Proctor & Gamble Co.	3	3/12/09	J. Harris
26	EXPO Dry Erase Board Cleaner	Sanford, L.P.	1	3/12/09	J. Harris
27	Windex Original Glass Cleaner	S.C. Johnson & Son, Inc.	4	3/12/09	J. Harris
28	Clorox Clean-up Cleaner with Bleach	Clorox Sales Company	1	3/12/09	J. Harris
29	Softsoap Liquid Hand Soap with Aloe	Colgate-Palmolive Company	2	3/12/09	J. Harris
30	Formula 409 Anitbacterial All Purpose Cleaner	Clorox Sales Company	1	3/12/09	J. Harris
31	Original Pine-Sol Brand Cleaner 1	Clorox Sales Company	1	3/12/09	J. Harris
32	Clorox Green Hand Wipes	Clorox Sales Company	1	4/22/09	J. Schmidt
33	Lysol Hand Wipes	Reckitt Benckiser, Inc.	8	4/22/09	J. Schmidt
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SECTION 12

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Office Equipment Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Black Inkjet Cartridge - DesignJet 800 Plotter	Hewlett-Packard Company	3	2/24/09	J. Harris
2	Cyan Inkjet Cartridge - DesignJet 800 Plotter	Hewlett-Packard Company	3	2/24/09	J. Harris
3	Magenta Inkjet Cartridge - DesignJet 800 Plotter	Hewlett-Packard Company	3	2/24/09	J. Harris
4	Yellow Inkjet Cartridge - DesignJet 800 Plotter	Hewlett-Packard Company	3	2/24/09	J. Harris
5	Black Inkjet Cartridge - LD445c Printer/Copier	Lanier	2	2/24/09	J. Harris
6	Cyan Inkjet Cartridge - LD445c Printer/Copier	Lanier	2	2/24/09	J. Harris
7	Magenta Inkjet Cartridge - LD445c Printer/Copier	Lanier	2	2/24/09	J. Harris
8	Yellow Inkjet Cartridge - LD445c Printer/Copier	Lanier	2	2/24/09	J. Harris
9	Wite Out Multi-Purpose Correction Fluid	Wite-Out Products, Inc.	2	2/24/09	J. Harris
10	Wite-Out Correction Fluid Quick Dry	Wite-Out Products, Inc.	2	2/24/09	J. Harris
11	Marks-A-Lot Permanent Marker	Avery Dennison	1	2/24/09	J. Harris
12	DabnSeal Envelope Moistener	Clarence J. Venne, Inc.	2	2/24/09	J. Harris
13	Paper Mate Flair	Sanford Corporation	1	2/24/09	J. Harris
14	Sharpie Accent Tank Highlighter	Sanford, L.P.	1	2/24/09	J. Harris
15	Dust Off Compressed Gas Duster	Falcon Safety Products, Inc.	3	2/25/09	J. Harris
16	Lexmark All-In-One Printer X7170 Black Cartridge	Lexmark International, Inc.	2	2/25/09	J. Harris
17	Lexmark All-In-One Printer X7170 Color Cartridge	Lexmark International, Inc.	2	2/25/09	J. Harris
18	HP DeskJet 842C Printer Black Cartridge	Hewlett-Packard Company	3	2/25/09	J. Harris
19	HP DeskJet 842C Printer Color Cartridge	Hewlett-Packard Company	4	2/25/09	J. Harris
20	HP DeskJet 960C/932C Printer Black Cartridge	Hewlett-Packard Company	3	2/25/09	J. Harris
21	HP DeskJet 960C/932C Printer Color Cartridge	Hewlett-Packard Company	4	2/25/09	J. Harris
22	HP DeskJet 710C Printer Black Cartridge	Hewlett-Packard Company	3	2/25/09	J. Harris
23	HP DeskJet 710C Printer Color Cartridge	Hewlett-Packard Company	4	2/25/09	J. Harris
24	HP LaserJet 4100N Printer Black Cartridge	Hewlett-Packard Company	3	2/25/09	J. Harris
25	Mita AI1810F Copier - Black Toner	Kyocera Mita America, Inc.	2	3/13/09	J. Harris
26	Kyocera KM 3050 Copier - Black Toner	Kyocera Mita America, Inc.	2	3/13/09	J. Harris
27	HP 1220c Printer - No. 78 Multi-color Cartridge	Hewlett-Packard Company	4	3/13/09	J. Harris
28	HP 1220c Printer - No. 45 Black Cartridge	Hewlett-Packard Company	3	3/13/09	J. Harris
29	HP 2550c Printer - Q3960A - Black Cartridge	Hewlett-Packard Company	3	3/13/09	J. Harris
30	HP 2550c Printer - Q3973A - Magenta Cartridge	Hewlett-Packard Company	3	3/13/09	J. Harris
31	HP 2550c Printer - Q3972A - Yellow Cartridge	Hewlett-Packard Company	3	3/13/09	J. Harris
32	HP 2550c Printer - Q3971A - Cyan Cartridge	Hewlett-Packard Company	3	3/13/09	J. Harris
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ACTIVITY HAZARD ANALYSIS (AHA) FORMS

Activity Hazard Analysis

Activity Project Mobilization **Analyzed By/Date** _____

Principal Steps	**Potential Safety/Health Hazards**	**Recommended Controls**
1. Site Safety and Emergency Procedures to be implemented immediately upon initiation of any site activities. 2. Stage Storage Trailer. 3. Stage Equipment & Materials. 4. Setup Project Field Office Operations.	1. Trip and Fall Hazards. 2. Site Vehicles.	1. Become familiar with general operations ongoing at the site.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. All site related mobilization work shall be accomplished using Hard Hats, Safety Glasses, work gloves and Safety Shoes.	1. Ensure that workers near building work site are using personal protective equipment (hard hats, safety glasses, safety shoes).	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety and emergency procedures.

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Activity Hazard Analysis

Activity Temporary Protection/Site Protection **Analyzed By/Date** _____

Principal Steps	**Potential Safety/Health Hazards**	**Recommended Controls**
1. Establish work building control perimeter. 2. Initiate Site Safety Program and Procedures. 3. Initiate site fire protective measures. 4. Setup Personnel Decontamination Units. 5. Erect temporary phase isolation barrier. 6. Install phase critical barriers.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders. 4. Erecting and working on Scaffolding. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Cuts using utility knives. 7. Power Tools. 8. Material lifting injury hazards.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal protective equipment (hard hats, safety glasses, safety shoes). 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4.Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Use caution and care when using sharp tools. 7. Use caution and understand proper, safe use of power tools. 8. Follow recommended, safe lifting procedures.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. All temporary protection/site protection work shall be accomplished using Hard Hats, Safety Glasses, work gloves and Safety Shoes. 2. Power Tools. 3. Ladders. 4. Scaffolding. 5. Powered Manlifts. 6. Lumber/Polyethylene Plastic/Tape/Spray Adhesive	1. Ensure that workers near building work site are using personal protective equipment cited. 2. Inspect all Power Tools daily. 3. Inspect Ladders, Scaffolding, Manlifts daily. 4. Check all warning devices, signage, etc. daily.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, power tools, etc.

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Activity Hazard Analysis

Activity Erecting Scaffolding **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Scaffolding may be used on this project. 2. Unloading scaffolding and support equipment from truck. 3. Temporary storage of scaffolding. 4. Erection of scaffolding – **Outside** work building. 5. Erection of scaffolding – **Inside** work building.	1. General building perimeter site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Unloading from truck – drop related injuries. 4. Unloading from truck – lifting related injuries. 5. Storage – material falling inflicting injuries. 6. **Exterior/Interior** – Unstable ground base for scaffold causing failure. 7. **Exterior/Interior** – Possible electrical contact hazard. 8. **Exterior** – Possible adverse weather effects hazard. 9. Erection of scaffolding – Drop hazards. 10. Erection of scaffolding – Fall hazards. 11. Failure to properly brace scaffolding during erection causing failure. 12. Scaffold frame section separation.	1. Become familiar with general operations ongoing at the site. Continue to use hard hats, safety glasses, safety shoes, etc. 2. Become familiar with the work building environment and warning devices installed at known trip hazards. 3. Employ care when unloading scaffolding. 4. Ensure stability and proper lifting procedures are employed during the unloading process. 5. Ensure stability of stored material. 6. Ensure safe, stable base for erection. 7. Review erection location for possible electrical contact. Safe off as necessary. 8. Ensure scaffolding is secured properly and tied down to withstand the elements (wind, rain, etc.) 9. Erection drop hazards – ensure scaffold/bracing sections secured by rope before lifting. Don't stand directly below material being hoisted. 10. Employ the use of fall protection procedures detailed in the Site Safety/Accident Prevention Plan. 11. Follow OSHA and manufac-turer's requirements for proper bracing. 12. Use proper section joining pins and pin locks at all times.

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Activity Hazard Analysis

Activity Erecting Scaffolding **Analyzed By/Date** _____

Equipment To Be Used	Inspection Requirements	Training Requirements
1. Scaffolding. 2. Cross bracing, leveling jacks, wheels, feet. 3. Miscellaneous hand tools.	1. Ensure that work is accomplished using personal protective equipment cited. 2. Inspect scaffold systems daily. 3. Check all warning devices, signage, etc. daily. 4. Check all anchorage devices daily and immediately before inclement weather. 5. Check all scaffolding safety devices such as guardrails, toe boards, etc. daily.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Follow EM 385-1-1 and the OSHA standards for proper use of scaffolding.

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Activity Hazard Analysis

Activity Work From Scaffolding **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Scaffolding may be used on this project. 2. Accessing the scaffold system for working. 3. Working on scaffolding. 4. Dismounting scaffold upon completion of work.	1. **Exterior/Interior** - General building perimeter site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Accessing scaffolding creates potential fall hazard. 4. Working on scaffolding presents potential fall hazard. 5. Worker working immediately beneath the perimeter of the erected scaffold may be faced with falling objects injury hazard. 6. Dismounting scaffolding presents potential fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use hard hats, safety glasses, safety shoes, etc. 2. Become familiar with the work building environment and warning devices installed at known trip hazards. 3. Use properly secured access ladder to ascend scaffold. If built-in ladder is to be used it must be manufactured for the purpose of personnel access and climbing. Use fall protection program for potential falls in excess of 6' during access. 4. Use proper fall protection at all times when working at heights in excess of 6'. 5. All workers must use personal protective equipment including hard hats, safety glasses and safety shoes. 6. Use properly secured access ladder to descend scaffold. If built-in ladder is to be used it must be manufactured for the purpose of personnel access and climbing. Use fall protection program for potential falls in excess of 6' during descent.

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Activity Hazard Analysis

Equipment To Be Used	Inspection Requirements	Training Requirements
1. Scaffolding. 2. Ladders – portable or built-in. 3. Fall protection devices and equipment.	1. Ensure that work is accomplished using personal protective equipment cited. 2. Inspect scaffold systems daily. 3. Check all warning devices, signage, etc. daily. 4. Check portable access ladders daily. 5. Check all scaffolding safety devices such as guardrails, toe boards, etc. daily. 6. Ensure that fall protection is being used properly at all times.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Follow EM 385-1-1 and the OSHA standards for proper use of scaffolding and personnel fall protection equipment.

Activity Dismantling Scaffolding **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Scaffolding may be used on this project. 2. Dismantlement of scaffolding – **Outside** work building. 3. Dismantlement of scaffolding – **Inside** work building.	1. General building perimeter site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. **Exterior/Interior** – Unstable ground base for scaffold causing failure. 4. **Exterior/Interior** – Possible electrical contact hazard. 5. **Exterior** – Possible adverse weather effects hazard. 6. Dismantlement of scaffolding – Drop hazards. 7. Dismantlement of scaffolding – Fall hazards. 8. Scaffold frame section separation – dropping sections. 9. Storage – material falling inflicting injuries. 10. Loading truck – drop related injuries. 11. Loading truck – lifting related injuries.	1. Become familiar with general operations ongoing at the site. Continue to use hard hats, safety glasses, safety shoes, etc. 2. Become familiar with the work building environment and warning devices installed at known trip hazards. 3. Ensure safe, stable base for dismantlement. 4. Review installation location for possible electrical contact. Safe off as necessary. 5. **Do not** attempt scaffold dismantlement during adverse weather conditions (wind, rain, etc.) 6. Dismantlement drop hazards – ensure scaffold/bracing sections secured by rope before lifting. Don't stand directly below material being hoisted. 7. Employ the use of fall protection procedures detailed in the Site Safety/Accident Prevention Plan. 8. Have each section and component secured by the lifting line **prior** to removing locking pins and removing section or bracing. 9. Ensure stability of stored material. 10. Employ care when loading scaffolding. 11. Ensure stability and proper lifting procedures are employed during the unloading process.

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Activity Dismantling Scaffolding **Analyzed By/Date** _____

Equipment To Be Used	Inspection Requirements	Training Requirements
1. Scaffolding. 2. Cross bracing, leveling jacks, wheels, feet. 3. Miscellaneous hand tools.	1. Ensure that work is accomplished using personal protective equipment cited. 2. Inspect scaffold-dismantling operation as accomplished. 3. Check all warning devices, signage, etc. daily. 4. Check all lifting and dismantlement equipment prior to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Follow EM 385-1-1 and the OSHA standards for proper use of scaffolding.

Activity Hazard Analysis

Activity Work From Ladders **Analyzed By/Date** _____

Principal Steps	**Potential Safety/Health Hazards**	**Recommended Controls**
1. Ladders will be used for a variety of work activities on the **exterior** of the work building during the course of work on this project. 2. Ladders will also be used periodically in support of work activities in the **interior** of the work building during the course of work on this project.	1. General building perimeter site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders above 6'. 4. Use of sharp tools while working on ladders increases the potential for cuts and other tool-inflicted injuries. 5. Use of power tools while working on ladders increases the potential for cuts and other tool-inflicted injuries. 6. Unstable base for ladders. 7. Reach hazards while working on ladders. 8. Standing too high on ladders.	1. Become familiar with general operations ongoing at the site. Continue to use hard hats, safety glasses, safety shoes, etc. 2. Become familiar with the work building environment and warning devices installed at known trip hazards. 3. Employ fall protection devices when working on ladders above 6'. Review Safety/Accident Prevention Program for proper use. 4. Use caution and care when using sharp tools. 5. Use caution and understand proper, safe use of power tools. 6. Ensure the ladder is sound on its base before using. 7. Reaching while working on ladders is one of the most common causes of accidents. DO NOT reach beyond the work limits of the ladder. Move it if necessary! 8. Do not stand above the next to last step on a stepladder.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Step Ladders (various heights). 2. Extension Ladders.	1. Ensure that work is accomplished using personal protective equipment cited. 2. Inspect Ladders daily. 3. Check all warning devices, signage, etc. daily.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Proper use of ladders.

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USA Environmental Management, Inc.

Activity Hazard Analysis

Activity Temporary Electric **Analyzed By/Date** _____

Principal Steps	**Potential Safety/Health Hazards**	**Recommended Controls**
1. Become familiar with Site Safety Program and Procedures and Site Emergency Procedures. 2. Initiate site fire protective measures. 3. Make electrical tie-in and meter installation on main pole along access road in front of work building. 4. Access pole to make proper tie-in. 5. Install meter. 6. Run temporary service line into work building. 7. Tie-in temporary service to electrical service panel. 8. Test installation.	1. General building site hazards, i.e. vehicles, etc. 2. Electrical Shock Hazards. 3. Trip and Fall Hazards. 4. Working on Ladders. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Cuts using utility knives, other hand tools. 7. Power Tools. 8. Material lifting injury hazards.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal protective equipment. 2. Follow all approved electrical tie-in procedures including, but not limited to, tag and lockout of main service until tie-in is completed, etc. 3. Become familiar with the work building environment and warning devices installed at known trip hazards. 4. Employ fall protection devices when working on ladders, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Use caution and care when using sharp tools. 7. Use caution and understand proper, safe use of power tools. 8. Follow recommended, safe lifting procedures.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. All temporary electric work shall be accomplished using Hard Hats, Safety Glasses, work gloves and Safety Shoes. 2. Power Tools. 3. Ladders. 4. Powered Manlifts. 5. Electrical equipment and materials such as wiring, meter, temporary service panel board.	1. Ensure workers at site and site manager are notified of the nature of the work and the work schedule. 2. Ensure that work is accomplished using personal protective equipment cited. 3. Inspect all Power Tools daily. 4. Inspect Ladders, Manlifts daily. 5. Check all warning devices, signage, and electrical lockout daily until temp. service install is complete.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Proper use of ladders, manlifts, power tools, etc. 5. Follow all electrical code procedures and standards.

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Activity Hazard Analysis

Activity Use of Power Tools **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. A variety of power tools shall be used on this project. 2. Drills, Screw guns, Cutting Saws, Hammers, etc. among others may be used from time-to-time.	1. Electrical shock hazards. 2. Skin cut hazards. 3. Clothing tangling hazards. 4. Hair tangling hazards.	1. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in conjunction with electrically powered hand tools. 2. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 3. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. Remove any tool without installed devices operating properly immediately from service. 4. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. Remove any tool without installed devices operating properly immediately from service. 5. Revise this Activity Hazard Analysis Sheet should new hand tools or equipment be put into use on the project presenting new hazards.

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Activity Hazard Analysis

Activity Use of Power Tools **Analyzed By/Date** _____

Equipment To Be Used	Inspection Requirements	Training Requirements
1. Drills, Screw guns, Cutting Saws, Hammers, etc. along with a variety of other small to medium size hand tools will be used on this project.	1. Ensure that workers near building work site are using personal protective equipment cited. 2. Inspect all Power Tools daily. 3. Inspect all power cords used in conjunction with any hand tools on a daily basis. 4. Inspect all safety guards and other such devices daily.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, power tools, etc.

Activity Hazard Analysis

Activity Work From Mechanical Lifts **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Mechanical manlifts may be used on this project. 2. Placing of mechanical equipment onsite – unloading from truck. 3. **Exterior** - Moving equipment to specific work location. 4. **Interior** - Moving equipment to specific work location. 5. If internal combustion powered – fumes evacuation for inside work. 6. Accessing the mechanical lift system for working. 7. Working on or below mechanical lift. 8. Dismounting mechanical lift upon completion of work. 9. Moving equipment from site to truck for removal from jobsite. 10. Loading of equipment onto truck.	1. **Exterior/Interior** - General building perimeter site hazards, i.e. vehicles, etc. 2. Equipment contact injury hazards. 3. Moving equipment across soft ground can create injury hazard – Personnel contact and/or roll-over hazard. Hard wheels vs. pneumatic wheels. 4. Moving equipment through building can create personnel contact hazard. 5. Fume exposure if internal combustion power is used. 6. Electrical hazard potential if operated electrically. 7. Accessing mechanical lift creates potential fall hazard. 8. Working on mechanical lift presents potential fall hazard for worker up and falling objects injury hazard for workers beneath. 9. Dismounting mechanical lift presents potential fall hazard. 10. Moving equipment throughout building inside or across soft ground outside can create injury hazard – Personnel contact and/or rollover hazard. Hard wheels vs. pneumatic wheels. 11. Equipment contact injury and/or rollover hazard.	1. Become familiar with general operations ongoing at the site. Continue to use hard hats, safety glasses, safety shoes, etc. 2. Be sure device has backup alarm – all workers should be aware of the location of the equipment at all times. Be sure unloading ramps, if needed, are sufficient to handle equipment weight and size. 3. Ensure equipment has pneumatic tires or is moved across solid ground at all times. Carefully test stability before placing into use. 4. Operator should be able to see all workers at all times during movement. Be sure to use a ground escort during movement. 5. If internal combustion powered – install exterior exhaust system during all motorized operations. 6. Check all electrics for proper operating condition. 7. Use properly secured ladder or fixed access ladder for accessing the equipment working area. 8. Use proper personnel fall protection at all times when working above 6’ in height. All workers on ground must use hard hats, safety glasses and safety shoes at a minimum. 9. Use properly secured ladder or fixed access ladder for dismounting the equipment working area. 10. Operator should be able to see all workers at all times during movement. Be sure to use a ground escort during movement.

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Activity Hazard Analysis

Activity Work From Mechanical Lifts **Analyzed By/Date** _____

		Recommended Controls (cont'd.)
		11. Ensure equipment has pneumatic tires or is moved across solid ground at all times. Be sure unloading ramps, if needed, are sufficient to handle equipment weight and size.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Mechanical manlifts. 2. Ladders – portable or built-in. 3. Fall protection devices and equipment. 4. Loading / Unloading Ramps.	1. Ensure that work is accomplished using personal protective equipment cited. 2. Inspect mechanical manlift systems daily. Run equipment through series of movements each morning prior to use. 3. Check all warning devices, signage, etc. daily. 4. Check exhaust elimination system daily (if internal combustion powered). 5. Check electrical service lines if portable cord power is needed. 6. Check portable access ladders daily. 7. Check all mechanical manlift safety devices such as guardrails, etc. daily. 8. Ensure that fall protection is being used properly at all times.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Follow all equipment manufacturers' instructions for use at all times. Review operations manual for the unit and be familiar with the proper operation of equipment at all times. 5. Operating employees shall undergo a field equipment operational test overseen by the project foreman and Project Safety Officer. 6. Follow EM 385-1-1 and the OSHA standards for proper use of mechanical manlift equipment and personnel fall protection equipment.

Activity Hazard Analysis

Activity Removal of Asbestos-containing Roofing and Chimney Flashing Cement **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of asbestos-containing roofing material and chimney flashing cement.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Asbestos exposure hazard to the workers performing the removals. 9. Wet removal of asbestos-containing material may present a slipping/fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

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Activity Hazard Analysis

Activity Removal of Asbestos-containing Roofing and Chimney Flashing Cement **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Asbestos abatement procedures and requirements as included in the project specification and the asbestos hazard abatement plan which is an appendix to the Safety Program/Accident Prevention Plan. 6. Use of Personal Protective Equipment (PPE) for asbestos abatement work included in the Asbestos Hazard Abatement Plan, OSHA 1926.1101 and EPA 40 CFR, Part 61, Subparts A & M – NESHAP regulations.

Activity Hazard Analysis

Activity Asbestos-containing Materials Removal **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of asbestos-containing materials from the inside of the building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Asbestos exposure hazard to the workers performing the removals. 9. Wet removal of asbestos-containing material may present a slipping/fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

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Activity Hazard Analysis

Activity Asbestos-containing Materials Removal **Analyzed By/Date**_____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Asbestos abatement procedures and requirements as included in the project specification and the asbestos hazard abatement plan which is an appendix to the Safety Program/Accident Prevention Plan. 6. Use of Personal Protective Equipment (PPE) for asbestos abatement work included in the Asbestos Hazard Abatement Plan, OSHA 1926.1101 and EPA 40 CFR, Part 61, Subparts A & M – NESHAP regulations.

Activity Hazard Analysis

Activity Removal of Emergency & Exit Lighting and Fire Panel Backup Batteries **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of lead-containing backup batteries for the emergency and exit lighting throughout the school building and for the backup power for the Fire Panel.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Potential lead exposure hazard to the workers performing the removals.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

Activity Hazard Analysis

Activity Removal of Emergency & Exit Lighting and Fire Panel Backup Batteries **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Lead abatement procedures and requirements as included in the project specification. 6. Use of Personal Protective Equipment (PPE) for lead hazard abatement per OSHA regulations CFR 1926.62.

Activity Hazard Analysis

Activity Removal of Miscellaneous Asbestos-Containing Basboard Mastic/Door Caulk **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of miscellaneous asbestos-containing baseboard mastic and door caulking from certain areas inside of the building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Asbestos exposure hazard to the workers performing the removals. 9. Wet removal of asbestos-containing material may present a slipping/fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

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Activity Hazard Analysis

Activity Removal of Miscellaneous Asbestos-Containing Basboard Mastic/Door Caulk **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Asbestos abatement procedures and requirements as included in the project specification and the asbestos hazard abatement plan which is an appendix to the Safety Program/Accident Prevention Plan. 6. Use of Personal Protective Equipment (PPE) for asbestos abatement work included in the Asbestos Hazard Abatement Plan, OSHA 1926.1101 and EPA 40 CFR, Part 61, Subparts A & M – NESHAP regulations.

Activity Asbestos-containing Mastic Removal – Blackboards/Tackboards **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of asbestos-containing mastic removal from behind existing blackboards/tackboards inside of the building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Asbestos exposure hazard to the workers performing the removals. 9. Wet removal of asbestos-containing material may present a slipping/fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in conjunction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be constantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

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Activity Asbestos-containing Mastic Removal – Blackboards/Tackboards

Analyzed By/Date _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Asbestos abatement procedures and requirements as included in the project specification and the asbestos hazard abatement plan which is an appendix to the Safety Program/Accident Prevention Plan. 6. Use of Personal Protective Equipment (PPE) for asbestos abatement work included in the Asbestos Hazard Abatement Plan, OSHA 1926.1101 and EPA 40 CFR, Part 61, Subparts A & M – NESHAP regulations.

Activity Hazard Analysis

Activity Asbestos-containing Carpet Mastic Removal **Analyzed By/Date**

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of asbestos-containing carpet mastic removal from certain areas inside of the building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Asbestos exposure hazard to the workers performing the removals. 9. Wet removal of asbestos-containing material may present a slipping/fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

Activity Hazard Analysis

Activity Asbestos-containing Carpet Mastic Removal **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Asbestos abatement procedures and requirements as included in the project specification and the asbestos hazard abatement plan which is an appendix to the Safety Program/Accident Prevention Plan. 6. Use of Personal Protective Equipment (PPE) for asbestos abatement work included in the Asbestos Hazard Abatement Plan, OSHA 1926.1101 and EPA 40 CFR, Part 61, Subparts A & M – NESHAP regulations.

Activity Hazard Analysis

Activity Removal of Fluorescent Light Ballasts **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of PCB-containing fluorescent light ballasts throughout the school building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Potential PCB exposure hazard to the workers performing the removals.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

Activity Hazard Analysis

Activity Removal of Fluorescent Light Ballasts **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Fluorescent light ballast abatement procedures and requirements as included in the project specification. 6. Use of Personal Protective Equipment (PPE) for PCB hazard abatement per OSHA regulations.

Activity Removal of Fluorescent Light Tubes **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of mercury-containing fluorescent light tubes throughout the school building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Mercury exposure hazard to the workers performing the removals.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in conjunction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be constantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

Activity Removal of Fluorescent Light Tubes **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Fluorescent light tube abatement procedures and requirements as included in the project specification. 6. Use of Personal Protective Equipment (PPE) for mercury hazard abatement per OSHA regulations.

Activity Hazard Analysis

Activity Project De-mobilization **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Remove Storage Trailer. 2. Remove Balance of Stored Equipment & Materials. 3. Breakdown Project Field Office Operations. 4. Remove any temporary protection installed around or on the site. 5. Remove temporary electric installation.	1. Trip and Fall Hazards. 2. Site Vehicles. 3. Truck Loading Hazards (i.e. falling equipment, etc.) 4. Material and/or equipment dropping hazards (hand and foot injuries). 5. Electrical Shock hazards. 6. Working on Ladders. 7. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 8. Cuts using utility knives, other hand tools. 9. Power Tools. 10. Material lifting injury hazards.	1. Become familiar with general operations ongoing at the site. 2. Use caution when working on active access roads in and around the site. 3. Use general care in handling and loading trucks with equipment, materials, etc. 4. Take care to handle equipment and materials with a firm grasp to avoid injury. 5. Follow all approved electrical procedures for the removal of temporary tie-in including, but not limited to, tag and lockout of main service until tie-in removal is completed, etc. 6. Employ fall protection devices when working on ladders, etc. Review Safety/Accident Prevention Program for proper use. 7. Employ fall protection as in 6. above. Also be aware of operational parts of lifts and other such moveable equipment. 8. Use caution and care when using sharp tools. 9. Use caution and understand proper, safe use of power tools. 10. Follow recommended, safe lifting procedures.

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Activity Hazard Analysis

Activity Project De-mobilization **Analyzed By/Date** _____

Equipment To Be Used	Inspection Requirements	Training Requirements
1. All site related de-mobilization work shall be accomplished using Hard Hats, Safety Glasses, work gloves and Safety Shoes. 2. Equipment/material handling carts. 3. Power Tools. 4. Ladders. 5. Powered Manlifts. 6. Electrical equipment and materials such as wiring, meter, temporary service panel board.	1. Ensure that workers near building work site are using personal safety equipment (hard hats, safety glasses, safety shoes).	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal safety equipment. 3. Be familiar with the developed site safety and emergency procedures. 4. Proper use of ladders, manlifts, power tools, etc. 5. Follow all electrical code procedures and standards.

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MISCELLANEOUS FIELD FORMS

Pre-Entry Briefing form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

PRE-ENTRY BRIEFING FORM

Project No.: 16-000701-01 **Date:** _____

Project Name: Syncon Resins Superfund Site OU2
77 Jacobus Avenue, South Kearny, New Jersey 07032

I hereby affirm that I have attended a Pre-entry Briefing Meeting presented by authorized management personnel of USA Environmental Management, Inc. (USAEMI), my employer. This meeting was held at the project site. During this meeting, the following items were discussed:

- General overview of the HASP
- Names of personnel and alternates responsible for site safety and health
- Lines of authority
- Safety, health and other hazards present on the site
- Personal protective equipment required for activities at the site
- Safe use of engineering controls and equipment at the site
- Level and degree of potential exposures
- Site emergency evacuation procedures
- Medical surveillance requirements, including recognition of symptoms and signs of heat stress and heat stroke
- Training requirements
- Review site vehicular traffic rules
- Existence of Lead-Based paint on various surfaces and/or lead components in various areas of the structures to be demolished.

I understand the items discussed during this briefing and will refer any questions to the Project Superintendent on site.

USA Environmental Management, Inc.:

USAEMI Safety Program Manager: _____
Signature

_____
Name Printed

USAEMI Employee: _____
Signature

_____
Name Printed

Subcontractor:

Subcontractor: _____
Subcontractor Company Name

Employee: _____
Signature

_____
Name Printed

Visitor:

Agency: _____
Agency Name

Employee: _____
Signature

_____
Name Printed

Health & Safety Plan (HASP) Acceptance form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

HEALTH AND SAFETY PLAN (HASP) ACCEPTANCE FORM

Project No.: 16-000701-01 **Date:** _____

Project Name: Syncon Resins Superfund Site
77 Jacobus Avenue, South Kearny, New Jersey 07032

I hereby affirm that I have read and fully understand all of the requirements of the Health and Safety Plan (HASP) developed for the above subject contract as well as the Company Health & Safety Program (CHSP). A copy of the aforementioned HASP is maintained at the project site for my continued reference.

I agree to abide by all of the applicable requirements of the HASP and CHSP as they apply to the performance of my assigned work on this contract. I further stipulate that I will follow the directions given me by the Project Superintendent and/or Joint Venture management, and/or Subcontractor (in the case of subcontractor employees) for whom I am working during the course of this project.

Project Superintendent: _____
Signature

_____
Name Printed

Project Employee: _____
Signature

_____
Name Printed

Subcontractor/Visitor: _____
Representative Signature

_____
Name Printed

Safety Meeting Sign-in form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

SAFETY MEETING SIGN-IN SHEET

Date: _____ Daily: ☒ Weekly: ☐ Monthly: ☐

Project Name: Syncon Resins Superfund Site
77 Jacobus Avenue, South Kearny, New Jersey 07032

Project No: 16-000701-01 Supervisor: _____

Describe safety topic discussed at meeting: _____

EMPLOYEE SIGN-IN

Print Name	Signature

Use extra sheets as necessary.

Date: _____ **EMPLOYEE SIGN-IN**

Print Name Signature

Daily Construction Quality Control Report form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

DAILY CONSTRUCTION QUALITY CONTROL REPORT

Project No.: 16-000701-01 **Date:**

Project Name: Syncon Resins Superfund site OU2
77 Jacobus Avenue
South Kearny, New Jersey 07032

Report No.: 001

Weather:

Phases of Construction in Progress:

Material and/or Equipment Delivered to Site:

Inspection Made:

Preparatory:

Initial:

Follow-up:

Tests Performed and Results of Tests:

Verbal Instructions Received:

Changed Conditions/Delays/Conflicts Encountered:

Remarks:

SIGNATURE: _____

Quality Control Inspector

Contractor's Verification: The above report is complete and correct and all material and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications except as noted above, and job safety and health requirements are in accordance with the USACE Safety and Health Requirements Manual EM 385-1-1.

SIGNATURE: _____

Contractor's Approved Authorized Representative

Project Emergency Telephone Numbers List

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

PROJECT EMERGENCY PHONE NUMBERS LIST

Project Name: Syncon Resins Superfund Site
77 Jacobus Avenue, South Kearny, New Jersey 07032

Project No.: 16-000701-01

Ambulance	**911**
Hospital	**911**
Fire Department	**911**
Police	**911**
U.S. EPA (24-Hour Hotline)	913-281-0991
CHEMTREC	800-424-9300
National Poison Control Center	800-222-1222
National Response Center and Terrorist Hotline	800-424-8802
Center for Disease Control	800-232-4636
New Jersey DEP	1-877-WARNDEP

USA Environmental Management, Inc.:

USAEMI - Jim Harris - daytime office	215-365-5810 ext. 102
USAEMI - Jim Harris - (Cell)	215-778-4061
USAEMI – Kevin Meldrum – (Cell)	215-397-8168

Sevenson Environmental, Inc.:

SSI – Project Manager - TBD	TBD
SSI – Project Site Superintendent – TBD	TBD

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

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State of New Jersey

Department of Community Affairs (DCA) -	609 - 292-7899
Department of Labor & Workforce Development, Asbestos Control and Licensing	TBD

US Army Corps of Engineers

Contracting Officer (CO)	TBD
Contracting Officer's Representative (COR)	TBD

CDM Smith

Project Manager	TBD

TTI Environmental, Inc.

Project Manager	TBD
Air Monitoring Technician (AST)	TBD

Other:

Worker Daily Sign-in form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

Worker Daily Sign In Log

PROJECT: Project Name: Syncon Resins Superfund Site **DATE:**

77 Jacobus Avenue, South Kearny, New Jersey 07032

PROJECT No.: 16-000701-01

			LUNCH PERIOD			
Employee Name (Print)	Employee Name (Signature)	Time In	Time Out	Time In	Time Out	Total Hours

Project Superintendent Name (Printed) _____

Project Superintendent's Signature _____

Visitor Daily Sign-in form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

Visitor Daily Sign In Log

PROJECT: **Project Name: Syncon Resins Superfund Site**

77 Jacobus Avenue, South Kearny, New Jersey 07032

Date: _____

PROJECT No.: 16-000701-01

Employee Name (Print)	Employee Name (Signature)	Time In	Time Out	Total Hours

Project Superintendent Name (Printed) _____

Project Superintendent's Signature _____

Hot Work Permit form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

DAILY HOT WORK PERMIT

Project No.: 16-000701-01 **Date:** _____

Project Name: Syncon Resins Superfund Site OU2
77 Jacobus Avenue, South Kearny
New Jersey 07032

Permit No.: _____

Work Location: _____

Work To Be Performed:

☐ WELDING ☐ BURNING ☐ BRAZING ☐ OTHER

Specific Work Activity Description:

_____

_____

Special Precautions:

_____

_____

Fire Watch Requirements:

_____

_____

The location where the work is to be performed has been examined. Necessary precautions have been taken and permission is granted for Hot Work to proceed.

_____ _____
(Supervisor Signature) (Name Printed)

FINAL CHECKUP: The work area and adjacent areas to which sparks and heat might have spread (including areas immediately above and below the hot work) have been inspected 30 minutes **after** the hot work was completed and all were found to be safe.

_____ _____
(Project Superintendent Signature) (Name Printed)

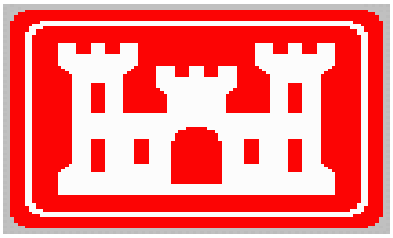
Contractor Quality Control Plan

Syncon Resins (OU2) Superfund Site
South Kearny, New Jersey

Contract No. W912DQ-15-D-3002, TO 0002

Prepared for:

U.S Army Corps of Engineers
Kansas City District



Prepared by:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Sevenson Environmental Services, Inc.

Date: September 2016

Revision 1

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Acronyms

ABIH	American Board of Industrial Hygiene
AHA	Activity Hazard Analysis
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
APP	Accident Prevention Plan
ASTM	American Society for Testing and Materials
cc	Cubic centimeter
CFR	Code of Federal Regulation
CHMM	Certified Hazardous Materials Manager
CHST	Certified Health and Safety Technician
CIH	Certified Industrial Hygienist
COR	Contracting Officers Representative
CPM	Corporate Project Manager
CPR	Cardiopulmonary resuscitation
CQ	Contractor Quality
CQC	Contractor Quality Control
CQCM	Corporate Quality Control Manager
CQCS	Contractor Quality Control Supervisor
CSP	Certified Safety Professional
CY	Cubic yard
DOT	Department of Transportation
EM	Engineering Manual
EMS	Emergency Medical Service
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	Hazardous, Toxic and Radioactive Wastes
mg/m^3	milligram per cubic meter
MSDS	Material Safety Data Sheets
NIOSH	National Institute for Occupational Safety and Health
NJDEP	New Jersey Department of Environmental Protection
OSHA	Occupational Safety and Health Administration
O_2	Oxygen gas
PCB	Polychlorinated Biphenyl
PPE	Personal Protective Equipment
ppm	parts per million
QCP	Quality Control Plan
RMS	Resident Management System
SHM	Safety and Health Manager
SSHO	Site Safety and Health Officer
SVOC	Semi-Volatile Organic Compound
T&D	Transportation and Disposal
TCLP	Toxicity Characteristic Leachate Procedure
ug/m^3	microgram per cubic meter
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

Signature Sheet

Syncon Resins Operable Unit 2 (OU 2) Superfund Site
Remedial Activities
South Kearny, New Jersey
CONTRACT No. W912DQ-15-0002 TASK ORDER: 0002

Quality Control Plan Approvals

September 2016
Revision 1

(1) Plan Preparer

9/7/16
Date

William Zambrana
Contractor Quality Control Systems Manager, Alternate
Sevenson Environmental Services, Inc.
973-518-0257

(2) Plan Approval

9/7/16
Date

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(3) Plan Concurrence

7 SEP 2016
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I. INTRODUCTION

Sevenson's Contractor Quality Control Plan (QCP) will be implemented to ensure that remedial and construction procedures are performed under this contract in compliance with the plans and specifications, and in accordance with a high standard of quality, reliability, and safety while minimizing hazards and nonconforming conditions. The quality control measures as presented herein will include construction procedures; staffing; types of material and equipment to be used; and methods of performing, documenting, and enforcing quality control operations of both the prime contractor and subcontractors (including inspection and testing).

Maintenance of the QCP will be the responsibility of Sevenson's On-Site Contractor Quality Control Supervisor (CQCS). The CQCS will be responsible for ensuring that all materials and work comply with the contract specifications. All inspection and testing firms will be at the disposal of the CQCS to ensure that all aspects of work are compliant with the contract. The CQCS will report any deviations from the QCP independently to Sevenson's Corporate Project Manager. Mr. Eric Delellis is designated as Sevenson's CQCS at the site.

II. PROJECT ORGANIZATION

Sevenson's managers and personnel assigned to this project possess a broad range of remedial action experience and skills. All have been involved with the handling of contaminated wastes at Hazardous, Toxic, and Radioactive Waste (HTRW) sites and are familiar with requirements of day-to-day work under this contract.

Sevenson's proposed project organization for this project, the resumes of key personnel, along with their job titles can be found in Appendix A.

The functional responsibilities of key technical personnel are summarized below.

HOME OFFICE PERSONNEL

Mr. Rick Elia – Vice President

Mr. Elia will ultimately be responsible for the project's success. He will provide the required Sevenson resources to ensure that work at the Syncon Superfund Site is successfully executed. He will be kept informed of the project's progress and maintain that the project is meeting its goals.

Mr. Elia will resolve problems that cannot be resolved by the On-site Project Manager or Project Administrator and issues that may arise between respective corporate groups. He will periodically visit the site and become acquainted with field personnel and procedures.

Al LaGreca - Corporate Project Manager (CPM)

Mr. LaGreca will oversee the project at the corporate level and report directly to the Vice President. He will communicate with the onsite Project Manager regarding all aspects of the project including, but not limited to, project problems, progress, payments, schedules, administrative duties, and CQCS oversight.

John Bartholomeo - Corporate Quality Control Manager

Mr. Bartholomeo will oversee the quality control aspects of the project including, but not limited to, processes, policies, and performance. Mr. Bartholomeo, who reports directly to the Vice President, will work closely with Mr. LaGreca on the oversight of the quality aspects of the project. As part of the oversight, he will conduct periodic audits of the Quality Control Process to ensure the work is accomplished in accordance with the plans and specifications, corporate Quality Control policies, and the policies of the US Army Corps of Engineers and the US Environmental Protection Agency, as applicable, within the defined budget and in a safe manner.

Paul Jung, Certified Industrial Hygienist (CIH) – CSP Director of Health and Safety / Safety and Health Manager

Regarding safety and occupational health, Sevenson will:

- Maintain overall responsibility of Syncon Superfund Site safety.
- Be responsible for assigning Site Safety and Health Officer (SSHO) responsibilities.
- Ensure that all activities are carried out in compliance with the approved Site Safety and Health Plan.

Sevenson's corporate safety program is managed in-house by an ABIH-Certified Industrial Hygienist, Paul Jung. Mr. Jung is responsible for the preparation, implementation, and enforcement of the site-specific Safety, Health, and Emergency Response Plan (SHERP). Sevenson's SSHO will report site safety activities to Mr. Jung on a regular basis, including all safety and occupational

health issues. All job safety records generated will be thoroughly reviewed by Mr. Jung, who will also perform quarterly job-site safety inspections. He will prepare an audit report of findings for each inspection, including identification of deficiencies requiring corrective action.

Mr. Jung will supervise the SSHO, review the respirator qualitative fit tests, and develop the air monitoring program. He will make periodic trips to the site to conduct safety audits, observe the administration of this plan, and make any necessary modifications to the program.

Kenneth Paisley, CHMM - Regulatory Specialist

Mr. Paisley is responsible for regulatory compliance on all Sevenson projects. He is committed specifically to overseeing all field sampling and chemical data acquisition plans, and is the point of contact with off-site laboratories. Mr. Paisley will review laboratory reports with our selected lab to ensure compliance with project specifications and all required protocols. He will coordinate off-site waste removal, including transport, disposal, manifesting, waste profiles, regulatory compliance, and disposal requirements.

FIELD PERSONNEL

Steve Gillespie, Project Manager

Mr. Steve Gillespie, Sevenson's On-site Project Manager, will be the contact person with whom the Corps of Engineers will deal with on a daily basis under this contract. Mr. Gillespie will ensure that:

- Appropriate Sevenson and subcontractor resources are allocated to the project and balanced to ensure best value to the Corps of Engineers.
- All reporting is carried out in a manner compliant with Corps of Engineers Contract Management Procedures.
- All tasks are conducted in accordance with the site project specifications.

Sevenson field personnel may rely on home office support throughout the course of the project. Mr. Gillespie reports directly to Sevenson's CPM, Mr. LaGreca. When problems arise that cannot easily be rectified in the field, Mr. Gillespie and Mr. LaGreca will become and remain personally involved until each problem is resolved and appropriate corrective measures are implemented. Mr. Gillespie will normally communicate with Mr. LaGreca at least once daily on the progress of the

project. Mr. LaGreca will be present on the jobsite as required, to ensure that the project is progressing as scheduled.

As Project Manager, Mr. Gillespie is responsible for implementation and support of Sevenson's QCP at the Syncon Superfund Site. He will oversee all aspects of work under this contract for remediation at the Syncon Superfund Site. His responsibilities include:

- Contractor coordination.
- Acting as site liaison between Sevenson and the Corps of Engineers.
- Maintaining charge of all field operations.

Eric Delellis - On-Site Contractor Quality Control Supervisor (CQCS)

As Quality Control Systems Supervisor, Mr. Delellis will report to the Corporate Quality Control Officer and will advise the onsite Project Manager and Superintendent of any violations of the project CQC plan. He has full written authority to act for Sevenson as the single point of contact for quality policy at the site, have overall authority to act on quality matters, and manage the quality system. His responsibilities will include, but not be limited to, controlling the quality specified in the plans and specifications, developing and maintaining an effective CQC system, stopping all work that is not in compliance with the contract specifications, performing all control activities and tests and preparing acceptable documentation of CQC activities. He will have both the authority and the duty to halt any operation appearing to be out of compliance with contract specifications.

The CQCS is responsible for keeping and maintaining all records related to personnel, supplies, equipment use, and equipment calibration and sampling. His functions will be as defined within the contract specifications and as referenced in the Quality Control Documents.

CQCS specific responsibilities include:

- Performing and documenting field inspections.
- Preparing daily Quality Control Reports.
- Scheduling, reviewing, certifying, and managing project submittals.
- Maintaining the Submittal Register.

- Providing coordination of required quality control testing, reviewing and submitting results.
- Conducting, documenting, and tracking preparatory, initial, and follow-up inspections.
- Tracking construction deficiencies and ensuring timely corrective action.
- Supervision of Quality Control testing (as required).
- Reviewing calibration of test equipment (as necessary).
- Preparing addenda to the QCP as necessary when additional phases of work are added.
- Maintenance of as-built drawings.
- Coordinating responses to vendors' requests for information and technical issues.
- Review of subcontractor Quality Assurance Programs
- Serving as main point of contact for the Corps of Engineers questions and discussions on quality and technical issues.
- Delegating duties, authorities and responsibilities to alternate CQCSs and notifying Corps of Engineers to whom what duties, authorities and responsibilities have been delegated.
- Maintain all required data in the Corps of Engineers RMS system.

The CQCS or an alternate must be on-site when work is being performed. Letters from Sevenson's Environmental Services Inc.'s Corporate Manager to the designated CQC Systems Manager granting full authority and responsibility for performing the CQC Systems Manager's functions as well as designation of alternate QC personnel are included with this plan, in Appendix B.

William Zambrana – Environmental Sampler, Alternate Contractor Quality Control Supervisor (Alt-CQCS)

As part of the CQC staff, the Mr. Zambrana will report to and assist the CQC Systems manager to ensure safety and contract compliance. He will be responsible for all onsite sample collection and field screening tests, results review, tracking and submission of analytical data, and providing recommendations for the designated sampling program. Mr. Zambrana will serve as alternate QC Systems Manager in the event of his absence.

Davis Raver, CHST - Site Safety and Health Officer (SSHO)

Wyatt Beougher - Alternate / Assistant Site Safety and Health Officer
David Goeckler - Alternate / Assistant Site Safety and Health Officer
Dave Larson - Alternate / Assistant Site Safety and Health Officer

As Site Safety and Health Officer, Mr. Raver and the alternate site safety and health officer will report to Sevenson's Certified Industrial Hygienist and be responsible for the implementation of the approved site SHERP, including conducting required safety inspections, safety briefings, and reports of safety-related activities at all times work is being performed. They have received 40-hour HAZWOPER training per 29 CFR 1910.120(e), and possesses current Red Cross First Aid and CPR training. The three alternate will only be onsite when needed.

Perry Novak - Site Superintendent

Mr. Novak will be responsible for supervising all field demolition, excavation and backfilling activities on the Syncon Superfund project. His duties include supervision of Sevenson's craft labor (equipment operators, truck drivers, and laborers) and all subcontractors.

Raymond Gabriel- Accountant

Mr. Gabriel will serve as Sevenson's on-site accountant for the project. Mr. Gabriel will track all the cost associated with the project, track daily costs, prepare weekly project cost summary reports (PCSR), monthly vouchers, work variation notifications (WVN), track funding against budgets, spending against budgets and prepare close out reports.

III. CONTRACTOR'S RESPONSIBILITIES UNDER THE CQC SYSTEM

The implementation of the entire CQC System is solely the contractor's responsibility. These include all administration and control activities of the general contractor, subcontractors, and off site fabricators and suppliers. The contractor shall implement the CQC System and shall ensure that the construction and all activities including safety, comply with the requirements of the contract.

The CQC System Manager shall have no duties other than Quality Control. The CQC System Manager shall coordinate activities with specialized personnel as may be required under specifications other than

CQC. The CQC System manager can have safety responsibilities but cannot serve as the sole site safety officer for the contractor.

Specialized personnel as required by the CQC specification shall augment the CQC Staff during periods when such specialized areas are under construction. They may include construction specialties such as mechanical, electrical, chemical data acquisition, thermal desorption, sampling and analysis, medical monitoring, etc., as may be required by the contract.

CQC Manager and staff are responsible for tracking and processing of submittals as required by specification section "Submittal Procedures". Submittal register must be kept current. Materials and equipment requiring Government Approval shall not be installed without approved shop drawings.

The CQC Manager is responsible for assuring the implementing of all testing as indicated in the specifications and on the list of tests in the CQC Plan. Either the Quality Control or Quality Assurance representatives will add additional inspections as required for the duration of the contract. These inspections will be listed in a log. Test results must be submitted as required. Sevenson will use forms in CQC Specifications for tracking tests. Sevenson's testing laboratory shall be for a list of labs assurance-inspected by the Corps of Engineers. Progress payments are affected by compliance with this specification section.

At least three phases of control (preparatory, initial and follow-up) shall be conducted for each Definable Features of Work (DFW). The list of DFW's is indicated in the CQC Plan and may be modified herein. RMS/QCS shall be used by the Sevenson. If any particular forms are not available in QCS, Sevenson shall use the form included in the CQC Specification to track all Preparatory and Initial Inspection meetings.

Sevenson shall not conceal or build upon non-conforming work. Unacceptable work will be removed and rebuilt. No payment will be made for deficient work. Both the Government and CQC Staff shall have the authority to immediately stop any unsafe practice or the use of unsafe equipment on the project.

CQC personnel are responsible for tracking and correcting deficiencies. Deficiencies shall be corrected promptly. RMS/QCS shall be used to track deficiencies. Any particular forms not available in QCS, the contractor shall use the form in the CQC specification and will keep current and use to track deficiencies.

Daily Quality Control reports shall be prepared by the CQC Staff per CQC specification, and submitted to the Government no more than 24 hours after the date for which prepared. Reports shall indicate factual

evidence of control activities including preparatory, initial phase meetings, follow-up inspections including the location of inspection and deficiencies found, tests performed and results, submittals reviewed safety, etc. RMS/QCs shall be utilized. Sevenson shall perform export to RMS at least weekly. Control shall fill all blanks on daily reports.

Completion Inspection shall be executed as indicated in the CQC specification and shall consist of Punch-out Inspection, Pre-Final and Final Inspections. Deficiencies found must be corrected before proceeding to the next phase of Completion Inspection.

IV RMS / QCS IMPLEMENTATION

The Resident Management System for Windows (RMS) will be used on the Syncon project to assist in its monitoring and administration. Sevenson shall use the USACE-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. This joint USACE-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for Sevenson to input, track, and electronically share information with the USACE in the following areas:

- Administration
- Finances
- Quality Control
- Submittal Monitoring
- Import/Export of Data

Correspondence and Electronic Communications

For ease and speed of communications, both USACE and Sevenson will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

Data Base Management

Sevenson shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. Sevenson shall establish and maintain the QCS database at Sevenson's site office. Data updates to USACE shall be submitted using the USACE's SFTP repository built into QCS export function with file attachments, e.g., daily reports, schedule updates, and payment requests. The QCS database typically shall include current data on the following items:

1. Administration

1.1. Contractor Information

The database shall contain Sevenson's name, address, telephone numbers of management staff, and other required items. Within 14 calendar days of receipt of QCS software from the USACE, Sevenson shall deliver Contractor administrative data in electronic format via Email.

1.2. Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in QCS.

1.3. Correspondence

All Contractor correspondence to USACE shall be identified with a serial number. Correspondence initiated by Sevenson's site office shall be prefixed with "S" and home (main) office shall be prefixed with "H". Letters shall be numbered starting from 0001 (e.g., H- 0001 or S-0001). The USACE's letters to Sevenson will be prefixed with "C".

1.4. Equipment

Sevenson's QCS database shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.5. Management Reporting

QCS includes a number of reports that Sevenson management can use to track the status of the

project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, Quality Assurance/Quality Control (QA/QC) comments, Submittal Register Status, and Three-Phase Inspection checklists.

1.6. Request for Information (RFI)

USACE and Sevenson shall exchange all RFI's using the built-in RFI generator and tracker in QCS.

2. Finances

2.1. Pay Activity Data

The QCS database shall include a list of pay activities that Sevenson shall develop in conjunction with the construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. CLINs may include multiple activities, but activities may be assigned to only one such CLIN. The total of all CLINs equals the Contract Amount.

2.2. Payment Requests

All progress payment requests shall be prepared using QCS. Sevenson shall complete the payment request worksheet, prompt payment certification, and payment invoice in QCS. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, Sevenson shall generate a payment request report using QCS. Sevenson shall submit the payment request, prompt payment certification, and payment invoice with supporting data using the USACE's SFTP repository built into the QCS export function. A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

3. Quality Control (QC)

QCS provides a means to track implementation of the Three-Phase QC System, prepare daily reports,

identify and track deficiencies, document progress of work, and support other Contractor QC requirements. Sevenson shall maintain these data on a daily basis. Entered data will automatically output to the QCS-generated daily report.

3.1. Daily Contractor Quality Control Reports

QCS includes the means to produce the Daily CQC Report. Sevenson may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS shall be Sevenson's official report. Data from any supplemental reports by Sevenson shall be summarized and consolidated onto the QCS-generated Daily CQC Report. Daily CQC Reports shall be submitted as required by SECTION 01451 – CONTRACTOR QUALITY CONTROL. Reports shall be submitted electronically to the Contracting Officer within 24 hours after the date covered by the report. Sevenson shall also provide the Contracting Officer with a signed, printed copy of the daily CQC report.

3.2. Deficiency Tracking

Sevenson shall use QCS to track deficiencies. Deficiencies identified by Sevenson will be numerically tracked using QC Comments. Sevenson shall maintain a current log of its QC comments in the QCS database. USACE will log the deficiencies it has identified using its QA punch list items. USACE's QA punch list items will be included in its export file to Sevenson. Sevenson will acknowledge receipt of these QA comments by specific number reference on the Daily CQC Report. Sevenson shall regularly update the correction status of both QC and QA comments.

3.3. Three-Phase Control Meetings

Sevenson shall maintain a schedule and actual dates and times of preparatory and initial control meetings in QCS.

3.4. Accident/Safety Reporting

USACE will issue safety comments, directions, or guidance whenever safety deficiencies are observed. USACE's safety comments will be included in its export file to Sevenson. Sevenson shall regularly update the correction status of the safety comments. In addition, Sevenson shall

utilize QCS to advise the USACE of any accidents occurring on the jobsite. This brief supplemental entry is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 300.

3.5. Features of Work

Sevenson shall include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity will only be linked to a single feature of work in accordance with Paragraph 2.1 – PAY ACTIVITY DATA.

3.6. QC Requirements

Sevenson shall develop and maintain a complete list of QC testing, transfer property listings, installed property listings, and user training requirements in QCS. Sevenson shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the USACE via QCS.

3.7. Labor and Equipment Hours

Sevenson shall log labor and equipment exposure hours on a daily basis. These data will be rolled up into a monthly exposure report.

3.8. Hazard Analysis

Sevenson shall use QCS to develop a hazard analysis for each feature of work included in the CQC Plan. The hazard analysis shall address any hazards, or potential hazards, that may be associated with the work.

4. Submittal Management

Sevenson shall initially enter all required submittal information into QCS. Thereafter, Sevenson shall maintain a complete list of all submittals, including completion of all data columns, as described in SECTION 01330 - SUBMITTAL PROCEDURES. Dates on which submittals are received and returned by the USACE will be included in its export file to Sevenson. Sevenson shall use QCS to track and transmit all submittals. Submittal Transmittal Forms (ENG Form 4025) and Submittal Register Updates (ENG Form 4288) shall be produced using QCS. RMS will be used to update, store

and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

5. Import/Export of Data

QCS includes the ability to export Contractor data to USACE and to import the submittal register, other USACE-provided data from RMS, and schedule data using SDEF.

Implementation

Sevenson shall ensure that sufficient resources are available to maintain its QCS database, and to provide USACE with regular database updates. QCS shall be an integral part of Sevenson's management of quality control.

V. QUALITY CONTROL

The QCP will be implemented in order to ensure compliance with the specifications for remedial action construction as detailed in the contract specifications.

Prior to the initiation of work, the CQCS will meet with the Corps of Engineers to discuss Sevenson's quality control system. During this meeting, a mutual understanding of the system's details will be developed, including forms for recording (presented herein), control activities, testing, and administration of the system for both on-site and off-site work.

Quality control measures will extend to field sampling procedures; staffing; types of material and equipment to be used; and methods of performing, documenting, and enforcing quality control operations of both the prime contractor and subcontractors (including inspection and testing).

Immediate notification by Quality Control and Safety Personnel of all accidents and incidents to the USACE Field Representative and COR via e-mail and/or phone are required. Submittals of written information related to all incidents/accidents are required within 24 hours.

As previously stated, maintenance of the QCP will be the responsibility of the CQCS. The CQCS will be responsible for ensuring that all materials and work comply with the contract specifications. The CQCS may have a Field Engineer at his disposal to assist him with the on-site inspections. Testing firms will be at the disposal of the CQCS to ensure contract compliance in all aspects of work. All reports from testing firms will be forwarded to the CQCS for his review and approval. Testing firms hired to perform chemical analysis will be required to comply with the requirements listed in the Sampling and Analysis Plan and

must be validated by USACE prior to conducting work.

VI. CHEMICAL QUALITY CONTROL

For all required environmental/chemical sampling, the CQCS will be responsible for oversight of the Chemical Quality Control Program as part of the site QCP. Sevenson will use the approved site specific Quality Assurance Plan generated by Sevenson's Data Quality Control Review Chemist.

VII. BASIS OF CONTRACTOR QUALITY CONTROL PLAN

The basis of the QCP is nationally recognized standards published by the American Society for Testing and Materials (ASTM), the American Association of State Highway and Transportation (AASHTO) and the Corps of Engineers specifications. In addition, procedures utilized within the QCP reflect the experience gained by Sevenson in completing construction projects similar to the Cornel-Dubilier Superfund Site, and include Lessons Learned over the decades of environmental restoration work completed by Sevenson.

VIII. IMPLEMENTATION

The CQCS will be responsible for implementing the QCP by ensuring that quality materials and supplies are provided for the proposed project, and that good workmanship is provided, not only by Sevenson employees but including all subcontractors, in all aspects of this contract. Sevenson's CQCS will report directly to the home office administration (PA/CPM/CCQCS) and will complete daily site inspections to ensure compliance with the quality control specifications and contract drawings. Daily reports will be completed listing all field testing and sampling activities. These reports will be submitted to the Corps of Engineer's representative on a daily basis. The CQCS will be responsible for ensuring that all materials and work comply with the contract plans and specifications and that all performance standards are met. Any discrepancies in work quality will be recorded and a corrective action will be implemented.

As additional features of work are added, addenda to the QCP will be submitted detailing updated lists of Definable Features of Work, updated lists of quality control testing, and other additional quality control information specific to the additional phases of work.

IX. REPORTING

The CQCS will record control activities in a daily quality control report maintained on site at all times. All site activities, including subcontracted work, site inspections, and field testing of materials will be recorded on a daily basis, along with any unacceptable site occurrences or deficiencies and their associated

corrective actions. Each daily entry into the report will be signed by the CQCS. Quality Control Reports will be submitted on a daily basis during all field construction activities. Each daily report will cover a 24-hour period from 7am to 7am, and will be available to the USACE by approximately 2pm the following day.

COST REPORTING

Job costs will be reported to the USACE daily via the Daily Costs Report and Bi-weekly via the Project Cost Summary Report. Reported costs will include overhead, burden and G&A per the 2008 Forward Pricing Rates memo dated June 24, 2008.

Daily Reports will be compiled in order to ensure proper documentation and billing using the example procedures below:

Labor

1.) Project Management - Will record charged job daily hours on a weekly time sheet form kept in Sevenson's office. Hours will be reviewed and verified by the P/M and reported on the daily report.

2.) Trades - (union employees) Hours will be reported on time logs established for each trade on site. Job hours will be recorded by the designated union steward and Project Superintendent. Hours will be reviewed and verified by the Project Superintendent and reported on the daily report.

3.) Billable Time Off – Project management (employees) have a combination of sick/personal days/vacation days per year that are billable to the job in accordance with approved contract management plan. Billable time off must be approved by the P/M and will be included on the daily report. A record of the billable time off will be kept on site and submitted to the USACE with the last Daily Report of each month and recorded on a daily report.

Materials & Other Direct Costs

1) Materials – Estimated costs for materials or services received will be recorded on the daily report upon receipt of a packing list, signed receipt for services or acknowledgement of receipt by the Superintendent.

2) Other Direct Costs – Estimated costs such as Utilities will be recorded on the daily report based on

historic usage and periodically updated according to usage and updated as required.

3) Lump-Sum - Entire costs of subcontract will be recorded on the daily report on the first day subcontractor is on site or work is performed.

4) Time & Material –Authorized costs will be calculated by dividing the total subcontract by the estimated days to complete the tasks and will be recorded on the daily report beginning with the first day subcontractor is on site or start of work.

5) Unit Price - Estimated costs will be calculated by multiplying unit cost times the number of units and will be recorded on the daily report as used equipment.

6) Engaged/utilized – Equipment hours will be reviewed and verified by the Superintendent and reported on the daily report

7) Stand-By - If equipment is not engaged/utilized there will be no costs recorded on the daily report.

HOUSING, TRAVEL AND M&IE

1) Lodging and Per-Diem - Will be recorded on the daily report utilizing the JTR rates for Middlesex County times 55%.

2) Per-diem - Will be charged for each day the employee is working for the project, except for travel weeks.

3) Receipts - Are required for all billable travel.

X. INSPECTIONS

To ensure that all construction and remedial activities comply with the project specifications, the CQCS will complete, in conjunction with the subcontractors, three phases of site inspections for each feature of work. A table of the Definable Features of Work for this contract and the anticipated inspections for each of the three phase inspections is included in Appendix C. Present at these inspections, in addition to the CQCS, will be Sevenson's Site Superintendent along with a representative for the Corps of Engineers. Completed inspection meeting minutes and/or checklists will be submitted in the corresponding daily

quality control report. These inspections will include the following:

Phase I - Preparatory Inspection

Preparatory inspections will be performed prior to beginning work on any definable feature of the project and will include:

- Reviews of contract requirements.
- Reviews of applicable Activity Hazard Analyses and associated administrative and engineering controls to be employed.
- A check to ensure that all materials and/or equipment have been tested, submitted, and approved.
- A check to ensure that provisions have been made to provide required control testing.
- Examination of the work area to ascertain that all preliminary work has been completed.
- A physical examination of materials, equipment, and sample work to ensure that they conform to approved shop drawings or submittal data and that all materials and/or equipment are on hand.
- Conduct a review of any activities being conducted within the immediate area of the subject work that may present a possible hazard or impediment to the work at hand.

Subsequent to the preparatory inspection and prior to commencement of work, Sevenson will instruct each applicable worker on the level of workmanship required to meet contract specifications.

Phase II - Initial Inspections

Initial phase inspections will be performed as soon as a representative portion of the particular feature of work has been accomplished. Initial inspections include, but are not limited to, examination of the quality of workmanship; review of control testing for compliance with contract requirements; and identification of defective or damaged materials, omissions, and dimensional requirements.

The initial phase inspection is the time to discuss and agree on the required level of quality

associated with a given work activity. Any discrepancies relative to work quality should be addressed at this time.

Phase III - Follow-Up Inspections

Follow-up inspections will be change daily to as determined to be necessary to ensure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. Final follow-up inspections will be conducted and deficiencies corrected prior to beginning new work.

Meeting minutes of all inspections will be recorded in the Daily Quality Control Report. Examples of the inspection forms to be utilized are presented in Appendix C.

Final Follow-Up Inspections

At the completion of all work, or any increment thereof established by a completion time stated in the specifications, the CQCS will conduct a final follow-up inspection of the work. The CQCS will develop a "punch list" of items that do not conform to the approved plans and specifications. This list will include the estimated date by which the deficiencies will be corrected. The CQCS or his staff will perform a second completion inspection to ascertain that all deficiencies have been corrected.

Following completion of all inspections at the end of the construction, a series of pre-final and final inspections will be conducted by the CQCS and attended by a Corps of Engineers representative.

Final Completion Inspections

Pre-final and final inspections will take place after all individual final follow-up inspections are completed, and all punch list items corrected.

The CQCS will conduct pre-final inspections to identify deficient areas of work, and develop a punch list of items requiring correction. Once all punch list items have been corrected, Sevenson and the Corps of Engineers will conduct a final inspection, noting any deficient areas of work. After correcting any deficiencies, the Corps of Engineers and Sevenson will conduct a final inspection, leading to acceptance of the work as complete.

The completion inspection(s) and any required deficiency corrections will be accomplished within the time stated for completion of the entire scope of work or any particular increment thereof if the project is divided into increments by separate completion dates.

XI. FIELD TESTING PROCEDURES

Sevenson will conduct field-testing to verify that control measures are adequate to provide a product that conforms to contract requirements. Sevenson will identify the subcontracted laboratories. Sevenson's CQCS and Environmental Sampler/QC Technicians will be responsible for the collection of samples. A table summarizing the anticipated operational QC testing requirements for this contract is included in Appendix C.

Field-testing shall be conducted under the auspices of the CQCS and he or his designee shall:

- Arrange for, or conduct, field testing in accordance with applicable test parameters (ASTM, etc).
- Verify that facilities and testing equipment are available and comply with testing standards and ensure that testing facilities are validated.
- Check test equipment calibration data against certified standards.
- Verify that all tests are documented and submitted as part of quality control system reporting.
- Review all test documentation prior to submittal.

XII. DEFICIENCY TRACKING SYSTEM

Throughout the course of the project, deficiencies will be recorded by a master list of outstanding deficiencies will be maintained by the CQCS.

The CQCS will list any deficiencies noted during the course of project work and both Sevenson and the Corps of Engineers QA representative will sign-off when each deficiency is corrected. These will also be maintained in the USACE Resident Management System (RMS) and will be identified, tracked and closed out via this system. During the quality control portion of the weekly progress meeting, a review will be held to ensure that the master list of outstanding deficiencies is kept up to date. During these meetings, discussions will be held on the inspection, addition, corrective actions, re-inspection, and ultimate removal of items from the deficiency list. Minutes will be recorded and copies given to the Corps of Engineers.

Both Sevenson and the Corps of Engineers' representative will sign-off on the master list of outstanding deficiencies once appropriate corrective actions have been implemented. An example master quality control deficiency list is included in Appendix C.

XIII. SUBMITTALS

An initial submittal register listing major submittals was entered into RMS, prepared by the Corps of Engineers. This register will be continually updated via RMS. The CQCS will follow standard procedures concerning submittals, including the use of the submittal register, transmittal form 4025, and cross-indexing the register and transmittals, etc. Each transmittal may contain more than one submittal specific to that specification section.

Transmittals shall be numbered sequentially in the following manner:

New Transmittals: Spec section – transmittal No.

Example: 01450-1

Revisions: Spec section - transmittal. revision

Example: 01450-1.1

SUBMITTALS REVIEW - NORMAL PROCESS - The CQCS will be responsible for the review and approval of submittals prior to their submittal to the Corps of Engineers. Safety engineering review of submittals such that safety is built in for all relevant submittals, this includes reviews of materials and suppliers' catalog cuts, as well as subcontractor submittals. The CQCS will review the submittal for completeness and compliance with the contract specifications. A twenty-one (21) working day review period will be the standard allowable time for government review of submittals. Variations to a submittal will be noted on the transmittal form 4025, and extend the allowable review period by an additional ten working days. Sevenson will plan submittals such that review and approval can occur within the specified time frame considering the respective features of work. The CQCS will actively participate during procurement activities to ensure purchase orders and subcontracts comply with the contract.

It is anticipated that the Corps of Engineers representative and Sevenson's CQCS will meet frequently in order to forecast and/or prevent any potential problems from arising, as well as to note any submittals

that may require expeditious review if there may be an impact to the schedule. An on-site quality control meeting will be conducted on a weekly basis as part of the weekly progress meeting in order to review performance during the previous one-week period, and to prepare for the upcoming two-week period.

XIV. AUDITS

An auditing system will be established to verify implementation and make determinations regarding the effectiveness of the QCP. The corporate quality control manager will be responsible for auditing the quality control process to ensure contract compliance. These audits will occur, at a minimum, on a quarterly basis or more frequently as deemed necessary. An audit report will be compiled by the corporate quality control manager in the form of a checklist and will include a review of reports and procedures, quality of ongoing construction, personnel, laboratories (on-site and off-site), deficiency tracking, and subcontractors. The audit report will be forwarded to CQCS for his review (information only). An example of the auditing form to be utilized is presented in Appendix C. All non-compliance conditions will be identified during the audit and will be re-audited to verify that the appropriate corrective action(s) has/have been performed. The Corporate QC Manager will perform intermittent, unscheduled reviews of the Quality Control process throughout the performance of the contract to ensure adherence to the approved QC Plan.

XV. DOCUMENTATION

All testing results will be recorded on the daily quality control report. A quality control report template is included in Appendix C. Each report will cover the 24-hour period beginning at 7am on the day the report is dated and ending at 7am the following morning. Any concerns or deviations from the required material specifications and the actions taken to correct the problems will be noted on the report. Information recorded on the daily quality control report will include:

- Definable features of work addressed.
- Description of trades working on the project.
- Numbers of personnel.
- Weather conditions.
- Types and numbers of tests performed.
- Results of testing.

- Inspections completed.
- Nature of defects or cause for rejection.
- Proposed corrective action(s).
- Corrective action taken and date.
- Delays encountered.
- Directions received from the CQCS and actions taken.
- Disagreements and how they were resolved.
- Health and safety issues or deficiencies and how they were resolved.

XVI. REVISIONS TO WORK

Sevenson will be responsible for ensuring total compliance of field work with the project specifications. Should modifications or revisions to the specifications become necessary, Sevenson will make the request, in writing, to the Corps of Engineers. Approval from the Corps of Engineers must be received prior to allowing the modifications or revisions to be made in the field. The CQCS will be informed of and record all such requests in his daily log and on the daily quality control report. The CQCS will also note any recommendations made to or changes made by the Corps of Engineers field personnel.

XVII. DEFINABLE FEATURES OF WORK

Listed below are the general categories and types of work that will be performed under this contract. These items, known as Definable Features of Work, have been grouped into the various categories in which work will be performed, and correlate to measurement and payment. Suitable quality control methods and procedures will be utilized in order to ensure that all work is performed to the standards and quality required by the specification. A table of the Definable Features of Work and the anticipated inspections for each inspection phase is provided in Appendix C.

DEFINABLE FEATURES OF WORK

Safety, Health and Emergency Response

Building inspection

Photograph / Video Taping

Survey

Utility mark out and clearance

Clearing and Grubbing

Mobilization/Temporary Facility

Site Security

Soil Erosion and Sediment Control

Dust Control

Haul/access Roads

Setting up of Decontamination Area and Exclusion Zones

Monitoring Well Abandonment

Construction of stockpile area

Asbestos Abatement

Lead Paint Removal

Vector Control

Demolition

Pre-Excavation Sampling

T&D of Debris Materials

Test Pit Investigation

Sampling and Data Acquisition

Above Ground Storage Tank Removal

Excavation and Disposal of Contaminated Soil and materials

Post Excavation Sampling

Backfilling and Soil Compaction Testing

Install Sheet Piling

Extraction Well Removal

Dewatering

Water Treatment System Installation and Operation

Installation of groundwater collection trench

Installation of extraction well and monitoring wells

Hydraulic and control functional testing

Site Restoration

Seeding

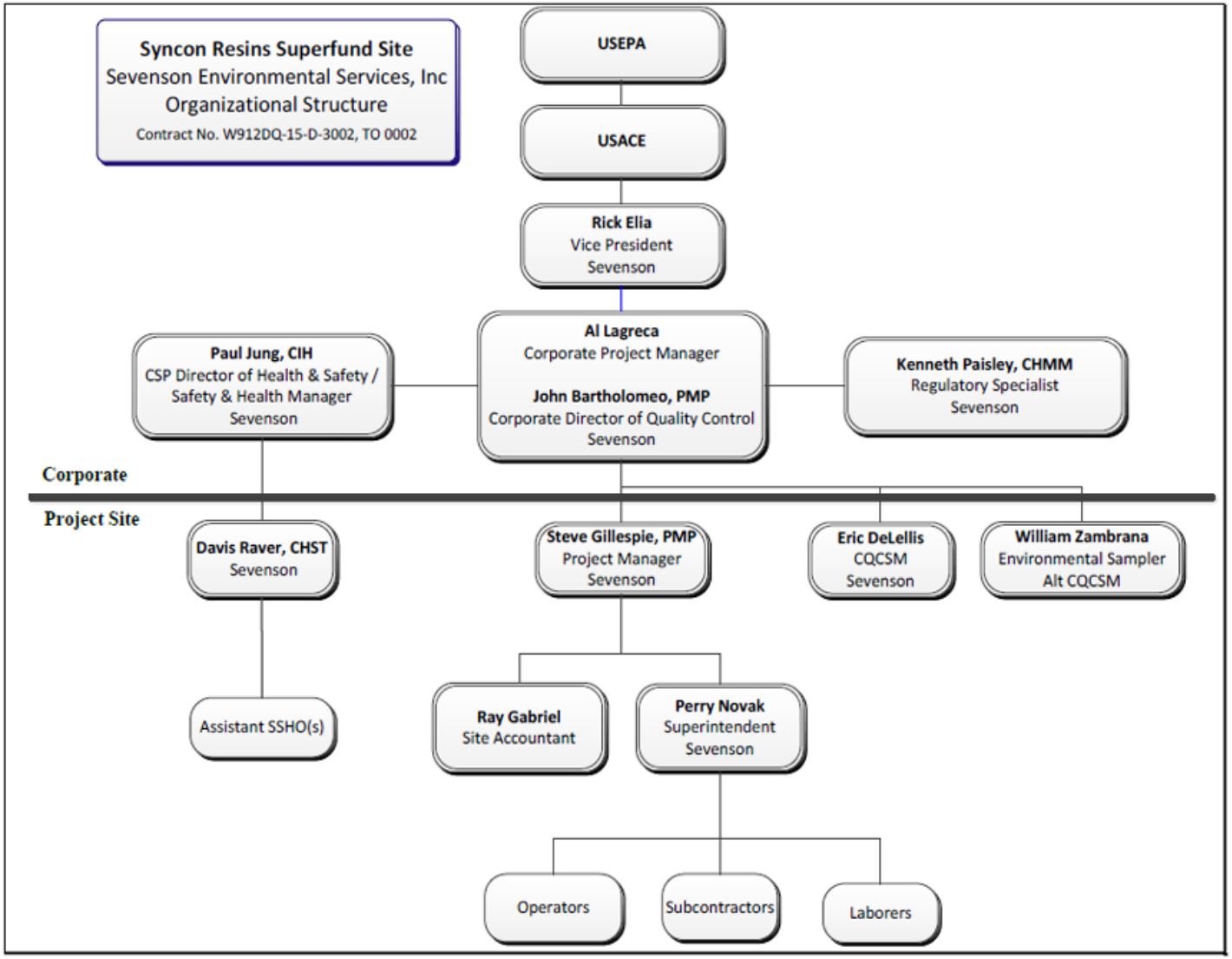
XVIII. CLOSE OUT PROCEDURES

Upon completion of individual features of work the CQCS will conduct a final inspection with the USACE QA representative. During this inspection a punch list of items that do not adhere to the contract requirements will be documented. Upon correction the feature of work, a follow up final inspection will be conducted and once all punch list items are complete the work will be deemed completed and acceptable.

After the overall contract work is complete, a final acceptance inspection will be conducted with Sevenson and USACE. Punch list items will be documented and corrected, and all project completion documents will be submitted.

Appendix A

Resumes of Key Personnel
Project Organization Chart
QC Certification



Years of Experience:

21

Education:

- B.S. Degree – Occupational Safety, SUNY – Empire State College
- A.S. Degree - Radiation Protection Technology, Central Florida Community College, Ocala, Florida

Certifications:

- Certified Industrial Hygienist Certification #10527CP
- Certified Safety Professional Certification #22748
- National Registry of Radiation Protection Technologist-2002
- 40-Hour and 8-Hour OSHA HAZWOPER Training
- 8 Hour OSHA HAZWOPER Supervisor Training
- 40 Hour ORISE Course "Implementing the MARSSIM Approach for Design and Conduct of Radiological Surveys"

Role and Responsibility:

- Oversees the health and safety aspects of all Sevenson's projects.
- Responsible for development, implementation, reviews, and evaluation of the project-specific worker health and safety plans related to occupational safety, industrial hygiene, and health physics.
- Responsible for reviewing air monitoring and exposure data to ensure appropriate controls are instituted and maintained.
- Manages a staff of 30 Site Health and Safety Officers and health physics personnel.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving: excavation and earthwork; innovative and traditional steel sheeting systems; sediment remediation; temporary and mobile water treatment systems; sludge solidification and soils stabilization; slurry wall and trench construction.

Paul Jung-CIH, CSP, RRPT

Director of Health and Safety

Mr. Jung has 21 years of practical, hands on field experience in a variety of health and safety capacities, each with increased responsibility throughout his career.

Mr. Jung is a Certified Industrial Hygienist through the American Board of Industrial Hygiene, a Certified Safety Professional through the Board of Certified Safety Professionals, and a Registered Radiation Protection Technologist through the National Registry of Radiation Protection Technologist.

Mr. Jung is Sevenson's Director of Health and Safety. He responsible for all aspects of occupational safety, marine safety, industrial hygiene, and health physics for Sevenson. The services Sevenon performs require a comprehensive safety program that involves OSHA or Agreement State regulations from the general industry, construction, and maritime standard, EPA TSCA, RCRA, and CERCLA regulations as well as Nuclear Regulatory Commission/Agreement State and United States Coast Guard regulations.

In addition to maintaining Sevenson's Corporate Health and Safety Program, he develops site specific health and safety plans for every Sevenson project. Since his time as Sevenson's Associate Director of Health and Safety and the Director of Health and Safety, he has prepared over 100 site specific health and safety plans.

Mr. Jung is responsible for the supervision and professional development for a staff of 25-40 safety, industrial hygiene, and radiological personnel. He provides safety oversight, technical support, and guidance for his safety staff as well as other project supervision.

Mr. Jung conducts Sevenson's training specific to HAZWOPER, radiation safety (health physics technician and general employee training), industrial hygiene (air monitoring protocols, data review, and method selection, job safety analysis, etc.) and occupational safety (fall protection, confined space, HAZCOM, Control of Hazardous Energy, PPE, etc.).

Mr. Jung also conducts job site inspections and audits as well as reviews all air monitoring and exposure data to evaluate and recommend controls to reduce or abate risk and exposure. He also works in conjunction with project estimators and design teams to ensure as many know physical hazards are eliminated through engineering or administrative controls as possible prior to executing the project in the field.

Mr. Jung is an active member in the Niagara Frontier Chapter of the American Society of Safety Engineers and is on the Board of Directors with the Western New York Safety Conference. As a member of the these two organizations, he has developed an extensive network of colleagues to discuss a variety of health and safety related issues to improve not only Sevenson's overall health and safety program but that of other companies and organizations as well.

8	Waste Manager: Ken Paisley, CHMM	TSES (Prime)

Experience Summary and Basis for Selection

- ✓ 22+ years experience with RCRA/HSWA, CERCLA/SARA, TSCA, CWA, CAA, NEPA, FIFRA, ESA on USACE and commercial projects.
- ✓ 22 years experience working at 8 FUSRAP sites.
- ✓ 22+ years of hazardous material transportation, including waste manifesting expertise for the full range of mixed wastes.
- ✓ Managed >2 million tons of non-haz and haz material shipped to disposal facilities nationwide.
- ✓ Managed >1.2 million tons of radiological contaminated material (including FUSRAP) and shipped to disposal facilities nationwide.
- ✓ Shipped RCRA hazardous, TSCA regulated (PCB and ACM), non-RCRA haz, C&D demolition, LLRW, LLMW, pre-1978 11(e)2, NORM, and TENORM waste streams.
- ✓ Experienced working collaboratively with EPA Regions II, V, VII, and VIII; multiple state/local agencies (especially NJDEP, NYSDEC) DOT, NRC, and OSHA in support of HTRW projects for 9 USACE districts.
- ✓ Coordinated all types of modes of transportation: gondolas, intermodals containers, bags, boxes, drums, bottles, via railroad, dump truck, box truck, box vans, rolloffs, supersacks, etc.
- ✓ Shipped material to NY, OH, ID, UT, MI, PA, CT, ME, NH, VA, WV, NC, SC, GA, LA, TN, KY, IN, AL, TX, OK, AR, KS, IL, WI, NM, WA, and CA disposal facilities.
- ✓ 5 years experience training staff in manifesting procedures.
- ✓ Shipped material to Subtitle D, Subtitle C, C&D demo waste landfills, radioactive waste landfills, incinerators, LLTD facilities, TSDFs, solids stabilization facilities, waste water treatment plants, fuels blending/cement kilns, and trash-to-steam energy production units.
- ✓ Mercury recovery, PCB dechlorination.
- ✓ Shipped material to all pertinent disposal facilities to this contract (US Ecology, Energy*Solutions* – Clive, WCS Texas, and potentially EQ Wayne, MI facility).
- ✓ Produced >200 T&D Plans and oversaw implementation.
- ✓ Produced >20 UFP-QAPPs and oversaw implementation.

Special Qualifications and Training

- ***DOT Transporters Certification per 49CFR172***
- ***Specialized training in HazMat transportation per HM-181POPS***
- ***Hazardous Waste Annual Report Preparation (NYSDEC)***
- ***40-hr and 8-hr OSHA HAZWOPER training (2002)***
- ***Radiation Worker I and II (2003)***

Education: BS, Biology, Bloomsburg University, 1988

Professional Registration/Certification(s): Certified Hazardous Materials Manager (#7961)

Total Years Experience: 22 years

Relevant Project / Contract Experience Highlights

Pre-Placed Remedial Action Contracts, EPA Region II and Northwest Division, CENWK

Start Date: 7/1994	**Completion Date:** ongoing	**Cost:** $600M (6 contracts)	**FFP or CR:** CR & FFP

Waste Manager: Manages all waste and regulatory compliance issues for 70+ TOs, at 8 FUSRAP sites, under six consecutive CENWK PRAC contracts .including support on technical, cost estimating, and chemical quality control issues. Develop FSPs, QAPPs, Waste Characterization/Sampling Plans, Waste Disposal Plans for task orders; negotiate pricing/terms for waste disposal; prepare waste approval profiles and coordinate T&D. Review field manifesting procedures. Perform TSDF compliance inspections and evaluations as part of Source Selection and chemical quality control auditing procedures, and review site analytical summary reports. Develop and oversee hazardous materials site security plans. Coordinates and maintains compliance with Federal Railroad Administration and DOT regulations for shipment of LLRW from the Welsbach/GGM Superfund Site (Project 2).

- Supported negotiations with NJDEP to obtain a B4B Qualifying Permit for WWTP discharge to Millstone River; obtained water allocation permits for 80 construction dewatering wells.
- Prepared or oversaw the preparation of tens of thousands of manifests and shipping documents for waste at CENWK sites, shipping to Subtitle C and D landfills or thermal treatment facilities.

Welsbach Superfund Site

- Oversaw the transportation and disposal of >225,000 Tons of LLRW, LLMW, pre-1978 11(e)2, NORM, and TENORM

wastes.

- Set up a separate offsite Tranship Facility (RTF) for bulk loading into rail gondola cars. Procured rail line access, installation of spur.

Buffalo FUSRAP Projects

Waste Manager: Manages implementation of waste and regulatory compliance issues at the below FUSRAP sites, under three different contracts, including support on technical, cost estimating, and chemical quality control issues.

SLDA FUSRAP Project, Vandergrift, PA

Oversaw the implementation of the transportation and loading of multiple radiological waste streams to Energy*Solutions* – Clive, UT facility via intermodal containers.

Rattlesnake Creek Project, Tonawanda, NY

- Oversaw the transportation and disposal of 53,000 tons of Pre-1978 11(e)2 contaminated soils, debris and buried containers of uranium contaminated ores. All material was consolidated and loaded into rail gondola cars at the onsite rail loading area.
- Coordinated with CELRB in support of Sevenson's VECP to switch from intermodal to gondola railcar shipment of wastes at Rattlesnake Creek Superfund Site (FUSRAP) to realize a 35% savings in rail transport cost.
- Expedited the preparation of a sampling plan; coordinated the sampling and analysis; provided characterization of waste and offsite transportation and disposal of 12 unanticipated drums of waste encountered during remediation to maintain project schedule and goals.

Linde FUSRAP Project, Tonawanda, NY

Oversaw implementation of loading out 25,000 tons of radiologically impacted materials via gondola / rail.

Other FUSRAP / Radiological Projects

Montclair/US Radium FUSRAP Sites (CENWK), Montclair/Glen Ridge/West Orange, NJ – Technical Services Manager for the excavation, removal, transport and disposal of 194,000 cubic yards of low-level radiological waste materials from 500 residential and industrial properties under 19 contracts over 13+ years. Waste was initially managed via cubic yard bulk bags to a rail transloading facility for shipment in gondola cars. Later phases were managed via intermodal boxes or by direct loading into rail gondola cars. Waste was transported and disposed of at Energy Solutions (formerly Envirocare Services) in Clive, UT.

Austin Avenue Radiation Superfund Site (CENAB), Lansdowne, PA – Technical Services Manager for the radiological remediation of 21 properties contaminated with radium-226 and thorium-230 tailings. Sevenson selectively removed and segregated radiologically contaminated portions of the properties. These were then staged, packaged and transported for offsite disposal via truck and rail.

Middlesex Municipal Landfill FUSRAP Site (CENAN), Middlesex, NJ – Technical Services Manager for the removal, transport and disposal of 14,000 tons of LLRW radiological waste soils. Soils were transported via dump truck and transloaded to rail gondola cars. Waste was disposed of at US Ecology's Mountain Home, ID landfill.

Oak Ridge Reservation – Boneyard/Burnyard Area Closure (DOE/NRC), Oak Ridge, TN – Technical Services Manager for the excavation, segregation and characterization of 86,000 CY of uranium tailings, building demolition debris and other wastes from the Y-12 Plant area of the site. Excavated and characterized material was managed under Oak Ridge National Laboratory protocols and was placed onsite in the Environmental Waste Management Facility (EWMF) and capped.

Lake Ontario Ordinance Works(LOOW)/NFSS – TNT Lines/Building 403 Demolition (CELRB), Lewiston, NY – Technical Services Manager responsible for the preparation of a site Sampling and Analysis Plan to delineate the extent of contamination and characterize waste for offsite disposal. Waste included radiologically contaminated soils and building demolition debris. Characterization of wastes to determine the presence of TNT (and its decomposition products) and coordination with and Unexploded Ordnance (UXO) removal was also conducted. Radiological wastes were shipped offsite via truck to Waste Control Specialists in Andrews, TX.

Ohio / Select Private Sector Projects

Gould Electronics Site, Cleveland, OH – Technical Services Manager for the remediation of a former electronics manufacturing property. Sevenson removed, transported and disposed of LLRW/TSCA (PCB) contaminated waste for offsite via truck to Waste Control Specialists Andrews, TX landfill.

BP Mixed Waste Pond Closure, Lima, OH – Technical Services Manager providing company oversight for the excavation, treatment and placement of waste in onsite containments cells constructed at the site. Sludge wastes were generated from the manufacture of acrylonitrile and acetonitrile, as well as depleted uranium 238, which was used as a catalyst in the manufacturing process. Scope of work included the excavation and treatment of 30,000 CY pond sludge for onsite placement.

Steve Gillespie – Project Manager

Company: Sevenson Environmental Services, Inc.	Currently Employed By: ☒ Prime 17 Yrs Employed
Education and Training (include relevant specialized training): BS, Mechanical Engineering, Widener University, 1995 USACE Construction Quality Management for Contractors, March 2015	Professional Registration/Certification(s): • PMP Certification (Registration No. 1846904) • NJ N4-Licensed Wastewater Treatment Operator (0021211) • NJ C1-Licensed Collection Systems Operator (0019401)
	HTRW Years Exp.: 17 / USACE Years Exp.: 17

Relevant Qualifications and Experience Record

Project Name and Location: Vineland Chemical Company Superfund Site, Vineland, NJ
Owner Name, Organization/Company, Contact Information: USACE, Philadelphia District, Stephen Creighton (856) 696-1879

Start Date: 09/2003	Completion Date: ongoing	Project Cost: $102M	FFP ☐ CR ☒ Other ☐

Description And Specific Role: Project Manager. ***Under Sevenson's PRAC contracts at Vineland***, Mr. Gillespie serves as the primary point of contact and managed four (4) CPAF and CPFF Task Orders, which included the excavation and treatment of arsenic-contaminated OU-1 (onsite) and OU-3 (offsite) soils, start up and operation of an a soil washing treatment plant using innovative technologies, installation of a sheet wall, performing stream diversions around the affected areas, bypass pumping to remove contamination under bridges and restoration of onsite areas and adjacent wetlands and floodplains. Responsibilities included:

- Management of a staff of 35 which included; management and administrative staff; Union Laborers, Equipment Operators, and Teamsters; field sampling technicians; subcontract personnel
- Implemented the demolition plan and conducted lead and asbestos surveys, asbestos remediation prior to demolition work.
- Oversaw the safe demolition of four concrete structures/building and the salvage and demolition of the prior soil washing treatment plant. Salvaging key pieces of equipment saved the project and the Government approximately $200,000.
- Managed contaminated site soils and floodplain sediments excavation, staging, treatment, and backfill
- Conducted project planning by utilizing Sevenson's MIS and project/corporate accounting staff to prepare and update schedules and monitor cost and schedule performance on a continuous basis. Sevenson's MIS and management tools are used to manage and project costs, generate trends and manage and predict resource needs. This information is vital to proper management of a cost reimbursable project, like that is incrementally funded to ensure that costs are not obligated and incurred before funding is obtained.

Under Mr. Gillespie's leadership, the Vineland Team accomplished:

- Working in excess of 660,000 safe man-hours with zero lost work time incidents.
- Implementation of Sevenson's patented MAECTITE® chemical fixation for on-site treatment of process oversize debris that allowed Subtitle D landfill disposal, saving $1.5M vs more costly Subtitle C disposal.
- 411,779 of contaminated soils were successfully excavated and treated through the onsite, innovative SWTP.
- 318,491 tons of arsenic contaminated floodplain peat material was excavated and shipped offsite for disposal.
- 20,185 tons of arsenic contaminated filter press cake was shipped offsite for disposal.
- Installation and removal of 1,600 LF of steel sheeting in the Phase I floodplain.
- Construction and restoration of 8,410 LF of stream diversion channel; Construction and restoration of 8,964 LF of restored stream bed.
- Restoration of 14 acres of onsite areas; Restoration of 98 acres of wetlands and floodplain areas.
- Sevenson completed all work on the Vineland Task Orders $8,990,985 under the negotiated budgets.

Project Name and Location: Vineland Chemical Company Superfund Site, Vineland, NJ
Owner Name, Organization/Company, Contact Information: USACE, Philadelphia District, Stephen Creighton (856) 696-1879

Start Date: 11/1999	Completion Date: 02/2013	Project Cost: $38M	FFP ☐ CR ☒ Other ☐

Description And Specific Role: Project Manager Under Sevenson's LTRA contracts at the Vineland Site, Mr. Gillespie managed six (6) CPFF Task Orders, which included the operation and maintenance of the site's groundwater treatment plant and execution of various plant upgrades. Responsibilities included:

- O&M of the site's 2MGD groundwater treatment plant utilizing a chemical / physical process to remove arsenic from the water.
- Management of the site's extensive sampling program. In addition to the plant's process sampling, the site contains over 150 monitoring wells that are sampled on a rotating basis.
- Managed the design and construction of the various plant upgrades that have been performed at the site.
- Management of extensive extraction and force main system- 15 extraction wells; ~5,000 feet of dual contained, HDPE force main.

Other Relevant Information/Experience (Include description of years of experience listed above)

- Key team member performing the same role at Vineland, project submitted for Volume I, Factor 1, as well as at various USACE projects in New Jersey
- 17 years project management experience under Region II PRAC and LTRA Task Orders at HTRW sites
- 17 years cost-reimbursable project experience under Region II PRAC and LTRA

Eric DeLellis – On-site Contractor Quality Control (CQC) Supervisor

Company: Sevenson Environmental Services, Inc.	Currently Employed By: ☒ Prime 15 Yrs Employed
Education and Training: BS, Environmental Science, minor in Business Management, Lock Haven University, 1993; USACE CQCM —2013; Active US Government secret level clearance—2013; OSHA HAZWOPER 40 Hour and 8 Hour refresher training—1994/2013; DuPont project QC Implementation course and safety audit training/safety programs training—1995; Lieutenant Colonel/Logistics Officer, U.S. Army Reserve—1993 – Present	Professional Registration/Certification(s): None HTRW Years Exp.: 20 — USACE Years Exp.: 10

Relevant Qualifications and Experience Record

Project Name and Location: Removal and Disposal of Radiologically Contaminated Soil, Welsbach/General Gas Mantle Superfund Site, Gloucester City and Camden, NJ
Owner Name, Organization/Company, Contact Information: USACE, Philadelphia District; Brian Duffy (856) 842-5630

Start Date: 06/2011	Completion Date: ongoing	Project Cost: $72.3M	FFP ☐ CR ☒ Other ☐

Description And Specific Role: On-Site CQC Supervisor. Managed on-site quality control for this CENWK/EPA R2 project involving deep excavation of 108,000 tons of contaminated material, dewatering, water treatment, soil disposal, backfill, and restoration. Implemented the 3-phase inspection process, performing soil boring, sampling and geotechnical analyses throughout excavation activities ensuring proper depths were achieved. Oversaw the successful remediation of five industrial/commercial properties. Supervised the safe ACM removal and cleanup of biological hazards and decontamination of the Armstrong Building in the active Port. Oversaw work zone and perimeter air monitoring maintaining compliance with OSHA and EPA standards. Working with Sevenson's in-house chemist to maintain stringent chemical data quality control including data validation for RCRA, TSCA, and radiological factors. He coordinated data management and validation between the chemist and NJDEP-certified on-site laboratory and catalogs data analysis for chemical, geotechnical, and radiological factors into RMS daily for USACE review. Provided quality oversight for all radiological controls and oversaw follow-up inspections verifying containment/decontamination procedures are meeting goals by checking/recording air monitoring results and taking random samples of decontaminated equipment. Coordinated with transportation coordinator to confirm transport is performed in compliance with local, state, and federal regulations, i.e., supervises scanning of railcars, preparing shipping documentation, and confirming railcars are properly inspected, sealed and placarded.

Project Name and Location: Removal and Disposal of Radiologically Contaminated Soil, Welsbach/General Gas Mantle Superfund Site, Gloucester City and Camden, NJ
Owner Name, Organization/Company, Contact Information: USACE, Philadelphia District; Brian Duffy (856) 842-5630

Start Date: 10/2007	Completion Date: 03/2013	Project Cost: $66.2M	FFP ☐ CR ☒ Other ☐

Description And Specific Role: *On-Site CQC Supervisor.* Eric oversaw all aspects of quality control for this CENWK/EPA R2 large-scale LLRW remediation project at three anchor sites and 13 residences involving the excavation and disposal of radiological contaminated materials and site restoration. Implemented a 3-phase inspection process including conducting initial surveys, prior to excavation, to designate limits of primary and secondary excavation where the depth of excavation was 1' to 17' BGS, resulting in a defined construction grid, preventing over-excavation, and minimizing costs. Directed periodic soil sampling during excavation activities to screen for contamination in secondary excavations to ensure compliance. Held daily QC meetings with the project team to review planned activities and reviewed safety AHAs. Developed and implemented daily checklists to assist with follow-up inspections to ensure continuing compliance with contract requirements. Utilized RMS for daily quality reporting. Attended all progress meetings and provided updates on quality control aspects of the project and discussed scope variances with the Resident Engineer.

Project Name and Location: GWTP Design and Construction, Emmell's Septic Landfill Superfund Site, Galloway Township, NJ
Owner Name, Organization/Company, Contact Information: USACE, NY District, Thomas Roche, PE (856) 287-0494

Start Date: 06/2010	Completion Date: 06/2012	Project Cost: $18.6M	FFP ☐ CR ☒ Other ☐

Description And Specific Role: *On-Site CQC Supervisor.* He managed all aspects of quality control in accordance with project specifications and all applicable federal and state regulations on this $18M CENWK/EPA R2 project. Employed the 3-phase CQC process for construction and remediation on this project which included the design, construction, mobilization, and O&M of a permanent groundwater treatment plant as well as excavation, characterization, and T&D of PCB contaminated soil. Supervised the safe demolition of a structure prior to excavation, including the identification of asbestos and lead paint contamination and disposal at approved facilities. Oversaw a USACE-directed limited subsurface soil sampling program, early in the GWTP design process, in areas associated with GWTP construction (GWTP footprint, effluent piping trench layout, effluent basins, and access roads) where PCB soil contamination above the NJDEP residential cleanup standard was identified. Performed chemical quality data management on analytical results. Documented all QC activities in RMS and had direct interface with the on-site Resident Engineer. Supervised the excavation, stockpile, and transportation of contaminated soil off-site for disposal in accordance with USACE direction.

Other Relevant Information/Experience (Include description of years of experience listed above)

- Key team member performing the same role at Welsbach, project submitted for Volume I, Factor 1, as well as at various USACE projects in New Jersey
- Supervised and oversaw four projects that included significant demolition work over the last ten years all in NJ.
- 10 years of experience as a quality control manager working on USACE and Region 2 PRAC and LTRA contracts

William Zambrana, Environmental Sampler

Education and Training: A.S., Radiation Health Physics, Central Florida College, Ocala, FL
OSHA 40 Hour HAZWOPER Training
OSHA 8 Hour HAZWOPER Refresher
Hazardous Waste Manifest Certificate
Radiation Worker I & II Certificate
Construction Quality Management for Contractors Certificate
First Aid / CPR / AED

Awards:
US Radium Superfund Site - Commander Certificate of Appreciation – Feb. 14, 2005
Federal Creosote Superfund Site - Certificate of appreciation – 500,000 Safe Man Hours – Feb. 9, 2007
Cornell-Dubilier Superfund Site - Citation of Merit Award - May 3, 2012

Years Experience: 26
Years with Sevenson: 24 years
HTRW Years Exp.: 18 Years
Radiological Years Exp.: 18 Years
USACE Years Exp.: 24 Years
EPA Years Exp.: 24 Years

Role and Responsibility:

- Collect all onsite samples and perform all field screening tests.
- Support and review through recording, processing, and tracking status of contaminated Materials.
- Maintain communications with engineering oversight to ensure proper execution of procedures, specifications, and standards.
- Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.
- Review material quantities, procedural submittals, and documentation.
- Create, update, and maintain computer log of various sampling documents.
- Formulate status reports and agenda, supply necessary logs and documentation.

Project Experience

US Radium Superfund Site –Orange, NJ: OU-1 Property Remediation Project (*2015 - 2016*) Contract Number Contract No. W912DQ-10-D-3006 T.O-0003

QC Manager/Environmental Sampler for the excavation, sampling, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Addresses the remedial action of residential property with contaminated basement, chimney, front yard, deck and backyard. The scope of work requires the excavation of over 859 cubic yards of radium

contaminated soil at concentrations greater than 5 pCi/g. Manifested soil that was transported to designated landfill facility, followed by backfilling of excavated areas with approved material. Support and review through recording, processing, and tracking status of submittals. Maintain communications with superintendent to ensure proper execution of procedures, specifications, and standards. Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.

Review material quantities, procedural submittals, and documentation. Create, update, and maintain computer log of various construction management documents. Prepare construction progress meetings. Formulate status reports and agenda, supply necessary logs and documentation, record and prepare minutes for distribution. Support project management through preparation of maintaining construction schedules. Procurement of equipment and materials. Coordination of subcontractors. Daily Safety Logs and QA/QC reports.

Cornell Dubilier Superfund Site –South Plainfield, NJ: **OU-1 Property Remediation Project** (***2012 - 2014***) **Contract Contract Number W912DQ-10-D-3006 Task Order: 0002**

Operable Unit 1 addresses the remedial action of 15 residential property contaminated Yards and Streets. The scope of work requires the excavation of over 6,000 cubic yards of PCB contaminated soil at concentrations greater than 500 ppm and additional contaminated soils that exceed New Jersey's IGWSC criteria for contaminants other than PCBs. Excavated soil will be transported to designated landfill facility, followed by backfilling of excavated areas with approved material. Property restoration.

QA/QC Manager/*CQC Systems Manager/Engineer/ Environmental Sampler.*

- Support and review through recording, processing, and tracking status of submittals. Maintain communications with engineering oversight to ensure proper execution of procedures, specifications, and standards. Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.

Review material quantities, procedural submittals, and documentation. Create, update, and maintain computer log of various construction management documents. Attend construction progress meetings. Formulate status reports and agenda, supply necessary logs and documentation, record and prepare minutes for distribution. Sampled contaminated material for site characterization. Support project management through preparation of maintaining construction schedules.. Procurement of equipment and materials. Coordination of subcontractors. Daily Safety Logs and QA/QC reports.

Cornell Dubilier Superfund Site – OU-2, Phase 1 and II South Plainfield, NJ: **, Soil Remedial (LTTD) Project** (***2008 - 2012***)
Contract Number W912DQ-04-D-00023 Task Order: 0011

Operable Unit 2 addresses the remedial action of contaminated facility site soils and buildings. The scope of work requires the excavation of over 100,000 cubic yards of PCB contaminated soil at concentrations greater than 500 ppm and additional contaminated soils that exceed New Jersey's IGWSC criteria for contaminants other than PCBs. Excavated soil will be treated by low temperature

thermal desorption (LTTD), followed by backfilling of excavated areas with treated soils. Contaminated soil and debris, including capacitors, will be transported offsite for disposal. Installation of a multi-layer cap and engineering controls. Property restoration.

QA/QC Manager/CQC Systems Manager/Engineer /Environmental Sampler.

- Support and review through recording, processing, and tracking status of submittals. Maintain communications with engineering oversight to ensure proper execution of procedures, specifications, and standards. Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.

Review material quantities, procedural submittals, and documentation. Create, update, and maintain computer log of various construction management documents. Attend construction progress meetings. Formulate status reports and agenda, supply necessary logs and documentation, record and prepare minutes for distribution. Sampled contaminated material for site characterization. Support project management through preparation of maintaining construction schedules. Procurement of equipment and materials. Coordination of subcontractors. Daily Safety Logs and QA/QC reports.

Cornel Dubilier superfund Site, South Plainfield, NJ: **OU-2 Remedial Action** (2006 - 2008) **Contract Number W912DQ-04-D-00023Task Order: 0005** Demolition, excavation, transportation, restoration and disposal of Lead, PCB's contaminated soil and debris from an Industrial site.

CQC Systems Manager/Engineer/Environmental Sampler

Responsibilities include: Managed fixed-price contract for the demolition of the industrial park. Work tasks include the demolition and environmental decommissioning of 18 industrial buildings, excavation, characterization, Sampling, transportation, and off-site disposal of both PCB contaminated soils and all debris generated from demolition operations; and rough grading the site upon completion of schedule work. Acquiring all permits form state and local levels. Extensive safety procedures are in place to protect the health of residents in and near the site.

Federal Creosote Superfund Site, Lagoon A, Phase II, Manville, NJ: (2004 - 2006) Excavation, transportation, restoration and disposal contaminated soil and debris from residential housing.

Quality Control Manager/ Project Engineer: Responsibilities include: Managed for the excavation, characterization, transportation and disposal of 69,000 cy of creosote contaminated soils. 770 linear feet of soldier pile and lagging, and 590 lf of sheet pile installed as protective shoring for deep excavation (35' depths). Extraction well system installed to aid site dewatering and installation of O+M of portable WWTP. Odor control measures implemented with extensive site restoration.

US Radium Superfund Site Phase IV, V, VI and VII Orange NJ: (1998 - 2006) Excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Quality Control Manager/ Assistant Project Manager/ Project Manager: Responsibilities include: Job administration, coordinating site work with USACOE, monthly payment submittal, payroll, and project documentation, contract modification, scheduling, public relations. Also responsible for assuming Project Manager responsibilities when regular Project Manager is off-site.

Glen Ridge, Bloomfield Superfund Site Phase VII, VIII and IX Bloomfield NJ*:* (1998 - 2005) Excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Quality Control Manager/ Assistant Superintendent: Responsibilities include: Job administration, Coordinating with Superintendent on the different tasks on site, coordinating site work with USACOE, monthly payment submittal, payroll, and project documentation, contract modification, scheduling, public relations.

US Radium Superfund Site Phase III, Orange NJ: (1997 - 1999) Quality Control Manager/Project Manager for the excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Quality Control Manager: Responsibilities include: Daily reports, progress payment, payroll, submittal, project documentation, and general job administration.

Whitmoyer, PA: (1997) Hazardous material excavation and transportation of Arsenic and Aniline.

Quality Control Manager: Responsibilities include: Daily logging and placard control of the transportation of hazardous material. Level B protection.

Montclair Radium Superfund Site Phase IV/V and VI, Montclair NJ*:(*1994 - 1998) Excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Health and Safety Officer, Radiological Safety Officer and Assistant Superintendent: Responsibilities include: Conduct initial site specific training, Develop, implement and enforce the site specific Safety and Health plan. Conduct air monitoring, radiological monitoring, Prepared, Wrote, designed and produced SSHP, CCRQC, QAPP, SAP, FSP. Site safety inspections and accident investigations, work operations, Daily reports.

Clevite, Cleveland, OH: (1995) Building decontamination and rehabilitation.

Years of Experience:
25

Certifications:

- CHST – Construction Health and Safety Technician Certificate Number C9243
- OSHA 30 Hour Construction Training
- OSHA 40 Hour Training/OSHA 8 Hour Refresher
- First Aid/CPR

Role and Responsibility:

- Responsible for implementation of the project-specific worker health and safety plans.
- Responsible for overseeing the medical monitoring of project-specific field employees.
- Performs audits and safety inspections at the sites.
- Conducts informational meetings.
- Repairs and maintains field instruments.
- Manages air monitoring and sampling programs.
- Evaluates analytical data.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving:
- Excavation and earthwork;
- Innovative and traditional steel sheeting systems;
- Sediment remediation;
- Temporary and mobile water treatment systems;
- Sludge solidification and soils stabilization;
- Chemical treatment/heavy metals fixation;
- Slurry wall and trench construction;
- Collection, recovery and treatment systems construction;
- Dredging and dewater technologies
- Facilities decontamination and demolition; and
- Low level radiation, metals,

Davis Raver, CHST

Onsite Health and Safety Officer

Past Project Experience

Beech Creek Superfund Site, Waynesboro County, TN: Project Manager. Project requires the excavation, characterization, T+D of PCB contaminated materials. Existing roads will be improved to enable site access. Runoff water from the landfill will be rerouted. Excavated materials transferred to a storage pad for dewatering. Water will be collected and processed onsite at a temporary WWTP sized at 200 GPM. All disturbed areas restored to existing conditions.

New Bedford Harbor Superfund Site, New Bedford, MA: Health and Safety Officer for the hydraulic dredging and mechanical dewatering of PCB contaminated harbor sediment. Design, install, operate and maintain a liquids/solids separation and water treatment system sized at 2,000 gpm. The WWT includes clarifiers, secondary settling, pH neutralization, and sand and carbon filtration. Desanding operation incorporated to minimize waste treatment and disposal. 1,300 cf of filter presses will be used.

Onondaga Lake Dredging, Sediment Transportation and Capping Project, Syracuse, NY: Health and Safety Officer. Project requires Sevenson to provide design support of a dredging, sediment, capping, and transport system. Dredge volume estimated at 2.4 million CY of sediments. Capping will extend over approximately 600 acres. Approximately 2,100,000 CY of material will be removed using a hydraulic dredge and a mechanical excavator with a hydraulic clam bucket. Upon completion of dredging operations, Sevenson will perform backfilling and capping operations. Material barges will transport material to the backfilling and capping areas and an excavator with a clamshell bucket will be used to place the materials into a slurry system used to install the cap.

Welsbach/GGM Superfund Site, Multiple Contracts, Camden, NJ: Health and Safety Officer/Health Physics Support Staff. This project requires Sevenson to excavate, characterize, transport and dispose, off-site, soils contaminated with thorium and radium. Site is a former manufacturing facility decommissioned and demolished under a previous contract. Existing utilities (gas, electric and sewer) will be capped, removed and relocated. Waste water treatment from excavation operations is required. In addition numerous residences will require remediation and restoration.

Beazer Site, Kearny, NJ: Site Safety and Health Officer. Excavation and stabilization of soils, sediments, and silts from wetland areas and riverbank contaminated with creosote and hexavalent chromium as well the relocation of previous treated river sediments. Air monitoring for this project included real time dust and VOCs as well as occupational sampling for total dust and hexavalent chromium.

Wyeth Pharmaceuticals, Bound Brook, NJ: Site Safety and Health Officer. Excavate and mechanical stabilization of hazardous material from settling ponds for the manufacturing of organic tars, dyes, and pigments that are contaminated with benzene, chlorobenzene, ethylbenzene, toluene, xylenes, naphthalene, and nitrobenzene. The occupational monitoring performed for this project was real time dust and VOC monitoring. The majority of this work was performed in Level B PPE.

Cornell Dubilier Electronics Superfund Site, South Plainfield, NJ: Site Safety and Health Officer. Demolition of existing site structures with asbestos and lead contamination and excavation of soils contaminated with PCB, pesticides, polyaromatic hydrocarbons, and metals. The occupational and community air monitoring performed for this project was; real time dust and VOC monitoring, TO-4a (PAH) sampling, NIOSH 7300 (Lead), 7400 (Asbestos) and 5503 (PCB), and OSHA 65 (Benzidine) sampling.

FEMA Emergency Repairs, Scranton, PA: Health and Safety Officer Emergency repairs to a collapsed culvert and roadway due to a wash out from storm water damage associated with heavy rains following hurricane Ivan.

Federal Creosote Superfund Site, Manville, NJ: Site Safety and Health Officer. Creosote contaminated soil excavation, disposal, and restoration in a residential and light industrial setting. The occupational and community air monitoring performed for this project was; real time dust and VOC monitoring, EPA PM-10 sampling, TO-13 (VOC) and TO-14 (SVOC) sampling, NIOSH 1501 (PAH) and 5506 (BTEX) sampling.

WR Grace, Chattanooga, TN: Health Physics Technician/Safety and Health Technician. High activity thorium remediation project that involved mechanical excavation and dredging of sediments settling ponds at a chemical plant.

Montclair Superfund Site, Montclair, NJ: Health Physics Technician. Radioactive soil excavation and building decontamination and rehabilitation in a residential neighborhood setting.

1991-1999 Outage support for various nuclear power plants throughout the United States as well as nuclear support centers for equipment and materials decontamination and waste minimization. Mr. Raver was a health physics technician as well as a health and safety technician while working at the facilities.

Perry Novak – Site Superintendent			
Company: Sevenson Environmental Services, Inc.	Currently Employed By: ☒ Prime 17 Yrs Employed		
Education and Training (include relevant specialized training): Niagara County Community College—1976; Excavation Competent Person—2015; OSHA 30-Hour Outreach Training Program/Construction Bill Judge 60/60 DOT Supervisor Training	Professional Registration/Certification(s): None		
	HTRW Years Exp.: 17	**USACE Years Exp.: 17**	

Relevant Qualifications and Experience Record

Project Name and Location: *Cornell-Dubilier Electronics Superfund Site, South Plainfield, NJ*
Owner Name, Organization/Company, Contact Information: *USACE, Kansas City District, Patrick Nejand, (732) 846-5830*

Start Date: 2008	*Completion Date: 2014*	*Project Cost: $66.3M*	*FFP* ☐ *CR* ☒ *Other* ☐

Description And Specific Role: Site Superintendent. On the first TO, he managed a staff of 19 field personnel and several subcontractors for the demolition of an 18 building industrial park. Oversaw sampling and characterization of soils, foundations, and demolition debris for waste disposal classification; excavation of PCB-contaminated soils for truck transportation and disposal to a TSCA-regulated landfill; and backfilling, grading, and paving all affected areas to promote proper drainage. Directed site operations and provided progress reports to PM.

Under the subsequent CR TO, managed 60 field personnel and 34 subcontractors excavating PCB-contaminated soil, installing and operating an on-site low temperature thermal desorption treatment system to treat impacted site soils. Managed the excavation, characterization, transportation, and off-site disposal of both PCB contaminated soils and soils that could not be treated due to high coal content. Directly supervised deep excavation with depths up to 15' bgs and used shoring in the deep excavations to ensure safe and effective excavation. Oversaw the operation and management of on-site WWTP, treating over 3.1 M gallons of LTTD contact and equipment decontamination water and meeting all State and MCUA criteria for discharge to the local POTW. Operated LTTD treatment facility for 16 months and worked 248,000 hours with zero safety incidents Coordinated with QC Manager to oversee subcontractors, ensuring work was performed in accordance with work plan to ensure proper screening, sampling, and field blending of soils to optimize LTTD throughput, minimize downtime, and mitigate re-treatment of soils. Used solar power air monitoring stations as part of our "Clean and Green" remediation efforts. Ensured daily productivity goals were met. Provided updates to the project manager and met with the project manager when problems arose to discuss corrective action. Reported daily labor and productivity through RMS.

Project Name and Location: *Federal Creosote Superfund Site, Manville, NJ*
Owner Name, Organization/Company, Contact Information: *USACE, Kansas City District, Tom Roche, (609) 562-1719*

Start Date: 2001	*Completion Date: 2008*	*Project Cost: $106.9M*	*FFP* ☐ *CR* ☒ *Other* ☐

Description And Specific Role: Site Superintendent. On two cost-reimbursable TOs under the KC PRAC oversaw the excavation, characterization, transportation and disposal of 450,000 cy of contaminated material from 2 lagoons and 100 residential and commercial properties for offsite thermal treatment or landfill disposal and all field operations at this highly visible and complex remediation site to clean up creosote contamination. Worked in excess of 560,000 man-hours on this site with ZERO lost-time injuries. Led community relations efforts with Manville Town officials, business leaders, and residents to communicate and coordinate work activities to minimize disruption of activities during daily work activities. Met with affected homeowners on a daily basis to ensure access and egress was maintained during remediation, and to allay concerns about the cleanup process. EPA received positive comments and praise from residents within the affected community. Scheduled work to minimize road closure durations; posted detour and alternate route signage; and met periodically with local fire, police, and EMS department to review current and upcoming street closing schedules.

Other Relevant Information/Experience (Include description of years of experience listed above)

- Over the last two years, Perry has been Site Superintendent on two CR projects for USACE in NJ
- Key team member performing the same role at Cornell-Dubilier, project submitted for Volume I, Factor 1, as well as at various USACE projects in New Jersey
- 3 Demolition projects in the last 10 years; 3 projects involving asbestos abatement
- 30 years of construction supervision experience, including 16 CR projects
- Supervised work on HTRW task orders consisting of multiple remedial technologies including deep excavation dewatering and water treatment, sediment contamination remediation, excavation for on- and offsite treatment

Cost Accountant			
Name: Raymond Gabriel		**Employed By:** ☒ **Prime** ☐ **Team Member:**	
Education and Training (include specialized training) BS Accounting, 2002 OSHA 40 and 8 hour HAZWOPER, 2013		**Professional Registration/Certification(s):** USACE CQM for Contractors certification, 2014	
Total Relevant Years Exp.: 34	**USACE Years Exp.:** 14		**EPA Fund Lead Years Exp.:** 14
Relevant Qualifications and Experience Record from Last Five Years			
Project Name and Location: Roebling Steel Back Channel and Crafts Creek Superfund Site; Roebling, NJ			**Client:** USACE
Start Date: 10/2009 & 10/2014	**Completion Date:** 12/2009 & 5/2016	**Cost:** $82.3M	**FFP or CR:** CR
Description And Specific Role: Cost Accountant. Set up the entire project, trained new hired onsite accountant during project startup. Took over responsibilities three months prior to field work being completed. Responsibilities in this role include cash flow management, cost tracking, change management (scope, cost) and forecasts, equipment costs, etc. Evaluated project budget performance and provided reports to senior management. Coordinated and managed TO cost lifecycle. Managed and reported baseline budgets and variance financial data. Prepared cost forecasting and variance analysis data to track the performance status of the project and key subcontracts. Prepared cost performance reports and led cost and schedule meetings with USACE. Developed and generated reports using the MIS accounting software to track and reconcile actual costs and support EV reporting. Set up initial cost reporting protocol, established original budget/funding, completed daily cost reports, project cost summary reports, progress payments, and cost tracking for weekly progress meetings. Provided accounting over-site until the new accountant was ready to fully take over the project. Later was re-assigned to Roebling to provide strict funding monitoring and to supervise project closeout including reconciling of purchase orders, managing and providing all files for final DCAA audit, preparing the final invoice package and Certificate of Release.			
Project Name and Location: Cornell-Dubilier Superfund Site, South Plainfield, NJ			**Client:** : USACE
Start Date: 10/2008	**Completion Date:** 10/2014	**Cost:** $70.4M	**FFP or CR:** CR
Description And Specific Role: Cost Accountant. Responsible for project controls and other responsibilities as outlined above. The TOs for this project were incrementally funded and spending trends needed to be reported to USACE/SES management to ensure completion of critical path work in a timely manner and avoid funding issues. To accomplish this, Ray developed current burn rates, projected future spending trends, and monitored percent expended and obligated costs. His abilities in this role were critical to the successful completion of this project. Examples of his contributions included the issuances of numerous on-time 75% expenditure notices giving ample notice to USACE and SES project management to allow fiscally prudent project decisions to be made considering both funding and critical path work to be completed. His timely information and utilization of our MIS led to work sequencing being altered including property excavations where lower cost excavations were accomplished first with the remaining funds until additional funds were made available. Another example was a decision to eliminate some T&D tasks. Ray identified that the T&D could not be completed with the available funding and the funding was made available for other more critical tasks. These are a few examples of many where Ray's contributions not only kept the project within budget but also maximized the outcomes with the budget that was available.			
Other Relevant Information			
Ray has worked as the Lead Cost Accountant on numerous other projects for SES (and USACE NWK and USEPA Region 2) between 2001 and 2008 including: Emmell's Septic Landfill Superfund Site, Metaltec/Aerosystems Superfund Site,Federal Creosote Superfund Site,Vineland Chemical Superfund site, and Welsbach Superfund Site			

David Goeckler **609-847-1963**

31 Downing Road, Ewing, NJ 08628 dvpg64@gmail.com

Professional Profile

Site & Safety Health Officer

- OSHA 40-Hour Hazardous Waste Operations and Emergency Response
- OSHA 10-Hour Construction Safety Program (1910.146 & 1926)
- OSHA 30-Hour Construction Outreach Training
- First Aid & CPR
- Confined Space Entry
- Confined Space Rescue Training
- Blood-Borne Pathogens Certificate
- General Lab Safety, "Right to Know"
- Respiratory Protection Certificate
- Respiration & Fit Test Training
- RCRA Refresher
- NJ Hazard Waste Transportation 49 CFR 172.704
- DOE Radiological Worker II
- Fall Protection Certification

Professional Accomplishments

- Well versed in OSHA construction safety standards.
- Broad understanding of OSHA, EPA, USACE regulations.
- SSHO on a variety of environmental remediation, demolition, construction, and dredging projects.
- Expertise in setup, calibration, and monitoring of sampling equipment including air monitors, soil monitors, noise monitors, and personnel monitoring.
- Completed reports including; site safety audits, technical safety recommendations, health and safety plans, activity and hazard analysis, and personnel/safety evaluations.
- Completed personnel health/safety education, training, and medical surveillance.
- Proficient in Word, Excel, and various SSHO programs.

Work History

Site & Safety Health Officer	Sevenson Environmental, Niagara Fall, NY	April 2010 to Present
Site & Safety Health Officer	Aerotek, South Plainfield, NJ	June 2008 to September 2009
Site & Safety Health Officer	Haztek Inc., Medford, NJ	October 2005 to June 2008
Hazard Waste Technician	DCS, Hillsboro, NJ	March 2001 to October 2004

Education

Associates Degree Culinary Arts	Restaurant School of Philadelphia, Philadelphia, PA	March, 1999

References

References are available upon request.

Years of Experience:
10

Certifications:

- OSHA 30 Hour Construction Training
- OSHA 40 Hour Training/OSHA 8 Hour Refresher

Role and Responsibility:

- Responsible for implementation of the project-specific worker health and safety plans.
- Responsible for overseeing the medical monitoring of project-specific field employees.
- Performs audits and safety inspections at the sites.
- Conducts informational meetings.
- Repairs and maintains field instruments.
- Manages air monitoring and sampling programs.
- Evaluates analytical data.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving:
- Excavation and earthwork;
- Innovative and traditional steel sheeting systems;
- Sediment remediation;
- Temporary and mobile water treatment systems;
- Sludge solidification and soils stabilization;
- Chemical treatment/heavy metals fixation;
- Slurry wall and trench construction;
- Collection, recovery and treatment systems construction;
- Facilities decontamination and demolition; and
- Low level radiation remediation.

Wyatt Beougher

Onsite Health and Safety Officer

Past Project Experience

Bayou D'Inde (Area B) / Lower Canal Sediment Remediation, Lake Charles, LA: Health and Safety Officer for the hydraulic dredging of approximately 95,000 CY of sediment from Area B of Bayou D'Inde. Place an insitu cap with a minimum of 12 inches of clean material over the dredged area in the Lower Canal. Place an insitu cover with a minimum of 6 inches over the dredged areas in three marshes. Construct temporary berms, levees, and containment structures to facilitate the placement and settlement of dredged sediment. Install temporary weir structures and culverts to control water levels in sediment placement areas and the flow of return water. Install permanent sheet pile walls in identified locations.

Menekaunee Harbor Improvements, Marinette, WI: Health and Safety Officer. Project requires a combination of hydraulic and mechanical dredging of approximately 72,500 CY of material within the Menekaunee Harbor to improve navigation as well as remove contaminants. Mechanically dredged sediments are loaded into scows and transferred to a processing area where they are dewatered, offloaded and staged for characterization. Sediments will either be shipped offsite to an approved disposal facility or stockpiled for beneficial reuse. An existing timber pile wall along the shoreline will also be removed and replaced with a combination of riprap, ledge stone, and sheet pile wall.

Menominee River Sediment Removal Project, Marinette, WI: Health and Safety Officer. Mechanical environmental dredging of approximately 235,000 CY of river sediment. Dredged sediments loaded onto hopper barges. Barges transport sediments to an offloading and storage area. Stabilization of sediments using a pugmill. Processed sediment for offsite transportation and disposal. Dredge water treated in WWTP prior to discharge.

New Bedford Harbor, New Bedford, MA: Health and Safety Officer for the hydraulic dredging and mechanical dewatering of PCB contaminated sediments with highest concentrations of 7,650 ppm in a phased multi-year approach. Eight (8) areas of the harbor have been successfully dredged thus far. A total of 300,000 CY have been removed and processed. Design, installation, operation and maintenance of a liquids/solids separation system and wastewater treatment system to handle a 2,000 GPM flow rate. Dredge spoils conveyance system required 20,000 lf of dual containment piping. 250 million gallons of filtrate successfully treated to meet criteria limits establish for metals and PCB's (parts per trillion). Erection of 15,000 sf desanding building in 40 days. Operated under Level B.

Berrys Creek Remedial Action, Bergen County, NJ: Health and Safety Officer for this sediment removal and restoration project. Project scope of work included installation and removal of an upstream diversion sheet pile dam and wet well to control stormwater flow; installation and removal of a downstream sheet pile dam to control tidal flow incorporating flood gates; installation and operation of a 68,000 gpm variable flow bypass pumping system; maintaining a dry excavation area with an extensive dewatering system; excavation of mercury contaminated sediment; stabilization of all excavated material to meet disposal requirements; monitoring and controlling mercury vapors during all material-handling activities; and restoration of excavation areas and banks with approved material, seeding and plantings.

Former GM Facility Sediment Remediation, Sleepy Hollow, NY: Health and Safety Officer for a project requiring the water based mechanical dredging, processing and on site disposal of metals-contaminated sediment from an area along the eastern shoreline of the Hudson River. Work was performed from October 15, 2012 – February 1, 2013 and required the construction of interim material handling and staging pads; the installation and removal of approximately 250 ft x 35 ft steel sheeting; the installation and removal of approximately (20) – 55 ft round piles and 650 ft of turbidity curtain and oil boom around the work area; the setup of a water treatment system to manage decant water from dredging operations, dredging of sediment using a water based tub crane with a 9 cubic yard GPS equipped environmental clamshell bucket; the off-loading of sediment with a 200 ton land based crawler crane; the transport of excavated materials between the pads; the blending of Portland cement into the sediment to enable it to pass paint filter test prior to final placement and disposal on site; and the placement of backfill to establish cover over the dredge foot print. 10,000 LF of storm cleaning and video inspection of sewers was also required.

Non-Public Properties Newhall Neighborhood, Hamden, CT: Health and Safety Officer. Newhall Street neighborhood is an 18 block residential area which requires remediation. Pre-construction surveys were conducted for each property. The top 4 feet of soils which required removal were excavated, consolidated onsite, characterized and shipped offsite for disposal. Disturbed areas were backfilled with clean imported common fill, and restoration to pre-existing features includes landscape, patios, fencing and driveways.

Melton Valley Soils and Sediments Project, DOE Oak Ridge, TN: Onsite Health and Safety Officer. Turnkey project to remediate multiple sites in the Melton Valley area of the Oak Ridge National Laboratory. Sites included four impoundment areas; one isolated cryogenic area; flood plain areas; and six unnamed problem areas. Sevenson excavated, characterized and disposed of material either at ORNL's onsite landfill or used material as fill. Impoundment material was stabilized with cement. Project completed in compliance with strict adherence to DOE protocol.

Dave Larson

Onsite Health and Safety Officer

Years of Experience:
19

Education:

- AAS Ocala Community College Radiation Protection, Ocala, FL

Certifications:

- OSHA 30 Hour Construction Training
- OSHA 40 Hour Training/OSHA 8 Hour Refresher
- First Aid/CPR

Role and Responsibility:

- Responsible for implementation of the project-specific worker health and safety plans.
- Responsible for overseeing the medical monitoring of project-specific field employees.
- Performs audits and safety inspections at the sites.
- Conducts informational meetings.
- Repairs and maintains field instruments.
- Manages air monitoring and sampling programs.
- Evaluates analytical data.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving:
- Excavation and earthwork;
- Innovative and traditional steel sheeting systems;
- Sediment remediation;
- Temporary and mobile water treatment systems;
- Sludge solidification and soils stabilization;
- Chemical treatment/heavy metals fixation;
- Slurry wall and trench construction;
- Collection, recovery and treatment systems construction;
- Facilities decontamination and demolition; and
- Low level radiation remediation.

Past Project Experience

Onondaga Lake Dredging, Sediment Transportation and Capping Project, Syracuse, NY: Health and Safety Officer. Project requires Sevenson to provide design support of a dredging, sediment, capping, and transport system. Dredge volume estimated at 2.4 million CY of sediments. Capping will extend over approximately 600 acres. Approximately 2,100,000 CY of material will be removed using a hydraulic dredge and a mechanical excavator with a hydraulic clam bucket. Upon completion of dredging operations, Sevenson will perform backfilling and capping operations. Material barges will transport material to the backfilling and capping areas and an excavator with a clamshell bucket will be used to place the materials into a slurry system used to install the cap.

Roebling Steel Superfund Site, Roebling, NJ: Health and Safety Officer for a combination of mechanical dredging and traditional excavation of an estimated 250,000 CY of contaminated sediment from two areas. Sediment loaded onto material barges and pushed by tug to dock for unloading; transfer and placement into an onsite storage area. A cover system will be installed over dredged sediments. Restoration includes backfill of excavation areas; wetlands restoration; and shoreline stabilization with geo-fabric and revetment stone.

New Bedford Harbor Superfund Site, New Bedford, MA: Health and Safety Officer for the hydraulic dredging and mechanical dewatering of PCB contaminated harbor sediment. Design, install, operate and maintain a liquids/solids separation and water treatment system sized at 2,000 gpm. The WWT includes clarifiers, secondary settling, pH neutralization, and sand and carbon filtration. Desanding operation incorporated to minimize waste treatment and disposal. 1,300 cf of filter presses will be used.

Sub-Aqueous Cap, Lake Charles, LA: Health and Safety Officer for a pilot project which required Sevenson to place, test, and monitor a sub-aqueous cap in a refinery lagoon as well as evaluate capping methodologies at a second location. The lagoon cap was constructed in multiple lifts by placing granular material over the existing sediment surface via a custom built pneumatic unit. The initial lifts provided site-specific design information on the application of sub-aqueous capping containment technologies and enabled final development of a cap design.

Former Manufactured Gas Plant Remediation, Savannah, GA: Health and Safety Officer. Oversaw all aspects of Health and Safety Plan implementation during remediation of this former MGP site. The site was comprised of two Areas: Area 1 required the excavation, characterization, and disposal of PAH contaminated soils; Area 2 entailed the remediation of an active city roadway. Roadwork included relocation of utilities; stormwater sewer improvements; excavation,

U.S. ARMY CORPS OF ENGINEERS

USACE LEARNING CENTER
HUNTSVILLE, ALABAMA

NAVFAC

CERTIFICATE

Steven Gillespie

NAB-02-15-19017

has completed the Corps of Engineers and Naval Facility Engineering Command Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS - #784

Towson, MD	April 23, 2015	NAB /WA 1CEU:0.8 LU:8POH:8	Randy W. Sitton
Location	Training Date(s)	Instructional District/ NAVFAC	CQM-C Manager

Richard Burcham/Joe Zurzolo	Salvatore.Vitale@us.army.mil	410-962-3032	Randy W. Sitton
Facilitator/Instructor	Email	Telephone	Facilitator/Instructor Signature

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

Jeffrey D. Dziedzic
Chief, USACE Learning Center

USACE LEARNING CENTER
HUNTSVILLE, ALABAMA

NAVFAC

CERTIFICATE

Perry Novak

NAB-02-15-23025

has completed the Corps of Engineers and Naval Facility Engineering Command Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS - #784

Towson, MD	June 11, 2015	NAB /WA 1CEU:0.8 LU:8POH:8	Randy W. Sitton
Location	Training Date(s)	Instructional District/ NAVFAC	CQM-C Manager

Richard Burcham/Tom Trulli	Salvatore.Vitale@us.army.mil	410-962-3032
Facilitator/Instructor	Email	Telephone

Facilitator/Instructor Signature

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

Chief, USACE Learning Center

USACE LEARNING CENTER
HUNTSVILLE, ALABAMA

Eric Delellis

NAB011214023

has completed the Corps of Engineers and Naval Facility Engineering Command Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS - #784

Timonium, Maryland	March 22, 2012	NAB/WA9 CEU:0.8 LU:8 PDH:8	Randy W. Sitton
Location	Training Date(s)	Instructional District/ NAVFAC	CQM-C Manager

Randy Sitton/ Tom Trulli	theodore.j.schorr@usace.army.mi	410-962-3032	Randy W. Sitton
Facilitator/Instructor	Email	Telephone	Facilitator/Instructor Signature

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE
CQM-C Recertification online course: https://www.myuln.net

Director, USACE Learning Center

U.S. ARMY CORPS OF ENGINEERS

PROFESSIONAL DEVELOPMENT SUPPORT CENTER
HUNTSVILLE, ALABAMA

CERTIFICATE

This is to certify that

William Zambrana

has completed the Corps of Engineers Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

Given at NEW YORK CITY (Location) By NEW YORK (Instructional District) 21-22 May 2013 (Date)

Peter De Stefano (212) 264-0123
Facilitator

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

Chief, USACE Professional Development Support Center

U.S. ARMY CORPS OF ENGINEERS

PROFESSIONAL DEVELOPMENT SUPPORT CENTER
HUNTSVILLE, ALABAMA

CERTIFICATE

This is to certify that

RAYMOND GABRIEL

has completed the Corps of Engineers Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

Given at 26 FEDERAL PLAZA , NY (Location) By NEW YORK (Instructional District) 11-12 MARCH, 2014 (Date)

JULIO SANTOS
Facilitator

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

Chief, USACE Professional Development Support Center

NYD011400001

APPENDIX B
Letters of Designation

Sevenson
Environmental
Services, Inc.

August 16, 2016

Mr. Matt Creamer
U.S. Army Corps of Engineers
214 State Route 18
East Brunswick, NJ 08816

RE: Syncon Resins Superfund Site OU2
Contract No. W912DQ-15-D-3002 TO # 0002
Steve Gillespie Project Manager

Mr. Creamer:

I am designating Mr. Steve Gillespie as the Project Manager for all phases of the Syncon Resins Superfund Site Project. Mr. Gillespie will have the authority to act on the behalf of Sevenson Environmental Services, Inc. (Sevenson). He will have the authority to sign progress payments and WVN's for Sevenson.

I will be available at Sevenson's corporate headquarters in the event additional support is required for the project.

We trust this assignment of Mr. Gillespie as Project Manager meets with your approval.

Sincerely,

SEVENSON ENVIRONMENTAL SERVICES, INC.

Richard A. Elia
Executive Vice President

cc: John Bartholomeo
Alfred R. LaGreca

(716) 284-0431
2749 Lockport Road, Niagara Falls, New York 14305
An Equal Opportunity Employer

Sevenson Environmental Services, Inc.

August 16, 2016

Mr. Eric DeLellis
Sevenson Environmental Services, Inc.
2749 Lockport Rd.
Niagara Falls, NY. 14305

Re: Designation as CQC Systems Manager
Syncon Resins Superfund Site
Contract - W912DQ-15-D-3002 (0002)

Dear Mr. DeLellis,

This letter is your designation to function as CQC Systems Manager (CQCSM) at the Syncon Resins Superfund Site, South Kearny, NJ. You will have the responsibility to stop whatever work/operation that appears to be out of compliance with the contract documents. The CQCSM is responsible for field chemistry and environmental sampling staff, and responsibility for all records related to personnel, supplies, equipment use, equipment calibration, and waste transportation and disposal. Your functions will be as defined within the contract specifications and as referenced in the Quality Control Documents. CQCSM responsibilities include, performing and documenting field inspections, preparing Daily Quality Control Reports, scheduling, reviewing, certifying, and managing project submittals, maintaining the submittals register in RMS, providing coordination of required QC testing, reviewing results, and submitting results to USACE, coordinating, documenting, and tracking preparatory, initial, and final follow-up inspections, tracking construction deficiencies and ensuring timely corrective action, coordinating field sampling activities, preparing addenda to the QC Plan as necessary when additional phases of work are awarded and maintenance of as-built drawings. You have stop work authority for all work not conforming to quality, as specified in the contract specifications for the job site.

If you have any questions regarding this matter, please contact me at my office at 716-284-0431.

Very truly yours,

SEVENSON ENVIRONMENTAL SERVICES, INC.

Richard A. Elia
Executive Vice President

cc: John Bartholomeo
Alfred R. LaGreca

Sevenson Environmental Services, Inc.

August 16, 2016

Mr. William Zambrana
Sevenson Environmental Services, Inc.
2749 Lockport Rd.
Niagara Falls, NY. 14305

Re: Designation as Alternate CQC Systems Manager
Syncon Resins Superfund Site
Contract - W912DQ-15-D-3002 (0002)

Dear Mr. Zambrana,

This letter is your designation to function as Alternate CQC Systems Manager (CQCSM) at the Syncon Resins Superfund Site, South Kearny, NJ . You will have the responsibility to stop whatever work/operation that appears to be out of compliance with the contract documents. The CQCSM is responsible for field chemistry and environmental sampling staff, and responsibility for all records related to personnel, supplies, equipment use, equipment calibration, and waste transportation and disposal. Your functions will be as defined within the contract specifications and as referenced in the Quality Control Documents. CQCSM responsibilities include, performing and documenting field inspections, preparing Daily Quality Control Reports, scheduling, reviewing, certifying, and managing project submittals, maintaining the submittals register in RMS, providing coordination of required QC testing, reviewing results, and submitting results to USACE, coordinating, documenting, and tracking preparatory, initial, and final follow-up inspections, tracking construction deficiencies and ensuring timely corrective action, coordinating field sampling activities, preparing addenda to the QC Plan as necessary when additional phases of work are awarded and maintenance of as-built drawings. You have stop work authority for all work not conforming to quality, as specified in the contract specifications for the job site.

If you have any questions regarding this matter, please contact me at my office at 716-284-0431.

Very truly yours,

SEVENSON ENVIRONMENTAL SERVICES, INC.

Richard A. Elia
Executive Vice President

cc: John Bartholomeo
Alfred R. LaGreca

APPENDIX C
TABLES AND TEMPLATES

- Definable Features of Work Inspection table
- Table of Anticipated Tests to be Performed
- Preparatory Phase Checklist
- Initial/Follow Up Inspection Checklist
- Final Phase Inspection Checklist
- Master Quality Control Deficiency List
- Daily Quality Control Report Template
- Daily Safety Log
- Quality Control Sample Checklist
- Transmittal Template
- Hazardous Waste Worker Acknowledgement

Definable Features of Work Inspection Table

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Safety, Health and Emergency Response	-General overview of H&S plan - Discuss general day to day safety routine - Discuss Air Monitoring	- Verify that morning safety toolbox meetings are held - Verify that safety personnel are inspecting the workers/field conditions - Review air monitoring and results - Verify that SPAs are created and signed by appropriate personnel	- Verify that morning safety toolbox meetings are held - Verify that safety personnel are inspecting the workers/field conditions - Review air monitoring and results	-n/a
Building Inspection	-General overview of H&S plan	Verify that inspections is being completed in the necessary areas	- Verify that the Hazard Analysis was discussed	-n/a
Photograph and Videotaping	-Progress photos will be submitted monthly to USACE Health and Safety will review the Activity Hazard Analysis (AHA)	- Preconstruction photographs and video taken immediately prior to intrusive work will be utilized for existing site condition. SES to provide USACE copy for review.	- Digital Camera will be used to record preconstruction activities, construction activities, and restoration activities	n/a

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Survey	-Verify surveyor approval/review qualifications - Review survey requirements - Coordinate with USCG and notify of scheduled work	- Verify that surveying is being completed in the necessary areas	-Review survey logs	- Surveyor Certificates - Copies of surveyors field notes, calculations, and layouts - As-builts - Compliance surveys
Mobilization	- General overview of H&S plan - Discuss Traffic Control Plan, Construction Site Plan, and permit requirements - Coordinate with adjacent property owners as necessary	- Verify that SPAs are reviewed - Verify Adjacent property owners are aware of mobilization efforts - Verify mobilization is in accordance with approved plans	- Verify that SPAs are reviewed - Verify mobilization is in accordance with approved plans	-n/a
Utility Mark out Clearing and Grubbing	-Disc Discuss equipment to be utilized Call 1-800 - MARKOUT - General overview of H&S plan -Discuss site specific area to be cleared/grubbed	- Verify dust control and erosion control measures are in place -Verify the H&S plan is being followed	- Periodically ensure that routine maintenance is being performed.	- Perform final inspection to ensure that work is satisfactorily complete.

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Mobilization / Temporary Facility	- General overview of H&S plan - Discuss Traffic Control Plan, Construction Site Plan, and permit requirements - Coordinate with adjacent property owners as necessary	- Verify that SPAs are reviewed - Verify Adjacent property owners are aware of mobilization efforts - Verify mobilization is in accordance with approved plans	- Verify that SPAs are reviewed - Verify mobilization is in accordance with approved plans	-n/a
Site Security	-General overview of H&S plan -Discuss site boundaries - Discuss Emergency Contacts	- Verify perimeter security fencing is intact -Verify proper security rounds are being made	- Verify perimeter security fencing is intact -Verify proper security rounds are being made	n/a
Soil Erosion and Sediment Control	- Verify materials utilized are approved/onsite - Discuss methods and equipment to be utilized -Discuss location and installation procedures	- Verify that materials are being placed as per the specifications -Verify installation is correct and effective	- Verify that materials are being placed as per the specifications -Verify installation is correct and effective	- Perform final inspection to ensure that work is satisfactorily complete.

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Dust Control	- Coordinate with adjacent property owners as necessary - Discuss methods and equipment to be utilized	- Verify safe driving habits	- Verify safe driving habits - Verify Air monitoring will be implemented	- Perform final inspection to ensure that work is satisfactorily complete
Haul/Access Roads	- Verify materials utilized are approved/onsite - Discuss implementation methods - Discuss testing, if applicable - Discuss placement and compaction procedures	- Verify dust control and erosion control measures are in place - Verify that materials are being placed as per the specifications - Verify that materials are compacted as necessary and that testing is completed if applicable	- Periodically ensure that routine maintenance is being performed. - Verify that materials are being placed as per the specifications - Verify that materials are compacted as necessary and that testing is completed if applicable - Monitor for differential settlement	- Perform final inspection to ensure that work is satisfactorily complete.
Decontamination Area and Exclusion Zone	- Verify materials utilized are approved/onsite- Discuss implementation methods - Discuss testing, if applicable - Discuss placement and compaction procedures - Discuss location and installation procedures for geotechnical instrumentation	- Verify dust control and erosion control measures are in place- Verify that materials are being placed as per the specifications - Verify that materials are compacted as necessary and that testing is completed if applicable - Survey instrumentation locations & elevations	- Periodically ensure that routine maintenance is being performed. – Verify that materials are being placed as per the specifications - Verify that materials are compacted as necessary and that testing is completed if applicable - Ensure instrumentation installation/testing continues in accordance w/specs - Ensure integrity of settlement monitoring equipment	- Perform final inspection to ensure that work is satisfactorily complete. - Review geotechnical instrumentation testing results.

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Monitoring Well Abandonment	- Discuss methods and equipment to be utilized- Verify materials utilized are approved/onsite - Discuss testing, if applicable - Discuss placement and compaction procedures - Discuss location and installation procedures for geotechnical instrumentation	-Verify everything has been properly removed from the well - Verify that materials are compacted as necessary and that testing is completed if applicable - Verify that materials are compacted as necessary and that testing is completed if applicable - Survey instrumentation locations & elevations	-Verify everything has been properly removed from the well - Verify that materials are compacted as necessary and that testing is completed if applicable - Verify that materials are compacted as necessary and that testing is completed if applicable - Ensure instrumentation installation/testing continues in accordance w/specs - Ensure integrity of settlement monitoring equipment	- Perform final inspection to ensure that work is satisfactorily complete. - Verify as-built survey
Construction of Load-out area	- Verify materials utilized are approved/onsite - Discuss implementation methods - Discuss testing, if applicable - Discuss placement and compaction procedures - Discuss location and installation procedures for geotechnical instrumentation	- Verify dust control and erosion control measures are in place - Verify that materials are being placed as per the specifications - Verify that materials are compacted as necessary and that testing is completed if applicable - Survey instrumentation locations & elevations	- Periodically ensure that routine maintenance is being performed. - Verify that materials are being placed as per the specifications - Verify that materials are compacted as necessary and that testing is completed if applicable - Ensure instrumentation installation/testing continues in accordance w/specs - Ensure integrity of settlement monitoring equipment	- Perform final inspection to ensure that work is satisfactorily complete. - Review geotechnical instrumentation testing results

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Asbestos Abatement	- Discuss methods and equipment to be utilized - Verify materials utilized approved -Discuss testing	-Verify the H&S plan is being followed -Verify that the Asbestos Plan is reviewed - Verify materials utilized to complete work are in accordance with specifications	- Ensure that testing occurs - All generators have GFI's at the source - Air Monitoring will be performed during Abatement - Verify that work is performed in accordance with approved plans	- Perform final inspection to ensure that work is satisfactorily complete.
Lead Paint Removal	- Discuss methods and equipment to be utilized - Verify materials utilized approved -Discuss testing	-Verify the H&S plan is being followed -Verify that the Asbestos Plan is reviewed - Verify materials utilized to complete work are in accordance with specifications - Verify that testing is completed, if applicable	- Ensure that testing occurs - All generators have GFI's at the source - Air Monitoring will be performed during Abatement - Verify that work is performed in accordance with approved plans - Verify control measures are in place	- Perform final inspection to ensure that work is satisfactorily complete.

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Demobilization	-Discuss equipment to be utilized - Discuss Traffic Control Plan, Construction Site Plan, and permit requirements - Coordinate with adjacent property owners as necessary	- Verify Adjacent property owners are aware of demobilization efforts - Verify safe driving habits	- Verify Adjacent property owners are aware of demobilization efforts -Verify all required items removed from site	- Perform final inspection to ensure that work is satisfactorily complete. - Verify as-built survey
T&D of Debris Materials	- Discuss methods and equipment to be utilized -Discuss manifesting - Discuss Traffic Control Plan, Construction Site Plan, and permit requirements - Coordinate with adjacent property owners as necessary	- Verify dust control and erosion control measures are in place - Verify that work is performed in accordance with approved plans -Verify Manifests - Verify safe driving habits	- Verify dust control and erosion control measures are in place - Verify that work is performed in accordance with approved plans -Verify Manifests - Verify safe driving habits	- Perform final inspection to ensure that work is satisfactorily complete.

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Test Pit Investigation	- Discuss methods and equipment to be utilized - Discuss SAP/QAPP - Verify laboratory certifications and 3-day TAT - Discuss methods and equipment to be utilized	- Verify sampling is being conducted (and logged) in accordance with FSP/QAPP - Verify analyses is being performed in accordance with SAP/QAPP - Verify Data review is being performed per SAP/QAPP and results are submitted within specified time frame - Verify sampling is being conducted (and logged) in accordance with FSP/QAPP	- Verify sampling is being conducted (and logged) in accordance with FSP/QAPP - Verify analyses continues being performed in accordance with SAP/QAPP - Verify Data review is being performed per SAP/QAPP and results are submitted within specified time frame - Verify sampling is being conducted (and logged) in accordance with FSP/QAPP	- Perform final inspection to ensure that work is satisfactorily complete. - Verify no additional samples are required prior to placement of subaqueous cover - Perform final inspection to ensure that work is satisfactorily complete
Sampling	- Discuss SAP/QAPP - Verify laboratory certifications and 3-day TAT	- Verify sampling is being conducted (and logged) in accordance with FSP/QAPP - Verify analyses is being performed in accordance with SAP/QAPP - Verify Data review is being performed per SAP/QAPP and results are submitted within specified time frame	- Verify sampling is being conducted (and logged) in accordance with FSP/QAPP - Verify analyses continues being performed in accordance with SAP/QAPP - Verify Data review is being performed per SAP/QAPP and results are submitted within specified time frame	- Perform final inspection to ensure that work is satisfactorily complete. - Verify no additional samples are required prior to placement of subaqueous cover

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Above ground storage Tank Removal	- Discuss methods and equipment to be utilized -Procedures will be in compliance with Site Safety and Health Plan (SSHP - Discuss Traffic Control Plan, Construction Site Plan, and permit requirements	- Verify dust control and erosion control measures are in place -Any confined space will be prepared by SSHO. -Activity Hazard Analysis was discussed and will be implemented. - Verify that work is performed in accordance with approved plans	- Verify dust control and erosion control measures are in place - Verify Air monitoring - Verify that work is performed in accordance with approved plans	- Perform final inspection to ensure that work is satisfactorily complete.
Excavation and Disposal of Contaminated Material	- Discuss methods and equipment to be utilized -Discuss manifesting - Discuss Traffic Control Plan, Construction Site Plan, and permit requirements - Coordinate with adjacent property owners as necessary	- Verify dust control and erosion control measures are in place - Verify that work is performed in accordance with approved plans -Verify Manifests - Verify safe driving habits	- Verify dust control and erosion control measures are in place - Verify that work is performed in accordance with approved plans -Verify Manifests -Verify removal is performed in accordance with drawings/specifications - Verify safe driving habits	- Perform final inspection to ensure that work is satisfactorily complete.

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Backfilling and Soil Compaction Testing	-Verify fill materials are approved/onsite - Verify that appropriate testing is complete for fill materials - Discuss method of placement - Discuss method of placement - Review portion of work plan describing this feature	- Verify that correct fill materials are being placed - Verify that erosion and dust control are in place - Verify proper compaction - Subgrade acceptable	-Verify that erosion and dust control are in place - Verify proper compaction and slope -Check the condition of dewatering materials	- Perform final inspection to ensure that work is satisfactorily complete.
Install Sheet Piling	- Verify materials utilized approved/onsite - Discuss methods and equipment to be utilized - Review portion of work plan describing this feature - Discuss testing, if applicable	- Verify dust control and erosion control measures are in place - Verify that work is performed in accordance with approved plans - Verify materials utilized to complete work are in accordance with specifications	- Verify dust control and erosion control measures are in place - Verify that work is performed in accordance with approved plans - Verify materials utilized to complete work are in accordance with specifications	- Perform final inspection to ensure that work is satisfactorily complete.

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Groundwater Collection Trench	- Review portion of wastewater treatment and environmental protection plans describing this feature - Verify materials utilized approved -Discuss testing	- Ensure that discussed work plan is being implemented - Verify materials utilized to complete work are in accordance with specifications - Verify that testing is completed, if applicable	- Ensure that continued testing occurs - Verify that work is performed in accordance with approved plans - Verify control measures are in place	- Perform final inspection to ensure that work is satisfactorily complete.
Wastewater Treatment Plant	- Review portion of work plan describing this feature - Verify materials utilized approved/onsite -Discuss testing. - Discuss placement and compaction procedures - Discuss location and installation procedures for geotechnical instrumentation	- Ensure that discussed work plan is being implemented - Verify materials utilized to complete work are in accordance with specifications - Verify that testing is completed and system prove out results are acceptable - Survey instrumentation locations & elevations	- Ensure that continued testing occurs per QAPP - Ensure that treatment capacity is adequate and acceptable effluent results are achieved - Ensure instrumentation installation/testing continues in accordance w/specs - Ensure integrity of settlement monitoring equipment	- Perform final inspection to ensure that work is satisfactorily complete.

Definable Work Feature	Preparatory Phase Inspection Activities	Initial Planning Inspection Activities	Follow-up Phase Inspection Activities	Final Follow-up Inspection Activity
Installation of Extraction well & Monitoring Well	- Discuss methods and equipment to be utilized - Verify materials utilized are approved/onsite	-Verify everything has been properly installed - Verify that materials are compacted as necessary and that testing is completed if applicable	-Verify everything has been properly installed - Verify that materials are compacted as necessary and that testing is completed if applicable	- Perform final inspection to ensure that work is satisfactorily complete. - Verify as-built survey
Site Restoration	- Verify materials utilized are approved/onsite - Discuss implementation methods - Discuss testing, if applicable - Discuss placement and compaction procedures	- Verify dust control and erosion control measures are in place - Verify that materials are being placed as per the specifications - Verify that materials are compacted as necessary and that testing is completed if applicable	- Monitor for differential settlement - Verify that materials are being placed as per the specifications - Verify that materials are compacted as necessary and that testing is completed if applicable	- Perform final inspection to ensure that work is satisfactorily complete.
Seeding	- Verify materials utilized are approved/onsite -Discuss specs, ensure proper seasonal placement - Discuss testing, if applicable -Discuss equipment to be utilized	-Verify restoration is in accordance with drawings/specifications - Verify that surveying is being completed in the necessary areas - Survey instrumentation locations & elevations	-Verify restoration is in accordance with drawings/specifications - Verify that materials are being placed as per the specifications - Verify that materials are compacted as necessary and that testing is completed if applicable	- Perform final inspection to ensure that work is satisfactorily complete. -Review Geotechnical testing results

List of Anticipated Tests to be Performed

(Following Page – Note: Table quantities do not include Duplicate/QA/QC samples, all Exposure Monitoring and Air Sampling requirements are detailed in the SSHP and QAPP)

(Sevenson shall collect and analyze all Water Treatment Plant Samples in accordance with NJPDES/DSW permit requirement)

Testing Requirements for Syncon Resin Superfund Site

:

Specification Section/Par.	Work Feature	Test	Test Frequency or Minimum Value Required
	Waste Characterization – Soil		
02100/2.1	**Geomembrane Liner** Thickness Tensile Strength at Break Tear Resistance Dimensional Stability Puncture Resistance	 ASTM D5199 ASTM D638 ASTM D1004 ASTM D1204 ASTM D4833	 60 Mil 225 ppi 42lbs ±2% 108 lbs.
02100/2.2	**Geotextile Fabric** Fabric Weight Fabric thickness Gran Strength Puncture Resistance Water Flow Rate Permeability, K	 ASTM D5261 ASTM D5199 ASTM D4632 ASTM D4833 ASTM D4491 ASTM D4491	 8.0 oz. / yd3 105 mil 230 lbs. 100 lbs. 90 gpm / ft3 0.34 cm / sec
02201/2.1	Common Fill	ASTM D2487 ASTM D422	1 per 5000 CY 1 per 5000 CY
02201/2.2	Gravel	NJDOT 901.03	1 per 5000 CY
02201/2.3	Topsoil	NJDOT 917.01 ASTM D5268 ASTM D4972	1 per 5000 CY 1 per 5000 CY 1 per 5000 CY
02201/3.5.2	Sieve Analysis	ASTM D421 ASTM D422	1 per 5000 CY
02201/3.5.3	Density Testing Calibration Check Cal. for in-place density	ASTM D6938 ASTM D3017 ASTM D1556	1 per 500 CY each lift 90% compaction
02201/3.5.4	Moisture-Density Test	ASTM D698	1 per 5000 CY
02250/2.1	Steel Sheet Piling	ASTM A572	Grade 50 Thickness 0.375 inches

Analytical method for Chemical Perimeters

Data Use	Parameter	Analytical Method (All methods are based on SW-846 except as noted)	
		Extraction	Analysis
Waste Characterization – Soil Waste Characterization – Railroad Ties[2]	TCLP VOC	1311, 5030B	8260B
	TCLP SVOC	1311, 3510C/ 3520C	8270D
	TCLP Pesticide	1311, 3510C/ 3520C	8081B
	TCLP Herbicide	1311, 8151A	8151A
	TCLP Metals	1311, 3010A	6010C, 7471B
	PCBs	PCBs: 3540C/3541	PCBs – 8082A
	Paint Filter Test	NA	9095B
	Reactivity, Corrosivity, and Ignitability	NA	Reactivity-Cyanide – 9014 Reactivity-Sulfide – 9034 Corrosivity –1110A/9040C; Ignitability – 1010A
	Moisture Content	NA	ASTM D 2216 - 10
Waste Characterization – AST Content	DRO	NA	Modified 8015C
	GRO	NA	Modified 8015B
	EPH	NA	NJDEP EPH Method Revision 3
	Oil and Grease	NA	1664A

Data Use	Parameter	Analytical Method (All methods are based on SW-846 except as noted)	
		Extraction	Analysis
Pre-Excavation, UST Closure, Post Excavation, Concrete, Backfill, and Topsoil Characterization	TCL VOC	5030B/5031	8260B
	TCL SVOC	3540C	8270D
	TCL Pesticide/PCBs	Pesticide: 3510C/3520C PCBs: 3540C/3541	Pesticides – 8081B PCBs – 8082A
	TAL Metals, Mercury and Cyanide	Metals 3050B; Cyanide 9013	Metals – 6010C, 7471B; Cyanide – 9012B/ 9010C
	Radium- 226	NA	HASL-300 or EPA approved method
	EPH	NA	NJDEP EPH Method Revision 3
	TOC	3050B	9060A, AASHTO T 194
	Nutrients	Potassium and phosphate – 3050B or Mehlich Nitrogen – KCl	Potassium and phosphate - 6010D Nitrogen - KCl-extraction/Cd-reduction or other approved method
	pH	NA	9045D, ASTM D4972

Footnotes:

Test Methods for Evaluating Solid Wastes, SW-846, revised 2008

1. Refer to Paragraph 1.5.3 for data use and associated parameter requirements.
2. Exclude Paint Filter Test and Moisture Content analyses.

Preparatory Phase Checklist

Syncon Resin Superfund Site

Contract: **Date Preparatory Held:**
Spec. Section & Paragraph:
Definable Feature of Work:
Drawing Sheet Numbers

Has each spec. paragraph, drawing, and shop drawing detail been studied? Yes □ No □

Transmittals Involved

Number and Item	Code

Materials

- Have all items involved been approved? Yes □ No □
- Are all materials on-hand? Yes □ No □
- Are the materials on the site to be incorporated the same as those approved? Yes □ No □
- Have all materials been checked for contract compliance against approved shop drawings? Yes □ No □

Equipment to be Used in Executing the Work:

Tests required in accordance with contract requirements:

Test	Paragraph

Scope of Work/Method of Construction:

Control Measures:

Accident Prevention Planning - Hazard Control Measures:
Activity Hazard Analysis – Discuss Attached Safe Plan of Action

Have procedures for accomplishing work been reviewed with appropriate people? Yes ☐ No ☐

Has all preliminary work been accomplished in accord with contract requirements and is this segment of work ready to start? Yes ☐ No ☐

Is there any adjacent work being performed that may interfere with this work? Explain.

Explain any problems/Comments

Quality Control Representative

Initial/Follow-Up Phase Inspection Checklist

Syncon Resin Superfund Site

Inspection Type: Initial Phase Follow-Up Phase
Date: _____
Specifications Paragraph:
Reference Contract Drawings:

Description and Location of Work Inspected:

Materials Being Used Are In Strict Compliance with the Contract Plans and Specifications
YES _____ NO _____
If not, explain:

Procedures and/or Work Methods Witnessed Are In Strict Compliance With The Requirements of The Contract Specifications: YES ____ NO _____
If not, explain:

Workmanship Is Acceptable. YES _____ NO _____ State Areas Where Improvement Is Needed:

Safety Violations and Corrective Actions Taken: _____

Control Checks:

Monitoring Performed:

Additional Comments/Observations:

_____
Quality Control Representative

Final Phase Inspection Checklist

Syncon Resin Superfund Site

Date: _____ **Specifications Paragraph:**
Contract Drawings:

Definable Feature of Work:

Description and Location of Work Inspected:

Were Materials Used In Strict Compliance With The Contract Plans and Specifications?

YES ☐ **NO** ☐ if not, explain:

Were Procedures and/or Work Methods Witnessed Are In Strict Compliance With The Requirements of the Contract Specifications: YES ☐ **NO** ☐

If not, explain:

Is The Workmanship Acceptable? YES ☐ **NO** ☐
State Areas Where Improvement Is Needed:

Additional Remarks:

-

This feature of work is considered complete and acceptable.

_____

SES Quality Control Representative

_____

USACE Representative

MASTER QUALITY CONTROL DEFICIENCY LIST

Syncon Resin Superfund Site

Contract Number:	Prime Contractor:

No.	Date	Location	Description of Deficiency	Corrective Action	Correction Date	CQCS/ QAR Init.		Remarks
1								
2								
3								
4								
5								
6								
7								
9								

Daily Quality Control Report Template

Daily Quality Control Report

Date

Project: Syncon Resin Superfund Site

Location: Karney, NJ

Report No. Contract Day: Job No.

Weather Summary: Temperature: High: Low:

Precipitation Summary:

Work Hours:

Description and Location of Work:

X

Work Performed by Sevenson:

X

Sevenson Subcontractors On-Site No. Subcontractor Personnel

X

Work Performed by Sevenson Subcontractors:

X

Equipment Brought To or Taken from the Site by Sevenson:

X

Material Brought To or Removed from the Site by Sevenson:

X

General Observations:

X

Observations During Training:

X

Verbal Instructions to Sevenson from USACE:

X

Issues, Which May Lead to Potential Modification(s):

X

Sevenson Safety Issues:

X

Man-hours Worked This Period:

Total Man-hours To-Date:

Sevenson Visitors to the Site:

Daily Quality Control Report Template

Other:

X

Certification: *I certify that the above report is complete and correct, and that I, or my authorized representative, have inspected the work performed this day by the Prime Contractor and each subcontractor and determined that all materials, equipment, and workmanship are in strict compliance with the plans and specifications, except as noted above.*

CQM

Date

Daily Safety Log Template

DAILY SAFETY LOG
Sevenson Environmental
Syncon Resins Superfund Site

DATE:

WORK PERIOD COVERED: Day Shift 0700/1530 pm.

WEATHER CONDITIONS: °F Wind:

SUMMARY OF DAY'S WORK ACTIVITY:

MONITORING EQUIPMENT UTILIZED BY HEALTH & SAFETY:

PROTECTIVE CLOTHING AND EQUIPMENT BEING USED BY TASK:

PHYSICAL CONDITION OF WORKERS (any heat or cold stress or other medical problems)

ACCIDENTS OR BREACH OF PROCEDURES:

DESCRIPTION OF MONITORING AND AIR SAMPLES TAKEN:
Field Monitoring Results attached.

MISCELLANEOUS:

NAME:	TITLE: Site Health & Safety Officer

SIGNATURE:

QC SAMPLE CHECKLIST

Project Name/Job Number: Syncon Resin Superfund Site
Sampling Location/Sample ID:
Sampling Date:

Complete the appropriate sections of this form for all samples taken. Answer each question by checking the appropriate column (yes, no or not applicable (N/A)).

Field Sample Collection Checklist

	Yes	No	N/A
Were protective gloves worn between sampling locations and/or intervals?			
Were samples collected using methods described in the QAPP?			
Were sample containers filled in the appropriate order?			
Was sampling equipment appropriate for the purpose and site conditions?			
Was sampling equipment decontaminated or disposable/dedicated equipment used between each sample?			
Were procedures for collecting QA/QC samples followed as per the QAPP?			
Were sampling locations properly photographed?			
Were bottles adequately protected from contamination prior to collection?			
Was head space in sample contained for volatiles eliminated?			
Were trip blanks labeled and sent with samples as designated in the QAPP?			

Field Documentation Checklist

	Yes	No	N/A
Was all original field data recorded in black indelible ink in the sampling log book?			
Were log books filled out properly, accurately recounting the days events?			
Were all field forms completed and information accurately recorded:			
Chain of custody forms			
Field log books			
Were any additional forms completed? (List below)			

Packing, Storage and Shipping Checklist

	Yes	No	N/A
Were the samples handled according to the FSP and QAPP?			
Did the samples remain on ice or refrigerated (except for sample transfer from coolers or refrigerators) from collection until the cooler was taped for shipment?			
Were Chain of Custody forms filled out accurately and completely including the project name and number, sampling date and time, analytical parameters, preservatives, size and number of containers for each analytical parameter, and media sampled?			
Were Chain of Custody forms signed and dated by the preparer and the form taped to the inside of the cooler lid?			
Were signed and dated custody seals properly placed on the cooler and the cooler sealed with strapping tape?			
Was a shipping label attached to the cooler?			

Notes/comments:

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on reverse side prior to initiating this form)*	DATE	TRANSMITTAL NO.

SECTION I – REQUEST FOR APROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM: **Sevenson Environmental Services, Inc.** **2749 Lockport Road** **Niagara Falls, New York 14305**	CONTRACT NO. W912DQ-15-D-3002 T.O. 0002	CHECK ONE: THIS IS A NEW TRANSMITTAL THIS IS A RESUBMITTAL OF TRANSMITTAL _____
SPECIFICATION SEC. NO: (Cover only one section with each transmittal)	PROJECT TITLE AND LOCATION: Syncon Resin Superfund Site – OU2 77 Jacobus Avenue,. Kearny, NJ 07032		CHECK ONE: THIS TRANSMITTAL IS FOR ~ FIO ~ GOVT. APPROVAL

ITEM NO.	DESCRIPTION OF ITEM SUBMITTED (Type size, model number/etc.)	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. *(See instruction No. 8)*	NO. OF COPIES	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE	VARIATION (See Instruction No. 6)	FOR CE USE CODE
				SPEC. PARA NO.	DRAWING SHEET NO.			
a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*	*i.*

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.
Name (TITLE)

NAME AND SIGNATURE OF CONTRACTOR

SECTION II – APPROVAL ACTION

ENCLOSURES RETURNED *(List by Item No.)*	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE
	78	

INSTRUCTIONS

1. Section 1 will be initiated by the contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for “Transmittal No.”. This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals, mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The “Item No.” will be the same “Item No.” as indicated on ENG FORM 4288-R for each entry on this form.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. Separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the “Variation” column when a submittal is not in accordance with the plans and specifications – also, a written statement to that effect shall be included in the space provided for “Remarks”.

7. Form is self-transmittal, letter of transmittal is not required.

8. When a sample of material or Manufacturer’s Certificate of Compliance is transmitted, indicate “Sample” or “Certificate” in Column c, Section 1.

9. U.S. Army Corps of Engineers approving authority will assign action cods as indicated below in space provided in Section I, Column I to each item submitted. In addition, they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, Column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A --	Approved as Submitted	E --	Disapproved (See Attached)
B --	Approved, except as noted on drawings	F --	Receipt Acknowledged
C --	Approved, except as noted on drawings. Refer to attached sheet resubmission required.	FX --	Receipt Acknowledged, does not comply as noted with contract requirements
D --	Will be returned by separate correspondence	G --	Other (Specify)

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

(Reverse of ENG Form 4025-R)

SEVENSON ENVIRONMENTAL SERVICES, INC.

Syncon Resins Superfund Site

HAZARDOUS WASTE WORKER ACKNOWLEDGMENT

I understand that I am performing work on a hazardous waste site / operation. I have been fully trained in compliance with OSHA 29 CFR 1910.120 (e). In addition, I have received site-specific training and have read and understand the Accident Prevention Plan as well as the Site Specific Health and Safety Plan.

Print Name:	
Signature:	Date:

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE		DATE	TRANSMITTAL NO. 02410-13.2
PROJECT TITLE	Syncon Resins Superfund Site OU2	CONTRACT NO. W912DQ-15-D-3002 0002	PAGE 1 of 1
LOCATION	77 Jacobus Ave, Kearny, NJ		

Item	*Description*	*Variation*	*QA Code*
6	Demolition Plan Rev 2	No	C

SECTION III - GOVERNMENT REVIEW REMARKS

1) Section 3.4 - Either the Asbestos Abatement Plan or this section should provide the "detailed appropriate plans" cited here that comply with NESHAP requirements for demolition of the buildings that contain known or assumed ACM but are deemed unsafe to enter for abatement: Buildings 1, 7, 8, 9, 10, 11, and 12. For example, Section 3.2 states that Building 12 is unsafe to enter for abatement unless shoring measures are undertaken - it should be stated that either this will be done, or that it will not be done and the building will be demolished with the ACM in place.

Section 3.4 revised to reflect that demo debris from buildings that could not be abated will be treated as non-friable asbestos contaminated debris and will be handled, transported and disposed of such.

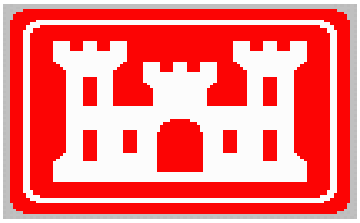
Demolition Plan

Syncon Resins Superfund Site
OU-2
South Kearny, New Jersey
Contract No. W912DQ-15-D-3002, TO 0002

Submitted by:
Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Prepared for:

U.S Army Engineer District
Corps of Engineers
New York District



January 2017
Revision 3

DEMOLITION PLAN

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APPENDIX B - PCB-BALLASTS AND LAMP REMOVAL WORK AND DISPOSAL PLAN
APPENDIX C - UNDERGROUND STORAGE TANK REMOVAL AND CLOSURE PLAN

DEMOLITION PLAN

I. INTRODUCTION

Demolition work will include removal of Buildings 1, 1A, 6A, 7, 7A, 8, 9, 10, 11, 12, the Red Building, the Northeast Building and the Shed. Also building slabs, above ground utilities, above ground storage tanks (AST's), railroad spurs, tank holders, subsurface components (foundations, footings, etc.) shall be demolished within the excavation boundary as defined in the plans and specifications for the project. The slabs and subsurface components for buildings 1, 7, 8, 10 and the Red Building shall remain and be addressed according to the pre-excavation investigation.

All work will be performed in accordance with the following plans:

- Site Safety and Health Plan;
- Site Sampling and Analysis Plan;
- Quality Control Plan;
- Soil Erosion and Sediment Control Plan; and
- Spill Control Plan.
- PCB-Ballasts and Lamp Removal Work and Disposal Plan

II. SITE SECURITY/ TRAFFIC CONTROL

Prior to commencement of demolition activities, site security will be established. Fencing will be installed around the entire perimeter of the work site to prevent unauthorized personnel from entering. The perimeter of structures located near vehicle traffic, pedestrian traffic and parking lot area will be detoured. Sevenson will coordinate with the neighboring business in conjunction with closing the adjacent parking area next to Buildings 7 and 10. A flagman will remain in constant contact with the equipment operators and any pedestrian or automobile traffic throughout the demolition activities. Demolition activities will temporarily be suspended to allow pedestrian or automobile traffic to safely pass, and will resume once they have safely cleared.

III. PRE-DEMOLITION ACTIVITIES

3.1 PERMITS

Sevenson will obtain all necessary permits required to complete demolition activities from the appropriate Federal, State, and local authorities. Sevenson needs to submit demolition permit applications for each building with the Town of Kearny. The permit application permit includes proof of approval of the Soil Erosion and Sediment Control Plan, proof of rodent abatement, certification of asbestos abatement or pending asbestos abatement, and proof that electric/water/gas utilities have been disconnected. All work will be performed in accordance with Federal, State and local regulations. No work will be performed until all permits have been obtained.

3.2 PRE-DEMOLITION EVALUATION

On 24 August 2016, all buildings were inspected by Glynn Geotechnical to determine if they are structurally safe to enter for lead and asbestos sampling and remediation. As per the evaluation, Buildings 1A, 5, 6A, 7A (electrical rooms 1 and 2) and the Red Building are safe to enter to perform remediation work. The North East Building was not inspected during this visit since it was inaccessible. It will be inspected prior to entering it. Building 12 was deemed unsafe to enter, unless shoring measures were taken. All other buildings on the site were deemed unsafe to enter to perform any remediation work.

Sevenson QC and Superintendent will examine the properties in the immediate vicinity. The conditions of the surrounding buildings and properties will be documented with video recordings, photographs, and/or written description.

3.3 DISCONNECTION OF UTILITIES

Sevenson contacted all relevant utility service providers (water, electric, gas, sewer, telephone) to ensure that disconnection of these services has been performed. Sevenson called for utility mark out locations utilizing the NJ One Call, 1-800-272-1000.

Status of Utilities:

- Water/Sewer – When Sevenson was performing the excavation with the licensed plumber to cap the lines, utility lines were not found according to the project plans. Sevenson performed a few test excavations and could not find the lines. The local utility was called and visited the site and they verified that there is no water service to the old buildings and stated that the water and sewer lines were likely capped years ago and the valves buried.
- Electric – Sevenson licensed electrician verified that there is no electrical service to any of the buildings. In addition, he tested for voltage in the two electrical rooms of Building 7A and found no voltage.
- Gas – there is no gas service at the site. When Sevenson called for utility mark-outs, there were no gas service mark-outs. In addition, there were service/regulators/meters found on any of the buildings.

If during demolition an unmarked utility is encountered, activities will immediately cease. The utility service provider will be contacted to disconnect the service and the client will be notified.

3.4 ASBESTOS/LEAD INSPECTION AND ABATEMENT

Prior to demolition, Sevenson will inspect each building that is considered structurally sound to enter and identify all ACM and LBP to be remediated. For buildings demolished without a thorough ACM and LBP inspection due to their structural integrity, Sevenson shall treat the demolition debris as ACM-contaminated debris and will handle, transport and dispose of the material as non-friable asbestos contaminated debris.

All asbestos and lead abatement will be performed in accordance with the approved Asbestos Hazard Abatement Plan and the approved Lead Compliance Plan.

3.5 ***ABOVEGROUND STORAGE TANK REMOVAL & DEMOLITION***

Sevenson shall inspect, remove the contents, and demolish and dispose of the ASTs. All existing ASTs shall be inspected to verify presence of any type of residual fluids, solids, sludge. If any type of content is found, Sevenson shall characterize the content in accordance with the approved UFP-QAPP

All contents shall be completely removed from ASTs and associated piping, if possible, to prevent accidental release, and shall be disposed of in accordance with applicable Federal and State regulations. Sevenson shall carefully dismantle piping that previously contained gas, gasoline, oil, or other dangerous fluids, with precautions taken to prevent injury to persons and property and shall store outdoors until all fumes and residues are removed.

All vacuum and transfer pump motors and suction hoses shall be grounded to the tank to prevent electrostatic ignition hazards. Only explosion proof or air driven pumps shall be allowed at the site.

The atmosphere around the AST shall be regularly tested for flammable and combustible vapor concentrations using a multi-gas monitoring instrument until the tank has been removed from the site.

After removal of content, Sevenson shall decontaminate the ASTs, and dispose of at an approved disposal facility. ASTs having solidified mass shall be disposed of at an approved RCRA facility.

All ASTs work including inspection, purging, content removal, decontamination, and demolition shall be performed in accordance with the approved APP/SSHP.

3.6 LAMP AND PCB BALLAST REMOVAL

Prior to demolition, Sevenson will remove and dispose of all electrical fixtures in accordance with the approved PCB-Ballasts and Lamp Removal Work and Disposal Plan.

IV. EROSION AND SEDIMENT CONTROL

Storm sewers and catch basins located in the vicinity of demolition work will be covered with a woven geotextile and surrounded by hay bales or coir wattles to protect against migrating sediment. Where applicable, silt fence will be installed surrounding the demolition area to prevent the movement of soils during demolition and removal efforts. Sediment control measures will be inspected and repaired daily, as necessary. Erosion control measures will be performed in accordance with Sevenson's Soil Erosion and Sediment Control Plan as approved by the Hudson Essex Passaic Soil Conservation District.

V. DUST CONTROL

Fire hydrants will be utilized by Sevenson as a source of potable water for use in dust suppression. Sevenson will receive permission and or permits from the Kearny Water Department prior to the use or installation of any hydrants. If a water source cannot be provided, Sevenson will utilize a water truck. During demolition activities, water will be used to wet the structure thereby limiting the amount of dust released into the environment. Pavements will be swept as necessary to prevent the accumulation of debris and dust. Water usage will be monitored to prevent ponding and runoff. If runoff starts to occur, the amount of water used for dust control will be curtailed. If ponding of water occurs in contaminated areas, the water will be collected by vacuum truck or pump and placed in the fractional tank for sampling and analysis and ultimate disposal.

VI. DEMOLITION SEQUENCE

Following the completion of the pre-demolition activities, Sevenson will begin demolition of the site structures.

Immediately preceding demolition, each area will be inspected to ensure that no personnel are nearby.

The equipment proposed for demolition activities include, but is not limited to the following:

- Two Komatsu PC 300 excavators;
- Grapple attachment;
- Shear;
- Hoe-ram attachment;
- Off-road dump trucks;
- Front-end loader;
- 40 – 90 lb pneumatically operated busters;
- Air Compressors; and
- Water Truck.

DEMOLITION PLAN

Sevenson will make all employees aware of the potential worker exposure issues during demolition procedures. Water will be misted onto the surface to eliminate the possibility of dust or lead emissions.

Sevenson will start the demolition work with Buildings 8, 1, 10, and 7. The slabs and subsurface components of these buildings will remain and be addressed according to the Pre-excavation Investigation sample results. Sample results above the site cleanup criteria will trigger slab and subsurface building component demolition followed by soil excavation. Sevenson intends to leave the Red Building for last, if possible, since this building is structurally sound and provides useful, indoor storage/work area. It may also be possible to leave the building and slabs if pre-excavation sampling shows that no contamination is under the building.

Buildings 1A, 9, the Shed, 6A, 7A, 12, 11, and the Northeast Building that require the complete demolition of all structures, including slabs and subsurface components will follow. Also during this sequence, Sevenson will remove all miscellaneous concrete foundations and tank holders required to be demolished. This will allow Sevenson to begin locating and laying out the Pre-excavation sampling locations and the design excavation limits.

Building Slabs, Foundations, Footings, Etc. will be removed using a Hoe-ram attachment on a PC300 excavator. Concrete sections will be sized and then removed by a backhoe.

Sevenson will coordinate disposal of material, including required waste characterization, sizing and manifesting.. Sevenson anticipates recycling all non-porous materials, including steel. Steel will be sized and placed into containers supplied by the recycling facility. Prior to shipment off-site, the materials to be recycled will be checked for the presence of contamination and if found will be decontaminated utilizing pressure washing techniques. Sevenson will utilize the Waste Tracking log found in Appendix D of the Waste Management and Transportation Plan to track and document recycled material.

Sevenson will remove the railroad spur and components throughout the course of performing the demolition. The steel will be placed with the other recyclable steel materials and any other waste will be characterized and disposed of appropriately.

DEMOLITION PLAN

Upon completion of load-out activities, site restoration will be completed as outlined in the Specifications.

Appendix A

Asbestos/Lead Abatement Plan

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on the reverse side prior to initiating this form)*	DATE **December 6, 2016**	TRANSMITTAL NO. **02080-1A**

TO: **Sevenson Environmental Services, Inc. 1405B North Mill Road Vineland, New Jersey 08360**	FROM: **USA Environmental Management, Inc. 8436 Enterprise Avenue Philadelphia, Pennsylvania 19153-3802**	CONTRACT NO. **G2883008**	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☒ THIS IS A RESUBMITTAL OF TRANSMITTAL 02080-1
SPECIFICATION SEC. NO. *(Cover only one section with each transmittal)* **02080**	PROJECT TITLE AND LOCATION **Syncon Resin Superfund Site, 77 Jacobus Avenue, South Kearny, New Jersey 07032**		CHECK ONE: THIS TRANSMITTAL IS FOR ☐ INFO ONLY ☐ APPROVAL

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED *(Type, size, model, number / etc.)* b.	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See instruction no. 8) c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE g.	VARIATION *(See instruction No. 6)* h.	FOR ENGINEER USE CODE i.
				SPEC. PARA. NO. e.	DRAWING SHEET NO. f.			
1	Asbestos Abatement and Disposal Plan *(Revised per comments on orginal submittal 02080-1)*		1	1.3.1				
2	Asbestos Waste Shipment Records *(Revised per comments on orginal submittal 02080-1)*		1	1.3.2				
3	Exposure Assessment and Air Monitoring *(Revised per comments on orginal submittal 02080-1)*		1	1.3.3				
	See notes under original comments attached to this Transmittal.							

REMARKS	I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the Contract Drawings and specifications except as otherwise stated. **James E. Harris** NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED *(List by Item No.)*	NAME,TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

For use of this form, see ER 415-1-10; the proponent agency is CECW-CE.

DATE: 11/17/2016

TRANSMITTAL NO.: 02080-66

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor)

TO: Environmental Residency
US Army Corps of Engineers
214 State Highway 18
East Brunswick, NJ 08816

FROM: Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, NY 14305-2229

CONTRACT NO.: W912DQ-15-D-3002 0002

CHECK ONE:
[X] THIS IS A NEW TRANSMITTAL
[ ] THIS IS A RESUBMITTAL OF TRANSMITTAL _____

SPECIFICATION SEC. NO. (Cover only one section with each transmittal)
02080 Asbestos Hazard Control Activities

PROJECT TITLE AND LOCATION 01-Main Register
Syncon Resins Superfund Site OU2 77 Jacobus Ave, Kearny, NJ

THIS TRANSMITTAL IS FOR: (Check one) [ ] FIO [X] GA [ ] DA [ ] CR [ ] DA/CR [ ] DA/GA

ITEM NO. (See Note 3) a.	DESCRIPTION OF SUBMITTAL ITEM (Type size, model number/etc.) b.	SUBMITTAL TYPE CODE (See Note 8) c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT: SPEC. PARA. NO. e.	CONTRACT REFERENCE DOCUMENT: DRAWING SHEET NO. f.	CONTRACTOR REVIEW CODE g.	VARIATION Enter "Y" if requesting a variation (See Note 6) h.	USACE ACTION CODE (Note 9) i.
4	Asbestos Abatement Plan - US Environment	SD-01	0	1.3.1		A		C*

REMARKS

Also included in this Plan:

Asbestos Waste Shipment Records
Asbestos Assessment and Air Monitoring
Asbestos Equipment certificates
Asbestos Licenses, permits and Notifications

*See attached comments.

I certify that the above submitted items have been reviewed in detail and are correct and in the strict conformance with the contract drawings and specifications except as otherwise stated.

NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by item No.)

NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY

Matthew T. Creamer
Contracting Officer's Representative (COR)

DATE: 28 Nov 2016

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE		DATE	TRANSMITTAL NO. 02080-66
PROJECT TITLE	Syncon Resins Superfund Site OU2	CONTRACT NO. W912DQ-15-D-3002 0002	PAGE 1 of 1
LOCATION	77 Jacobus Ave, Kearny, NJ		

Item	*Description*	*Variation*	*QA Code*
4	Asbestos Abatement Plan - US Environment	No	C

SECTION III - GOVERNMENT REVIEW REMARKS

1. General - The plan should clearly state which locations/materials/quantities are to be abated. The plan should reference the TTI Asbestos & LBP Survey dated 10/20/16 which contains these details. The locations of the ACM should be clearly described or shown.

2. General - The plan does not address the ACM/presumed ACM in buildings deemed structurally unsafe. If not described here, those procedures should be included in the Demolition Plan and referenced here (this includes the boiler insulation in Building 6A, which TTI did not have access to but recommended to be sampled prior to demolition).

3. HASP - The Scope of Work listed in the HASP lists all materials in the 2006 materials assessment. Based on the State Notification included, not all of these materials will be abated. This section should be updated with the information from the TTI Survey.

4. Notification - The State Notification lists 120 SF of Roofing Material to be abated from Building 7. This should be "Building 7 Small Room"; Building 7 was deemed structurally unsafe to enter.

5. Waste/Material Handling Plan - It is not clear what the proposed waste disposal facility is. The plan lists both Tullytown Landfill and GROWS Landfill (PA); the State notification form provided lists Minerva Landfill (OH)

6. Section 3.H - Language implies samples may be analyzed in the field as opposed to the proposed laboratory (EMSL Cinnaminson). Please clarify.

7. Section 3/Air Monitoring Statement - Section 3 gives general descriptions of area monitoring, but later states that USAEMI will only perform personal monitoring. The plan should indicate what entity is performing area monitoring.

USA Environmental Management, Inc. (USAEMI)

Responses to US Army Corps of Engineers comments on USAEMI Transmittal 02080-1
USAEMI response to comments noted as Section III – Government Review Remarks to Sevenson Transmittal No. 02080-66

Our revised Transmittal No. is 02080-1A

RESPONSE: USAEMI has made deletions/corrections as noted in 1. Above to our Asbestos Abatement and Disposal Plan. Deletions are noted in ~~**BOLD**~~ and Additions are noted in **BOLD**.

1. General - The plan should clearly state which locations/materials/quantities are to be abated. The plan should reference the TTI Asbestos & LBP Survey dated 10/20/16 which contains these details. The locations of the ACM should be clearly described or shown.

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Abatement and Disposal Plan:

Table of Contents pagination has been adjusted per changes
Page 10

---

2. General - The plan does not address the ACM/presumed ACM in buildings deemed structurally unsafe. If not described here, those procedures should be included in the Demolition Plan and referenced here (this includes the boiler insulation in Building 6A, which TTI did not have access to but recommended to be sampled prior to demolition).

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Abatement and Disposal Plan:

Page 38
Page 46

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3. HASP - The Scope of Work listed in the HASP lists all materials in the 2006 materials assessment. Based on the State Notification included, not all of these materials will be abated. This section should be updated with the information from the TTI Survey.

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Abatement and Disposal Plan:

Table of Contents pagination has been adjusted per changes
Page 108

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4. Notification - The State Notification lists 120 SF of Roofing Material to be abated from Building 7. This should be "Building 7 Small Room"; Building 7 was deemed structurally unsafe to enter.

Item No. 2 on the 1st page of the Notification of Asbestos Abatement should indicate that the 120 SF of roofing material to be removed is found on Building 7A instead of Building 7. A revision of the notification will be made as required.

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5. Waste/Material Handling Plan - It is not clear what the proposed waste disposal facility is. The plan lists both Tullytown Landfill and GROWS Landfill (PA); the State notification form provided lists Minerva Landfill (OH)

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Abatement and Disposal Plan:

Page 95
Pages 97-98
Page 100

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Waste Shipment Records:

Page 3
Pages 6-7
Page 9

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6. Section 3.H - Language implies samples may be analyzed in the field as opposed to the proposed laboratory (EMSL Cinnaminson). Please clarify.

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Asbestos Abatement and Disposal Plan:

Page 18

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Exposure Assessment and Air Monitoring Data:

Page 3

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7. Section 3/Air Monitoring Statement - Section 3 gives general descriptions of area monitoring, but later states that USAEMI will only perform personal monitoring. The plan should indicate what entity is performing area monitoring.

Changes have been made to the following pages (.pdf page numbers) in the attached REVISED Exposure Assessment and Air Monitoring Data:

Page 3

ASBESTOS ABATEMENT and DISPOSAL PLAN

SD-01 Pre-Construction Submittal

GA

CONTRACTOR: **USA ENVIRONMENTAL MANAGEMENT, INC.**
8436 Enterprise Avenue, Philadelphia, PA 19153-3802

_____ Approved

_____ Approved with corrections noted on submittal data and/or attached sheet(s).

SIGNATURE: _____

TITLE: _____

DATE: _____

CERTIFIED INDUSTRIAL HYGIENIST

PLAN REVIEW SIGN OFF

ASBESTOS ABATEMENT and DISPOSAL PLAN

SD-01 Pre-Construction Submittal

GA

CONTRACTOR: **USA ENVIRONMENTAL MANAGEMENT, INC.**
8436 Enterprise Avenue, Philadelphia, PA 19153-3802

I have reviewed the following Asbestos Abatement and Disposal Plan and have found it satisfactory for the scope of work on this project and therefore have indicated approval below.

__V__ Approved

Mark Schlager
Certified Industrial Hygienist

SIGNATURE: _____

CIH NUMBER: 5024

DATE: November 15, 2016

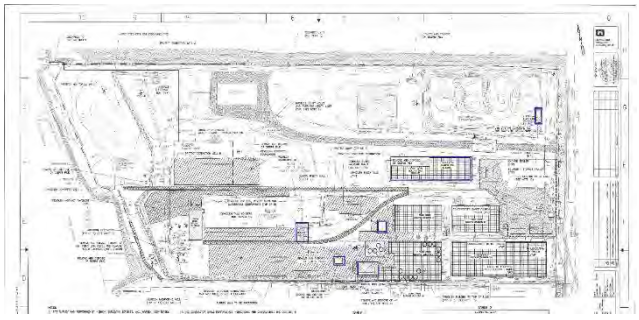
(Seal)

ASBESTOS ABATEMENT and DISPOSAL PLAN

Environmental Management, Inc.
Environmental Engineering Construction
8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Office: 215-365-5810 FAX: 215-365-5870

ASBESTOS ABATEMENT and DISPOSAL PLAN

SYNCON RESINS SUPERFUND SITE



Prepared for:

Sevenson Environmental Services, Inc.

1405B North Mill Road
Vineland, NJ 08360

Since 1985 TTI Environmental, Inc.

1253 North Church Street
Moorestown, NJ 08057-1136

US Army Corps of Engineers

REVISION NO. 1

December 6, 2016

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1. GENERAL INFORMATION

1.A SCOPE OF WORK

This Asbestos Abatement plan specifies the requirements applicable to the removal, handling and disposal of Asbestos-Containing Materials. The project specifications identify the exact locations any quantities of materials to be removed. All work involving the removal and disposal of asbestos-containing materials shall be accomplished in conformance with the general requirements herein and specifications prepared for the Asbestos Abatement at the former Syncon Resins Superfund site – OU2 located at 77 Jacobus Avenue, South Kearny, New Jersey 07032. USA Environmental Management, Inc. (USAEMII) is subcontracted to Sevenson Environmental Services, Inc. to perform the required asbestos abatement site in buildings on this complex. Work is being performed for the US Army Corps of Engineers (USACE). ***TTI Environmental, Inc. (TTI) performed an asbestos and lead-based paint survey of the structures that were accessible on this site. Some properties were structurally unsound and asbestos abatement will have to be addressed during demolition.***

The following asbestos-containing materials have been identified for abatement in the TTI Environmental, Inc. Asbestos and Lead-Based Paint Survey report dated October 28, 2016:

Non Friable Materials Abatement

Location	Asbestos Containing Material	Approximate Quantity
Building 6A, Building 7 (Small Room), Building 7A,	Transite Switch Gears	60 Square Feet
Building 7 (Small Room)	Roofing Material	120 Square Feet
Building 6A	Boiler Gasket	40 Linear Feet
Red Metal Building	Window Glazing	400 Linear Feet

Non Sub 8 Tented Glove Bag Pipe Insulation Abatement

Location	Asbestos Containing Material	Approximate Quantity
Building 7 (Small Room)	Pipe Insulation	15 Linear Feet

1.B DESCRIPTION OF WORK

Asbestos abatement procedures described herein include the handling of asbestos-containing friable and non-friable materials which are encountered prior to or during removal operations; the work consists of furnishing all plant, labor, materials, and equipment and performing all work for the removal of asbestos-containing materials. List materials to be removed are noted in the notification submitted to the regulatory agencies.

1.C REFERENCE STANDARDS

Asbestos Abatement shall be performed in compliance with Federal, State, and Local requirements. This includes, but is not limited to, the following:

A. Occupational Safety and Health Administration (OSHA)

1. 29 CFR 1910, Occupational Safety and Health Standards for General Industry
2. 29 CFR 1926.1101 OSHA Asbestos Standard for Construction
3. 29 CFR 1910-134 OSHA Respiratory Protection Standard

B. Environmental Protection Agency (EPA)

1. NESHAP 40 CFR Part 61 Subparts A, B, and M, Asbestos Standards

C. American Society for Testing and Materials (ASTM)

1. E849-82, Safety & Health Requirements Relating to Occupational Asbestos Exposure

D. American National Standards Institute (ANSI)

1. Publication Z29-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems
2. Publication Z88.2-1980, Practices for Respiratory Protection

E. State of New Jersey Department of Labor and Workforce Development
Title 12 of the Asbestos Control and Licensing Act

F. US Army Corps of Engineers
Safety and Health Requirements Manual – EM 385-1-1
3 November 2003

2. GENERAL PRACTICES

2.A DESCRIPTION

This section covers the furnishing of all labor, materials, facilities, equipment, services, employee training, permits and agreements necessary to perform the work required for asbestos abatement in accordance with these specifications, EPA and OSHA Regulations and any other applicable Federal and State Asbestos Regulations. Whenever there is a conflict or overlap of the above references the most stringent provisions are applicable.

2.B STANDARD OPERATING PROCEDURES

USAEMI shall develop and implement a written standard procedure for abatement work to ensure maximum protection and safeguard from asbestos exposure to workers, visitors, general public, and the environment.

USAEMI shall:

A. Provide evidence of a valid State Asbestos Contractor's License prior to abatement operations.
B. Permit only STATE-Licensed Workers and Supervisors within the asbestos regulated areas. Evidence of valid badges must be available at all times.
C. Maintain on-site a copy of USAEMI's current respiratory protection program including evidence of respirator fit testing which must be performed on a semi-annual basis in accordance with OSHA Regulations 29 CFR 1910.134.
D. Maintain tight security of each job site to avoid unauthorized entry into work area(s). Asbestos warning signs shall be posted in highly visible locations, typically 20 feet from the periphery of the work area(s). Where the area is to be cordoned off, Asbestos Warning Tape will be used. Warning signs shall be in vertical format conforming to 29 CFR 1910 and 29 CFR 1926, and shall be at minimum 20 by 14 inches in size.
E. All individuals entering the work area shall sign in and out on the supervisor's daily entry log and shall be wearing personal protective equipment as described herein.
F. Shutdown HVAC system prior to disturbing any ACM; disconnect electrical services and provide temporary electrical service protected by ground fault circuit interrupter.
G. Provide proper protective clothing and respiratory protection to supervisors, and monitors prior to try into containment
H. Ensure safe work practices including the exclusion of eating, drinking, and smoking within the designated work areas.
I. Ensure proper exit practices from the work space to the outside through the Personnel Decontamination Unit (PDU).
J. Remove asbestos in ways that minimize release of fibers techniques and immediate bagging of ACM is required.

K. Pack, label, load, transport, and dispose of contaminated material (and Equipment) in a way that minimizes potential for fiber release. All equipment will be decontaminated (or bagged) before removal of enclosure.
L. Clearly identify, at the job site, an evacuation plan for medical or safety emergency situations (e.g. fire, smoke, heat exhaustion).
M. Provide a safe work environment safe from accidents, especially from electrical shocks, slippery surfaces, proper identification and enclosure of holes, ladders and scaffolding, and entanglements in loose hoses and equipment.
N. Administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated without delay for Personal decontamination.
O. When an injury occurs, USAEMI shall stop work and implement fiber reduction techniques (e.g., amended water spraying) until the injured person has been removed from the work area.
P. Assume responsibility for the proper disposal of all building materials incident to abatement, unless otherwise specified by the Contracting Officer.
Q. Perform abatement without damage or contamination of adjacent work areas, supplies or equipment. Where damage or contamination occurs, restore or replace to the original condition.
R. Ensure that workers use non-metallic tools for scraping while working near energized lighting or other electrical equipment
S. Be responsible for identifying all areas where energized equipment or circuits are located. These areas shall be demarcated with signs measuring no smaller than 81/2 X 11 inches. Signs shall be placed within every 100-feet section of removal area with energized lighting or circuits.
T. Not use power tools to remove ACM unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation capture and collection system or otherwise be approved by the Contracting Officer.
U. Have employees wearing electrically insulated boots and gloves while working near energized lighting or other equipment in the removal area to prevent electrical shock. All other protective foot covering shall be disposed of as ACM.
V. Mark all electrical outlet boxes located in the removal zone with an identifying number and the location of the circuit breaker protecting that circuit. Extension cords and temporary power lines shall be marked every 15 feet.
W. Have all energized electrical outlets, panels, or equipment in the removal zone tightly wrapped and taped in such a manner that water spray will not contact them.
X. Have transformers or other electrical boxes which may release heat wrapped in a manner so that proper cooling is provided.

2.C PRE-CONSTRUCTION INSPECTION

A. Prior to area preparation activities, an inspection of work areas shall be made in accordance with the prime contractor's approved Contractor Quality Control Plan. Existing site condition shall be documented and agreed upon by the Contracting Officer and USAEMI.

B. Upon completion of abatement activities, any damages to finishes, floors, walls or any other items or fixture that has been the result or actions by USAEMI or their subcontractors shall be repaired to their original condition without any additional cost, except for damages to materials, which will be demolished as part of building activities. A comparison of the pre-construction inspection report shall be the basis for the assessment of damages to be addressed

2.D PRE-CONSTRUCTION SAFETY MEETING

A. The Contractors designated Competent Person/Supervisor shall meet with the Contracting Officer prior to beginning work for a safety pre-construction conference to discuss the details of the specific site.

B. The Site-Specific Accident Prevention Plan shall include work procedures and safety precautions. Once accepted by the Contracting Officer, the submitted plans will be enforced along with the specifications.

3. WORK PRACTICES

3.A LICENSING/CERTIFICATIONS

A. Asbestos abatement operations will be performed only by those workers and industrial hygienists who have been identified in USAEMI's Submittals. Moreover, they shall have a valid State Department of Labor Asbestos License pertinent to their function on the job site.

B. Asbestos abatement contractors specified shall only use asbestos workers/supervisors which an EPA-AHERA trained and certified within the previous 12 months, or at least annually after their original training.

C. Within one year prior to assignment to asbestos work, each employee shall be instructed as to the hazards of asbestos, necessary safety and health precaution, the use and requirements for protective clothing, equipment and respirators, engineering and all hazard control techniques and procedures, the correlation between cigarette smoking and asbestos related diseases and all additional requirements set forth by 29 CFR 1926.1101.

D. USAEMI has a training program for all employees determined to have been exposure to asbestos airborne concentrations in excess of the action level (0.1 f/cc). USAEMI requires their participation in the program.

E. USAEMI workers shall be trained for an 8-hour period by an IH or Competent Person, regarding safety precautions and work procedures specific to the job.

3.B PERMITS/NOTIFICATIONS

A. USAEMI shall secure necessary permits in conjunction with asbestos removal, hauling, storing, transporting, and disposal and provide timely notification of such actions as may be required by Federal, State, regional and local authorities.

3.C INTERFACING WITH TRADES

A. In conformance with OSHA 1926.1101, USAEMI shall inform other employers (i.e. trades) on the site of the nature of USAEMI's work with asbestos and of the existence and requirements pertaining to regulated areas.

B. Entrance to regulated area shall be cordoned off approximately 20 feet around the perimeter and asbestos warning signs posted. Access shall be restricted to properly trained, licensed, and protected personnel.

C. Should any aspect of the work be in violation of the asbestos plan requirement or fiber level in outside trade locations exceed 0.01 f/cc, work shall cease and corrective course actions employed until fiber levels are below 0.01 f/cc. The Contracting Officer will issue a stop work order under these circumstances which will take effect immediately.

3.D RECORD KEEPING

3.d.1 Medical Records

A. Before exposure to airborne asbestos fibers, workers shall have a comprehensive medical examination as required by 29 CFR 1926.1101 and other pertinent state and local directives. This requirement must have been satisfied within the past six months. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving asbestos and within 30 calendar days before or after termination of employment in such occupation.

B. USAEMI shall an accurate record of all measurements taken to monitor employees to asbestos exposure, as prescribed in paragraph (f) of 29 CFR1926.1101.

C. USAEMI shall maintain and establish medical surveillance records for at least 30 years, in accordance with 29 CFR 1910.20.

3.d.2 Training Records

A. USAEMI maintains all employee training records for one year beyond the last date of employment

3.d.3 Transfer of Records

A. Upon written request, USAEMI shall make all records required by 29 CFR 1926.1101 to be available for examination and copying in accordance with 29 CFR 1910.20.

B. USAEMI complies with the requirements set forth in 29 CFR 1910.20(h) concerning transfer of records.

3.E CERTIFIED INDUSTRIAL HYGIENIST

A. A CIH shall be designated by the Contractor to oversee the Contractor's overall Health & Safety Plan implemented for the project.

B. The CIH shall be independent (not directly employed by) the Contractor and shall be certified by the American Board of Industrial Hygiene (ABIH) and have a minimum of two years of asbestos abatement experience.

C. The contractor’s Asbestos Hazard Abatement Plan, perform training, direct air monitoring, provide guidance to the on-site Industrial Hygiene Technician, and assist contractor’s competent person supervisor in implementing and ensuring safety and health requirements during the performance of asbestos abatement work.

D. The CIH will be responsible for the following work

1. The Asbestos Hazard Abatement Plan shall be prepared/approved, signed and sealed by a ABIH Certified Industrial Hygienist and be approved by the Contracting Officer, prior to start of any work.
2. The CIH and IH Technician have the authorization to halt abatement activities at any time, irrespective of airborne fiber levels, if the provisions of asbestos removal plan are not being followed by the abatement contractor or the general contractor.
3. The CIH shall approve that the proposed IH Technician is properly trained and capable of on-site asbestos project monitoring and air sampling.
4. Air Monitoring results and daily log entries by the IHT shall be reviewed at least weekly or within 24 hours of termination of the project.

3.F SUPERVISION

A. All projects shall have at least one qualified Foreman or Competent Person on site throughout the duration of the project. He shall have at least completed training for and be certified as an Asbestos Supervisor.

B. The Competent person shall be responsible for the following:

- Setting up Isolation Barriers
- Ensuring integrity of enclosures
- Controlling entry to and exit from regulated areas
- Monitoring job site asbestos contamination levels
- Verifying that the scope of work conforms to plans
- Maintain all job site records
- Ensuring that all employees are properly using protective equipment and respirators

3.G TEMPERATURE MONITORING METHOD

A. Thermometers will be placed at the two end of the building opposite each other.

B. Thermometer temperatures will be read and recorded in the mornings and in the afternoon.

C. Average temperature in the building $[(T_1+T_2)/2]$ must be at least 45°F or abatement to be performed without any heating system.

D. If temperatures fall under 45°F, then the Contractor has the option to do one of the following:

1. Not Work for that day, or until temperature reaches at least 45°F; or
2. Install a heating system in the work area sufficient enough to bring the temperature to at least 45°F. The Contractor must propose the type and method of the heating system and obtain the approval of the Contracting Officer or his designated representative prior to the installment.

3.H AIR MONITORING

A. Air samples will be collected by the Industrial Hygiene Technician (3rd party) under the supervision of the Certified Industrial Hygienist, CIH. Air sampling and analysis shall be performed in accordance with 29 CFR 1926.1101 and the NIOSH 7400 method. Sampling results shall be reviewed by the CIH within sixteen hours. If area monitoring shows samples with concentrations greater than 0.01 f/cc, work will be stopped and corrective measures taken before resuming abatement activities. The IH Technician will notify the Contractor, Contracting Officer and any other designated parties of the results immediately. In order to ensure the integrity of samples analyzed, a minimum of two or 10%, whichever is greater, of each set of samples will be Quality Control Blanks (one field and one sealed) will be analyzed and the average fiber count of these will be subtracted from the fiber counts of regular samples. ~~**Moreover, 10% of samples read in the field will be sent to the laboratory for analysis. Rereading will also been done to 10% of samples by the on-site analyst and laboratory. Samples to be reread are to be chosen at random.**~~ ***All samples shall be analyzed at the laboratory of EMSL Analytical, Inc., 200 Rt. 130 North, Cinnaminson, New Jersey, Office: 1-800-220-3675/Fax: (856) 786-5974.***

3.h.1 Personal Air Monitoring

A. Worker's (Personal) exposure monitoring shall be conducted for the full shift and for the entire project duration by the IH Technician. Personal air samples are taken to insure that control methods area effective and that respirator protection factor are sufficient in order to keep the time-weighted avenge, TWA, of asbestos exposure below the Permissible Exposure, PEL.

B. Workers will be monitored at least every four hours (twice a day) to establish the TWA for the full shift. At a minimum, 25% of all workers in group or two, whichever is greater, will be monitored to represent that group's exposure. Note: Workers chosen for monitoring will be those representing the greatest exposure in their respective group.

C. At least one Short Term Excursion Limit sample will be collected daily. STEL's should last no more than half an hour.

D. The minimum required respirators are:

Half-Face for (TWA < 1 f/cc)
Full-Face for (1 f/cc < TWA < 5 f/cc)
PAPR for (5 f/cc < TWA < 100 f/cc)
Type C for (TWA > 100 f/cc)

E. A personal air sample pump should be attached to the employee's belt with the tubing draped over his shoulder, with the cassette attached and facing down (approx. 45 degrees) within the breathing zone (approx. 6" to 9" from

the mouth). The top piece of the cassette must be removed to obtain an "open face" sample.

F. Prior to starting the air sampling, the pump should be calibrated (with a rotometer) and adjusted to the desired flow-rate (typically 1 to 25 liters/minute), then noted and logged on the Air Sampling/Analysis Data form.

G. Upon completion of the air sample, the actual flow-rate should again be measured with a rotometer and noted on the Air Sampling/Analysis Data form. The average of the pre-sample and post-sample flow-rates will be used as the actual flow-rate during the sampling period. If the flow-rates differ by more than 10%, the will not be valid.

H. The results of the worker monitoring shall be posted at the job site and made available to the Contracting Officer within 24 hours

3.h.2 Area Monitoring

1. Pre-Abatement Monitoring

   a. Prior to initiation of abatement operations, background samples of airborne asbestos shall be collected inside and outside the work area, and at least two shall be collected outside the building. Sampling shall be performed 1 day prior to initiation of abatement work. If fiber concentrations exceed 0.01 f/cc as per PCM analysis, then these samples shall be confirmed by NIOSH 7402 (TEM) at the project owners expense.

2. During-Abatement Monitoring

   a. Environmental monitoring during abatement shall be performed inside and outside the work area during removal operations, in accordance with 29 CFR 1926.1101, State, and Local requirements. Samples shall be changed at a frequency not less than once every four hours. Should perimeter results exceed 0.01 f/cc, as per PCM NIOSH Method 7400, all work shall stop. Work will not be allowed to restart until corrective measures taken and authorization is given by the Contracting Officer.

      a) Typical sampling locations will be:

      b) Negative Air Pressure Unit Exhaust

      c) In the vicinity of occupants immediately adjacent, above, or below work area

      d) Outside the Personnel Decontamination Unit (PDU)'s Clean Room

b. Inside the work area

c. An area air sample pump should be placed in a strategic sampling location to monitor possible fiber release from contained work area. Area air sampling pumps' hoses shall be fixed 4’ to 5’ from ground level by a tripod, with the cassette attached and facing down (approx. 45 degrees).

d. Prior to staring the air sampling, the pump should be calibrated (with a rotometer) and adjusted to the desired flow-rate (typically 5 to 12 liters/minute), then noted and logged on the Air Sampling/Analysis Data form. Area air samples shall draw a minimum of 800 liters.

e. Upon completion of the air sample, the actual flow-rate should again be measured and noted on the Air Sampling/Analysis Data form. Sample flow-rate to be used will be the average between the pre and post-sample flow-rates.

f. The results of the worker monitoring shall be posted at the job site and made available to the Contracting Officer within 24 hours.

3. Post-Abatement Monitoring

a. Final air clearance and visual inspection shall be performed by the On-site Industrial Hygienist Technician. Aggressive Air Sampling techniques shall be used as defined in the EPA 560/5-85-024 or as otherwise required by federal or state requirements Sampling and analytical method to be used for clearance shall be NIOSH 7400 (PCM) with optional confirmation, at the expense of the Contractor, by NIOSH 7402 (TEM) utilizing the EPA AHERA Air Sampling Protocol. Should air clearance sample results exceed the 0.01 f/cc clearance criteria, re-cleaning and re-sampling to meet the above criteria shall be required. After final air samples pass the clearance criteria, the perimeter barrier and the Personnel Decontamination Unit (PDU) system may be dismantled and disposed of as asbestos waste.

3.I WETTING AGENT

A. The wetting agent (surfactant) to be used to wet the ACM during removal and bagging operations will be a product manufactured specifically for this purpose. The product will be as submitted previously.

3.J ENCAPSULANT

A. The encapsulant to be used to seal surfaces from which ACM have been removed or which have been cleaned/decontaminated therefrom will be a product manufactured specifically for this purpose. The product will be as submitted previously.

3.K PROTECTIVE CLOTHING AND EQUIPMENT

A. USAEMI shall provide to all workers, foreman, superintendents and authorized visitors and inspectors protective disposable clothing consisting of full-body coveralls, foot coverings, head covers, eye protection, respiratory devices, and gloves. Disposable underwear shall also be provided and worn next to skin or cloth under clothing. Contractors IH and Competent Person/Supervisor shall select and approve the whole body protection to be used.

   NOTE: Protective clothing and gloves shall be of the nonporous type, with front zippers unless otherwise agreed upon by the Contracting Officer.

B. USAEMI shall provide fog protective eye wear, hard hats, shoes, cloth socks, and gloves on all work, in accordance with ANSI Z87.1.

C. Reusable footwear, hard hats and eye protection devices shall be left in the "Contaminated Equipment Room" until they can be completely decontaminated at the end of the asbestos abatement work, or bagged for transport to and use in another contained area. Eye protection may either be left in the Personnel Decontamination Unit (PDU) equipment room or thoroughly washed upon departure through shower room.

D. Disposable protective clothing shall be discarded and disposed of as asbestos waste every time the wearer exits from the enclosure work space to the outside through the Personnel Decontamination Unit (PDU).

E. USAEMI shall furnish the Contracting Officer with 2 sets of personal protective equipment, as required herein, for each entry into and inspection of the asbestos control area.

F. The enforcement of the utilization, maintenance, and proper sanitation of personal protective equipment by all employees shall be the responsibility of all levels of supervision.

G. It shall be required of all employees to wear safety shoes or boots to prevent injury to the feet. Sandals, shoes with holes or slits, or shoes with worn heels or soles shall not be permitted to be worn inside the work area.

H. Employees shall be provided with eye and face protection equipment when machines or operations present potential eye or face injury from physical, chemical, or radiation agents. Eye and face protection equipment shall meet the requirements specified in the American National Standards Institute (ASTM), Practice for Occupational and Educational Eye and Face Protection.

I. Persons whose vision requires the use of corrective lenses like spectacles should wear goggles that can be worn over corrective spectacles without disturbing the adjustment to the spectacles.

J. Persons working in areas where there is a danger of head injury from impact or from falling objects, or from electrical shock and burns, shall be protected by helmets

meeting the specifications of the American National Standards Institute (ASTM), Safety Requirements for Industrial Head Protection.

K. Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in the table below, when measured on the A-scale Type # sound level meter at slow response:

L. Exposure to impulsive or impact noise shall not exceed 140 dB peak sound pressure level. Ear Protective devices inserted in the ear shall be fitted or determined individually by Competent Persons.

M. Plain cotton is not an acceptable protective device.

3.L TEMPERATURE MONITORING

A. Thermometers will be placed at the two far ends of the building opposite to each other.

B. Thermometer temperatures will be read and recorded in the mornings and in the afternoon.

C. Average temperature in the building $[(T_1+T_2)/2]$ must be at least 45^oF for abatement to be performed without any heating system.

D. If temperatures fall under 45^oF, then the Contractor has the option to do one of the following

1. Not work for the day, or until temperature reaches at least 45^oF; or
2. Install a heating system in the work area sufficient enough to bring the temperature to at least 45^oF. The Contractor must propose the type and method of the heating System and obtain the approval of the Contracting Officer or his representative prior to the installment.

3.M RESPIRATORY PROTECTION

A. USAEMI shall provide all workers, foreman, superintendents, authorized visitors and inspectors personally issued and marked respiratory equipment in accordance with OSHA regulations 29 CFR 1910.134, and 29 CFR 1926.1101, 29 CFR 1910.1001. When respirators with disposable filters are employed, provide a sufficient inventory of HEPA filters for replacement as necessary by the worker. All respiratory equipment shall be NIOSH/MSHA approved.

B. USAEMI shall require that each person entering the work area wear an approved respirator when the level of airborne asbestos is likely to be above the Action Level of 0.1 f/cc. There shall be no exceptions to this rule.

C. All respiratory equipment shall be inspected by USAEMI's project supervisory personnel at the beginning of each work period. Moreover, workers are required to perform positive and negative pressure checks whenever respirators are put on.

D. Respirator type shall be selected to provide the regulatory level of protection required for specific background and/or environmental conditions. All recommendations made by the Contractor's IH to downgrade the respirator type shall be submitted in writing to the Contracting Officer for acceptance. Upgrading respirator type need only be communicated verbally. The minimum required respirators are:

Half-Face for TWA < 1 f/cc
Full-Face for 1 f/cc < TWA <5 f/cc
PAPR for 5 f/cc < TWA < 100 f/cc
Type C for TWA > 100 f/cc

E. The IH may certify that initial/background air monitoring is not required in the following two instances

1. The Contractor has data from monitoring work operations conducted under workplace conditions closely resembling the processes, type of material being removed, control methods, work practices, and environmental conditions prevailing in the contractor's current operation.
2. The Contractor can demonstrate that workers are below the action level by providing objective data indicating that the material containing asbestos cannot release, under the conditions being employed, airborne fibers in excess of the action level.

F. At no time in the project shall disposable dust masks be utilized for respiratory protection against the inhalation of airborne asbestos fibers.

G. All personnel engaged in asbestos removal procedures requiring a respirator shall have an unobstructed face/mask seal (i.e., no facial hair) and shall have received required qualitative or quantitative fit testing every 6 months and medical screening as mandated in OSHA Regulations 1926.1101 and its appendixes.

H. Where type "C" respirators are worn, a belt shall be used to minimize possibility of dislodging the face mask when the hose is snagged in the work area and provide a minimum of two spare hoses to be available at all times to the consultant and/or authorized visitors and to inspectors to connect to their assigned type "C" respirator without having to wait for removal of the worker from the area to obtain a hose connection.

I. Where type "C" respirators are employed, the air supply system shall provide grade "D" breathing air in accordance with OSHA.

J. The compressed air system for type "C" respirators shall be high pressure, with a compressor capacity to satisfy the respiratory manufacturer's recommendations. The face mask separate escape shall have sufficient filters to allow a 15 minute escape time from enclosure in the event of compressor failure or malfunctions. The compressed air system shall have compressor failure alarm, and suitable in-line air-purifying sorbent beds and filters to assure grade "D" breathing air.

3.N FIT TESTING

A. Qualitative fit testing for a respirator shall be accomplished for each employee at the time of issuance and every six months thereafter using an irritant fume, in accordance with 29 CFR 1926.1101, Appendix C. The following protocol will be used.

1. Employee must be clean shaven.
2. Employee must be familiarized with irritant smoke odor.
3. Employee wears respirator for at least 10 minutes prior to fit test
4. Employee performs a positive and negative pressure fit check.
5. Test conductor directs a stream of irritant smoke from the tube toward the face seal, moving gradually from 12" to 1" away from the face around the perimeter of the mask. (Volume shall be 200 ml per minute).
6. Employee shall breathe normally, then deeply, and rotate head from side to side, up and down, then talk aloud for several minutes.
7. If no irritant smoke is detected during this process, the employee has passed the Fit Test upon final sensitivity testing without use of the respirator.

B. An approximately administered fit test may be substituted for a qualitative fit test.

C. Each employee must perform a positive and negative air pressure fit test each time a respirator is put on, whenever the respirator design so allows.

D. Documentation of adequate respirator Fit Tests shall be kept.

4. PRE-ABATEMENT PROCEDURES

4.A WORK AREA PREPARATION

A. Prior to removal/clean-up activities, the Contracting Officer will notify USAEMI of items which require special attention and cannot be moved out of the designated work area. These items must be HEPA vacuumed and/or wet-wiped (with amended water) and covered (i.e., sealed) in a minimum of two independent layers of 6 mil plastic sheeting to prevent surface contamination and water damage.

Note: Sensitive equipment such as electrical panels shall be contained in plywood enclosures prior to establishment of work area containment.

B. Any items to be removed (desks, chain, rugs, fixtures, furniture etc.) shall be thoroughly cleaned with HEPA vacuuming and/or wet-wiping (with amended water) techniques and stored in a location designed by the Contracting Officer. Moreover, all surfaces to remain inside the containment shall be cleaned by HEPA vacuum prior to establishment of containment. All cloths used for cleaning shall be disposed of as contaminated waste.

C. USAEMI shall post required OSHA asbestos warning signs at all entrances to the work area and along the work limit of site or along the perimeter sections of the site at intervals of 20 feet or less where abatement operations are to be performed or where asbestos-containing waste material was deposited. These signs shall remain in place until the successful completion of visual inspection and final clearance testing. The signs shall be posted in such a manner and locations that a person easily may read the legend.

Note: Should an area be considered politically sensitive, the CIH and the Contracting Officer may decide to strategically place the warning signs for others to see only when approaching/entering the work area.

D. Building HVAC system shall be shut down prior to any activities involving the potential for disturbing asbestos. The air supply and return registers/openings shall be cleaned (if needed) and sealed by USAEMI with two independent layers of 6 mil plastic sheeting to prevent contamination and fiber dispersal to other areas of the buildings.

E. The work area shall include all contained areas as well as a 20 feet radius all around the enclosure.

F. A viewing inspection window shall be installed on the wall of the containment enclosure. This shall be a plexiglass window of a minimum dimension of 1.5’x2’. NOT REQUIRED.

G. Power to the asbestos regulated area shall be locked out by switching off all breakers in accordance with 29 CFR 1910.

H. Tools, scaffolding, staging, etc. necessary for the work shall be placed in the area to be isolated prior to the erection of the work area enclosure containment an air-tight manner prior to work commencement in accordance with 29 CFR 1910.147.

I. Electricity shall be de-energized where necessary for wet removal methods. Where this is not possible, USAEMI shall seek a variance from the Contracting Officer.

J. All criticals (e.g., doorways, windows and openings to other areas) shall be sealed with two layers of 6 mil plastic sheeting. Building structures, electrical boxes, etc. which are not subject to removal will also be sealed with two layers of 6-mil plastic sheeting. All plastic will be sealed with duct tape and seams will be overlapped and sealed in both places.

4.B PERSONNEL DECONTAMINATION UNIT (PDU)

A. Location of Personnel Decontamination Unit (PDU) chamber facility shall be determined by USAEMI and shall have the approval of the CIH and the Contracting Officer before assembly. It shall be located in such a manner as to provide a minimum of inconvenience to the building occupants. The facility shall consist of a clean room large enough to accommodate a full crew. Utilization of prefabricated Personnel Decontamination Unit (PDU) units must have the approval of the Contracting Officer.

B. USAEMI shall provide a Personnel Decontamination Unit (PDU) facility which shall consist of separate chambers directly attached to each other and the work area. The chambers shall be arranged so that the clean room precedes the shower room which precedes the equipment room. The equipment room is directly attached to the work area. The Personnel Decontamination Unit (PDU) unit shall be in compliance with 29 CFR 1910.141. Two airlock chambers shall also be constructed: one between the equipment and shower rooms and the other between the shower and clean rooms.

C. Waste shower water shall be filtered with a first stage pore size of 20 microns and second stage size of 5 microns and then to a sanitary drain. USAEMI shall provide a foot bath to clean shoes and boots.

D. USAEMI shall provide all temporary electrical fixtures for lighting, heating etc. of Personnel Decontamination Unit (PDU) facilities, work areas, and storage areas.

E. Should sufficient hot water be unavailable, the Contractor shall provide a minimum of a 40 gallon electric hot water heater with a minimum recovery rate of 20 gallons per hour. There should be a minimum of 2 showers. The waste water pump shall be sized for 1.25 times the shower heads and be capable of supplying a minimum flow of 25 gallons per minute.

F. The Industrial Hygiene Technician shall be monitoring the clean room of the Personnel Decontamination Unit (PDU) system. If at any time airborne concentrations exceed 0.010 f/cc. USAEMI shall halt all abatement operations and shall be required to completely clean all affected areas as directed by the on-site Industrial Hygienist Technician.

G. Personnel Decontamination Unit (PDU) Clean room and Shower will be cleaned twice each shift.

H. Removal operations will not begin until the work area and Personnel Decontamination Unit (PDU) Systems have been inspected and approved by a representative of Contracting Officer. Personnel Decontamination Unit (PDU) should be set up early and before pre-cleaning and Negative Air pressure (where required) is established.

I. Whenever feasible, a separate 2- or 3-stage waste/equipment decontamination facility should also be constructed for bag out and equipment decontamination activities.

4.C ISOLATING WORK AREA

A. To prevent airborne asbestos from escaping into areas outside the work area and/or lodging into to the outside of the building will be sealed with 2 layers of 6-mil polyethylene sheeting.

B. Double layers of plastic sheeting shall be sealed at all joints with water-resistant duct tape (and spray adhesive if necessary) to provide a continuous isolation which will prevent any fiber escape.

C. All entrances and exits to the work area shall be sealed as a critical with plastic sheeting and tape, with the exception of the Personnel Decontamination Unit (PDU) Facility.

D. Certain work areas may be isolated in a variety of ways as follows based on the surrounding area, location of material to be removed and type of material to be removed and the method chosen for removal.

4.c.1 WORK AREA PREPARATION (Full Containment Areas)

This method shall be utilized for the removal of all ACM.

A. Construct critical barriers on all windows, doors and HVAC openings. Criticals to have 2 layers 6 mil plastic sheeting taped all around.

B. Any HVAC and other appropriate mechanical or electrical system shall be shut down for the duration of abatement and until final air clearance.

C. All wall sockets, light sockets, light switches, and other small fixtures shall be either taped or covered with 6 mil plastic.

D. Seal all joints using sprayed adhesive or duct tape.

E. Negative air HEPA ventilation system should already be installed, test run and operated in accordance with ANSI Z9.2, 29 CFR 1926, and UL 586 filters standard. All Air Filtration Devices (AFDs) shall be vented outside the building. AFDs shall be in sufficient quantity to provide a minimum of 4 air exchanges per hour and a pressure differential of 0.02 inches of water

column continuously, 24 hours a day, until the enclosure of the asbestos control area is moved.

Note: Pressure differential recordings for each work day shall be reviewed by the Industrial Hygienist and submitted to the Contracting Officer within 24 hours from the end of each work day. The Industrial Hygienist shall notify USAEMI and the Contracting Officer immediately of any variance in the pressure differential which would cause exposure of adjacent unsealed areas to asbestos fiber concentration in excess of the action level. Pressure differential to be recorded mechanically on a disc or manually read & recorded every two hours.

F. A three stage Personnel Decontamination Unit (PDU) system shall be constructed for each work area. The Personnel Decontamination Unit (PDU) should already have been installed with pre-cleaning.

G. Construct a separate 2- or 3-stage waste/equipment Decontamination facility system (where feasible).

H. Removal of all asbestos material shall be performed in accordance with paragraph 1.03 above.

4.c.2 WORK AREA PREPARATION (Friable Floor Tile and/or Mastic Removal Areas)

A. Friable removal means removal methods such as hand scraping or other mechanical removal techniques, which would pulverize and/or break up tiles during the removal and/or shot-blasting for the removal of mastic.

B. Completely isolate the work area from other portions of the building and the outside by installing critical barriers at all openings, doorways, windows (operable portion only!), ducts, grilles, grates, diffusers, and any other such openings and/or penetrations.

C. Protect any and all heating units and cabinets found along the walls or inside the work area with a single layer of 6 mil polyethylene

D. Install a single layer of 4-mil polyethylene to the underside of the existing ceiling inside all abatement work areas.

E. Install a single layer of 6-mil polyethylene on all wall surfaces (full height).

F. The work area shall be placed under a negative pressure condition.

G. Removal procedures shall be as indicated in the Section Removal of Asbestos-containing Materials for friable methods.

4.c.3 WORK AREA PREPARATION (Non-Friable Floor Tile and/or Mastic Removal Areas)

A. Non-friable removal means removal without breakage of tiles or a minimum of breakage and no damage to mastics, which would render airborne contamination.

The use of heat (infrared) machines, water and/or dry ice, or any combination thereof would constitute non-friable removal techniques for floor tile.

B. The preparation of the work area for non-friable floor tile removal shall include the following:

1. Completely isolate the work area from other portions of the building and the outside by installing critical barriers at all openings, doorways, windows (operable portion only!), ducts, grilles, grates, diffusers, and any other such openings and/or penetrations.

2. Protect any and all heating units and cabinets found along the wall or inside the work area with a single layer of 6-mil polyethylene.

3. Where chemical removal techniques are to be used for removal of the mastic, all walls, fixtures, cabinets, floor – mounted book shelves, heating units, etc., in the work are shall be protected with a single layer of 6 mil plastic sheeting to extend a minimum of three (3) feet above the floor.

4. The work area shall be placed under a negative pressure condition using HEPA equipped negative air filtration machines.

5. Removal procedures shall be as indicated in the Section on Removal of Asbestos-containing Materials for non-friable methods.

4.c.4 WORK AREA PREPARATION (Glove Bag Areas)

A. A minimum of two persons is required to perform a glove bag removal project.

B. The work area where the technique is to be utilized shall be isolated with critical barriers and/or appropriate barrier tape with required OSHA asbestos warning signs posted.

C. Contractor shall protect the floor immediately beneath the glove bag

removal area with one (1) layer of 6-mil polyethylene plastic sheeting.

D. Contractor to protect any fixed items immediately adjacent to the glove bag removal operation with a minimum of one (1) layer of 6-mil polyethylene plastic as a precaution.

E. Contractor shall establish negative pressure in all areas of glove bag removal or use the negative pressure glove bag technique.

F. All necessary materials and supplies shall be brought into the work area before any removal begins.

4.c.5 WORK AREA PREPARATION (Localized Isolation Areas)

A. Contractor shall HEPA vacuum or wet wipe all surfaces contaminated with residual asbestos-containing material (Initial Cleaning).

B. All of the procedures as indicated in 5.a.1 and 5.a.3 shall be followed. A complete three (3) stage Personnel Decontamination Unit (PDU) constructed in accordance with the OSHA regulation may be required depending on the nature of the asbestos abatement activity undertaken and if required, shall be functional and used at a remote, central location within the building.

C. The perimeter of the abatement area shall be isolated through the use of asbestos barrier warning tape and OSHA asbestos warning signs sufficient to keep unprotected, unauthorized personnel away from the control area and not be exposed to asbestos during the abatement activity.

D. Workers shall wear double sets of disposable uniforms during the abatement and/or Decontamination work, HEPA vacuum the outer garment off when done within the perimeter of the protected work area, remove and dispose of the outer garment in this area, and then proceed, with respiratory protection still in place, to the remote, central Personnel Decontamination Unit (PDU) for showering and full Decontamination upon completion of work.

E. All temporary protection shall be removed upon completion of the asbestos abatement/cleanup activity and successful air monitoring by the IH Technician.

4.c.6 WORK AREA PREPARATION (Mini-Enclosure Areas)

A. Contractor shall HEPA vacuum or wet wipe all surfaces contaminated with residual asbestos-containing material (Initial Cleaning).

B. All of the procedures as indicated in 5.a.1, 5.a.2, 5.a.3, 5.a.4 and 5.a.5 shall be followed except that a one (1) stage change chamber shall be attached directly to the Mini-Enclosure work area, constructed as indicated below, and a complete three (3) stage Personnel Decontamination Unit (PDU) chamber as required by OSHA shall be functional and used at a remote, central location within the building.

C. Floors inside the mini-enclosure shall be covered with two (2) layers of 6-mil (minimum) sheeting.

D. Walls shall be covered with one (1) layer of 6-mil (minimum) sheeting except where such walls of the mini-enclosure are free-standing, in which case they shall be appropriately supported by 2" x 3" wood studs, metal studs or PVC tubing, on maximum 48" centers, and be constructed with two (2) layers of 6-mil sheeting.

E. A small chamber, a minimum of 3' x 3' in size shall be constructed using 2" x 3" studs, metal studs or PVC tubing, and two (2) layers of 6 mil sheeting for ceilings, floors and walls, and attached directly to the mini-enclosure. The change room shall be separated from the work area by three (3) weighted crossover sheets of polyethylene (curtained doorway). A similar curtained doorway will allow passage from the change room to non-work areas.

F. Workers shall wear double sets of disposable uniforms, step into the change room, HEPA vacuum the outer garment, remove and dispose of same in this room, and then proceed the remote, central Personnel Decontamination Unit (PDU) for showering and full decontamination upon completion of work.

G. Negative pressure-air filtration engineering controls shall be installed in all mini-enclosure work areas used for removal and/or handling of asbestos-contaminated materials.

4.D WARNING SIGNS AND LABELS

A. The Contractor shall provide signs at all approaches to the asbestos controlled work areas. Signs will be located at such a distance that personnel may read the sign and take the necessary protective steps required before entering the work area.

B. The Contractor shall provide labels and will affix them to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos.

C. Warning signs shall have a vertical format conforming to 29 CFR 1910.145 (d) (4).and 29 CFR 1926 1101 (k), and 29 CFR 1910.120, and be 20 X 4 inches, displaying the following information:

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD

AUTHORIZED PERSONNEL ONLYRESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

D. Warning labels shall be printed in large bold letters, and shall contain the following information:

DANGER

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE HAZARD

4.E WORK AREA ENTRY AND EXIT/DECONTAMINATION PROCEDURES

A. The following are procedures and sequence to be followed by ALL who enter and exit the contained work area. These procedures shall be posted inside (or immediately outside) the clean room. There shall be no drinking, eating, chewing gum or tobacco, or any smoking inside the containment. To do any of the above, persons shall leave the containment using the proper sequence described below. In order to prevent contamination of the environment, the Contractor shall be responsible for controlling access to contained work area and shall maintain and post a daily log of all entry to and exit from the work area. This log will contain: names, signatures, entry and departure times.

4.e.1 Work Area Entry Procedures

A. All workers and authorized personnel shall enter the work area through the Personnel Decontamination Unit (PDU) Facility's clean room.

B. All persons entering the work area shall sign an entry/exit log located in the clean room.

C. Street clothes shall be removed, placed in a locker, and personal protective clothing and respirator shall be donned at this point.

D. Proceed through the Shower and Equipment rooms and then to the contained work area.

4.e.2 Work Area Personnel Decontamination and Exit Procedures

A. Manually remove and HEPA vacuum gross contamination and debris from disposable clothing before entering the Personnel Decontamination Unit (PDU) Facility's Equipment room.

B. Equipment and clothes not to be disposed of (reusable) shall be stored in the Equipment room in a safe manner so as not to be tripped over or injured by. If these clothes or equipment need to be taken out of work site, they must be washed and decontaminated or placed in sealed container/bag for transport to and usage in another contained area.

C. Enter the Equipment room, remove contaminated clothing and place them in a suitable container/bag for disposal. Note: Respirators must still be worn at this point.

D. Enter shower room and rinse entire body, while still wearing respirator.

E. Once whole body and head are rinsed from debris, proceed to remove respirator while rinsing the face. Note: Caution should be exercised against inhaling asbestos debris and/or contaminated water.

F. Wash entire body including face and hair.

G. Seal the exterior of the respirator filter cartridge and wash the respirator.

H. Proceed to clean room and change into street clothes.

4.e.3 Emergency Evacuation

A. Prior to commencing asbestos removal, the Contractor's Competent Person shall clearly identify to all workers the emergency and fire exits from the work area. These exits will be maintained on a routine basis. Workers shall be trained for these emergency exit procedures.

B. In case of a medical emergency, aid shall be rendered to a seriously injured worker without delay. Pathway shall be cleared for medical personnel, and someone should be instructed to guide the medical team to the scene. Moreover, proper personnel decontamination procedures to exit from the work area is not required, but recommended whenever possible.

C. During fire evacuations and other such emergencies, an attempt should be made to properly decontaminate oneself whenever possible.

D. When an emergency should occur, abatement will cease, but engineering control methods such as wet-methods and negative air pressure shall resume to prevent the potential of fiber release into non-contaminated areas.

4.F PRE-ABATEMENT INSPECTION

A. The IHT and a representative of Contracting Officer shall visually inspect the containment prior to any ACM removal. Work area must be contained and a Personnel Decontamination Unit (PDU) Facility installed as prescribed above.

B. All necessary equipment and tools needed for abatement clean-up and disposal of asbestos must be on job site.

C. Prior to removal, negative air HEPA ventilation system should already be installed and test run and operated in accordance with ANSI Z9.2, 29 CFR 1926, and UL 586 filters standard. All air filtration devices (AFDs) shall be vented outside the building. AFDs shall be in sufficient quantity to provide a minimum of 4 air exchanges per hour and a pressure differential of 0.02 inches of water column continuously 24 hours a day, until the enclosure of the asbestos control area is removed.

D. Each AFD must be equipped with HEPA filters to ensure that air is filtered before being exhausted. HEPA filters should be replaced after every 700 hours of use, or when negative pressure becomes insufficient.

E. Pressure differential shall be recorded automatically by the manometer recorder at least every two hours through the use of manometer. Recordings for each work day will be made available to the Contracting Officer for review upon request. The IHT shall notify the Contractor and Contracting Officer immediately of any variances in the system's negative pressure which would cause exposure of adjacent areas to asbestos fibers contamination in excess of the Action Level.

F. Each AFD shall be periodically inspected for air flow velocity and filtering efficiency every 2000 hours of use and a log shall be kept documenting all inspections and results thereof.

4.G CONTINGENCY PLANS

4.g.1 Power Failure

A. Should a loss of power occur, all work will be stopped and the occupants evacuated until power can be restored. An attempt will be made to restore power by resetting electrical circuit breakers, replacing fuses, and checking extension cord connections.

B. If power cannot be restored within one hour, an emergency generator will be brought on line, and an electrician called to restore power.

Note: All power to the work area must be from a GFIC (Ground Fault Interrupt Circuit).

C. Removed ACM is to be misted with amended water to keep from drying and becoming more friable and should be bagged if possible.

D. The air inside the work area will also be misted with amended water.

E. Containment is to remain intact, and the flaps of the Personnel Decontamination Unit (PDU) entrance sealed after last person leaves the work area.

4.g.2 Failure of Negative Air

A. In the case of power failure to the negative air filtration machines, follow power failure responses above.

B. For occupied buildings, if power is not restored in 30 minutes, an emergency generator will be brought on line until power is restored.

C. Removed ACM is to be misted with amended water to keep from drying and becoming more friable, and should be bagged if possible.

D. The air inside the work area will also be misted with amended water.

E. At least one backup air filtration machine must be on job site, in case a machine fails to provide its required negative pressure.

4.g.3 Emergency Exit Plan

The Emergency Exit Plans for each building will be developed in accordance with 29 CFR 1910.37 and 29 CFR 1910.38.

A. Emergency and fire exit plans will be made for each work area of the project. Personnel will be trained and drilled on proper emergency exit procedures. These procedures and routes in a simple sketch of the building will be posted in the clean room of the Personnel Decontamination Unit (PDU) chamber along with emergency telephone numbers. Prior to commencing asbestos removal, the Contractors Competent Person shall clearly identify and train all workers on the emergency and fire exits from the work area. These exits will be maintained on a routine basis.

B. Mark exits from work area and post directional arrows according to plan when exits are not visible from remote work areas. This can easily be done by using duct tape on the polyethylene walls and barriers.

Note: Some emergencies are considered greater than an asbestos hazard, thus, Personnel decontamination procedures may be bypassed and containment breached for the health and safety of the workers during a fire emergency.

C. The supervisor will establish a system for alerting workers of a fire or other emergencies requiring evacuation of the work area. All persons entering the work area should be familiar with this evacuation alarm signal and the primary and secondary exits.

D. In case of a medical emergency, aid shall be rendered to a seriously injured worker without delay. Pathway shall be cleared for medical personnel, and someone should be instructed to guide the medical team to the scene. Moreover, proper Personnel decontamination procedures to exit from the work area is not required, but recommended whenever possible.

E. When an emergency should occur, abatement will cease but engineering control methods such as wet-methods and negative air pressure shall resume to prevent the potential of fiber release into non-contaminated areas.

4.g.4 Fire Response Emergency

This Fire Response Plan has been developed in accordance with 29 CFR 1926.130,29 CFR 1926.131, and 29 CFR 1910.38.

A first aid kit along with a fire extinguisher will be located in the clean room of the Personnel Decontamination Unit (PDU) chamber at all times.

A. In case of fire emergency, cease all work activities and pull the nearest fire alarm, alert your fellow workers and evacuate the work site in an orderly fashion through the nearest emergency/fire exit.

   Note: A fire hazard is considered greater than an asbestos hazard; thus, personnel decontamination procedures may be bypassed and containment breached for the health and safety of the workers during a fire emergency.

B. Contact the fire department immediately (Emergency numbers will be posted in the clean room of Personnel Decontamination Unit (PDU). Dial 911 if necessary.

4.g.5 Medical Emergency Response

This Medical Emergency Plan has been developed in accordance with 29 CFR 1926.150.

A first aid kit along with a fire extinguisher be located in the clean room of the Personnel Decontamination Unit (PDU) chamber at all times.

A. In the case of life-threatening emergency, pull the nearest fire alarm, alert your fellow workers and take the nearest exit out, disregarding all critical barriers.

B. In case of injury, assist your fellow worker through the Personnel Decontamination Unit (PDU) chamber. Then call the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU).

C. In the case of life-threatening injury, disregard critical barriers and take injured person through the nearest exit out. Then call the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU).

D. In case of heat stroke or exhaustion, assist your fellow worker through the Personnel Decontamination Unit (PDU) chamber. Instruct someone to call

the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU), and proceed by first aid procedures aimed to decrease body temperature.

4.g.6 Breech in the Enclosure and Emergency Clean-Up

A. Breech in the enclosure shall be repaired immediately after acknowledgment.

B. Affected area shall be evacuated, if occupied, by and at the direction of the CIH and the Contracting Officer.

C. All HVAC Systems servicing the affected area will be shut down or temporarily modified as instructed by the CIH and/or Contracting Officer.

D. USAEMI shall respond immediately to the directions of the CIH and the Contracting Officer.

E. All personnel entering the affected area shall be required to wear full body protective coveralls and respiratory protection as described in this asbestos abatement plan.

F. USAEMI shall seal off the area by closing all doors and posting warnings signs along the perimeter of the area, and allow entrance to the area only to necessary personnel.

G. USAEMI shall install HEPA negative air units (vented to the outside) in the affected area during clean-up operations.

H. Any damaged ACM shall be repaired to the satisfaction of the CIH, IHT and/or the Contracting Officer, or USAEMI shall remove the asbestos to the extent indicated.

I. The entire area shall be cleaned via HEPA vacuum and wet-wiping techniques starting from the uppermost areas and working down to ground level. All items in the affected area are to be thoroughly cleaned and decontaminated, including all light fixtures, HVAC system, books, personal items, etc. to the satisfaction of the CIH, IHT and/or the Contracting Officer.

J. Dispose of all debris, filters, mop-heads, and cloths in sealed, leak-tight, appropriately labeled containers as asbestos-containing materials.

K. The IHT will provide air monitoring during and after clean-up operations. This will include air sampling and surface dust sampling to ensure that all asbestos fibers have been removed from the area. Airborne concentrations shall not exceed 0.010 fiber/cc of air when analyzed by NIOSH Method 7400. Should analysis show concentrations above this level or surface dust samples reveal the presence of asbestos, USAEMI will re-clean the entire work area immediately until it meets the standards listed herein.

5. SPECIFIC ASBESTOS ABATEMENT PROCEDURES

5.A ENGINEERING CONTROL METHODS

The following procedures shall be followed where asbestos-containing materials are located within buildings/structures that are structurally sound and able to be safely entered by workers to perform the abatement.

This site does have numerous structures and/or areas of structures that are not structurally sound to allow workers to enter and perform the abatement work as with normal, structurally sound buildings. The procedures to be followed for buildings/structures of this nature on this site are addressed in section 5.b.1 below.

5.a.1 PROCEDURES FOR ASBESTOS ABATEMENT IN STRUCTURALLY SOUND BUILDINGS/STRUCTURES

A. The work area is the location where asbestos abatement work occurs. It is a variable of the extent of work of the contract. It may be a portion of a room, a single room, or a complex of rooms. A "work area" is considered contaminated during the work, and must be isolated from the balance of the building, and decontaminated at the completion of the asbestos-control work.

B. Completely isolate the work area from other parts of the building so as to prevent asbestos-containing dust or debris from passing beyond the isolated area. Should the area beyond the work area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, clean those areas in accordance with the procedures indicated in section on decontamination. Perform all such required cleaning or decontamination at no additional cost to owner.

C. Place all tools, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to erection of plastic sheeting temporary enclosure.

D. Pre-clean using worker Personal Protective Equipment (PPE), all movable objects within the work area using HEPA filtered vacuum and/or wet cleaning methods as appropriate. After cleaning, these objects shall be removed from the work area and carefully stored in an un-contaminated location. The abatement contractor shall return all objects to the original areas after completion and approval of the final air monitoring.

E. Carefully remove, using worker Personal Protective Equipment (PPE), items necessary to access any asbestos-containing materials herein required to be removed, HEPA vacuum same and store in a clean, secure

area for re-installation after the successful completion of clearance air monitoring after asbestos removal. The abatement contractor will be responsible for reinstallation of any and all items removed in order to perform the abatement work.

F. Pre-clean using worker Personal Protective Equipment (PPE), all fixed objects in the work area, as well as the work area itself (Initial Cleaning), using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery, behind grilles or gratings where access may be difficult but contamination significant. Also pay particular attention to wall, floor and ceiling penetrations behind fixed items. After pre-cleaning, enclose fixed objects in two (2) layers of 6-mil polyethylene sheeting and seal securely in place with duct tape.

G. Shut down and lock out all heating, cooling and air conditioning system (HVAC) components that are in, supply or pass through the work area. Seal all intakes and exhaust vents in the work area with tape and 6-mil polyethylene. Also seal any seams in system components that pass through work area using duct tape at a minimum. Remove all HVAC system filters and place in labeled 6 mil polyethylene bags for staging and eventual disposal as asbestos contaminated waste.

H. Lockout power to circuits running through the work area wherever possible by switching off all breakers or removing fuses serving these circuits. Contractor shall draw power from outside the work area and connect to a ground fault circuit interrupter (GFCI).

I. Emergency exits shall be provided for each work area. Exits shall be arranged so that the door is secure from outside the work area but permits exiting from the work area. These exits shall be marked in all locations with the words "Emergency Exit", clearly visible within the work areas.

J. Abatement contractor shall provide and maintain access to fire extinguishers throughout the course of all abatement work. One (1) extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of protected building area. Travel distances to nearest available extinguisher shall not exceed 100 feet.

CONTROL ACCESS

A. Permit access to the work area only through the Personnel Decontamination Unit (PDU). All other means of access shall be closed off and sealed and warning signs displayed on the clean side of the sealed access.

B. Where the area adjacent to the work area is accessible to the public, Contractor shall construct a solid barrier to ceiling level. Construct barrier with 2" x 3" wood or metal studs, 16" on center securely anchored and covered with a minimum of 1/2" (fire-rated) plywood sheathing on work area side. **Each** side of this barrier shall be covered with two (2) individual layers of 6-mil polyethylene secured with duct tape.

WARNING SIGNS

A. Contractor shall supply and post caution signs meeting the requirements of OSHA 29 CFR 1926.1101 (k) (l) at any location and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures. Signs shall be multi-lingual if necessary.

CRITICAL BARRIERS

A. Completely isolate the work area from other portions of the building and the outside by installing barriers consisting of two (2) sheets of 6-mil polyethylene taped securely in place as a minimum.

B. Seal off all windows (operable portion only!), doorways, corridor entrances, drains, ducts, grills, grates, diffusers, and any other openings between the work area and uncontaminated areas outside of the work area with two (2) layers of 6 mil polyethylene sheeting taped in place.

C. Fire-rated expandable foam may be used to seal any irregular penetrations from the work area to non-work areas. This foam may be left in place upon completion of the abatement work.

ADDITIONAL CONTROLS

A. Provide negative air pressure system to ensure a minimum of one (1) complete air change within the work areas isolation every fifteen (15) minutes, at a minimum.

B. Provide Personnel Decontamination Unit (PDU) complete with showering facility as required by OSHA 29 CFR 1926.1101 (j) (l) (i).

NEGATIVE AIR PRESSURE

A. Prior to removal, negative air HEPA ventilation system should already be installed and test run and operated in accordance with ANSI Z9.2, 29 CFR

1926 and UL 586 filters standard. All air filtration devices (AFDs) shall be vented outside the building.

B. All critical openings (i.e. windows, doors, ducts, etc.) to the outside of the building will be sealed with 2 layers of 6 mil polyethylene sheeting. Wall, ceilings, floors will not require covering with plastic sheeting since these are significantly contaminated and will be demolished after removal of ACM. However, all surfaces in the regulated work areas will be encapsulated with a sealant after removal of the ACM. This will ensure that asbestos fibers on said surfaces are locked and will not be released during demolition operations.

WET METHODS

A. In order to avoid excessive fiber release, asbestos-containing materials should be removed in a careful, deliberate manner. Prior to removal, the material should be wetted, using water that has been amended with the wetting agent, ”Serpifactant” by International Protective Coatings, that enhances penetration and surface tension of the water.(Note: When working around high temperature steam piping or live electrical equipment, material may be removed dry). Unless otherwise designated by the manufacturer, three ounces or more of wetting agent (e.g. fabric softener will do) should be mixed with five gallons of water. The material shall be thoroughly wet and removed in small sections before having a chance to dry. While still wet, the material should be promptly placed into a bag/container for disposal (refer to the Waste Disposal Procedures) and not left on the floor to accumulate. Inside the bag/container, waste shall be further wet, double bagged, and goose-neck tied.

CONTAINMENT BAG TECHNIQUE (GLOVE BAG)

A. The removal of asbestos by use of the glove bag shall be limited to the removal of asbestos-containing insulation from piping.

B. The preparation of the work area for glove bag removal shall include the following:

1. A minimum of two persons is required to perform a glove bag removal project. A third person may be required to conduct personnel air monitoring and assist with supplies.

2. The work area where the technique is to be utilized shall be sealed with critical barriers and warning signs posted on the perimeter to prevent unauthorized personnel from entering the work area. The work area shall then be placed under negative pressure for the duration of the work.

3. A mini-enclosure consisting of a single layer of six-mil polyethylene sheeting shall be installed on all surfaces immediately adjacent to the insulation being removed, as well as over any fixed equipment or items which may become contaminated upon failure of a glove-bag. Contractor will be responsible for the proper decontamination of anything contaminated due to this operation. Negative pressure and a one-stage change chamber shall also be required for this operation.

4. The Contractor shall additionally prepare each work area as follows:

   a. Construct a localized containment (tent) to be sealed with one layer of six-mil polyethylene. Polyethylene sheeting shall be supported as indicated in the Section covering Isolation Procedures.

   b. Localized negative air pressure shall be established inside the glove bags by use of HEPA vacuum at a minimum.

5. All necessary materials and supplies shall be brought into the work area before any removal begins.

C. The following is a list of recommended equipment and tools for the removal of asbestos by the glove bag technique:

1. The glove bag, which consists of a six-mil bag, fitted with long sleeve gloves, a tool pouch, and a two-inch opening used for water application;

2. A pump-up sprayer (garden type) with a two or three gallon capacity;

3. Amended water (water mixed with a surfactant);

4. Six-mil polyethylene disposal bags with the proper markings for asbestos waste;

5. A HEPA filtered vacuum with a capillary tube for insertion into the glove bag;

6. Tools such as: a small scrub brush; a utility knife for cutting the insulation; a stapler; wire cutters; smoke tubes with aspirator bulb; tin snips; duct tape; wettable cloths; and a bone saw (a serrated heavy-gauge wire with ring-type handles at each end);

7. A roll of six-mil polyethylene;

8. An encapsulant (tinted).

D. Removal procedures shall be conducted as follows:

1. A visual inspection of the pipe where the work will be performed shall be made to determine if any damaged pipe covering (broken lagging, hanging, etc.) exists. If there is, the pipe shall be wrapped in polyethylene plastic and fully secured with duct tape. This procedure will prevent high airborne fiber concentrations caused by the damaged pipe lagging, hanging several feet or yards away, from occurring during the glove bag work activity. Debris on the floor and other surfaces that have accumulated and contain asbestos must be cleaned up as necessary. If the pipe is undamaged, one layer of duct tape shall be placed around the pipe at each end of where the glove bag will be attached. This permits a good surface to which the ends of the glove bag may be sealed, and minimizes the chance of releasing fibers when the tape at the ends of the glove bag is peeled off at the completion of the job.

2. Slit the top of the glove bag open (if necessary) and cut down the sides to accommodate the size of the pipe (about two inches longer than the pipe diameter).

3. Place the necessary tools into the pouch located inside the glove bag. This will usually include the bone saw, utility knife, rags, scrub brush, wire cutters, tin snips and pre-cut wettable cloth. Cut out a donut shape in the cloth with the inner diameter one-half-inch smaller than the diameter of the pipe beneath the insulation. The outer diameter of the donut should be three inches longer than the diameter of the pipe insulation being removed. Finally, cut a slit in each of the two donuts so they can be slipped around the pipe.

4. One strip of duct tape shall be placed along the edge of the open top slit of the glove bag for reinforcement.

5. Place the glove bag around the section of material to be worked on and staple the top together through the reinforcing duct tape. Staple at intervals of approximately one inch. Next, fold the stapled top flap back and tape it down with a strip of duct tape. This should provide an adequate seal along the top. Next, duct tape the ends of the glove bag to the pipe itself, previously covered with plastic or duct tape (see step 1 above). The bottom seam of the glove bag shall be sealed with high quality duct tape or equivalent to prevent any leakage from the bag that may result from a defect in the bottom seam.

6. Using the smoke tube and aspirator bulb, place the tube into the

water sleeve (two-inch opening to glove bag). By squeezing the bulb, fill the bag with visible smoke. Remove the smoke tube and twist the water sleeve closed. While holding the water sleeve tightly, gently squeeze the glove bag and look for smoke leaking out, especially at the top and ends of the glove bag. If leaks are found, they shall be taped closed using duct tape and the bag shall be re-tested.

7. Insert the wand from the water sprayer through the water sleeve. Using duct tape, tape the water sleeve tightly around the wand to prevent leakage.

8. One person places their hands into the long-sleeved gloves while the second person directs the water spray at the work.

9. If the section of pipe is covered with an aluminum jacket, this is removed first using the wire cutters to cut any bands and the tin snips to remove the aluminum. It is important to fold the sharp edges in to prevent cutting the bag when it is placed in the bottom. A box may be put in the bottom of the bag when the tools are placed in, and the metal placed in the box to further protect the bag from being cut.

10. With the insulation exposed, using the bone saw, cut the insulation at each end of the section to be removed. Throughout this process, water is sprayed on the cutting area to keep dust to a minimum.

11. Once the ends are cut, the section of insulation should be slit from end to end using the utility knife. The cut should be made along the bottom of the pipe and water continuously supplied. Again, care should be taken when using the knife not to puncture the bag. Some insulation may have wire to be clipped as well. Again, a box may be used here as in step nine above to protect the bag from puncture.

12. Rinse all tools with water inside the bag and place back into pouch.

13. The insulation can now be lifted off the pipe and gently placed in the bottom of the bag, while the side of the insulation adjacent to the pipe is being thoroughly wetted.

14. Using the scrub brush, rags and water, scrub and wipe down the exposed pipe.
15. Wet the donut-shaped pieces of wettable cloth over the exposed ends of the insulation remaining on the pipe. An encapsulating sealer shall be applied to the substrate at this time.

16. Remove the water wand from the water sleeve and attach the small nozzle from the HEPA-filtered vacuum. Turn on the vacuum only briefly to collapse the bag.

17. Remove the vacuum nozzle, twist the water sleeve closed, and seal with duct tape.

18. From outside the bag, pull the tool pouch away from the bag. Place duct tape over the twisted portion and then cut the tool bag from the glove bag, cutting through the twisted/taped section. In this manner, the contaminated tools may be place directly into the next glove bag without cleaning. Alternatively, the tool pouch with the tools can be placed in a bucket of water, opened underwater, and the tools cleaned and dried without releasing asbestos into the air. Rags and the scrub brush cannot be cleaned in this manner and should be discarded with the asbestos waste.

19. With removed insulation in the bottom of the bag, twist the bag several times and tape it to keep the material in the bottom during removal of the glove bag from the pipe.

20. Slip a six-mil disposal bag over the glove bag (still attached to the pipe). Remove the tape and open the top of the glove bag and fold it down in to the disposal bag.

21. All surfaces in the work area shall be cleaned using disposable cloths wetted with amended water. These cloths shall be disposed of or rinsed thoroughly to eliminate visible accumulation of debris. Then, when these surfaces have been allowed to dry, all surfaces shall be cleaned again using a HEPA filtered vacuum.

22. Place any contaminated articles, debris, etc. into the bag with the waste.

23. Twist the top of the bag closed, fold this over, and seal with duct tape. Place this bag into a second six-mil disposable bag, and seal as in the above manner. Label the bag with a warning label.

24. Asbestos containing material shall be disposed of in accordance with regulatory requirements.

25. Air sampling shall be performed after completion of glove bag operations to determine if undetected leakage occurred. Once the area has been found to be safe for re-entry by unprotected personnel, the barriers may be removed.

5.a.2 PROCEDURES FOR ASBESTOS ABATEMENT IN STRUCTURALLY UNSOUND BUILDINGS/STRUCTURES

As a result of the condition of many of the buildings/structures on this site being structurally unsafe to enter, many of the convention asbestos-abatement work area isolation and engineering controls will not be able to be followed. It will be virtually impossible in many instances to create a full, negative-pressure enclosure to perform much of the asbestos abatement work.

This will apply to certain materials identified by TTI Environmental, Inc. as being asbestos-containing as well as any suspect asbestos-containing building materials, such as the suspect boiler insulation material identified in Building 6A, that may be found during the demolition process of structurally unsound buildings/structures.

USAEMI licensed asbestos workers will need to work in conjunction with the demolition contractor to segregate potential or previously identified asbestos-containing materials in these building/structures to properly containerize and dispose of these materials to the greatest extent possible.

This may involve the loaded of possible asbestos-contaminated debris directly into lines containers (lined with special bladder bags) for disposal as asbestos-contaminated. This will need to be determined on a case-by-case basis per location.

The following procedures as stated previously will still be followed:

1. ***Personnel Decontamination Unit (PDU) – a function unit shall be constructed at a remote location but in close proximity to the abatement work being performed for worker decontamination.***

2. ***Workers will use Personal Protective Equipment (PPE) as noted previously, including proper respiratory protection.***

3. ***Work areas shall be locally isolated using asbestos warning tape and OSHA asbestos warning signs to the greatest extent possible and as required.***

4. ***Identified and suspect asbestos-containing and/or contaminated materials shall be wetted during removal and remain wet while placed into disposal containers.***

5. ***All asbestos-containing waste materials shall be properly disposed and waste shipment records provided for each load.***

5.B WASTE DECONTAMINATION UNIT (WDU)

A. Water to be decontaminated will be pumped by a sump pump.

B. Water to be decontaminated will be filtered in two phases. The first phase will consist of filtering out particles 50 micrometers and larger. The second and final phase will filter the contaminated water of particle 5 micrometers and larger.

C. Water filtration equipment and procedures shall comply with 29 CFR 1910.14 (d) (3).

5.C WORK AREA DECONTAMINATION & CLEANUP

A. Gross removal shall be considered complete when no visible clumps of asbestos-containing material remain on the surface. All surfaces from which ACM was removed shall be thoroughly scrubbed with a scrub pad and mild soap solution, and wet-wiped with amended water. Special attention should be given to small horizontal surfaces, cracks and penetrations. After cleaning and successfully passing a final visual inspection by a representative of Contracting Officer, the surface will be coated with a penetrating sealant that locks all invisible residual fibers in place. Plastic sheeting on critical openings shall also be coated with a mist of the sealant.

B. Only upon receipt of final clearances report from the TEM analysis laboratory, can the containment barrier, Personnel Decontamination Unit (PDU) unit, and negative air pressure units may be removed.

C. The following decontamination procedures must be accomplished utilizing Personal Protective Clothing:

1. Air filtration system shall continue to operate to provide air changes as specified and exhausted air shall be monitored.
2. All unnecessary equipment and supplies shall be properly cleaned (or bagged for transporting to another containment and removed from the containment area).
3. After completion of cleaning operation, but before the final air clearance tests, a representative of Contracting Officer will conduct a complete visual inspection of the work area to ensure that it is dust free in accordance with ASTM E 1368. The Contracting Officer may choose to be present. If visual inspection fails, then the Contractor shall re-clean as necessary and conduct more inspections until all has passed.
4. After passing of the visual inspection, USAEMI shall spray coat all surfaces with a bridging encapsulant. The surfaces to be coated shall include, but are not limited to, surfaces from which asbestos containing materials have been removed and polyethylene which has been used to cover critical barriers, and furnishing and non-removable fixtures.
5. Upon passing of the final visual inspection, the IHT shall perform aggressive final air testing. The concentration of asbestos fibers shall not exceed 0.005 fibers per structures when analyzed via by TEM, Transmission Electron Microscopy.
6. Aggressive air sampling will be used. If the test results exceed the limits specified clean-up and test results repeated until compliance is achieved. The negative air units must be operated during re-cleaning.

7. The IHT shall certify, in writing, that the concentration of airborne fibers in control area is less than 0.01 f/cc. Do not remove the asbestos control area enclosure or roped off perimeter and caution signs prior to the Contracting Officer’s receipt of the Industrial Hygienist certification.
8. After final clean-up, remove filters on the buildings' HVAC system and provide new filters. Dispose of filters as asbestos contaminated materials. Re-establish HVAC, mechanical and electrical systems in proper working order.

6. WASTE TRANSPORTATION, DISPOSAL & PROJECT CLOSE-OUT

6.A BAGGING AND STORAGE

A. During removal, all asbestos waste (and other contaminated materials such as disposable clothing, polyethylene sheeting, etc.) must be accumulated and placed into sealed impermeable bags/containers of 6 mil thickness. The bags/containers must be pre-printed, or labeled, with the required labeling information that clearly identifies the waste as "ASBESTOS", and informs the reader of associated hazards. The DOT asbestos identification number NA 2212, as well as the name and address of the generator must also be indicated on the label.

B. All materials must be placed into the bag, while still being wet to avoid release of excessive fibers during the bagging process; and once inside the bags, materials should be further wetted.

C. Effort should be made to eliminate air pockets inside sealed bags to prevent rupture under pressure. Special caution to packing of sharp-edged materials should be exercised; drums may be used and/or sharp materials may be encapsulated and then wrapped in plastic sheeting.

D. An enclosed area for bag removal (waste/equipment Personnel Decontamination Unit (PDU)) must be constructed, when feasible, adjacent to the regulated work area. In this area, all asbestos waste, contaminated water, scrap, debris, bags, containers, equipment and contaminated clothing, shall be collected and placed in sealed leak-tight containers (e.g. double 6 mil poly plastic bags), sealed 6 mil double poly sheets, sealed fire-board boxes, drums, barrels or other approved containers.

E. Materials will be double bagged (and/or placed in containers), sealed with goose-neck ties and tape, and decontaminated (by vacuuming and/or wet-wiping) prior to being passed into the ambient atmosphere.

F. Workers bagging and loading bags shall be fully suited in disposable clothing and must wear respiratory protection.

G. Pre-filters from the buildings HVAC shall be changed (and disposed of as ACM) after removal and clearance but before the HEPA Negative Air Machines are turned off.

H. Any debris or residue observed on containers or surfaces outside of the work area resulting from clean-up or disposal activities shall be immediately HEPA vacuumed and/or wet-wiped as appropriate.

I. The container used for the storage of contaminated waste shall be an enclosed 30 cu. yd. dumpster. The dumpster shall have a solid metal roofing, solid metal door with padlock; open top dumpsters will not be permitted. The container shall be layered with 6 mil plastic sheeting all around.

J. The location of the dumpsters shall be at the direction of the BCE and the Contracting Officer.

K. No materials shall be thrown from the windows or the doors of buildings.

L. Interim storage of asbestos waste bags/drums shall not be permitted outside the work area (with the exception of a dumpster) without the prior approval of the BCE and the Contracting Officer.

6.B WASTE TRANSPORTATION

A. Where applicable laws exist, asbestos waste must be transported from the job site to the landfill by a licensed Asbestos Transporter/Hauler. The transporter must possess a valid Hauler permit, obtainable from the Department of Health or other appropriate agency. Additionally, each hauling vehicle must, wherever applicable, be registered as an Asbestos-Hauling vehicle. A warning and Department of Transportation (DOT) label shall be affixed or preprinted on each bag.

B. Procedure for hauling of asbestos waste shall comply with 40 CFR 61, Subpart M, 40 CFR 241 and 257, and State, regional and local standards.

C. When moving bags/containers, the Contractor shall utilize hand trucks, carts and proper lifting techniques to avoid injuries.

D. All routes through the building (hallways, elevators, stairways, etc.) to be used for the transportation of contaminated waste shall be at the direction of the BCE and/or the Contracting Officer.

E. Personnel loading asbestos shall wear personal protective clothing, half-face air-purifying HEPA-equipped respirators.

6.C WASTE DISPOSAL

A. Procedure for disposal of asbestos waste shall comply with 40 CFR 61, Subpart M, 40 CFR 241 and 257, and State, regional and local standards.

B. All asbestos waste shall be taken to a landfill that is licensed and qualified to accept asbestos for final burial. For small loads and wherever applicable, asbestos waste may be hauled to a branch location to be individually manifested, but accumulated with other loads. Eventually, but within 100 hours, the waste will be transported to the landfill.

C. Upon reaching the landfill, trucks/haulers shall approach the dump location as closely as possible for unloading of the asbestos containing waste.

D. Personnel unloading containers at the disposal site shall wear personal protective clothing and respiratory protection.

E. All non-asbestos debris generated at the site shall be segregated from the asbestos waste. Non-asbestos waste shall be removed daily and the premises left neat and

cleaned at the end of each work shift Special attention shall be given to restricting the spread of dust and debris within the regulated work area.

6.D MANIFESTING

A. For every load of asbestos waste, copies of delivery ticket, shall be prepared, signed and dated by an agent of the landfill, certifying the amount of asbestos materials delivered. The Contracting Officer shall receive copies of this within 3 working days after delivery.

B. The manifest shall indicate the names and addresses of the facility owner (generator), the transporter, and landfill, the specific identification numbers to each of the above, as well as the DOT identification number NA 2212 and the contract number, and the type, percentage of asbestos and quantity of waste.

6.E CLOSING DOCUMENTATION

A. The following items must be submitted to the Contracting Officer before payment is made to USAEMI and approved post submittal.

B. Copies of the daily log beginning on commencement of the work through final clearance showing: the name of the person, the date, entering and leaving time and type respirator used for all persons who enter the work area (submitted weekly).

C. Manifest(s) signed by the landfill operator with date or information on the material delivered and quantity.

D. Air sampling sheets and laboratory results from OSHA compliance sampling on workers, areas and backgrounds.

E. Any other documents required by the Contract Documents and Contracting Officer.

7. EMPLOYEE TRAINING PROGRAM

A. USAEMI Employees are trained in the proper handling of and protection against Asbestos Containing Materials are currently certified under US EPA-AHERA.

B. All USAEMI workers and supervisors hold appropriate asbestos State certifications and valid licenses.

C. All USAEMI employees will receive at least an 8 hour refresher course annually for the original and appropriate certification obtained.

D. All USAEMI employees understand the health implication and risks involved in the handling of Asbestos-Containing Materials, and have signed a Worker's Risk Acknowledgment form.

E. All USAEMI employees are given a Respiratory Fit Test at least every six months by a company designated Competent Person.

8. EMERGENCY PROCEDURES

8.A POWER FAILURE

A. Should a loss of power occur, all work will be stopped and the occupants evacuated until power can be restored. An attempt will be made to restore power by resetting electrical circuit breakers, replacing fuses, and checking extension cord connections.

B. If power cannot be restored within one hour an emergency generator will be brought on line, and an electrician called to restore power.

NOTE: All power to the work area must be from a GFIC (Ground Fault Interrupt Circuit).

C. Removed ACM is to be misted with amended water to keep from drying and becoming more friable, and should be bagged if possible.

D. The air inside the work area will also be misted with amended water.

E. Containment is to remain intact, and the flaps of the Personnel Decontamination Unit (PDU) entrance sealed after last person leaves the work area.

8.B FAILURE OF NEGATIVE AIR

A. In the case of power failure to the negative air filtration machines, follow power failure responses above.

B. For occupied buildings, if power is not restored in 30 minutes, an emergency generator will be brought on line until power is restored.

C. Removed ACM is to be misted with amended water to keep from drying and becoming more friable, and should be bagged if possible.

D. The air inside the work area will also be misted with amended water.

E. At least one backup air filtration machine must be on job site, in case a machine fails to provide its required negative pressure.

8.C EMERGENCY EXIT PLAN

The Emergency Exit Plans for each building will be developed in accordance with 29 CFR 1910.37 and 29 CFR 1910.38.

A. Emergency and fire exit plans will be made for each work area of the project. Personnel will be trained and drilled on proper emergency exit procedures. These procedures and routes in a simple sketch of the building will be posted in the clean room of the Personnel Decontamination Unit (PDU) chamber along with emergency

telephone numbers. Prior to commencing asbestos removal, the Contractor's Competent Person shall clearly identify and train to all workers on the emergency and fire exits from the work area. These exits will be maintained on a routine basis.

B. Mark exits from work area and post directional arrows according to plan when exits are not visible from remote work areas. This can easily be done by using duct tape on polyethylene walls and barriers.

C. NOTE: Some emergencies are considered greater than an asbestos hazard; thus, Personnel decontamination procedures may be bypassed and containment breached for the health and safety of the workers during a fire emergency.

D. The supervisor will establish a system for alerting workers of a fire or other emergencies requiring evacuation of the work area. All persons entering the work area should be familiar with this evacuation alarm signal and the primary and secondary exits.

E. In case of a medical emergency, aid shall be rendered to a seriously injured worker without delay. Pathway shall be cleared for medical personnel; and someone should be instructed to guide the medical team to the scene. Moreover, proper Personnel decontamination procedures to exit from the work area is not required, but recommended whenever possible.

F. When an emergency should occur, abatement will cease, but engineering control methods such as wet-methods and negative air pressure shall resume to prevent the potential of fiber release into non-contaminated areas.

8.D FIRE EMERGENCY RESPONSE

This Fire Response Plan has been developed in accordance with 29 CFR 1926.150, 29 CFR 1926.151, and 29 CFR 1910.38.

A first aid kit along with a fire extinguisher will be located in the clean room of the Personnel Decontamination Unit (PDU) chamber at all times.

A. In case of fire emergency, cease all work activities and pull the nearest fire alarm, alert your fellow workers and evacuate the work site in an orderly fashion through the nearest emergency/fire exit.

B. NOTE: A fire hazard is considered greater than an asbestos hazard; thus, Personnel decontamination procedures may be bypassed and containment breached for the health and safety of the workers during a fire emergency.

C. Contact the fire department immediately (Emergency numbers will be posted in the clean room of Personnel Decontamination Unit (PDU). Dial 911 if necessary.

8.E MEDICAL EMERGENCY RESPONSE

This Medical Emergency Plan has been developed in accordance with 29 CFR 1926.150.

A first aid kit along with a fire extinguisher will be located in the clean room of the Personnel Decontamination Unit (PDU) chamber at all times.

A. In the case of life-threatening emergency, pull the nearest fire alarm, alert your fellow workers and take the nearest exit out, disregarding all critical barriers.

B. In case of injury, assist your fellow worker through the Personnel Decontamination Unit (PDU) chamber. Then call the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU).

C. In the case of life-threatening injury, disregard critical barriers and take injured person through the nearest exit out. Then call the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU).

D. In case of heat stroke or exhaustion, assist your fellow worker through the Personnel Decontamination Unit (PDU) chamber. Instruct someone to call the emergency number for medical help which is posted in the clean room of the Personnel Decontamination Unit (PDU), and proceed by first aid procedures aimed to decrease body temperature.

8.F BREECH OF THE ENCLOSURE AND EMERGENCY CLEAN-UP

A. Breech in the enclosure shall be repaired immediately after acknowledgment.

B. Affected area shall be evacuated, if occupied, by and at the direction of the CIH and the Contracting Officer.

C. All HVAC systems servicing the affected area will be shut down or temporarily modified as instructed by the CIH and/or Contracting Officer.

D. USAEMI shall respond immediately to the directions of the CIH and the Contracting Officer.

E. All personnel entering the affected area shall be required to wear full body protective coveralls and respiratory protection as described in this asbestos abatement plan.

F. USAEMI shall seal off the area by closing all doors and posting warnings signs along the perimeter of the area, and allow entrance to area only to necessary personnel.

G. USAEMI shall install HEPA negative air units (vented to the outside) in the affected area during clean-up operations.

H. Any damaged ACM shall be repaired to the satisfaction of the CIH, IHT and/or the Contracting Officer, or USAEMI shall remove the asbestos to the extent indicated.

I. The entire area shall be cleaned via HEPA vacuum and wet-wiping techniques starting from the uppermost areas and working down to ground level. All items in the affected

area are to be thoroughly cleaned and decontaminated (or properly disposed as asbestos contaminated), including all light fixtures, HVAC system, books, personal items, etc., to the satisfaction of the CIH, IHT and/or the Contracting Officer.

J. Dispose of all debris, filters, mop-heads, and cloths in sealed, leak-tight, appropriately labeled containers as asbestos-containing materials.

K. The IHT will provide air monitoring during and after clean-up operations. This will include air sampling and surface dust sampling to ensure that all asbestos fibers have been removed from the area. Airborne concentrations shall not exceed 0.010 Fiber/cc of air when analyzed by NIOSH Method 7400. Should analysis show concentrations above this level or surface dust samples reveal the presence of asbestos. USAEMI will re-clean the entire work area immediately until it meets the standards listed herein.

APPENDICES

SITE/HAUL ROUTE PLAN

ACCESS AND HAUL ROAD PLAN

1. All areas of the project including doorways, stairs, garages, grounds, driveways and rooms are to be kept clear of debris at all times. Danger - Hard Hat Areas signs will be posted.

2. All roadways and sidewalks are to be kept clear and open. Speed limits will be strictly observed.

3. The Contractor will be responsible for snow removal and/or ice removal within his work area while under construction.

4. During work hours all doors in each unit under construction is to be kept unlocked and in working order.

5. Roof is to be accessed well away from all overhead utilities. Special conditions are to be observed at utility and service runs.

It will be the Superintendent and Project Safety Officer's responsibility to maintain this plan.

Safe means of access and egress shall be provided and maintained to all working places. All passageways, stairways, gangways and access ways shall be kept free of materials, debris, and obstructions at all times.

Appropriate signage will be posted to inform employees of particular hazards throughout the project. Following each Phase-Hazard Analysis review, other notices will be posted as necessary.

Under the direction of the Project Safety Officer each superintendent and foreman will have the responsibility of observing any safety deficiencies regarding access/egress and taking what measures are necessary to remove these hazards in a timely fashion. Housekeeping is considered to be a cooperative effort.

In addition to the specific sections of EM385-1-1 Manual, OSHA Standards, BOCA and other pertinent codes, the following standards will be highlighted.

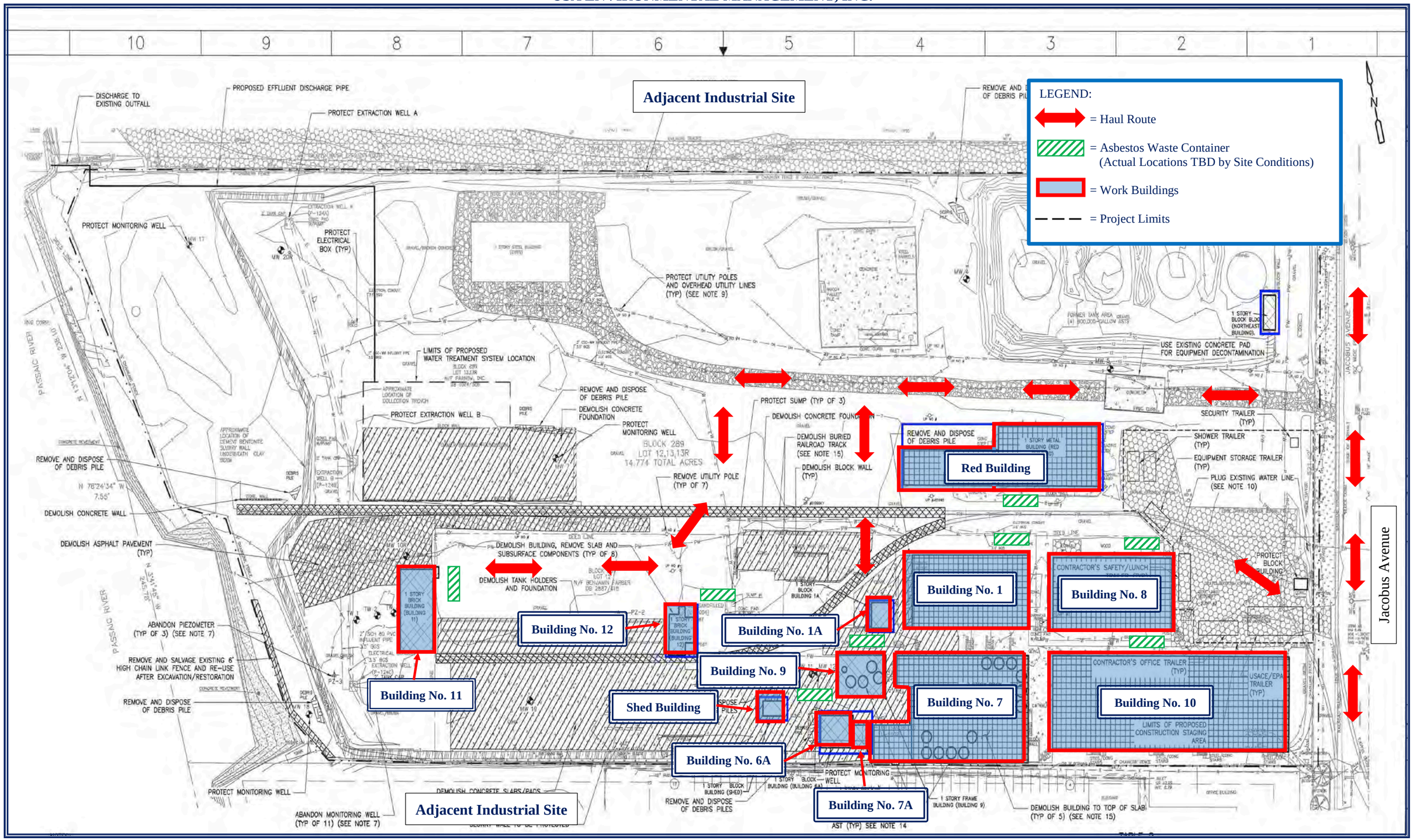
> Self-propelled equipment that is to be used on the project will be inspected upon arrival at the project to determine that it is in a safe operating condition, will meet the required safety standards and is approved for use by the Contracting Officer.
>
> Equipment shall be inspected daily by the Project Safety Officer. Equipment defects affecting safety will be noted and shall be corrected before the equipment is used. This determination shall be made by the Project Safety Officer or his designee.

Operators shall be certain, by signal or other means that all persons are clear before starting or moving equipment.

Equipment operating speeds shall be consistent with conditions of roadways, grades, clearance, visibility, traffic, and the type of equipment used. Mobile equipment operators shall have full control of the equipment while it is in operation.

Mobile equipment will be equipped with an automatic back-up alarm warning devices.

Roll-over protective structures (ROPS) will be used in accordance with the appropriate standards referenced in OSHA Standards.



Syncon Resins Superfund Site – Site Plan/Haul Routes for Asbestos Abatement Work

Typical Asbestos Work Area Isolations

and/or Control Area Statement

TYPICAL ASBESTOS WORK AREA ISOLATIONS AND/OR CONTROL AREAS

USA Environmental Management, Inc. (USAEMI) has included in the Asbestos Abatement and Disposal Plan diagrams of potential work area isolations and/or control areas that may be applicable to certain areas of asbestos abatement on this project.

While the diagrams show a schematic of a typical full work area isolation enclosure (Diagram No. 1), it should be noted here that this type of setup may in fact be impossible to create based upon the existing condition of the structures on this site.

It will be more likely that the localized work control area approach (Diagram No. 2) will be the method of choice given the working conditions. This approach could be used not only for miscellaneous pipe/fitting insulation abatement work using the Glove Bag removal technique but also for the areas involving the removal of asbestos-containing roofing material and window glazing as well.

Each approach will be modified as necessary based on the condition of the structure as well as the location within the structures and types of asbestos-containing material to be abated.

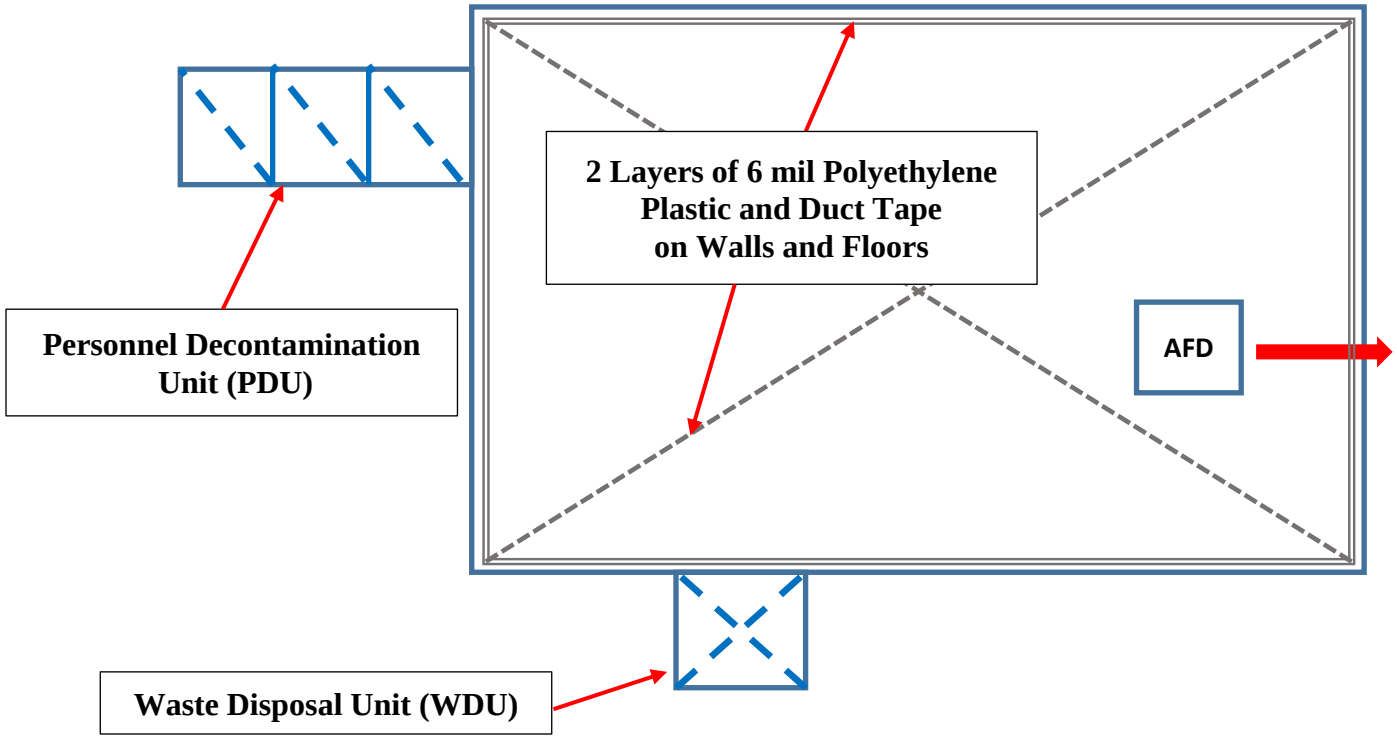
8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Tel: (215) 365-5810 ♦ Fax: (215) 365-5870 ♦ Web: www.usaemi.com

Typical Asbestos Work Area Isolations

and/or Control Area Diagrams

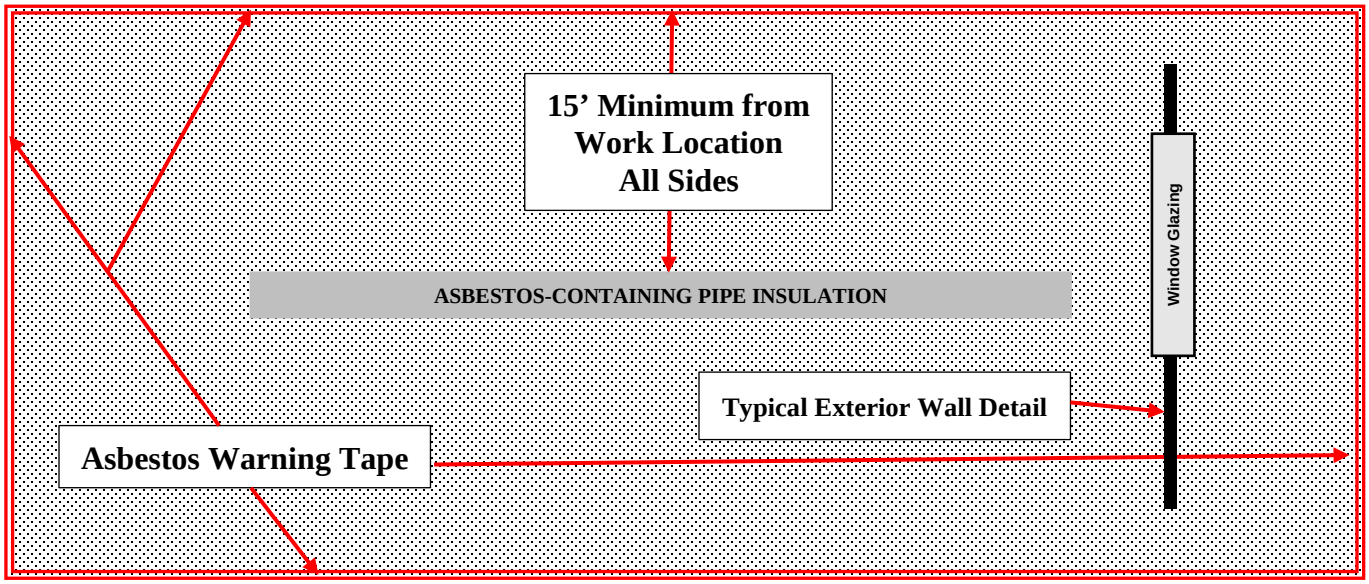
Full Enclosure Work Area (Schematic Diagram)

Diagram No. 1



Localized Asbestos Abatement Control Area

Diagram No. 2



Pipe/Fitting Insulation -
Roofing Material -
Window Glazing -

FIRE PREVENTION PLAN

Fire Prevention and Protection Plan:

Recommendations of NFPA shall be complied within situations not covered by EM 385-1-1 Safety Manual. Local BOCA Building Code is referenced for further protective measures. The more stringent codes shall apply.

Prior to the start of work, arrangements shall be made for fire protection, ambulance service, medical facilities to be available for prompt attention to the injured and consultation on occupational health.

Emergency medical response teams and full treatment hospital facilities are available within approximately seven miles of the project and response time is considered to be less than twenty minutes.

Fire and rescue response team is available within approximately .5 miles with minimal emergency response time. Notification will be given to the appropriate response crews as to location and expectations at the project site.

Emergency rescue crews will be apprised of emergency circumstances and will be met and directed at the site access for further direction.

Fire fighting equipment, which is provided on the project site, shall be strategically located, and readily accessible, plainly marked, properly maintained and inspected periodically. Records shall be kept of such inspections. Equipment shall be of the appropriate type, adequate in number and size for the particular fire hazard involved.

Flammable and combustible liquids shall be in a storage building. They shall be in a posted NO SMOKING area and separated from combustible construction and other stored materials by 50 feet.

Accumulation of flammable and combustible liquids on floors, walls, etc., shall be cleaned up immediately.

Air Monitoring Protocol

Air Monitoring Statement

OSHA WORKER EXPOSURE MONITORING

USA Environmental Management, Inc. (USAEMI) will self-perform all OSHA required personal exposure monitoring for workers performing asbestos abatement work on this project.

Samples will be acquired per OSHA requirements and a Chain-of-Custody (COC) completed for each sample group. Samples along with the COC will be submitted to a 3rd party analytical laboratory specializing in asbestos air sample analysis.

The laboratory to be used for this purpose on this contract is as follows:

EMSL Analytical, Inc.
200 Rt. 130 North
Cinnaminson, New Jersey

Office: 1-800-220-3675
Fax: (856) 786-5974

USAEMI will perform all required initial exposure assessments and ongoing exposure assessments as required by the OSHA regulation 29 CFR 1926.1101 Asbestos Standard on this project.

Please note that all other monitoring of the asbestos abatement being performed by USA Environmental Management, Inc. on this project, other than our required OSHA Worker Exposure Monitoring/Analysis, shall be performed by OTHERS.

Employee Exposure Monitoring Program

EMPLOYEE EXPOSURE MONITORING PROGRAM

Any time fiber concentrations do exceed or will most likely exceed the PEL, USAEMI will establish a regulated work area in order to control airborne concentrations of fibers. Persons entering the area are required to wear personal protective clothing and proper respiratory protection. Employee exposure monitoring will be performed in accordance with Section A below.

Personal monitoring measures the airborne fibers in the worker's breathing zone. Area monitoring measures the airborne fibers inside an enclosure as well as outside the enclosure to ensure that contaminated fibers do not enter the "clean" areas.

1. Definitions

a) The Permissible Exposure Limit (PEL) means airborne concentrations of asbestos of 0. 1 fibers/cubic centimeter as measured over an 8-hour, time-weighted average (TWA). Note: this was changed from 0.2 f/cc under the revised asbestos standards in the August 12, 1994 Federal Register;

b) The Excursion Limit (EL) means airborne concentrations of asbestos of 1.0 f/cc as averaged over a 30-minute period.

Note: The Action Level which was 0.1 f/cc, was eliminated under the revised asbestos standards in the August 12, 1994 Federal Register.

2. Employee Air Monitoring Program

Personal samples shall be collected with a low constant-flow pump and open-face filter cassette. Air flow rates shall be between 0.5 liters/min. and 2.5 liters/min. when using a 25-ram cassette. The cassette shall be attached to the pump with a length of plastic tubing. The cassette will be pinned, clamped or otherwise securely attached on the forward part of the shoulder of a worker in an acceptable manner. The person being monitored shall be the person with the greatest risk of encountering asbestos fibers. The sample will be taken in the breathing zone of the worker, six (6) to nine (9) inches forward of the shoulders. The cassette's exposed filter surface shall be positioned so that it points downward. The pump shall remain attached to the body of the worker and shall run until conditions as described are met to produce a filter fiber density of 100 to 1,300 fibers per square millimeter in accordance with 29 CFR 1926.1101, Appendix B, which follows.

At a minimum*, 5 samples will be run:

- 2 work area (1 sample for each shift, for each employee in each job classification in each work area)

- 1 short term exposure limit (EL or ST.EL.) (30 mins.)
- 2 field blanks

*if fiber concentrations are higher, 2 cassettes per shift are recommended.

A. Sampling is performed as follows:

1. *Initial Monitoring:* At the initiation of each asbestos job, to accurately determine the airborne concentrations of asbestos fibers, USAEMI will perform initial monitoring. The exception is when employee exposure limits obtained during workplace operations conducted under workplace conditions closely resembling the processes, type of ACM, control methods, removal procedures and environmental surroundings, etc., indicate limits acceptable for respiratory protection used; and if product or material information of ACM demonstrates that airborne fibers cannot exceed the EL.

2. *Periodic Monitoring* USAEMI will perform daily monitoring that is representative of the exposure of each employee within the regulated area. Periodic monitoring is not required when using supplied-air respirators in the positive-pressure mode.

3. *Termination of Periodic Monitoring* when the periodic monitoring indicates that employee exposure is below the exposure level, employee monitoring may be halted, only the for the employees whose exposures are represented by data gathered.

4. *Additional Monitoring* whenever there is a change in the process or control methods/equipment used during abatement, periodic monitoring must be initiated again, until representative data is gathered indicating airborne fibers are under the and EL.

5. *Method of Monitoring all* samples taken under this employee monitoring program are personal samples, collected following procedures set forth in 29 CFR 1926.1101, Appendix B. Only those portions associated with Method of Sampling are provided, as follows:

3. Detailed Procedure for Asbestos Sampling and Analysis-Non Mandatory.

Asbestos Sampling

Technique: Microscopy, Phase Contrast.

Analyte: Fibers (Manual count)
Sample Preparation: Acetone/triacetin method.
Calibration: Phase-shift detection limit about 3 degrees.
Range: 100 to 1300 fibers/ram-2 filter area.

Estimated Limit of Detection: 7 fibers/mm-2 filter area.
Sampler: Filter (0.8-1.2 um mixed cellulose ester membrane, 25-mm diameter).
Flow rate: 0.5 L/min to 2.5 L/min (25-mm cassette); 1.0 L/rain to 2.5 L/min (3 7-mm cassette).
Whenever a 37-mm cassette is used, a written justification must accompany the test results. Sample Volume: Adjust to obtain 100 to 1300 fibers/ram-2. Shipment: Routine.
Sample Stability: Indefinite.
Blanks: 10% of samples (minimum 2).
Standard Analytical Error: 0.25.

Applicability: the working range is 0.02 f/cc (1920-L air sample) to 1.25 f/cc (400-L air sample). The method givens an index of airborne asbestos, fibers but may be used for other materials such as fibrous glass by inserting suitable parameters into the counting rules. The method does not differentiate between asbestos and other fibers. Asbestos fibers less than ca. 0.25 um diameter will not be detected by this method.

Interferences: any other airborne fiber may interfere since all particles meeting the counting criteria are counted. Chain-like particles may appear fibrous. High levels of nonfibrous dust particles may obscure fibers in the field of view and raise the detection limit. Reagents:

1. Acetone.
2. Triacetin (glycerol triacetate), reagent grade.

Special Precautions

Acetone is an extremely flammable liquid and precautions must be taken not to ignite it. Heating of acetone must be done in a ventilated laboratory fume hood using a flameless, spark-free heat source.

Equipment

1. Collection device: 25-mm cassette with 50-mm electrically conductive extension cowl with cellulose ester filter, 0.8 to 1.2 nun pore size and backup pad.

   NOTE: Analyze representative filters for fiber background before use and discard the filter lot it more than 5 fibers/100 fields are found.

2. Personal sampling pump, greater than or equal to 0. 5 L/min, with flexible connecting tubing.

3. Microscope, phase contrast, with green or blue filter, 8 to 10 X eyepiece, and 40 to 45X phase objective (total magnification ca 400X); numerical aperture=0.65 to 0.75.

4. Slides, glass, single-frosted, pre-clean, 25 X 75 mm.

5. Cover slips, 25X25 mm, no. 1-1/2 unless otherwise specified by microscope manufacturer.
6. Knife, #1 surgical steel, curved blade.

7. Tweezers.

8. Flask, Guth-type, insulated neck, 250 to 500 ml (w/single-nosed rubber stopper and elbow-jointed glass tubing, 16 to 22 cm long).

9. Hotplate, spark-free, stirring type; heating mantle; or infrared lamp and magnetic stirrer.

10. Syringe, hypodermic, with 22-gauge needle.

11. Graticule, Walton-Beckett type with 100 um diameter circular field at the specimen plane (area-0.00785 mm-2). Type G-22. The graticule is custom-made for each microscope.

12. HSE/NPL phase contrast test slide, Mark II. 13. Telescope, ocular phase-ring centering. 14. Stage micrometer (0.01 mm divisions).

Sampling

1. Calibrate each personal sampling pump with a representative sampler in line. Flow rates shall be between 0.5 liters/min. and 2.5 liters/mm. when using a 25-mm cassette. A 37-mm cassette may be used if necessary, but written justification must accompany the sampling results.

2. Fasten the sampler to the worker's lapel as close as possible to the worker's mouth. Remove the top cover from the end of the cowl extension (open face) and orient face down. Wrap the joint between the extender and the monitor's body with shrink tape to prevent air leaks.

3. Each set of samples taken will include 10% field blanks or a minimum of 2 field blanks. These blanks will come from the same lot as the filters used for sample collection. The field blank results will be averaged and subtracted from the analytical results before reporting. A set consists of any sample or group of samples for which an evaluation is made. Any samples represented by a field blank having a fiber count in excess of the detection limit of the method Being used will be rejected. Remove the caps from the field blank cassettes and store the caps and cassettes in a clean area (bag or box) during the slumped period. Replace the caps in the cassettes when sampling is completed.

4. Sample at 0. 5 L/min or greater. Do not exceed 1 mg total dust loading on the filter. Adjust sampling flow rate, Q (L/min), and time to produce a fiber density, E (fibers/mm-2), of 100 to 1300 fibers/m-2 [3.85 X 10-4 to 5 X 10-5 fibers per 25-ram filter with effective collection area (Ae=385 mm-2)]. Calculate the minimum slumped time at the EL (f/cc) of the fibrous aerosol being sampled.
5. Remove the field monitor at the end of sampling, replace the plastic top cover and small end caps, and store the monitor.

6. Ship the samples in a rigid container with sufficient packing material to prevent jostling or damage. Do not use polystyrene foam in the shipping container because of electrostatic forces, which may cause fiber loss from the sample prefilter.

B. Reporting is performed as follows:

(a) Affected employees are notified as soon as possible following receipt of monitoring results, in writing, as follows:

(i) individually;
(ii) job-site posting; or
(iii) centrally located place accessible to all affected employees.

(b) If the monitoring results indicate fiber levels at or exceeding either the PEL or the excursion limit, the written notification will include the corrective action being taken to reduce the exposure levels to or below the PEL or excursion limit.

(c) Samples of Personnel Monitoring Reports for Asbestos and Lead exposure follow.

C. Observation of Monitoring

1. Any affected employee or his/her designated representative has an opportunity to observe USAEMI's employee exposure monitoring. USAEMI will provide all necessary personal protective clothing and respiratory equipment.

Asbestos Personal Exposure Monitoring Report

SAMPLE

USA Environmental Management, Inc. Run Date: 1/20/2004

Personnel Monitoring Record

ASBESTOS

Contract No. : DACW61-00-C-0044
Project Name : Roof Replacement - Bldg. 52
Project Phase/Location : Fort Mifflin Distribution Center, Philadelphia, PA

Sampling Date: 12/16/1998 **Certificate of Analysis Date:** 1/6/1999
Employee : John Doe SS # : 000-00-0000 Crew Size: 6

Sample No.	Activity	Analysis Result (f/cc)	Time (minutes)	Calculation
0-1-1	Boiler Ins. Rem.	0.240	30	7.200
0-1-2	Boiler Ins. Rem.	0.040	120	4.800
0-1-3	Boiler Ins. Rem.	0.023	180	4.140
-	Lunch	0.000	45	0.000
-	Suitups Outside	0.000	105	0.000
				0.000
		Total Time:	[illegible] TOTAL	16.140
	TWA Divisor =	480	TWA	**0.034** f/cc
			30 Minute Excursion	**0.240** f/cc

Sampling Date: 12/17/1998 **Certificate of Analysis Date:** 1/6/1999
Employee : John Doe SS # : 000-00-0000 Crew Size: 6

Sample No.	Activity	Analysis Result (f/cc)	Time (minutes)	Calculation
1-1-1	Removal Cleanup	0.360	30	10.800
1-1-2	Removal Cleanup	0.021	150	3.150
1-1-3	Removal Cleanup	0.013	240	3.120
-	Lunch	0.000	45	0.000
-	Suitups Outside	0.000	15	0.000
				0.000
		Total Time:	480 TOTAL	17.070
	TWA Divisor =	480	TWA	**0.036** f/cc
			30 Minute Excursion	**0.360** f/cc

Sampling Date: **Certificate of Analysis Date:**
Employee : SS # : Crew Size:

Sample No.	Activity	Analysis Result (f/cc)	Time (minutes)	Calculation
				0.000
				0.000
				0.000
				0.000
				0.000
				0.000
		Total Time:	0 TOTAL	0.000
	TWA Divisor =	480	TWA	**0.000** f/cc
			30 Minute Excursion	**0.000** f/cc

SAMPLE

Page 1 of 1

Worker Personal Exposure Sampling Methodology/ Analytical/TWA Calculation Procedures

Worker Personal Exposure Sampling Methodology/Analysis/TWA Calculation Procedures

Personal samples reveal the level of workers' exposure during each stage of asbestos abatement work. The results are used to determine proper respiratory protection and engineering methods. Low-Volume pumps with properly attached cassettes are used to take samples from the workers breathing zone.

Usually, most of the information regarding fiber concentration within the work area comes from the personal monitoring of the workers. OSHA Standards 29 CFR 1910.1001 and local and federal regulations require monitoring of all employees exposed to airborne asbestos fibers. Typically, personal monitoring of workers on an abatement project is **not** one of the responsibilities of the third party Industrial Hygienist (IH) hired by the owner. However, you may be asked to perform personal monitoring by the building owner. Therefore, it is important for the Industrial Hygienist to understand the purpose and proper procedures for conducting OSHA worker exposure sampling.

OSHA worker exposure sampling requires the determination of the Permissible Exposure Limit (PEL). The PEL is defined as follows: "The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fibers per cubic centimeter (f/cc) of air as an eight (8) hour Time Weighted Average (8hr-TWA)." OSHA also requires the determination of the Short Term Exposure Limit (STEL). The current STEL is defined in as follows: "The employer shall insure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 f/cc of air as averaged over a sampling period of thirty (30) minutes." These samples are collected at times when employee exposure is expected to be highest.

A 25mm cassette should be fixed inside a worker's "breathing zone" as close to the mouth and nose as possible without interference between the cassette and the openings of the respirator tract. The cassette is attached by a section of clear flex tube to a low volume pump located at the worker's waist area. Changing cassettes must be done in the work area. No cutting of critical barriers in order to change cassettes is permitted. The change of the cassettes and the start/finish of sampling must be done by the IH personally. Pump flow rate during personal monitoring should be between 0.5 and 2.5 liters per minute (LPM). Pump flow rate must be checked at least twice for each cassette. In case flow rate fluctuations exist, the pump must be checked at least every hour and any variations logged.

The IH must check the flow rate initially, when removing a cassette and when inserting a new cassette. The flow rate of a pump should be checked with a secondary calibration device (rotometer), such as a Dwyer rotometer. A log containing dates and times of calibration for each rotometer must be maintained and made available upon request for inspection by any regulatory inspector. See Section VI.H. - Rotomer Calibration for more detail.

An 8hr-TWA concentration is needed to establish workers' personal exposure to airborne asbestos fibers. Therefore, all the measurements and calculations must be performed accurately and by using the following formula:

FORMULA 1:

The TWA formula for a work day is as follows:

$$TWA = \frac{Ca*Ta+Cb*Tb+\ldots\ldots Cn*TN}{480}$$

Where:
- Ta = The time of the first exposure period
- Ca = The concentration in period "a'
- Tb = Another time period
- Cb = The concentration during period "b'
- Tn = The final time period
- Cn = The concentration during period 'n"

EXAMPLE 1

A worker arrived on site at 8:00 AM., entered the work area at 8:20 A.M., left the work area for a lunch break at 11:20AM, came back to the work area at 12:20 p.m. and finished working at 3:00 p.m. He was monitored when working inside the containment The concentrations were from: 8:20 a.m. to 11:20a.m., 2.40 f/cc: from 12:20 p.m. to 3:00 p.m., 1.62 f/cc. Calculations:

$$TWA = \frac{0x20+2.40x180+0x60+1.62x\ 160}{480} = 1.44 f/cc$$

NOTE: Exposure is assumed to be zero (0) to take account for rest periods, meal break, etc.

EXAMPLE 2

A worker was exposed for:

20 minutes to concentration 0.0 f/cc
150 minutes to concentration 0.95
60 minutes to concentration 0.0
150 minutes to concentration 1.06
60 minutes to concentration 0.0
200 minutes to concentration 1.24

$$TWA = \frac{0x20 +0.95x150+0x60+ 1.06x150 +0x60+1.24x200}{480} = 1.14 f/cc$$

NOTE: Even if the time that the worker spent inside the containment was longer than 480 minutes, we still use the denominator 480.

NOTE: Exposure is assumed to be zero (0) to take account for rest periods, meal break, etc.

If the flow rates, when checked vary, do not try to adjust the flow rate to the initial reading. Write the new flow rate instead, and calculate the time – weighted average using the following formula:

EXAMPLE 3

Time 8:20-flowrate 2.00 LPM
Time 9:20-flow rate 1.95 LPM
Time 10:20-flow rate 1.80 LPM

$$\text{Volume} = \frac{(2.0 + 1.95)\text{x } 60}{2} + \frac{(1.95 + 1.80)\text{x } 60}{2} = 231.0 \text{ liters}$$

1.975x60 + 1.875x60 = 231 liter
Or
237 + 225 =462 \2 = 231.0 liters

The calculated volume will be used in determining the concentration for the exposure period.

Remember, every time you change the cassette, check and log the flow rate. Collect at least 10 percent blank samples or a minimum of two (2) blank samples.

Every two days fully discharge the battery in a personal pump by running it until it stops and then recharge.

It is important to establish a TWA for each job classification, not just for those performing the actual asbestos abatement work. Examples of other job classifications include: Workers Applying Surfactant, Picking up Debris and Placing in Bags, Vacuuming and Placing Bags in the Dumpster. As a rule of thumb, 25 percent of the workers in each classification should be monitored during each shift. OSHA requires that both the PEL and the STEL be determined for these different job classifications.

Once the TWA has been determined for each job classification, you can use this information to check if the level of protection provided by the respirators being used by the workers is adequate. To check the level of protection, the concentration outside respirator (your TWA value) should be divided by the respirator's protection factor. The respirator protection is adequate if the concentration inside the respirator is less than or equal to the PEL of 0.l f/cc over an 8hr-TWA period as established by OSHA.

If the concentration inside the respirator is higher than 0.1 f/cc, the respirator should be substituted for a more efficient one. See example 4 below. Upgrading the respirator protection should take place in the clean room after the worker has completed the decontamination procedure.

EXAMPLE 4

TWA: Total fiber concentration 2.03 f/cc
We assume workers exposure to be 3.00 f/cc

RESPIRATORY PROTECTION: Half-Mask Air Purifying Respirator Protection Factor. (OSHA 1910.1001, Table 1) 10x

ACTUAL WORKERS EXPOSURE: 3.00: 10=0.3 f/cc

PERMISSIBLE EXPOSURE LIMIT: 0.1 F/CC over an 8-hour TWA

CONCLUSION: The Respiratory Protection was not adequate.

RESPONSE ACTION: Provide full face AP Respirator with a protection factor of 50x or provide PAPR with a protection factor of 100x.

EMSL Analytical, Inc.

State of New Jersey
Department of Environmental Protection
Certifies That

EMSL Analytical Inc

Laboratory Certification ID # 03036

is hereby approved as a

Nationally Accredited Environmental Laboratory

to perform the analyses as indicated on the Annual Certified Parameter List
which must accompany this certificate to be valid

having duly met the requirements of the

Regulations Governing the Certification of
Laboratories and Environmental Measurements N.J.A.C. 7:18 et. seq.

and

having been found compliant with the 2009 TNI Standard approved by the

The NELAC Institute

Expires June 30, 2017

Michele M. Potter
Interim Manager

NJDEP is a NELAP Recognized Accreditation Body

This certificate is to be conspicuously displayed at the laboratory with the annual certified parameter list in a location on the premises visible to the public. Consumers are urged to verify the laboratory's current accreditation status with the State of NJ, NELAP.

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 09/21/2016 until 06/30/2017

Laboratory Name: EMSL ANALYTICAL INC Laboratory Number: 03036 Activity ID: NLC160006
200 RT 130 NORTH
Cinnaminson, NJ 08077

Category: AE01 -- Inorganics - Non-Metals Analysis

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	AE01 .00310	AE	Gravimetric	[EPA 40 CFR Part 50, App. J]	Particulate Matter

Category: AE02 -- Inorganics - Metals Analysis

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Deseription	Approved Method	Parameter Description
Certified	Yes	NJ	AE02 .00750	AE	ICP/MS	[EPA 40CFR50, 2013, App. G]	Lead

Category: AE03 -- Asbestos Analysis

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	AE03 .00010	AE	Phase Contrast Microscopy	[OTHER NIOSH 7400]	Asbestos
Certified	Yes	NJ	AE03 .00020	AE	Transmission Electron Microscopy	[ASTM D6281]	Asbestos
Certified	Yes	NJ	AE03 .00030	AE	Transmission Electron Microscopy	[ASTM D6480]	Asbestos
Certified	Yes	NJ	AE03 .00040	AE	Transmission Electron Microscopy	[EPA 540/2-90-005a]	Asbestos
Certified	Yes	NJ	AE03 .00050	AE	Transmission Electron Microscopy	[OTHER 40CFR763, Sub. E, App. A]	Asbestos
Certified	Yes	NJ	AE03 .00070	AE	Transmission Electron Microscopy	[OTHER AHERA]	Asbestos
Certified	Yes	NJ	AE03 .00080	AE	Transmission Electron Microscopy	[OTHER NIOSH 7402]	Asbestos

Category: AE04 -- Organics Analysis

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	AE04 .02000	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1016
Certified	Yes	NJ	AE04 .02010	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1221
Certified	Yes	NJ	AE04 .02020	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1232
Certified	Yes	NJ	AE04 .02030	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1242
Certified	Yes	NJ	AE04 .02040	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1248
Certified	Yes	NJ	AE04 .02050	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1254
Certified	Yes	NJ	AE04 .02060	AE	GC/ECD, LV PUF	[EPA TO-10A]	Aroclor 1260

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

WASTE/MATERIAL HANDLING PLAN

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1.0 INTRODUCTION

USA Environmental Management, Inc. (USAEMI) has prepared this Asbestos Abatement/Disposal and Material Handling Plan to identify the potential waste streams of regulated materials that may be generated during work on the former Syncon Resins Superfund site OU2, 77 Jacobus Avenue, South Kearny, New Jersey and to detail the techniques to be implemented to safely accomplish the handling of these materials. This MHP presents an overview for the management of the waste streams that will be encountered during the course of the construction activities, and describes how the materials will be segregated, stockpiled, classified and properly disposed.

2.0 PROJECT DESCRIPTION AND LOCATION

The project includes the complete environmental abatement and demolition (by others) of all structures located on the former Syncon Resins site. The physical address of the site is 77 Jacobus Avenue, South Kearny, New Jersey. The site is located on the west side of Jacobus Avenue at 3rd Street which comes into the site from the east. The site is bordered to the west by the Passaic River and other industrial sites to the north and south and Jacobus Avenue to the east.

Asbestos abatement work will be performed in the following buildings identified as part of our contractual scope of work:

Building 1
Building 1A
Building 6A
Building 7
Building 7A
Building 8
Building 9
Building 11
Building 12
Red Building
Shed

The Scope of Work for this project includes the removal of various types of asbestos-containing building materials (ACBMs) from various areas of the buildings identified above.

3.0 WASTE STREAM

The waste stream anticipated by our current scope of work would be a variety of asbestos-containing building materials. The list of potential waste streams is identified in Section 3.1. Should other waste streams be encountered other than those described below, this Material Handling Plan will be amended accordingly.

3.1 Material Identification and Segregation

Table 1 – Material Identification and Definitions		
MATERIAL	**DEFINITION**	**DISPOSAL**
Asbestos-Containing Waste Materials – ID-27	Non-Hazardous asbestos-containing waste materials.	GROWS Landfill – Morrisville, PA
Free Product/LNAPL	Any free phase petroleum product collected from the Above Ground Storage Tank will be transported to and recycled at an approved facility.	Monarch Environmental, Inc., 108 East Lake Road, Woodstown, NJ 08098

3.2 Asbestos-Containing Waste Materials

All asbestos-containing waste material will be removed and collected by asbestos workers licensed by the State of New Jersey within the asbestos abatement work area. Materials will be thoroughly wetted and placed into double 6-mil polyethylene plastic waste disposal bags and sealed with duct tape. Disposal bags shall have the required OSHA and EPA warning labels visible on the exterior as required for labeling of asbestos-containing waste material.

A. All waste material shall be containerized in one (1) of the following methods:

1. Two (2) 6-mil disposal bags.
2. Two (2) 6-mil disposal bags and fiberboard drums.
3. Wrapped with two (2) layers of 6-mil polyethylene.

Floor tiles shall first be placed into cardboard boxes, burlap or nylon bags before placement into two (2) 6-mil disposal bags.

B. Carefully load containerized waste on enclosed trucks, enclosed dumpsters, or other appropriate vehicles for transport. Exercise care before and during transport, to insure that no unauthorized persons have access to the material.

The Contractor shall cover the floor of trucks or dumpsters with a sheet of 6-mil polyethylene. This sheet shall continue up each sidewall approximately six (6) feet.

C. Do not store bagged or containerized asbestos-containing waste material outside of the work area. Take bags and/or containerized material from the work area directly to a secure and sealed truck or dumpster. When transporting bagged material through buildings, it must be done in enclosed utility type carts with lids.

D. Do not transport disposal bagged materials on open trucks.

E. Any items or materials, which could compromise the integrity of the polyethylene bags shall be double bagged and then packaged in fiber drums or placed into boxes, burlap bags, etc. for loading, transport, and unloading operations.

F. Advise the landfill operator, at least twenty-four hours in advance of transport, of the quantity of material to be delivered.

G. At the burial site, sealed plastic bags shall be carefully unloaded from the truck.

H. Maintain records of waste shipments in accordance with NESHAPS 40 CFR Part 61, Section 61.150, (d) 1-5 and (e).

H. Retain Waste Shipment Records (manifests) from the landfill for materials disposed. The manifests shall be signed by the hauler and landfill operator and shall indicate the amount of material being disposed and the location where the waste was generated per EPA NESHAPS requirements.

I. Provide completed Waste Shipment Records (manifests) to the New Jersey Schools Development Authority for this project for their project records.

4.0 LOAD OUT AND TRANSPORTATION

Prior to loading and transporting any asbestos-containing waste materials offsite, a copy of the completed application and acceptance notification from the disposal facilities will be provided. Shipping documents will be created and will be utilized to track each load that is transported to the facility. Shipping documents will be signed by the generator or an authorized agent of the generator before being transported to the designated facility.

The transportation will be performed by licensed haulers with current and valid permits in accordance with applicable federal, state and local regulations. Asbestos-containing waste materials will be placed in completely enclosed roll-off waste containers and removed from the site as soon as practical after being completely filled.

Trucks will follow the haul routes are pre-determined by a site logistics plan approved by the owner. This plan will be developed after the pre-construction conference so that the routes of ingress/egress shall take into consideration the access requirements of Sevenson and other project subcontractors.

.

5.0 STOCKPILING

Asbestos-containing wastes may be stockpiled within enclosed abatement work areas for short periods of time only until such time as enough material is accumulated to allow for the full loading of the roll off container. Otherwise, properly containerized materials will directly loaded into the enclosed roll off container and the container will be secured by locking the door with a padlock. Proper asbestos warning signs shall be posted on the roll off containers on site.

6.0 RECORD KEEPING AND REPORTING

Tracking the transportation of impacted soil will be performed utilizing an approved Waste Shipping Document. This manifest will be utilized to track each load that is transported to the disposal facility and will be signed by the generator or an authorized agent of the generator before being transported to the designated facility.

The shipping document will have information of the generator, trucker, the receiving facility and weight of the material transported. Copies of the shipping documents and all records regarding the removal and disposal of the asbestos-containing wastes shall be monitored and maintained by the USAEMI and will be made available to Sevenson when received by USAEMI from the landfill.

Information on the landfill to be used, the Waste Hauler and a sample of the waste shipment record (manifest) is included in Appendices which follows.

APPENDICES

LANDFILL STATEMENT

USA Environmental Management, Inc.
Environmental ♦ Engineering ♦ Construction

LANDFILL FOR DIPOSAL OF ASBESTOS-CONTAINING WASTE

USA Environmental Management, Inc. (USAEMI) will be using the following landfill for disposal of all asbestos-containing waste materials generated on this project:

~~**WASTE MANAGEMENT, INC.**~~
~~**Tullytown Landfill**~~
~~**200 Bordentown Rd**~~
~~**Tullytown, PA 19007**~~
~~**Phone: 215-736-1700**~~

Minerva Landfill
P.O. Box 709
8955 Minerva Road S.E.
Waynesburg, Ohio 44688
Phone: 330-866-3435
FAX: 330-866-3488

Minerva Enterprises, LLC Permits

Construction & Demolition Debris Landfill Permit
Asbestos Permit
Compost Permit
Storm water Discharge Permits
Air Emission Permits:

- **Asbestos Handling**
- **Material Handling**
- **Road Management**

ASBESTOS WASTE

Landfill Information

MINERVA LANDFILL

Waynesburg, Ohio

History

In 1991 Minerva Enterprises, LLC's property was permitted to allow construction of a Construction & Demolition Debris Landfill.

From 1958 to 1972, the property was a Coal strip mine. The property is ideal for a Construction & Demolition Debris landfill due to the large quantities impermeable clay reserves, which protect the ground water from landfill activities.

Experienced Management Team

President: Mr. Frank Stufano

30+ Years Environmental and Hazardous Waste Disposal Management Experience

Operations & Financial Consultant (Partner): Per-Olof Soderberg

30+ Years Multinational Background-Managed $2 Billion Operation.

Minerva Advantages:

1. **Centralized Location to Eastbound Trucking Freight provides Backhauls for disposal trucks.**
2. **Low Environmental Risk:**
   a. **Best Available Design Technology(BAT)**
   b. **Built under most stringent Regulations**
   c. **Highly Inspected Waste Screening Program**
   d. **Experienced Staff**
3. **Close Proximity to Rail**
4. **Many "grandfathered landfills" Closing (5 in 2004-05)**
5. **Price Competitive**
6. **Asbestos Disposal Permit**

MINERVA LANDFILL

Waynesburg, Ohio

Minerva is permitted to dispose of construction & demolition material and friable and non-friable waste material from your facility. Waste must conform to Ohio State & Federal regulations. Asbestos material must be placarded, labeled, packaged and wetted in accordance with the local responsible agency and State & Federal guidelines.

A primary reason for Minerva's selection by different companies is that the source selection of waste materials to be disposed of at Minerva: construction debris and asbestos materials; result in little long term risk.

Minerva's liner and leachate collection systems are protecting very "clean" leachate compared to many of our Municipal Solid Waste (MSW) (i.e.: trash) competitors. This is caused by the lack of methane, liquid waste and high organic values of MSW. Therefore the potential offsite leakage risk is monumentally lower than MSW facilities. C&D debris is very dry compared to MSW and readily desorbs most of the leachate generated for dust control, compaction and re-injection into the waste material.

ASBESTOS WASTE

Waste Manifest

SAMPLE

SERVICE TRANSPORT GROUP, INC.

58 PYLES LANE, NEW CASTLE, DE 19720 PHONE: (877) 999-9559

Nº 414017

WASTE SHIPMENT RECORD

S.T.G. # _____

SAMPLE

GENERATOR

1. Material Origin Site	Generator: Name/Address	Generator: Phone #

2. Removal Contractor: Name/Address	Contractor: Phone #
Contact:	

3. Responsible Agency: Name/Address	4. US DOT Class - FRIABLE ASBESTOS ONLY NA2212, Asbestos, 9, PG III, RQ	
5. Description of Materials Specify Friable or Non-Friable	Containers No. Type	Total Quantity
IF Friable (enter required information)		
IF Non-Friable (check one): ☐ Category I ☐ Category II		

6. Special Handling Instructions

7. Generator Certification:

This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transport by highway according to the applicable regulations of the Department of Transportation, US E.P.A., and any other state government agency. I certify that the foregoing is true and correct to the best of my knowledge. If the waste shipment is not as I stated, I accept the RETURN of the COMPLETE LOAD to the generator's service location at the generator's expense.

Printed/Typed Name & Title	Signature	Date

TRANSPORTER

8. Transporter 1 (Acknowledgement of Receipt of Materials) If blank, see Transporter 2 or 3 below.

Company Name & Address	Signature: _____ Printed Name: _____ Title: _____	Telephone No. Date:

9. Transporter 2 (Acknowledgement of Receipt of Materials) If Transporter 1 & 2 are blank, Transporter 3 servers as sole transporter.

Company Name & Address	Signature: _____ Printed Name: _____ Title: _____	Telephone No. Date:

10. Transporter 3 (Acknowledgement of Receipt of Materials)

Company Name & Address Service Transport Group, Inc. 58 Pyles Lane New Castle, DE 19720	Signature: _____ Printed Name: _____ Title: _____	Telephone No. 877-999-9559 Date:

DISPOSAL SITE

11. Discrepancy Indication Space:

12. Waste Disposal Site Owner or Operator's Certification (Receipt of above Waste except as noted in 11)

Waste Disposal Site (Check One)		STG USE ONLY		
Sanitary Landfill ☐ 901 Tyrol Blvd. Belle Vernon, PA 15012 724-929-7694 Ext. 14 Permit No. 100277	Minerva Landfill ☐ 8955 Minerva Rd. Waynesburg, OH 44688 330-866-3435 Permit No. P0104984	☐	Signature: _____ Printed Name: _____ Title: _____	Date:

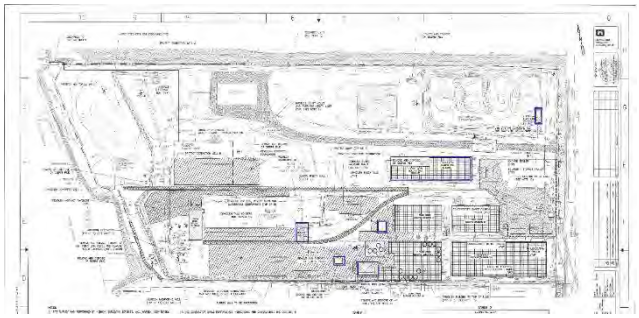
WHITE-Generator • GREEN-S.T.G. • YELLOW-Contractor • PINK-Landfill • GOLD-Pick Up Receipt

Health & Safety Plan (HASP)

Environmental Management, Inc.
Environmental Engineering Construction
8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Office: 215-365-5810 FAX: 215-365-5870

SITE SPECIFIC HEALTH & SAFETY PLAN

SYNCON RESINS SUPERFUND SITE



Prepared for:

Sevenson Environmental Services, Inc.

1405B North Mill Road
Vineland, NJ 08360

Since 1985 TTI Environmental, Inc.

1253 North Church Street
Moorestown, NJ 08057-1136

US Army Corps of Engineers

November 4, 2016

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APPENDICES

1.0 INTRODUCTION

1.1 Purpose

This site-specific Health and Safety Plan (HASP) has been developed to establish the health and safety procedures required to minimize any potential risk to personnel who will perform activities associated with the environmental remediation/demolition scope of work along with site restoration all in accordance with the project plans and specifications for the asbestos abatement at the former Syncon Resins Superfund site OU2. The address of the work location is 77 Jacobus Avenue, South Kearny, New Jersey 07032.

The project includes the complete environmental abatement and demolition (by others) of all structures located on the former Syncon Resins site. The physical address of the site is 77 Jacobus Avenue, South Kearny, New Jersey. The site is located on the west side of Jacobus Avenue at 3rd Street which comes into the site from the east. The site is bordered to the west by the Passaic River and other industrial sites to the north and south and Jacobus Avenue to the east.

1.2 Scope

All activities performed by USA Environmental Management, Inc. (USAEMI) workers at this site will be covered by the Occupational Safety and Health Administration's (OSHA) Respiratory Protection standard in 29 CFR 1910.134; Exposure to Asbestos in Construction standard 29 CFR 1926.1101; Exposure to Lead in Construction standard 29 CFR 1926.62, and Specifications for Accident Prevention, Signs and Tags standard 29 CFR 1910.145. All workers involved in the environmental remediation work will also meet the requirements of OSHA 1910.120 App E for Hazardous Materials training and for asbestos work they shall meet the requirements specified in 40 CFR Part 61, General Provisions and National Emission Standard for Asbestos, the State of New Jersey Asbestos Licensing regulation, the State of New Jersey Department of Labor and Workforce Development Title 12 of the Asbestos Control and Licensing Act, US Army Corps of Engineers Safety and Health Requirements Manual – EM 385-1-1 - 3 November 2003, in addition to safety standards and requirements included herein. Workers involved in the general demolition work and site restoration work activities shall perform this work in accordance with the applicable requirements of the OSHA General Industry (29 CFR 1910), American National Standards Institute (ANSI) Publication Z29-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems and Publication Z88.2-1980, Practices for Respiratory Protection and Construction Industry (29 CFR 1926) standards as well as the plans and specifications for the project.

1.3 Application

The provisions of this HASP and the Corporate Health & Safety Program apply to USAEMI personnel and all subcontractor personnel who will potentially be exposed to safety and/or health hazards associated with any of the work activities associated with the contract for Asbestos Abatement of structures associated with the former Syncon Resins Superfund site OU2. The address of the work location is 77 Jacobus Avenue, South Kearny, New Jersey 07032. Personnel or visitors to whom this HASP applies, who cannot, or will not comply with its requirements will be excluded from site activities by the Project Manager (PM) or Project Superintendent (PS).

1.4 Approval and Distribution of the HASP

Prior to being issued, this HASP must be reviewed and approved by SEVENSON ENVIRONMENTAL SERVICES, INC. AND THE US ARMY CORPS OF ENGINEERS, the owner's representative for the project. A copy of this HASP must be made available to all Contractor/Subcontractor and supervisory personnel to whom it applies.

1.5 Documentation of HASP Receipt by Site Personnel

Prior to performing site activities, all personnel to whom this HASP applies, must complete and sign a copy of the HASP Acceptance Form and submit it to the USAEMI Project Superintendent (PS) who is responsible for the overall Safety program daily onsite. The main purpose of this form is to provide documentation that all site personnel have read and agree to abide by the HASP for this project.

1.6 Modification of the HASP

The procedures in this HASP have been developed based on current knowledge regarding the specific chemical and physical hazards that are currently known or anticipated for the operations that are to be conducted at this site. Should additional information become available regarding site hazards or should operations at the site change, it may be necessary to modify this HASP.

Whenever the HASP is modified, USEMI will:

- Physically amend the available copies of the HASP at the site.
- Notify the SEVENSON AND ARMY CORPS OF ENGINEERS
- Project Manager of the changes.
- Explain the changes to the affected employees (usually during the morning daily safety meeting).

Any significant modifications must be incorporated into the written document as addenda and the HASP must be reissued. The Project Superintendent (PS) will ensure that all personnel covered by this HASP receive copies of all issued addenda. Sign-off forms will

accompany each addendum and must be signed by all personnel covered by the addendum. Sign-off forms will be submitted to the owner's Project Representative as required. The HASP addenda should be distributed during the daily safety meeting so that they can be reviewed and discussed. Attendance forms will be collected during the meeting.

1.7 Organization and Responsibilities

The implementation of health and safety at this site will be the responsibility of the USAEMI Project Superintendent (PS), and all other contractor site personnel.

1.7.1 USAEMI Project Superintendent

The USAEMI PS is, by designation, the individual who has the primary responsibility for ensuring the overall health and safety of this project. The PS therefore has the primary responsibility for ensuring the implementation of the requirements of this HASP. Some of the PS's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies have reviewed a copy of it and have submitted a completed copy of the HASP sign-off form.
- Assuring that all personnel to whom this HASP applies have attended a pre-entry briefing prior to entering an isolation area.
- Maintaining a high level of health and safety consciousness among employees at the work site.
- Maintaining regular communications with the SEVENSON ENVIRONMENTAL SERVICES, INC. AND THE US ARMY CORPS OF ENGINEERS'S Project Manager and other USAEMI/Subcontractor project supervisory personnel, as necessary.

1.7.2 USAEMI Project Foremen/Site Supervisor(s)

The USAEMI Project Foremen/Site Supervisor(s) (PF/SS) will be on site during removal, decontamination and demolition/general construction activities covered by this HASP. The PF/SS is/are responsible for enforcing the requirements of this HASP once on-site work begins. By design, the PF/SS has/have the authority, and the responsibility, to immediately correct all situations where noncompliance with this HASP is noted and to immediately stop work in cases where an immediate danger is perceived.

1.7.3 Other Site Personnel

All Contractor/Subcontractor/Project Oversight personnel are responsible for following the health and safety procedures specified in this HASP and for performing

their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

* Reading the HASP in its entirety prior to the start of on-site work.
* Submitting a completed HASP Acceptance Form and documentation of medical surveillance and training to the Project Superintendent prior to the start of work.
* Attending the required HASP briefing.
* Bringing forth any questions or concerns regarding the content of the HASP to the PS or the PF/SS prior to the start of work.
* Reporting all accidents, injuries, and illnesses, regardless of their severity, to the PF/SS and PS.
* Complying with the requirements of this HASP and the requests of the PS and PF/SS.
* Any and all accidents shall be reported and documented as required by the Corporate Health & Safety Program.

2.0 SCOPE OF WORK

The following are the activities by line item included in the current scope of work for this project along with the quantities where applicable:

ASBESTOS

Non Friable Materials Abatement

Location	Asbestos Containing Material	Approximate Quantity
Building 6A, Building 7 (Small Room), Building 7A,	Transite Switch Gears	60 Square Feet
Building 7 (Small Room)	Roofing Material	120 Square Feet
Building 6A	Boiler Gasket	40 Linear Feet
Red Metal Building	Window Glazing	400 Linear Feet

Non Sub 8 Tented Glove Bag Pipe Insulation Abatement

Location	Asbestos Containing Material	Approximate Quantity
Building 7 (Small Room)	Pipe Insulation	15 Linear Feet

All environmental remediation activities shall be performed in accordance with the requirements of any applicable federal, state and local regulations as mentioned previously, the project plans and specifications prepared by the owner's representative CDM SMITH on behalf of the US ARMY CORPS OF ENGINEERS and any approved procedures presented to and approved by the owner's representative.

3.0 HAZARD ASSESSMENT

The following chemical and physical hazard assessment applies only to the proposed activities covered by this HASP. As the project progresses, revisions will be issued as necessary to address the hazards associated with tasks not specifically covered in this document.

3.1 Chemical/Airborne/Contact Hazards

The most significant *potential* routes of chemical exposure for project personnel during the performance of this project will be the inhalation of contaminated dusts (asbestos and lead, for example) and the ingestion of contaminated dusts.

Inhalation and ingestion of contaminated dusts, which would occur through inadvertent hand-to-mouth transfer, will be avoided through the required personal hygiene practices, as well as using wet abatement methods, proper work practices, PPE and decontamination techniques. To further reduce the potential for transfer of contaminants, under no circumstances, will smoking and eating will not be allowed in the work areas of the building.

In addition to the potential exposure to hazardous dusts, the project scope of work presents potential exposure to Chlorinated Volatile Organic Compounds (CVOC); dissolved phase petroleum (benzene) and/or free-phase petroleum product and sediments.

Proper use of personal protective equipment (PPE) will be enforced at all times, where and when applicable.

General exposure hazards identified on this project include the following:

Asbestos

Asbestos is a naturally occurring fibrous inorganic mineral consisting of hydrated magnesium or calcium silicates. A popular additive in thousands of construction products because of its non-flammability, high tensile strength, insulating and acoustical qualities, asbestos is found throughout our environment.

Asbestos is toxic by ingestion and inhalation of dust. Chronic overexposure to asbestos has been shown to adversely affect the respiratory system and may induce development of pulmonary fibrosis (lung scarring), carcinoma in the lungs, pleura, stomach, intestine and

other organs. Long term symptoms of asbestos related illness include fatigue, shortness of breath, abdominal and/or chest pains.

Lead

As noted above, lead coatings and/or paint may be found on some of the structural and/or finish components of the buildings to be demolished.

Based on the fact that no bulk sampling and analysis or X-Ray Fluorescence (XRF) testing (in situ testing) was accomplished on painted structures/surfaces throughout these buildings, an initial walk through visual assessment was made of the painted surfaces throughout the buildings. All painted surfaces that were visual observed evidenced relatively minor damage. There were no areas of extensive paint flaking or damage observed.

Based on these observations along with the fact that the structures are going to undergo complete demolition using heavy equipment, as well as from previous experience with performing structure demolition using the means and methods to be employed on this project, it was determined that the likelihood of exposure to workers using this equipment to lead at or above the Action Level of 30 micrograms per cubic centimeter of air over an 8 hour Time Weighted Average (TWA) exposure period would be negligible.

However, as and additional precaution, USAEMI will have air sampling performed periodically, if necessary, during the demolition activities by a third party monitoring firm specializing in this type of exposure monitoring.

Chlorinated Volatile Organic Compounds (CVOC); Dissolved Phase Petroleum (Benzene) and/or Free-phase Petroleum Product and Sediments

USAEMI's current scope of work does not include the remediation of any of the above-noted hazardous materials on this project.

Chlorinated Volatile Organic Compounds can be found at most of the hazardous waste sites across the country. These forms of halogenated organics, once released to the environment, present several unique challenges to the owners of contaminated sites as well as to the environmental remediation industry. Dissolved Phase Petroleum (benzene) and/or Free-phase Petroleum Product and Sediments can be encountered

For operations where the exposure limit may be exceeded, a NIOSH approved organic vapor respirator at a minimum is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice.

Skin Protection: Rubber gloves are suitable for normal use of the product. For long exposures chemical resistant gloves may be required such as 4H ™ or Silver Shield ™ to avoid prolonged skin contact.

Eye Protection: Safety glasses with side shields or safety goggles.

An eye wash station and safety shower should be available.

IF ENCOUNTERED AND MADE PART OF OUR SCOPE OF WORK:

USAEMI's current scope of work does not include the remediation of any of the following Universal Wastes that may be found on this project.

Fluorescent Light Tubes

All personnel associated with the removal of all fluorescent light tubes shall use appropriate Personal Protective Equipment (PPE) to protect themselves from potential exposure to mercury.
All tubes shall be removed intact and packaged as required for transport and recycling.

Light Ballasts

Light ballasts present a potential exposure to PCB fluids during the removal and disposal process. The ballasts shall be removed using full Personal Protective Equipment appropriate for protection from exposure to PCB-containing waste materials.

All ballasts shall be removed intact and placed into fiber drums for proper hauling and disposal. Care shall be taken to avoid rupturing the casing of the ballasts and releasing the PCB-containing fluid within.

Mercury Thermostats and Thermometers

All personnel associated with the removal of all mercury-containing devices shall use appropriate Personal Protective Equipment (PPE) to protect themselves from potential exposure to mercury.

All devices shall be removed intact and packaged as required for transport and recycling.

Backup Batteries

Devices such as backup emergency lighting, exit lighting and fire panel contain batteries that are to be removed and recycled as part of the environmental remediation work on this project.

All batteries shall be removed by personnel using appropriate Personal Protective Equipment, packaged properly and transported for recycling.

Other Hazardous Materials - A safety data sheet (SDS) shall be presented for any hazardous materials that USAEMI brings to the site, including petroleum products. Each

SDS must be reviewed by the PS and the PF/SS and filed on site for reference. The material cannot be used if a MSDS is not presented. All containers must be properly labeled. If a label is not on the containers, it will not be allowed on site. When new materials are brought on site, the MSDS will be reviewed by PS, the PF/SS, and those employees who must use it.

3.2 Physical Hazards

Below is a list of some of the physical hazards that may be encountered during the performance of work on this project:

3.2.1 Operating Heavy Equipment

Heavy equipment such as backhoes, excavators, loaders, dump trucks/trailers, skid steer loaders, etc., as well as powered hand tools like demolition saws, may be used during work on this contract. The use of such equipment poses a potential hazard to site employees, underground utilities, and also poses a potential for employee overexposure to noise.

Use of heavy equipment concrete demolition and disposal, soil removal and disposal debris and to lift and haul the removed debris will require all personnel in the vicinity of the operating machinery to wear steel-toed footwear, hard hats, hearing protection, and safety glasses. Personnel involved in the cleanup should handle the debris carefully and avoid sharp edges. Do not lift heavy objects without assistance.

All heavy equipment will be equipped with reverse gear alarms.

3.2.2 Exposure to Noise

Exposure to occupational noise in the construction industry is regulated by 29 CFR 1926.52. The standard requires protection from the effects of noise exposure be provided when exposures exceed 90 dB(A) for an 8-hour day. Exposure to impact or impulse noise should not exceed 115 dB(A) peak sound pressure level. Depending upon the noise levels generated, USAEMI may choose to perform noise monitoring of its personnel to determine when, and during what activities, hearing protection will be required and to determine the appropriate noise reduction rating (NRR) that the protection must provide.

Exposure to noise can result in the following:

* Temporary hearing losses where normal hearing returns after a rest period;
* Interference with speech communication and the perception of auditory signals;

* Interference with the performance of complicated tasks; and
* Permanent hearing loss due to repeated exposure resulting in nerve destruction in the inner ear.

3.2.3 Electrical Hazards

Ground fault circuit interrupters will be used on all portable, electrically operated equipment. Equipment which has the potential to come in contact with overhead power lines, such as excavators, etc., shall not be positioned or operated so that they may come within 10 feet of energized power transmission lines.

All equipment and lines with a potential electrical exposure will be verified and tagged as being out of service. This will be accomplished before any demolition operations are initiated. All lines must be traced to the main electrical panel or nearest junction box to verify the lines have been de-energized.

If electrically powered equipment is used to facilitate the collection of samples, the following safety precautions must be followed:

* Confirm that electrical outlets used to supply power during field operations are of the three wire grounding type.
* Extension Cords used for field operations should be of the three wire grounding type and designed for hard or extra-hard usage.
* **NEVER** remove the ground plug blade to accommodate ungrounded outlets. If a cord is missing the grounding prong, it shall be marked and taken out of service.
* Do not use extension cords as a substitute for fixed or permanent wiring. Do not run extension cords through openings in walls, ceilings, or floors.
* Protect the cord from becoming damaged if the cord is run through doorways, windows, or across pinch points.
* Examine extension and equipment cords and plugs prior to each use. Damaged cords with frayed insulation or exposed wiring and damaged plugs with missing ground blades **MUST BE REMOVED** from service immediately.
* All portable or temporary wiring to be used outdoors or in other potentially wet or damp locations must be connected to a circuit that is protected by a ground fault circuit interrupter (GFCI). GFCIs are available as permanently installed outlets, as plug-in adapters and as extension cord outlet boxes. **DO NOT CONTINUE TO USE A PIECE OF EQUIPMENT OR EXTENSION CORD THAT CAUSES A GFCI TO TRIP**.

* When working in flammable atmospheres, be sure that the electrical equipment being used is approved for use in Class, Division I atmospheres.

* Do not touch a victim who is still in contact with current. Separate the victim from the source using a dry, nonmetallic item such as a broomstick or cardboard box. Be sure your hands are dry and you are standing on a dry surface. Turn off the main electrical power switch and then begin rescue efforts.

3.2.4 Slip, Trip, and Fall Hazards

Employees should be aware of slip, trip, and fall hazards on site. In the presence of heavy equipment requires all personnel on site to wear steel-toed footwear and hard-hats. Personnel in the immediate work vicinity should maintain a safe distance from operating machinery. In addition, in any environmental remediation/ decontamination in any level of PPE, it can be expected that the ground may be slippery, the surface may be unreliable, surface debris may be present, and wet or dusty areas may exist. All personnel should therefore be aware of the variability of the work surfaces in their work area.

3.2.5 Ladders

Ladders may be used to access excavations during work on this project. The following steps should be employed when using ladders:

a. Workers should face the ladder when climbing up, down, or working from it.

b. All ladders used to gain access to the excavation shall extend at least 3 feet beyond the edge of the excavation and be tied off or otherwise secured from falling at the top of the excavation.

c. Workers should not carry objects in their hands while ascending or descending ladders. While working from a ladder, they should hold on with at least one (1) hand.

d. An elevated workstation is defined as off-the-ground work at a level of 6+ feet. The use and erection of ladders will comply with all OSHA regulations.

e. Ladders should not be used as a substitute for planks, runways, or walkboards.

f. Ladders should be maintained in good condition. Defective ladders should be destroyed so that no one uses them by mistake.

g. Ladders should have safety feet in good condition to keep the ladder from slipping and cutting through polyethylene floor covers.

h. Ladder rungs/steps should be kept free of contaminates such as amended water and buildup of asbestos waste.

i. Employees should work no higher than the fourth step/rung from the top of the ladder.

j. Employees should not attempt to "reach" distant objects from a ladder; other platforms should be used.

k. Wood or fiberglass ladders should be provided to help control exposure to electrical hazards.

l. Employees should not straddle the space between a ladder and another object.

m. Employees should make a visual inspection of ladders before each shift.

3.2.6 Demolition

The scope of work requires the complete demolition (BY OTHERS) of the old building concrete floor slab, foundations at and below grade, and footings. These activities will incorporate procedures previously discussed such as cutting, concrete demolition using excavators with hammer attachments, material handling with heavy equipment, the use of PPE, associated slip, trip, and fall hazards and hazardous noise exposure.

All concrete demolished as part of this project will be separated into two (2) distinct categories. One would be Non-contaminated concrete (Non-ID27) and contaminated concrete (ID27).

Contaminated material shall be properly disposed while non-contaminated material may be recycled.

Employees handling contaminated concrete material shall use appropriate Personal Protective Equipment (PPE) at all times during this work.

3.2.7 Soil Excavation, Removal and Disposal/Stockpiling

The scope of work requires the removal (excavation) of potentially contaminated soil as well as non-contaminated soil. These activities will require the use of excavators, loaders, dump trucks/trailers for excavation/stockpiling and waste disposal, the use of PPE, associated slip, trip, and fall hazards and hazardous noise exposure.

All soil excavated as part of this project will be separated into two (2) distinct categories. One would be Non-contaminated concrete (Non-ID27) and contaminated concrete (ID27).

Contaminated material shall be properly disposed while non-contaminated material will be left onsite.

Employees handling contaminated soil shall use appropriate Personal Protective Equipment (PPE) at all times during this work.

4.0 TESTING

The primary potential inhalation hazard during this project will be from the generation of dusts from asbestos-containing materials and asbestos contaminated surfaces. Personal air samples will be used to assess worker exposure to asbestos particulate during asbestos abatement activities. All personal air sampling and analysis of samples will be performed in accordance with the requirements of the OSHA Asbestos Standard, 29 CFR 1926.1101. The requirements for personal monitoring are specified below. Personal exposure air monitoring will be performed by USAEMI. Sample analysis will be performed by a third party laboratory specializing in this type of analysis. The laboratory for this project is EMSL Analytical, Inc., 107 Haddon Avenue, Westmont, New Jersey 08108.

4.1 Personal Exposure Monitoring

Personal exposure monitoring will be conducted within the work areas or containment structures during the abatement and decontamination activities to document employee exposures to asbestos and lead when working inside the containment structure. Samples will be collected within the breathing zones of those individuals performing unique work tasks to determine the representative exposure for an employee involved in similar activities.

Applicable exposure levels to the anticipated hazards are as follows:

CONTAMINANT OF CONCERN	OSHA PEL	NIOSH REL	ACGIH TLV
ASBESTOS	0.10 f/cc	N/A	N/A
CONTAMINANT OF CONCERN	OSHA PEL	OSHA AL	ACGIH TLV
LEAD	0.50 ug/m3	0.30 ug/m3	N/A

4.2 Record Keeping

A USAEMI Industrial Hygiene Chain of Custody Form is to be completed for each air sample or batch of air samples collected. The form is to be filled out in its entirety on the day of sample collection. Calibration data for any sampling pumps utilized is to be recorded on the form.

Sample results shall be recorded on a USAEMI Sampling Results Report form using the results presented on the laboratory Certificate of Analysis. Appropriate TWA calculations shall be reported on this form for the exposure sampling performed.

Personnel will be notified as required, and sample results posted in the project office trailer onsite and included in employee records for all personal sampling results.

5.0 PERSONAL PROTECTIVE EQUIPMENT

Employees performing asbestos removal and associated activities will wear the following PPE. The wearing of such equipment is designed to reduce the potential for contact with contaminated materials and the tracking of contaminants off site. It is anticipated that work on this project would require Level C PPE. This is subject to modification following receipt of analytical data from initial air monitoring as discussed in Section 4.0.

5.1 Protective Clothing and Other Equipment

It is anticipated that environmental remediation work on this project will be accomplished using a Level A and Level B PPE that includes disposable outer garments and gloves, safety boots, hard hat and safety glasses and ½ face, Air-Purifying and/or Powered-Air Purifying respiratory protection.

Other PPE may include the following as appropriate:

- Steel-toed safety boots
- Hard hat
- Safety glasses
- Dedicated demolition work coveralls, if needed
- Disposable protective polypropylene coveralls
- Fall Protection Harness (as required)
- Cotton Gloves
- Latex Gloves
- Leather or Kevlar work gloves
- Hearing protection
- ½ face, air-purifying respiratory protection
- Powered-Air Purifying respiratory protection (when necessary)

5.2 Respiratory Protection

Based upon current analytical data, the nature of the required remediation work activities and the requirements of the project specifications, the use of respiratory protection for personal protection from exposures to asbestos will be required. Work activities will be conducted with half -face respirators. Based on the engineering controls anticipated to be used on this project and in consideration of previous similar work activities, it is not anticipated that respiratory protection beyond Level A will be required. If it is, this upgrade will be done.

5.2.1 Respirator Selection

Respiratory protection will be determined by the PS and/or PF/SS based on the following criteria:

- The contaminant concentration is in the range requiring respiratory protection, as determined by industrial hygiene monitoring information.
- The permissible exposure limit (PEL), threshold limit value (TLV), short-term exposure limit (STEL), ceiling value or maximum permissible concentration (MPC) for the contaminant may be exceeded.
- The contaminant is a gas, vapor, mist, dust, or fume.
- The contaminant concentration or absence of oxygen could be termed immediately dangerous to life or health (IDLH).
- The contaminant is flammable and the estimated concentrations may approach the Lower Explosive Limit (LEL).
- The contaminant has poor warning properties (i.e., odor, irritation, or taste).

5.2.2 Respirator Fit Testing

Each individual who must wear a respirator will be required to be clean-shaven in the sealing areas of the respirator face piece. Each respirator user will be fit tested using qualitative testing on initial assignment and at least every six (6) months thereafter in accordance with OSHA CFR 29, 1926.1101 (h)(4)(ii), OSHA CFR 29, 1926.62 Appendix B, paragraph IV (F), Appendix A of OSHA CFR 29, 1910.134 Respiratory Protection standard requirements and ANSI Z88-2-92. Upon donning the respirator device or before entering any remediation work area each respirator wearer of a negative pressure, air-purifying respirator will be required to perform a negative and positive pressure fit test. Qualitative fit test certificates for site personnel shall be maintained on-site by the PM and PF/SS.

5.2.3 Respirator Assignment

Respirators will be assigned on an individual basis. Respirators should be marked with the employee's name or identification number, if the respirator is to be reused by the same employee.

5.2.4 Respirator Cleaning, Inspection, Maintenance, Sanitization, and Storage

Respirators and supplied-air equipment that is used either occasionally or daily shall be cleaned, sanitized, inspected, assembled, and maintained ready for use on a daily basis. Each respirator will be sanitized and stored in a clean and sanitary container. Parts that require inspection include the valves, valve covers, nosepiece, straps, eye piece, the face piece and its snaps, cylinders, and canisters. The individual responsible for the cleaning, inspection, maintenance, sanitization, and storage of respirators and supplied-air equipment will be trained in the proper methods and procedures.

Each respirator user shall store his/her respirator in a clean, sealed plastic bag when not in use, unless it has been determined that the respirator and/or supplied-air equipment is contaminated, or is returned at the end of its use. If a respirator and/or supplied-air equipment becomes contaminated, it will be replaced with a clean and sanitized respirator and/or supplied-air equipment. The respirator wearer shall inspect it for defective parts and leaks.

5.2.5 General Considerations and Limitations for Respirator Use

The following criteria will be followed:

- Oxygen Deficient Atmospheres - atmosphere-supplying respirators shall be used in environments immediately dangerous to life or health (atmospheres containing less than 19.5 percent oxygen).
- Eye irritation - when working in contaminated environments or where there is a potential for eye irritation, a half face piece unit shall be used.
- Nuisance dust - any approved filter respirator can be used for nuisance dusts.
- Warning Properties of Contaminant - chemical cartridge respirators shall not be used for exposures to air contaminants that cannot be easily detected by odor or irritations.

  Chemical cartridges will be used only for those contaminants and the concentrations for which they are certified.

5.3 Other Required Safety Equipment

Basic emergency and first aid equipment will be available. The equipment will be placed in a pre-identified location within the zone. The following equipment will be available:

* First-aid kit
* Six-gallon, gravity fed emergency eye wash

* Portable, hand-held eyewash bottles with spare solutions
* Fire extinguisher (rated 20 A-B-C or higher) placed on each work floor level as required
* Basic spill kit
* Air horn (emergency use only)
* Safety harnesses
* Cutting/Welding helmets/glasses (if required)

6.0 SITE CONTROL AND SECURITY

To reduce the possibility of exposure of unprotected and unqualified personnel and off-site migration of contamination due to tracking by personnel or equipment, a site control program will be implemented during this project.

Only authorized personnel will be allowed to enter the containment area or work area. There will be separate sign-in and sign-out forms for USAEMI employees, any sub-contractor employees and any visitors. These forms will be located inside the jobsite office trailer located in the parking lot to the east of the work building.

Access to the active work area will be controlled by requiring authorized personnel sign in and out. No visitor will be permitted to enter unless accompanied by authorized personnel and with the consent of PM or PF/SS. Names and affiliation of each visitor will be recorded and maintained.

A daily Toolbox Safety Meeting form will be used for documentation and for site safety meetings. A copy of the site-specific, HASP will be kept on site for reference purposes and must be reviewed by all visitors as well as assigned personnel. Written acknowledgment of having reviewed the plan will be required by all persons working on the site.

A site map clearly delineating all work zones and all routes into and from the site will be posted at the entrance. The primary and alternate site evacuation routes will be designated on the site map and communicated verbally for each work area to assigned personnel.

6.1 Additional Site Control and Security Measures

The following measures are designed to augment the specific health and safety guidelines regarding the control of work areas.

* The "buddy system" will be used at all times by all field personnel. No one is to perform remediation/demolition work alone. Standby team members must be intimately familiar with the procedures for initiating an emergency response.
* Avoidance of contamination is of the utmost importance. Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces or materials.

* A designated area will be determined for eating and drinking on-site outside abatement work areas.
* Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in all work areas.
* Workers exiting from any friable abatement work area must decontaminate by showering in the decontamination unit.
* Hands and face must be thoroughly washed upon leaving non-friable work area and before eating, drinking, or any other activities.
* Beards or other facial hair that interfere with respirator fit are prohibited.
* The use of alcohol or illicit drugs is prohibited during the conduct of field operations.
* All equipment must be decontaminated or discarded before leaving the work area.
* Personal protective safety equipment described in Section 5.0 will be required for all field personnel unless otherwise approved by the PF/SS or PM.
* No open flame, cutting, welding, or grinding is allowed unless a proper burning permit is secured.

6.2 Dust Control Measures

Dust control techniques will be implemented to maintain dust levels as low as possible.

Dust is likely to be generated during the following decontamination/demolition activities:

* Remediation of Asbestos, Lead,
* Clean-up and decontamination activities
* Waste handling and disposal
* General demolition activities

Dust will be controlled with the use of wet methods and, in environmental abatement work areas, the use of temporary exhaust ventilation systems equipped with HEPA filtration devices.

7.0 HEAT STRESS

Sweating does not cool the body unless moisture is removed from the skin by evaporation. The wearing of personal protective equipment (PPE) reduces the body's ability to eliminate large quantities of heat because the evaporation of sweat is decreased. The body's efforts to maintain an acceptable temperature become impaired.

7.1 Definitions

The following terms have specialized definitions when used with respect to the heat stress program:

1. ***Air Temperature*** is the temperature measured with a standard mercury-in-glass thermometer with the bulb shielded from the sun and other radiant heat sources.

2. ***Heart Rate Monitor*** is an electronic instrument that measures the pulse as an indicator of heart rate.

3. ***Heat Disorder*** is a general term used to describe the illnesses associated with excessive heat exposure.

4. ***Heat Stress*** is the combination of environmental and physical work factors that constitute the total heat load imposed on the body. Environmental factors such as humidity air temperature can affect the body's heat transfer capability. If the worker than must perform strenuous work under unfavorable ambient conditions, heat stress conditions exist.

5. ***Heat Rash*** can be caused by continuous exposure to hot and humid air. The condition is characterized by a localized red skin rash and reduced sweating. Aside from being a nuisance, the ability to tolerate heat is reduced.

6. ***Heat Cramps*** are caused by profuse perspiration with inadequate fluid intake and salt replacement. The symptoms for heat cramps include muscle spasm and pain in the extremities and abdomen.

7. ***Heat Exhaustion*** is a mild form of shock caused by sustained physical activity in heat. Profuse perspiration without adequate fluid and salt replacement also contributes. The signs and symptoms of heat exhaustion include a weak pulse, shallow breathing, pale/cool/moist/clammy skin, profuse sweating, dizziness and fatigue.

8. ***Heat Stroke*** is the most severe form of heat stress. Immediate cooling is necessary to prevent injury or death. The signs of heat stroke include red/hot/dry skin, body temperature of 105°F or higher, no perspiration, nausea, dizziness and confusion, rapid pulse and loss of consciousness.

9. ***Impermeable Work Clothing*** includes semi-permeable or impermeable encapsulating ensembles such as disposable Tyvek coveralls, nitrile gloves, etc.

10. ***Normal Work Clothing*** is the permeable clothing made of cotton or synthetic cloth.

Heat related problems include heat fatigue, heat rash, fainting, heat cramps, heat exhaustion and heat stroke. Heat rash occurs because sweat isn't evaporating; making the skin wet most

of the time. Standing erect and immobile in the heat allows blood to pool to lower parts of the body. As a result, blood does not return to the heart to be pumped to the brain. Fainting may then occur.

Heat cramps are painful spasms of the muscles due to excessive salt loss associated with profuse sweating. The loss of large amounts of fluid and excessive loss of salt results in heat exhaustion. The skin will be clammy and moist and persons exhibit extreme wetness, giddiness, nausea and headache.

Heat stroke occurs when the body's temperature regulatory system has failed. Skin is hot, dry, red and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. **EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH**. A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling. **GET MEDICAL ATTENTION IMMEDIATELY!!**

Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

7.2 Early Symptoms of Heat Related Problems:

1. decline in task performance
2. uncoordination
3. decline in alertness
4. unsteady walk
5. excessive fatigue
6. insomnia
7. muscle cramps
8. dizziness

Susceptibility to Heat Stress Increases due to:

1. lack of physical fitness
2. lack of acclimation
3. increased age
4. dehydration
5. obesity
6. drug or alcohol use
7. sunburn
8. infection

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

7.2.1. Heat Stress Prevention

The first phase in addressing the heat stress problem is to take a number of preventive measures that do not interfere with the employee's job task to any significant degree. Training is an important first step in the process. The importance of the following factors should be reviewed with the employees in the daily site safety "tailgate" meeting:

7.2.2. Measures to Avoid Heat Stress:

* Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
* Identify a shaded, cool rest area.
* Rotate personnel, alternative job functions.
* Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink fewer fluids than needed because of an insufficient thirst. **DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK**. For an 8-hour workday, 50 ounces of fluids should be drunk.
* Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
* Save most strenuous tasks for non-peak hours such as the early morning or at night.
* Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.
* Avoid double shifts and/or overtime.

The implementation and enforcement of the above mentioned measures will be a joint responsibility of the project manager and the on-site foreman/supervisors. Potable water MUST be available each day for the work crew.

The second step is to concerning the best combination of preventive measures which suit the circumstances of the project including:

Acclimation of the workers so they become better able to deal with the rigors of working in hot environments. The degree to which a worker's body has physiologically adjusted or acclimatized to working under hot conditions affects his or her ability to do work. Acclimatized individuals generally have lower heart rates and body temperatures than un-acclimatized individuals and sweat sooner and more profusely. This enables them to maintain lower skin and body temperatures at a given level of environmental heat and work loads than un-acclimatized workers.

Acclimation can occur after just a few days of exposure to a hot environment. With fit or trained individuals, the acclimatization period may be shortened 2 or 3 days. However, workers can lose acclimatization in a matter of a few days and work regimens should be adjusted to account for this.

Reduction of manual labor by mechanization of tasks is another factor to be considered to help reduce heat stress situations. Uses of a backhoe instead of shoveling, and the use of a crane to lift or move drums, are examples of how mechanization can be used to reduce heat stress.

Modification of the thermal environment is also possible to a limited degree. Control of radiant heat gain is best accomplished by shielding. For example, umbrellas are available which can be used to shade equipment operators from the sun. Reducing heat gain from convection may be accomplished by supplying cooler air to the work environment.

Temperature reduction in the rest area is also a good preventive measure. As a minimum, break areas, locker rooms, and lunchrooms should be located in shaded areas. Ideally, the rest area will be maintained at a temperature of approximately 77° F.

Clothing modifications can reduce the amount of time an employee is in full protective clothing. While an adequate level of personal protective clothing is always required on a project, the impact of this clothing on the employee's heat balance should always be remembered.

Fluid replacement will always be provided. Adequate supplies of drinking water and drinks are always available to employees so that fluid loss by sweating is replaced. Employees should be encouraged to drink more fluids when working in hot environments. Increased dietary salt or lightly salted (0.2 percent) water is adequate to replace lost salt. Salt tablets are not to be used. If juice or electrolyte drinks are used, they should be diluted prior to drinking. Thirst is not an adequate indicator of body water loss. Workers are to drink at least small amounts of water on each break.

When enclosed in an impermeable suit, physically fit, acclimatized individuals sweat more profusely than unfit or un-acclimatized individuals and may therefore actually face a greater danger of heat exhaustion due to rapid dehydration. Consuming adequate quantities of water can prevent this.

Reduced time for employees' working in the hottest environment is another measure. Work/rest periods should be developed according to the results of the worker-monitoring program. Scheduling heavy workloads for a cooler part of the day is another successful method.

7.2.3. Monitoring Procedures

If the preventive measures outlined above are not effective in reducing heat stress in terms of the observed symptoms and the workers' complaints, then the second phase of the program will be required. These procedures are outlined in this section.

Weight loss monitoring is used as a direct measurement of the impact the hot environment is having on the employee fluid balance. The employee's weight is measured at the beginning of the day on a scale accurate to ± 0.25 pound. The employee is then measured at the end of the day and other appropriate times throughout the day to determine if adequate fluids are being taken in to prevent dehydration. Weights should be taken while the employee wears similar or no clothing. The body water loss should not exceed 1.5% of the total body weight loss in a workday.

Heart rate monitoring is also useful in determining the exposure of the employee to excessive heat. Workers wearing normal work clothing should be monitored whenever the dry bulb temperature exceeds 70° F. Workers wearing impermeable protective work clothing should be monitored whenever the dry bulb temperature exceeds 60° F.

The pulse rate is measured in the wrist as early as possible after the period of stress according to the frequency specified.

Heat Stress Pulse Monitoring

Working in Shade Dry Bulb Thermometer Temperature	**Working in Sunlight Bulb Thermometer (Shielded From Sun) Temperature**	**Frequency of Pulse Monitoring**	
		Impermeable Clothing	**Normal Work Clothes**
Greater than 90° F	Greater than 77° F	After each 15 minutes of work	After each 45 minutes of work
87.5° F - 90° F	74.5° F - 77° F	After each 30 minutes of work	After each 60 minutes of work
82.5° F - 87.5° F	69.5° F - 74.5° F	After each 60 minutes of work	After each 90 minutes of work
77.5° F - 82.5° F	64.5°F - 69.5° F	After each 90 minutes of work	After each 120 minutes of work
72.5° F - 77.5° F	60° F - 64.5° F	After each 120 minutes of work	After each 150 minutes of work

Oral temperature monitoring should also be used any time the heart rate exceeds 110 beats per minute. A clinical thermometer available from a drug store (3 minutes under the tongue) or similar device (IVAC digital thermometer) can be used to measure the oral temperature at the end of the work period. Oral temperatures should be taken before drinking cool fluids.

Worker monitoring shall be conducted until a work/rest cycle is established which controls work weight loss, heart rate, and oral temperatures to an acceptable level.

7.2.4. Control Measures

If the heart rate exceeds 110 beats per minute, shorten the next work cycle one-third and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

If the oral temperature exceeds 99.6° F, shorten the next work cycle by one-third without changing the rest period. If the oral temperature still exceeds 99.6° F at the beginning of the next rest period, shorten the following work cycle by one-third.

Employees should not be permitted to wear a semi-permeable or impermeable garment when his/her oral temperature exceeds 100.6° F.

The monitoring results shall be recorded. The records should be maintained in the project file for the active life of the project.

Response

The procedures presented herein are to be followed during an incident where an employee is adversely affected by an overexposure to heat. All employees are to remain alert to the symptoms of over-exposure to heat in themselves and their fellow employees. Treatment for over-exposure is recommended below:

* ***Heat rash*** treatment includes keeping the skin clean and allowing it to dry thoroughly after using chemical protective clothing.
* ***Heat cramps treatment includes removing the affected person to a cool place. Salted water or other electrolyte source, such as Gatorade, or similar electrolyte replacement product ingested slowly should help mitigate the cramps. Manual pressure may also be applied to the cramped muscles.***
* ***Heat exhaustion*** treatment includes removal of the affected person to the cool shade, removal of as much clothing as possible, sips of salted water or Gatorade, or similar electrolyte replacement product and fanning the person continually to remove heat by convection. Do not allow the affected person to become chilled. Treat for shock if necessary.
* ***Heat stroke*** treatment includes placing the individual in the shade, removing as much clothing as possible, pouring cool water on the person and fanning him vigorously. Summon emergency medical assistance since the transportation of the victim to a medical facility must not be delayed. Apply cold packs, if available; place under the arms, around the neck, or any other place where they can cool large surface blood vessels. If convulsions develop, prevent victim from biting his tongue. If transportation to a medical facility is delayed, reduce body temperature by immersing victim in an ice/water bath (however, be careful not to over chill the victim once

body temperature is reduced below 102° F). If this is not possible, keep victim wrapped in a sheet and continuously douse with water and fan.

The employee's pulse, breathing rate, and dilation of pupils should be noted immediately when the employees are overcome. This information should be made available to the emergency medical technicians when they arrive at the scene.

8.0 DECONTAMINATION

As previously described, it is anticipated that the remediation activities within the areas will be conducted with half mask/face respirators, which will include the use of disposable coveralls, hard hats, rubber safety boots, or rubber overboots over safety shoes. To reduce the possibility of migration of contamination due to off-site tracking by personnel exiting the work areas, personnel will be required to proceed through a complete remote three stage decontamination facility that will include a dirty room, multiple shower rooms and clean room. Showers will be required each time personnel exit the environmental remediation isolation work area. The main unit shall be located on the 1st floor of the building in proximity to a building exit.

A decontamination area will be established at the access/egress point of each separate and distinct remediation isolation work area (floor) in the building. These decontamination areas will consist of one stage change chambers. Workers will remove dirty protective coveralls, booties, gloves, etc. in the one-stage unit. Upon exiting the one stage unit, they shall proceed immediately to the full, 3-stage Personnel Decontamination Unit on the 1st floor and perform the following:

* Enter the dirty room of the decontamination unit.
* Vacuum off entire body
* Remove outer boots, gloves and disposable coveralls
* Cross into shower room
* Rinse respirator or airline mask.
* Remove and wash respirator or airline mask; hang to dry.
* Workers shall shower and proceed to clean room and dress.

8.1 Equipment Decontamination

All equipment, tools, etc. will be decontaminated before leaving the work areas in the one stage units. Decontamination shall be performed by HEPA vacuuming and/or wet wiping procedures

8.2 Personnel Hygiene

Smoking, eating, or drinking will not be permitted within the buildings.

Portable sanitary facilities will be provided. The number of facilities provided will be in accordance with the requirements of 1910.120(n). They will be maintained in clean condition at all times. These units will be located in the parking lot staging area adjacent to the office trailer to the east of the work building. These units will be serviced by the provider.

8.3 Disposal of Environmental/Contaminated Waste Streams

Shower water from the decontamination process will be filtered and discharged into the sanitary sewer system and/or re-cycled into the work area for wetting of abated materials. Solid waste such as disposable clothing, towels, and asbestos/lead-containing materials that have been abated will be generated as part of the abatement process.

Waste will be properly containerized and disposed per regulatory requirements and the requirements of the project specifications.

Any waste streams not previously characterized, must be characterized to determine how the waste is to be handled and disposed.

Documentation will be provided to the owner for all environmental wastes transported and disposed as a result of work under this contract.

8.4 Disposal of General Demolition Waste Streams

All concrete demolition materials, excavated soil wastes and/or liquids removed shall be disposed of as either ID 27 or General Construction/Demolition (C&D) waste, depending on sampling analysis.

Documentation will be provided to the owner for all wastes transported and disposed as a result of work under this contract.

9.0 TRAINING

9.1 General Training Requirements

All personnel covered by this HASP who will enter the regulated work areas on this site must meet the training requirements specified in OSHA 29 CFR 1926.1101(k) and US EPA Model Accreditation Plan training required by 40 CFR Part 763, Subpart E, Appendix C, for asbestos. In addition, such personnel must have in their possession a valid and current asbestos worker or supervisor license for the performance of asbestos abatement work and a lead worker or supervisor license to perform lead abatement work, all issued by the Commonwealth of Pennsylvania Department of Labor. Workers involved in the remediation of contaminated concrete/soil/liquid materials will be required to have training in accordance with the requirements of OSHA 29 CFR 1910.120 App E – Hazardous Materials.

Finally, the on-site Project Manager or foreman/supervisors of personnel who will be responsible for the asbestos abatement work must possess a valid and current asbestos abatement supervisor license, as appropriate, issued by the State of New Jersey Department of Labor.

Minimally, the following site personnel must have completed management training:

* Project Manager
* Site Supervisor

9.2 Pre-Entry Briefing Requirements

Prior to performing site work, all personnel (including subcontractor personnel and project oversight personnel covered by this HASP must attend a pre-entry briefing to apprise them of the contents of the HASP. This briefing is to be conducted by the Project Manager or his designee. A copy of the complete HASP will be available to all personnel in the site office trailer. The following information should be covered in this briefing:

* General Overview of the HASP
* Names of Personnel and Alternates Responsible for Site Safety and Health
* Lines of Authority
* Safety, Health and Other Hazards Present on the Site
* Personal Protective Equipment Required for Activities at the Site
* Safe use of Engineering Controls and Equipment at the Site
* Level and Degree of Potential Exposures
* Site Emergency Evacuation Procedures
* Medical Surveillance Requirements, Including Recognition of Symptoms and Signs of Heat Stress and Heat Stroke
* Training Requirements

9.3 Periodic Safety Meetings

A Daily Toolbox Safety Meeting will be held in the morning to reinforce the attention of the employees to health and safety issues pertinent to that day's activities and a safety meeting will be held during the day whenever the conditions change or situations warrant. These periodic meetings could be held right on the work floor.

9.4 Documentation of Training Requirements

Documentation of required general training, in the form of a copy of each appropriate abatement license for all USAEMI employees will be maintained on site.

Documentation that each site employee covered by this HASP has attended the required pre-entry briefing prior to performing project site activities will be through signing in on the Pre-

Entry Briefing Attendance Form. Each pre-entry briefing conducted must be documented on this form.

9.5 CPR/First Aid Training

USAEMI will assure that at least one individual, who is trained in cardiopulmonary resuscitation (CPR) and first aid will normally be present on site.

10.0 MEDICAL SURVEILLANCE

10.1 General Medical Surveillance Requirements - Asbestos

All employees covered by this HASP who will work in the established areas on this site must meet the medical surveillance requirements specified in OSHA 29 CFR 1926.1101(m) for asbestos. Therefore, such personnel must have completed a baseline occupational medical surveillance examination, or an annual occupational medical surveillance examination within the last 12 months.

The requirements for the medical surveillance examination should include the following components:

For Asbestos:

* Personal Medical Questionnaire
* Occupational Exposure History
* Physical Examination
* Spirometry
* Chest X-Ray (B Reader) (At Physician's Discretion)
* Electrocardiogram (At Physician's Discretion)

10.2 General Medical Surveillance Requirements - Lead

All employees covered by this HASP who will work in the established areas on this site must meet the medical surveillance requirements specified in 1926.62. Therefore, such personnel must have completed a baseline occupational medical surveillance examination, or an annual occupational medical surveillance examination within the last 12 months.

The requirements for the medical surveillance examination should to include the following components:

- Personal Medical Questionnaire
- Occupational Exposure History
- Physical Examination
- Vision Testing

- Spirometry
- Audiometry
- Chest X-Ray (At Physician's Discretion)
- Electrocardiogram (At Physician's Discretion)
- Initial biological blood lead level monitoring for Blood lead and zinc protoporphryin levels
- Periodic blood lead and zinc protoporphryin levels
- At least every 2 months for the first 6 months and every 6 months thereafter

11.0 EMERGENCY RESPONSE

The basic elements of an emergency evacuation plan include personnel training, alarm systems, escape routes, escape procedures, critical operations or equipment, rescue and medical duty assignments, designation of responsible parties, emergency reporting procedures and methods to account for all employees after evacuation. An area safely remote from the building will be designated as the personnel rendezvous location for all personnel involved in the project.
911 shall be used to notify emergency personnel in case of all emergencies.

Employee Training: All site personnel will be instructed in the specific aspects of emergency evacuation applicable to the site as part of the site safety meeting prior to the commencement of activities. Escape routes will be established for each working zone. They will be mapped and will be reviewed with all personnel as part of the safety meetings. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed.

The operations covered by this HASP have some potential to create emergency situations, such as spills of fuels or hydraulic fluids. Other emergency situations could occur such as fire, explosion, disruption of utility service, and accident or injury to field personnel. This section of the HASP has been written to address the procedures that will be followed in the event that such an emergency occurs within a regulated work area (i.e., on site).

11.1 Site Emergency Coordinators

The On-Site Emergency Coordinators are:

Primary – Project Manager – Kevin Meldrum – Cell No. 215-397-8168
Secondary – Contract Manager – James E. Harris – Cell No. 215-778-4061

The on-site Project Manager/Project Foremen/Site Supervisors shall implement the emergency plan whenever conditions at the site warrant such action. They will be jointly responsible for assuring the evacuation, emergency treatment, emergency transport of site personnel as necessary, and notification of emergency response units and the appropriate project management staff designated in the Emergency Reference Table.

11.2 Alarm Systems/Emergency Signals

11.2.1. Emergency Signals

The following alarms will indicate an emergency and the need for implementation of the evacuation procedure.

An emergency communication system must be in effect at this site. The most simple and most effective emergency communication system in many situations will be direct verbal communications. Verbal communications will be supplemented anytime voices cannot be clearly perceived above ambient noise levels (i.e., noise from heavy equipment, jackhammers, lift trucks, etc.) and anytime a clear-line-of-sight cannot be easily maintained amongst all site personnel because of distance, terrain, or other obstructions. When verbal communications must be supplemented, the following Emergency Signals (using hand held portable air horns) may be implemented:

1. ONE HORN BLAST: GENERAL WARNING

One horn blast is used to signal relatively minor, yet important events on-site. An example of this type of event would be a minor chemical spill where there is no immediate danger to life or health yet personnel working on-site should be aware of the situation so unnecessary problems can be avoided. If one horn blast is sounded, personnel must stop all activity and equipment on-site and await further instructions from the PM.

2. TWO HORN BLASTS: MEDICAL EMERGENCY

Two horn blasts are used to signal a medical emergency where immediate first aid or emergency medical care is required. If two horn blasts are sounded, all first-aid and/or CPR trained personnel should respond as appropriate, all other activity and equipment should stop and personnel should await further instructions from the PSO.

3. THREE HORN BLASTS FOLLOWED BY ONE CONTINUOUS BLAST: IMMEDIATE DANGER TO LIFE OR HEALTH

Three horn blasts followed by another extended or continuous horn blast signals a situation that could present an immediate danger to the life or health (IDLH) of all personnel on-site. Examples of possible IDLH situations could include fires, explosions, hazardous chemical spills or releases, hurricanes, tornadoes, blizzards or floods. If three horn blasts followed by a continuous blast are sounded, all activity and equipment must stop, all personnel must evacuate the site to an appropriately designated site located outside the site gate or further off-site if necessary. (Note: Unless otherwise specified, all decontamination procedures must be implemented).

All personnel must be accounted for by the PM or PF/SS and other response actions determined by the PM/PF/SS must be observed.

11.3 Emergency Management

A site emergency is considered to be a major event that has or threatens to have a detrimental physical impact on facilities, people and/or the environment and requires immediate action.

Emergencies can be grouped into three categories:

* Fire
* Medical
* Natural (hurricanes, flooding, etc.)

Fire Detection: If an employee discovers a fire:

Report the emergency to the USAEMI Project Foremen/Site Supervisor or PM.

Report your name, exact location, and the nature of the emergency. Use the emergency warning procedures defined in Section 11.2.

* Shut down and turn off all equipment.
* Leave the areas.

11.4 Emergency Reference

For personnel with less serious injuries that border being first aid cases that do require outside assistance (i.e., emergency transportation) the worker should contact the PF/SS or the PM to place the request for emergency ambulance services. USAEMI personnel will stabilize the injured person as much as possible within the work area. Injured personnel will be decontaminated to the extent possible and removed to a clean area for medical attention.

Prior to initiating work at the site, the PM will be appointed to activate emergency response actions. In the event an injury or illness requires more than first aid treatment, an escort person shall be provided to accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the PM.

The investigation should begin while details are fresh in the mind of anyone involved. The person administering first aid may be able to start the fact gathering process if the injured are able to speak. Pertinent facts must be determined. Questions beginning with who, what, when, where, and how are usually most effective to discover ways to improve job performance in terms of efficiency, quality of work, as well as safety and health concerns.

11.5 Accident/Incident Reporting and Investigation

All injuries or illnesses incurred at this site by employees covered by this HASP, regardless of their severity, must to be reported to the PF/SS and the PM. Serious injuries or illnesses must be reported directly to the PM immediately after their occurrence.

Any accident or incident (other than minor first aid treatment) resulting in an OSHA recordable injury or illness, treatment at a hospital or physician's office, property damage, or a near miss that could have resulted in any of the above requires that an accident/incident investigation be performed. The investigation will be initiated by the PM or the first line supervisor of the employee(s) involved as soon as emergency conditions are under control. The results of the accident investigation are to be documented. The incident shall be investigated and documented in accordance with the requirements of the Corporate Health & Safety Program.

11.6 Evacuation of Site Personnel

In the event of an emergency situation where evacuation of the area is necessary, all personnel in the area will evacuate the work area and assemble near a support area location determined prior to the beginning of the daily operating tasks. For efficient and safe site evacuation and assessment of the emergency situation, the PM will have authority to initiate proper action if outside services are required. Under no circumstances will incoming personnel or visitors, other than emergency personnel; be allowed to proceed into the area once the emergency signal has been identified. The site evacuation plan shall be included as part of the pre-entry briefing required for all site personnel.

11.7 Injury or Illness

Emergency first aid shall be applied on site as deemed necessary. If necessary and appropriate, cleanup of the affected individual will be performed prior to transportation to the hospital. In cases of emergency, the ambulance squad shall be contacted for transport to the hospital. In non-emergency situations, the individual may be transported to the hospital in a site vehicle.

11.8 Activity Hazard Analysis

This is a typical Activity Hazard Analysis form. Please refer to the complete Safety Program Addendum for Activity Hazard Analysis program applicable to this project and this plan.

Activity: _____ Analyzed By: _____ Date:_____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
Elevated/Roof Work	Falls/Slips & Trips Heat Stress	Each worker to wear a safety harness with an energy absorbant lanyard. Establish work-rest cycles. Identify shaded, cool rest area. Alternative job function. Water intake to be equal to sweat produced. Drink salted drinks like Gatorade.
Articulating Boom Lift	Fall	Boom to be equipped with back up alarm. Bucket not to exceed the maximum rated capacity. Safety harness to be worn at all times while in the bucket.
Pipe Insulation Removal	Slips/Trips/Falls	Scaffolding to be erected on level ground. Guard rails to be provided around perimeter of work surface. Deck entire top portion of the work surface. Extend planks at least six inches over the supports. Train all employees in proper use of scaffolding. Inspect scaffolding to identify any defects.
Interior Transite Panels	Electric Hazards Slips/Falls	Suspend all air lines and electric cords when possible using a tape. Hard hats, safety glasses to be worn by all employees. Ladders and scaffold to be inspected before each use. Minimize debris on floor. Always face the ladder when climbing up, down or when working from it. Ladders not to be used as substitute for planks. Wood/fiber glass ladders to be used to help control exposure to electrical hazards.

Respiratory Protection Program

USA ENVIRONMENTAL MANAGEMENT, INC.

RESPIRATORY PROTECTION PROGRAM

Revised 10/12

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REASONS FOR HAVING A RESPIRATORY PROGRAM

Working and breathing in some environments can pose a hazard to workers' health. Inhalation of some substances can cause immediate injury to the respiratory system or other major organ systems of the body. Carbon monoxide and some paint solvents are examples of relatively quick acting substances. The injuries/illnesses caused by other contaminants may not be obvious for years or even decades. Asbestos and other cancer causing agents fall into this category of long latency (developing) periods.

Respirators are commonly used to help protect against these inhalation hazards, especially on asbestos abatement projects. However, the protection program is not nearly as simple as choosing a respirator, giving it to an employee, and expecting the employee to get adequate protection. There is a need to have and apply knowledge about lung structure and function, human characteristics, hazard recognition, evaluation and control, and government regulations.

Respiratory hazards are generally divided into two categories--oxygen deficiency and toxic contaminants. The potential for either or both must be considered when addressing respiratory protection.

Normal air containing about 21 percent (20.9%) oxygen. For breathing purposes, air should not contain less than 19.5 percent or more than 23.5 percent oxygen. Oxygen deficiency generates a variety of symptoms, ranging from increased breathing and pulse rate to unconsciousness and death.

Asbestos abatement projects generally do not pose oxygen deficiency hazards. However, since there are abatement projects and circumstances where it can be a problem, it must always be considered. For example, there could be an oxygen deficiency problem while working in confined spaces such as steam tunnels, mechanical chases, or boilers. ***Please note – there are no work areas in the scope of this contract work, which would present an oxygen deficient work environment.***

Toxic contaminants are the more common category of respiratory hazards on asbestos abatement jobs. Those toxic contaminants are generally subdivided into two categories, particulates and gaseous materials (or a combination of the two). Asbestos fibers are an example of the particulate category and carbon monoxide is an example of the gaseous category. It is possible to have both these hazardous substances plus others (such as encapsulant solvents) in a work area at the same time.

As mentioned earlier, the effects of these contaminants can develop quickly or slowly and they can be mild or fatal. For example, mesothelioma (cancer of the lung or abdominal linings) may take 20 to 45 years to develop, but once it is detected, it causes death within a year. Severe exposure to carbon monoxide can cause death within a few minutes or may not leave residual damage if promptly detected and treated.

Acceptable limits of exposure for respiratory hazards are based on values documented through research by such organizations as the American Conference of Governmental Industrial Hygienists (ACGIH), the National Institute for Occupational Health and Safety (NIOSH), the Occupational Safety and Health Administration (OSHA), and others. These organizations publish Permissible Exposure Limits (PELs) and Threshold Limit Values (TLVs) for a variety of toxic substances.

The limits are expressed for exposure durations, usually a full work shift. For example, the current OSHA limits for exposure to carbon monoxide are 50 parts per million (PPM) in work place air and 20 PPM in air supplied to Type C respiratory. The current limits and recommended guidelines for asbestos exposure range from 0.2 f/cc (OSHA) down to 0.01 f/cc (generally accepted "clearance level" in the asbestos abatement industry), or lower.

Asbestos abatement work has a likelihood for high personal exposure to asbestos, whether it is removal, encapsulation, or enclosure work. Thus, adequate procedures in assessing hazards, reducing hazards, and providing respiratory protection must be conscientiously applied.

Hazard assessment during abatement work involves a variety of visual inspections. For example, barriers must be frequently checked for leakage. Removed asbestos materials must be checked for adequate wetness and surfaces need to be carefully inspected for asbestos contamination. Personal and work area samples must be collected to document the asbestos fiber content of the workplace air. Sampling locations include outside the barrier, in the work area, and at the breathing zone of workers. The result of the samples from the work area and workers are necessary to establish proper hazard reduction/elimination techniques and to choose proper respirators for the workers.

Several hazard reduction techniques may be used inside the abatement area including wetting with amended water, using negative air machines, prompt bagging of removed materials, wet cleaning, and HEPA vacuuming. These techniques reduce the airborne fiber concentrations during removal projects, reduce the asbestos hazard to the worker, and ease clean-up efforts.

Respirators must be selected and a respirator program established based on OSHA standards, the actual or anticipated air sampling results, and other guidelines (i.e., respirator manufacturers'). ***Please note that the project specific respiratory, procedures are included in the appropriate sections of the project specific Asbestos Hazard Abatement Plan and the Lead-Based Paint Management Plan.***

Only respirators approved for use in asbestos atmospheres should be used. Both the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) test and approve respirators and assign a joint NIOSH/MSHA approval number for each specific respirator assembly. The following shows examples of approval labels that would be found on respirators.

The label below is for a respirator model with high efficiency filter cartridges that might be used for protection against airborne asbestos fibers. The approval number assigned by NIOSH for

this specific manufacturer and model is 21C-353 (see label The "TC" indicates "tested and certified", the "-21C" indicates what style/category of respirator it is, and the "-353" is a unique number assigned to this specific manufacturer and model.

Respirator selection must be based on the anticipated exposure level to asbestos. However, based on actual 8-hour TWA exposure sampling performed on similar type projects, it is anticipated that this project would allow for the use of ½ face, negative pressure, respiratory protection throughout.

TYPES OF RESPIRATORS

AIR PURIFYING RESPIRATOR

Air purifying respirators remove limited concentrations of air contaminants from the breathing air but do nothing to improve (or change) the oxygen content. Thus, they can only be used in atmospheres where there is enough oxygen and where air contaminants do not exceed the specified range of the respirator and cartridge.

These respirators generally consist of a soft, rubber face piece and some kind of replaceable filter or cartridge. Two major subcategories of air purifying respirators are the mechanical filter type and the chemical cartridge type. The mechanical filter variety is designed to protect against particulate matter such as dust and asbestos fibers. The chemical cartridge variety is used to protect against light concentrations of chemicals such as solvent vapors. There are combination models approved for both types of protection.

Respirator face pieces (including those for the air purifying category) are used to further describe specific subcategories based on the construction and face coverage. The major subcategories are:

-- Half Mask
-- Full Face

HALF MASK RESPIRATOR

It is called a half-mask because it covers half of the face from under the chin to the bridge of the nose. Most, but not all, half-mask respirators are NIOSH/MSHA approved. It is

still necessary to choose the correct approved model for the identified air contaminant. Note the respirator components and the correct position for the head and neck strap.

FULL FACEPIECE RESPIRATOR

Full-face types cover from under the chin to the forehead. This broader coverage provides a better face fit, higher degree of protection, and gives some eye protection. Many full-face respirators have four or more straps. Regardless of the number of straps, the respirator should be put on by placing the chin into the chin cup, then tightening the straps going from the bottom to the top.

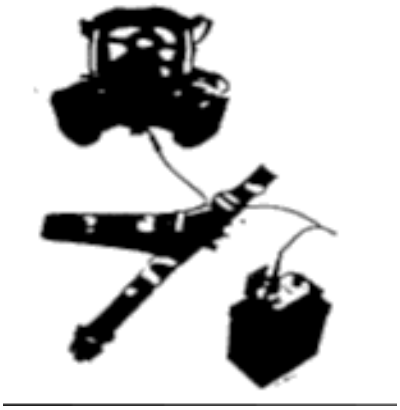
POWERED AIR PURIFYING RESPIRATOR (PAPR)

A subcategory of air purifying respirators is the powered Air Purifying (PAPR) type. It has received considerable use on asbestos abatement projects.

PAPR units use a battery-powered blower that passes the contaminated air through a cartridge or filter where the air is cleaned and forced through a hose to the face piece. The face covering can be a half-mask, full-face mask, helmet (hat), or hood.

An advantage of using a powered air-purifying respirator is that it supplies air at a positive pressure within the face piece, helmet, or hood. They provide a higher degree of protection than do half-mask and full-face air purifying respirators.

Powered respirators must deliver at least four cubic feet of air per minute (CFM) to a tight fitting face piece and at least seven CFM to a loose fitting helmet or hood. They are reportedly designed to operate a full eight-hour work shift, but after repeated rugged use some seem to need recharging or a new battery during the shift. If employees request PAP respirators, employers must provide them even if negative pressure respirators would provide adequate protection [29 CFR 1910.1001 (g)(2)(i)] & (29 CFR 1926.58 (h)(2)(iii)].



Another category of respirators is the Air Supplied respirator.

AIR SUPPLIED RESPIRATOR

Air-supplied respirators deliver breathing air through a supply hose connected to the worker's face piece (half mask or full face). This category of respirator is becoming the most important type on asbestos abatement jobs for several reasons:

-- The OSHA asbestos standards (29 CFR 1910.1001 and 1926.58) require jobs be started with them if exposure is unknown of greater than 1000 X PEL

-- They provide a very high degree of protection

-- They are often required by the contract specifications

The third and last major category is the Self-Contained Respirator.

SELF-CONTAINED RESPIRATOR

Self-contained respirators provide protection for various periods of time depending upon the amount of breathing air (air pressure and tank size) and the breathing demands of the wearer. The worker is independent of his/her surrounding atmosphere when using these devices. Therefore, they can be used in environments immediately harmful to life.

However, since they have several disadvantages, they are seldom used on asbestos abatement jobs except by some inspectors. They are heavy and awkward to wear. The air supply usually lasts only 30 to 60 minutes, thus requiring a large supply of filled tanks on-site. They require more worker training than the other types or respirators.

GENERAL MAINTENANCE

When not is use, dry respiratory equipment should be sealed in plastic bags and stored in a single layer with the face piece and exhalation valve in a non-distorted position. A metal cabinet with shelves is well suited for this purpose.

Repair or replacement of component parts must be done by qualified individuals. Substitution of parts from a different brand or type of respirator will invalidate the approval of the respirator and may adversely affect its performance.

Inspection for defects in respiratory equipment must be done before and after each use and during cleaning. The primary defects to look for in the inspection of component parts of the respirator and corrective actions where appropriate are itemized below:

1. Air purifying and powered air purifying respirators (half-mask, and full face piece)

a. Rubber face piece--check for:

--Excessive dirt (clean all dirt from face piece).

--Cracks, tears, or holes (obtain new face piece).

--Distortion (allow face piece to "sit" free from any constraints and see if distortion disappears. If not, obtain new face piece).

--Cracked, scratched, or loose-fitting lenses (contact respirator manufacturer to see if replacement is possible. Otherwise, obtain new face piece).

b. Head straps--check for:

--Breaks or tears (replace head straps).

--Loss of elasticity (replace head straps).

--Broken or malfunctioning buckles or attachments (obtain new buckles).

--Slipping face piece (replace head strap).

c. Inhalation valve/exhalation valve-check for:

--Detergent residue, dust particles, or dirt on valve or valve seat (clean residue with soap and water).

--Cracks, tears, or distortion in the valve material or valve seat (contact manufacturer for manufacturer instructions).

--Missing or defective valve cover (obtain valve cover from manufacturer).

d. Filter element(s)--check for:

--Proper filter for the hazard.

--Approval designation.

--Missing or worn gaskets (contact manufacturer for replacement).

--Worn threads--both filter threads and face piece threads (replace filter or face piece, whichever is applicable).

--Cracks or dents in filter housing (replace filter).

--Missing of loose hose clamps (obtain new clamps).

2. Atmosphere-supplying respirators (Air-supplied and Self-contained).

a. Check face piece, head straps, valves, and breathing tube, as for air purifying respirators.

b. Hood, helmet, blouse, or full suit, if applicable--check for:

--Headgear suspension (adjust properly for worker).

--Cracks or breaks in face shield (replace face shield).

--Protective screen to see that it is intact and fits correctly over the face shield, abrasive blasting hoods, and blouses (obtain new screen).

c. Air supply system--check for:

--Breathing air quality

--Breaks or kinks in air supply hoses and end fitting attachments (replace hose and/or fitting).

--Tightness of connections

--Proper setting of regulators and valves (consult manufacturer's recommendations).

--Correct operation of air purifying elements and carbon monoxide or high-temperature alarms.

ADMINISTRATION OF RESPIRATORY PROGRAM

Dilip Kumar will be the Program Administrator for USA Environmental Management, Inc. (USAEMI's) Respiratory Program. He will be responsible for making sure that each individual worker is properly fit tested with an appropriately sized respirator, that the respirators are maintained, and that each individual assigned to wear a respirator is medically monitored in accordance with OSHA standard 29 CFR 1926.58.

PROGRAM ADMINISTRATORS RESPONSIBILITIES

--Purchasing inventory

--Issuing respirators

--Controlling inventory, to include, a system of accounting and record keeping to track identification of users and to compile maintenance records for specific respirators.

Record keeping should include:

--Results of any pre- of post-training evaluation of workers' knowledge and hands-on skill.

Records of worker's exposure, medical exams, and air monitoring results will be kept a minimum of 30 years.

MEDICAL MONITORING

Free medical exams are provided to all employees required to wear a negative-pressure respirator, before employment and once annually after that or more frequently if deemed necessary by the physician, and after termination. Exams must include a standardized OSHA respiratory history form, pulmonary function tests, chest x-rays, a physical examination directed toward the pulmonary, cardio-vascular and gastro-intestinal systems and other tests the physician feels are necessary.

The physician and B-reader have been given copy of the OSHA standard, information about the employee's exposure, duties respirator use, and previous medical exams. The physician's opinion must be confined solely to medical conditions that may limit ability to work. X-rays must be read by a B-reader. A copy must be provided to the employee within thirty (30) days after receipt.

USAEMI keeps records on any historical data used for exemptions from monitoring (as long as relied on), exposure measurements (30 + years) medical examinations (30 + years after employment), employee training (one (1) year after employment). Records are available to employees and their representatives. Medical records require written consent for release.

USAEMI uses the occupational health component of Jefferson Health System, Healthmark, Inc., 2301 S. Broad Street, Philadelphia, PA 19148 for the required physical examination. The examination includes a complete physical examination by a physician, chest x-ray (read by a B reader), Pulmonary Function Test and ***Respirator Clearance Form***. After examination, a summary is given to the worker to be brought back to the office ***indicating whether or not the worker is capable of working with a respirator***. Within a few days complete detailed results are sent to the employee at his home address and appropriate information is sent to USAEMI to keep on file with employee records. If an employee is unable to function normally while using a respirator, he will be given the opportunity to be assigned to a different position not requiring the use of a respirator.

> Copies of complete, current, medical program for each worker will be maintained at the project site throughout the course of all abatement activities.

PERMISSIBLE EXPOSURE LIMIT

As established by the OSHA Construction Standard, 1926.1101 the following will apply to individuals employed in potential asbestos exposure work activities:

--Permissible exposure limit (PEL) of 0.1 fibers/cc average over an 8-hour day.

--A short-term excursion limit based on 30 minutes of sampling has a maximum exposure level of 1.0 f/cc.

--USAEMI must inform other employers on the site of their asbestos work.

--Regulated areas must be set up to minimize the number of workers exposed whenever PEL may be exceeded. Activities in the area are strictly controlled.

--Negative-pressure enclosures must be set up wherever feasible.

--A competent person must supervise all activities and compliance with all applicable regulations.

--Exposures must be monitored initially and daily on representative workers in each work area, unless historical data or periodic monitoring can demonstrate levels not exceeding the action level.

--USAEMI notifies workers either individually or by posting of their exposures as soon as possible after results are received. Workers and their representatives have the right to observe monitoring.

--Engineering controls (e.g., local exhaust, HEPA vacuums) and work practices (e.g., wet methods), must be used to control exposures as much as possible.

--Workers using half of full-face masks can request PAPR. Respirators must be fit-tested and documented to ensure proper fit using qualitative or quantitative fit-testing initially and every six months.

--Protective clothing must be provided for exposures over the PEL. Proper laundering is re -quired. Torn or ripped work suits must be immediately mended or replaced.

--Decontamination areas, clean rooms, and showers must be provided for exposures over the PEL, except for small scale short-duration operations.

--Employees exposed above the Action Level must be trained at least once a year on the hazards of asbestos, their relationship to smoking, how to minimize exposure, the uses and limitations of respirators.

TABLE D-4 of 29 CFR 1926.58 prescribes the appropriate minimum respiratory protection needed according to the airborne concentration of asbestos in the area.

AIRBORNE CONCENTRATION OF ASBESTOS	**REQUIRED RESPIRATOR**
Not in excess of 1 f/cc (10 X PEL)	Half-mask air purifying respirator equipped with high-efficiency filters.
Not in excess of 5 f/cc (50 X PEL)	Full Face piece air purifying respirator equipped with high efficiency filters.
Not in excess of 10 f/cc (100 X PEL)	1. Any powered air purifying respirator equipped with high efficiency filters.

	2. Any supplied-air respirator operated in continuous flow mode.
Not in excess of 100 f/cc (1000 X PEL)	Full-face piece supplied-air respirator operated in pressure demand mode.
Greater than 100 f/cc (1000 x PEL) or Unknown Concentration	Full-face piece supplied-air respirator operated in pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus.

RESPIRATOR LIMITATIONS AND WARNINGS FOR AIR PURIFYING AND POWERED AIR PURIFYING RESPIRATORS

1. This respirator does not supply oxygen.

2. Use only in adequately ventilated areas containing at least 19.5% oxygen.

3. Do not use for respiratory protection when atmospheric contaminants are unknown or immediately dangerous to life or health or against contaminants, which generate high heats of reaction.

4. Leave work area immediately, check integrity of respirator, and replace parts if:

   a. they become damaged;
   b. breathing becomes difficult, increased breathing resistance occurs;
   c. dizziness or other distress occurs; or
   d. you taste or smell contaminants or an irritation occurs.

5. Use strictly in accordance with the face piece, cartridge and pre-filter instruction, labels and limitations pertaining to this respirator assemble. If you have any doubts about the applicability of this product to your job situation, it is recommended you consult the Respiratory Program Administrator.

6. Use of this or any respirator should be in accordance with applicable safety and health standards, respirator selection tables, or pursuant to the recommendations of an industrial hygienist.

7. The assembled respirator may not provide satisfactory face seal with certain physical characteristics (such as beards or sideburns) resulting in leakage in connection with the face piece, which voids or limits the protection. If such a condition exists, the user assumes all risks of bodily injury, which may possibly result.

8. Never modify of alter this device.

9. Only for use by trained qualified personnel.

10. Store this device in a sealed container away from contamination areas when not in use. Important: Failure to follow all instructions and warnings on the use of this product and/or failure to wear this respirator during all times of exposure may adversely affect the wearer's health.

STANDARD OPERATING PROCEDURES FOR FULL FACEPIECE POWERED AIR PURIFYING (RACAL™) RESPIRATOR

1.1 Battery Charging

A completely exhausted battery pack should be charged for 14-16hours with the single unit battery charger. A longer charging period will not normally damage the battery pack, but may reduce battery life if repeated regularly.

Charge the battery pack as follows:

a. Connect the battery pack to the charge by plugging the charger lead into the top of the battery pack. The position of the switch on the battery pack does not affect the ability of the charger to charge.

b. Plug the charger into a suitable source of AC power (110-120 volt).

c. Check that the LED indicator will gradually diminish. This does not imply that the battery pack is completely charged; the battery pack should be charged for the full 14-16 hours. Check the battery pack voltage after charging to be sure that it is above 5.0 volts.

In addition to single unit chargers, charging stations are available for use with the Powerflow System, Consult Chapter 4 for a complete listing.

1.2 Pre-Operational Inspection

Before beginning each work shift, perform the following Pre-operational Inspection to ensure proper operation. If any components are missing or damaged, replace them prior to using the Powerflow System. Make sure:

a. the head harness straps are not torn, and the visor is not cracked,

b. the inhalation valves are not worn, torn, bent, dry, or sticky, and there are no pinpoint holes in the facemask fabric,

c. the battery pack is fully charged (see Section 1.1),

d. the filter is an SP3 filter with part number 520-01-34 or 450-01-01,

e. the SP3 filter is appropriate for the environment of its intended use, as confirmed by your local safety professional, and

f. air flows properly through the system as determined by the following airflow check:

1. connect the filter to the motor/airflow unit as described in Section 1.3b,

2. insert the base of the airflow indicator into the outlet side of the motor/airflow unit. Turn the battery pack switch to the "ON" position,

3. hold the motor/airflow unit so the airflow indicator is in a vertical position. (See Figure 1.), and

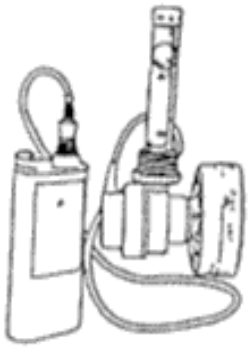


Figure 1: Position of the airflow indicator on the motor/airflow unit for an airflow check

4. Make sure the center of the airflow indicator float falls at or above the ten mark on the airflow indicator specified for power flow. If the float fails to reach this mark, install a new filter (see Section 3.10). Be sure to replace the plug and screw cap on the old filter and dispose of it according to local, state, or federal guidelines. If problems

still exist, check the charge of the battery pack (see Section 2.1) and examine the motor/airflow unit for problems.

> WARNING: MAKE SURE THE CENTER OF THE AIRFLOW INDICATOR FLOAT IS AT OR ABOVE THE ARROW MARK SPECIFIED FOR POWER-FLOW PRIOR TO ASSEMBLING THE SYSTEM AND ENTERING THE WORK AREA. FAILURE TO DO SO MAY RESULT IN INADEQUATE AIRFLOW.

1.3 System Assembly and Donning

Notes: For your protection, this Powerflow System must only be assembled in non-contaminated environments.

A. Connecting the Motor/Airflow Unit to the Facemask

Screw the motor/airflow unit into the threaded hole in the front of the facemask. Hand-tighten the motor/airflow unit to the facemask. The motor/airflow unit may be swiveled to a position of choice and comfort.

Note: When swiveling the motor/airflow unit, it may accidentally be loosened from the facemask. Double check to make sure the unit is properly and securely fastened to the facemask each time the unit is swiveled.

B. Connecting the Filter to the Motor/Airflow Unit

Read the User Instructions packed with the filter. Remove the packaging, screw cap, and plastic plug from the filter, retaining the cap and plug for use during decontamination, storage, and disposal. Check that a gray (or black) gasket has been installed in the filter inlet on the motor/airflow unit, (if a gasket is not in place, notify your supervisor and obtain a motor/airflow unity that has a gasket in place). Screw the filter into the filter inlet on the motor/airflow unit and hand-tighten to affect a good seal with the gasket.

> WARNING: DO NOT USE THE SYSTEM WITHOUT THE GASKET IN PLACE. FAILURE TO HAVE A GASKET IN PLACE MAY CAUSE INWARD LEAKAGE OR CONTAMINATED MATERIAL RESULTING IN SERIOUS INJURY OR LOSS OF LIFE.

C. Donning the System

Note: RACAL Health and Safety recommends wearing the Facemask underneath any protective outerwear that covers your head.

Remove the visor guard and fit the facemask as described below (fitting the facemask properly will yield designed protection):

1. Place the facemask's neck strap around your neck.

2. Loosen the facemask's straps and fit the facemask by placing your thumbs inside the facemask straps, placing your chin into the chin cup and pulling the head harness over your head. Tighten the lower straps first, then the upper side straps, and finally the top strap. A correct seal may be obtained without over tightening the facemask straps.

3. Confirm good facial fit of the facemask.

4. Attach the battery pack to your belt, using the belt clip. Insert the male plug of the motor/airflow unit into the battery pack. Turn the battery pack switch to the "ON" position and assure yourself of sufficient airflow. (See Section 1.2f).

Note: RACAL Airstream recommends facemask fit be checked in the positive-pressure mode. There are several good methods for confirming good facial fit. Check with your safety professional and/or a physician.

If this system will be exposed to large amounts of water, the battery pack must be placed in a water repellent battery cover (available from RACAL Airstream) or in a waterproof plastic bag prior to use to avoid corrosion, deterioration and possible battery failure.

1.4 Fault Location

In the event airflow over your face reduces or stops, leave the contaminated environment immediately and perform the following faultfinding procedures. Make sure:

a. there are no pinpoint holes in the facemask fabric, tears in the head harness straps, or cracks in the visor,

b. the inhalation valves are not worn, torn, bent, dry, or sticky,

c. the Powerflow System is turned on and the power cord is properly connected to the battery pack,

d. no damage has occurred to any part of the battery pack or the motor/airflow unit,

e. the battery pack voltage is greater than 4.4 volts, and

f. air is properly flowing through the system, as verified by performing the airflow check described in Section 1.f. If the system fails the airflow check, and the battery pack is above 4.4 volts, install a new filter (see Section 2.1). Make sure the new filter passes the airflow check. Always replace the plug and screw cap on any used or damaged filter and dispose of it according to local, state, or federal guidelines.

If any components are not functioning properly, remove and replace them, as described in Section 2 and perform the Pre-Operational Inspection described in Section 1.2. Always make sure sufficient airflow is maintained before re-entering the contaminated work environment.

Figure 2: Correctly Donned Powerflow System

1.5 Post-Operational Maintenance

Note: For your protection, the Powerflow System must only be removed in non-contaminated environments. Be sure to turn off the battery back before removing the system.

Take care of the Powerflow system after each use in the manner detailed below. Do not use abrasive cleaners.

WARNINGS: WATER MUST NOT BE PERMITTED TO ENTER THE BODY OF THE MOTOR/AIRFLOW UNIT; IT WILL DAMAGE THE MOTOR. UNDER NO CIRCUMSTANCES SHOULD THE MOTOR/AIRFLOW UNIT BE SUBMERSED IN WATER.

TO PRESERVE THE SYSTEM'S INTEGRITY, GASOLINE, ORGANIC-BASED SOLVENTS, OR CHLORINATED DEGREASING FLUIDS (SUCH AS TRICHLOROETHYLENE) MUST NOT BE USED TO CLEAN ANY PART OF THIS SYSTEM.

A. Unscrew the motor/airflow unit from the facemask and wash the facemask in a solution of warm water and mild detergent. Rinse the facemask and visor in clean, running water and shake excess water from the facemask. Wipe the visor dry with a clean, soft cloth. Handle the facemask care- fully to avoid unnecessarily scratching the visor.

B. Remove the filter from the motor/airflow unit and change, if necessary (See Section 2.1). Wipe all components with clean, damp cloths to prevent contaminants from entering

either the threaded side of the filter or the motor/airflow unit. If the filter does not need to be changed, the Powerflow System should still be disassembled, cleaned, and if necessary, decontaminated. If the filter is to be discarded, cover the threaded side of the filter with a screw cap and insert the translucent plastic plug into the filter inlet. Discard the used filter in accordance with local, state, or federal guidelines.

C. After all components have been cleaned, allow them to dry completely, away from sunlight and direct heat. Recharge the battery pack and place the facemask in a new plastic bag. Store the system in a clean area, away from moisture, heat, and direct sunlight. Storage temperatures must not exceed 120 degrees F.

NOTE: Certain operating conditions require decontamination procedures after using a system. The Powerflow motor/airflow unit is enclosed in a rubber shroud that helps prevent system contamination.

D. When preparing to go through decontamination showers, keep the battery pack in its water repellent battery cover to protect it from direct water contact. Swivel the motor/airflow unit so the filter inlet faces directly down (see Figure 3) and proceed through the shower.

Figure 3: Position of the Motor/Airflow Unit Prior to Entering the Decontamination Shower.

E. Upon exiting the shower, allow the motor/airflow unit to run for an additional fifteen minutes. This will permit the unit to dry and will drive out any moisture. Disconnect the motor/airflow unit from the battery pack. Remove the facemask. Cover the motor/airflow unit air outlet port with the screw cap that came with the filter and insert the plastic plug into the filter inlet. Keep the filter attached to the motor/airflow unit.

F. Rinse the facemask and motor/airflow unit with clean water. Remove the water repellent battery pack cover, decontaminate it, and store it fur future use. If a plastic bag has been used, dispose of the bag properly. Wipe the battery pack with clean cloths.

G. Remove the used filter from the motor/airflow unit. Change the filter, if necessary, as described in Section 2.1. Carefully wipe the motor/airflow unit with clean, damp cloths. Do not allow water to enter the motor/airflow unit.

2.1 Filter

The filter must be changed when the center of the airflow indicator float falls below the mark specified for power flow during an airflow check for the motor/airflow unit (see Section 1.2f), when the filter has been damaged by outside forces, when an excessive amount of water has been permitted to enter the filter, or in order to comply with local administrative procedures. Be sure to replace the plug and screw cap any used or damaged filter and dispose of it according to local, state, or federal guidelines. To install the filter, proceed as follows:

1. Confirm that the filter is an SP3 filter by reading the wrap around label and confirming Part No. 520-01-34 or 450-01-01. Also confirm with your local safety professional that the filter is appropriate for the environment of its intended use.

2. Read the User Instructions packed with the filter.

3. Remove ten packaging, plug, and cap. The plug and cap may be reinserted to protect the filter when not in use.

4. Discard any filter that is damaged (body, thread, and media).

5. Inspect the threaded hole in the motor/airflow unit to be sure that a gray (or black) gasket is in place. If a gasket is not in place, notify your supervisor and obtain a motor/airflow unit that has a gasket in place.

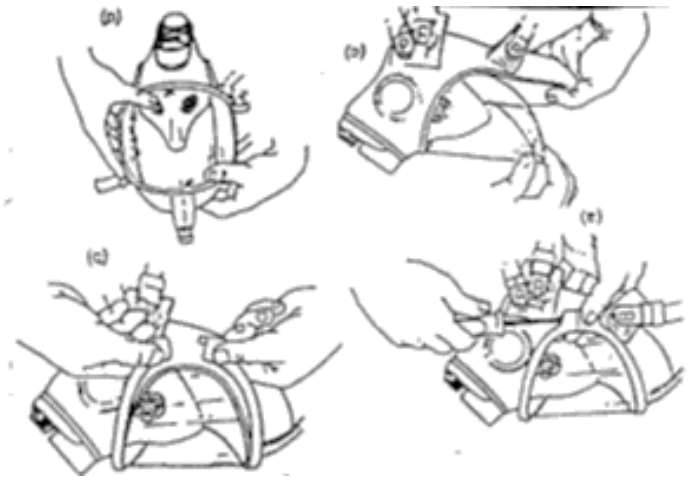
6. Screw the filter into the motor/airflow unit and tighten to affect a tight seal with the gasket.

2.2 Visor

A. Removal

Remove the screws on the visor clamps and pry the visor clamps apart. Lift the flange surrounding the visor and pull the visor from the facemask (See Figure 4).

Figure 4: Visor, Removal and Replacement



B. Replacement

Ensure the new visor is not damaged before proceeding. Replace the visor by reversing the order described above. Pay particular attention to the molded witness marks on the visor and clamps, aligning them with the center of the facemask (See Figure 4d). To facilitate reassembly, lubricate the inside groove of the visor clamps with silicone grease.

2.3 Valves and Valve Box Assembly

Inhalation and exhalation should be periodically checked. They should be replaced if they are worn, torn, or otherwise damaged only by experienced personnel with parts designed for the respirator. The area around the exhalation valve must be free of contaminants and dirt. Check frequently and wipe clean, if necessary.

2.4 Fuses

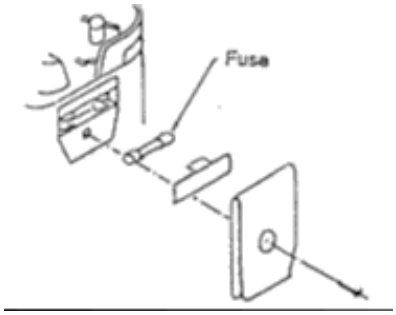
A. Removal

The fuse for the 520-01-17 battery pack is located behind the clothing clip. Remove the screw from the battery pack using a Phillips head Screwdriver and remove the clothing clip. Lift the fuse cover (now revealed) and its fuse from the battery pack.

B. Replacement

Replace the fuse with a 1.5 amp fuse (Part No. 520-01-14) by inserting the fuse into the fuse cover (See Figure 5). Replace the fuse cover into the battery pack. Attach the clothing clip to the battery pack.

Figure 5: Fuse Removal and Replacement



CAUTION: Use exclusively 520-01-14 replacement fuses in 520-01-17 (1.5 amp) fuses are available only from authorized RACAL Airstream distributors. Other than fuse replacement, no dismantling or repair of battery packs should be attempted.

WORKER DECONTAMINATION

A. All workers without exception shall:

1. Remove street clothes in the change room and put on the disposable coveralls, head covers, foot covers, gloves, and respirators before proceeding to Work Area. All of these items will be supplied by USAEMI.

2. Remove contaminated garments and footwear before leaving the Work Area; while still wearing the respirator, proceed to the shower and remove it while showering with soap and water.

3. Shower every time you leave the Work Area and before entering change room. Following this decontamination, workers shall dress in new, clean disposable garments to eat, smoke of drink. These garments may be worn to re-enter the Work Area or workers may change into street clothes at the end of the workday.

4. Non disposable work footwear shall remain inside work area until completion of the project.

B. Workers shall not eat, drink, smoke, chew gum or chew tobacco in the Work Area.

1. To eat, drink of smoke, workers shall adhere to the entire decontamination procedure contained in Items 2 through 4 above.

2. Workers shall be clean-shaven.

3. Workers shall not wear contact lenses.

SACCHARIN SOLUTION AEROSOL PROTOCOL

A. Respirator Selection

1. The test subject shall be allowed to pick the most comfortable respirator from a selection including respirators of various sizes from different manufacturers. The selection shall include at least five sizes of elastomeric half face pieces from at least two manufacturers.

2. The selection process shall be conducted in a room separate from the fit-test chamber to prevent odor fatigue. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine a "comfortable" respirator. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This

instruction may not constitute the subject's formal training on respirator use, as it is only a review.

3. The test subject should understand the employee is being asked to select the respirator, which provides the most comfortable fit. Each respirator represents a different size and shape and, if fit properly and used properly will provide adequate protection.

4. The test subject holds each face piece up to the face and eliminates those, which obviously do not give a comfortable fit. Normally, selection will begin with a half-mask and if a good fit cannot be found, the subject will be asked to test the full-face piece respirators. (A small percentage of users will not be able to wear any half-mask).

5. The more comfortable face pieces are noted; the most comfortable mask is donned and worn at least five minutes to assess comfort. All donning and adjustments of the face piece shall be performed by the test subject without assistance from the test conductor or other person. Assistance in assessing comfort can be given by discussing the points in #6 below. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of the comfort shall include reviewing the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

    --Positioning of mask on nose.
    --Room for eye protection.
    --Room to talk.
    --Positioning mask on face and cheeks.

7. The following criteria shall be used to help determine the adequacy of the respirator fit:

    --Chin properly placed.
    --Strap tension.
    --Fit across nose-bridge.
    --Distance from nose to chin.
    --Tendency to slip.
    --Self-observation in mirror.

8. The test subject shall conduct the conventional negative and positive-pressure fit checks before conducting the negative or positive pressure test the subject shall be told to "seat" the mask by rapidly moving the head from side to side and up and down, while taking a few deep breaths.

9. The test subject is now ready for fit testing.

10. After passing the fit test, the test subject shall be questioned again regarding the comfort of the respirator. If it has become uncomfortable, another model of respirator shall be tried.

11. The employee shall be given the opportunity to select a different face piece and be retested if the chosen face piece becomes increasingly uncomfortable at any time.

B. Taste Threshold Screening

1. An enclosure about head and shoulders shall be used for threshold screening (to determine if the individual can taste saccharin) and for fit testing. The enclosure shall be approximately 12 inches in diameter by 14 inches tall with at least front clear to allow free movement of the head when a respirator is worn.

2. The test enclosure shall have a three quarter inch hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

3. The entire screening and testing procedure shall be explained to the test subject prior to conducting the screening test.

4. During the threshold-screening test, the test subject shall don the test enclosure and breathe with an open mouth with tongue extended.

5. Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

6. The threshold check solution consists of 0.83 grams of sodium saccharin, USP in water. It can be prepared by putting 1 cc of the test solution (see C 7 below) in 100 cc of water.

7. To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, than is released and allowed to fully expand.

8. Ten squeezes of the nebulizer bulb are repeatedly rapidly and then the test subject is asked whether the saccharin can be tasted.

9. If the first response is negative, ten more squeezes of the nebulizer bulb are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

10. If the second response is negative ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

11. The test conductor will take note of the number of squeezes required to elicit a test response.

12. If the saccharin is not tasted after 30 squeezes (Step 10), the saccharin fit test cannot be performed on the test subject.

13. If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

14. Correct use of the nebulizer means that approximately 1 cc of liquid is used at a time in the nebulizer body.

15. The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least every four hours.

C. Fit Test

1. The test subject shall don and adjust the respirator without the assistance from any person.

2. The fit test uses the same enclosure described in B.1 above.

3. Each test subject shall wear the respirator for at least 10 minutes before starting the fit test.

4. The test subject shall don the enclosure while wearing the respirator selected in Section Above. This respirator shall be properly adjusted and equipped with a particulate filter.

5. The test subject may not eat, drink (except plain water), or chew gum for 15 minutes before the test.

6. A second DeVilbiss Model 40 Inhalation Medication Nebulizer is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

7. The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 cc of warm water.

8. As before, the test subject shall breathe with mouth open and tongue extended.

9. The nebulizer is inserted into the hole in the front of the enclosure and the fit test solution is sprayed into the enclosure using the same technique as for the taste threshold screening and the same number of squeezes required to elicit a taste response in the screening (see B 8 through B 10 above).

10. After generation of the aerosol read the following instructions to the test subject. The test subject shall perform the exercises for one minute each.

    i. Breathe normally.

    ii. Breathe deeply. Be certain breaths are deep and regular.

    iii. Turn head all the way from one side to the other. Be certain movement is complete. Inhale on each side. Do not bump the respirator against the shoulders.

    iv. Nod head up and down. Be certain motions are complete. Inhale when head is in the full up position (when looking toward the ceiling).Do not bump the respirator on the chest.

    v. Talking. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages, which serve the same purpose, may also be used.

    vi. Jogging in place.

    vii. Breathe normally.

RAINBOW PASSAGE

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

11. At the beginning of each exercise, the aerosol concentration shall be replenished using one-half the number of squeezes as initially described in C 9.

12. The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected.

13. If the saccharin is detected the fit is deemed unsatisfactory and a different respirator shall be tried.

14. At least two face pieces shall be selected by the IAA test protocol. The test subject shall be given the opportunity to wear them for one week to choose the one, which is more comfortable to wear.

15. Successful completion of the test protocol shall allow the use of the half mask tested respirator in contaminated atmospheres up to ten (10) times the PEL of asbestos. In other works, this protocol may be used to assign protection factors no higher than ten.

16. The test shall not be conducted if there is any hair growth between the skin and the face piece sealing surface.

17. If hair growth or apparel interferes with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive pressure respirator such as powered air-purifying respirators, supplied air respirator, or self-contained breathing apparatus.

18. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

19. Qualitative fit testing shall be repeated at least every six months.

20. In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(1) Weight change of 20 pounds or more.

(2) Significant facial scarring in the area of the face piece seal.

(3) Significant dental changes: (i.e., multiple extractions without prosthesis, or acquiring dentures).

(4) Reconstructive or cosmetic surgery, or

(5) Any other condition that may interfere with face piece sealing.

D. Record keeping

A summary of test results shall be maintained in each office for three (3) years. The summary shall include:

(1) Name of test subject.
(2) Date of testing.
(3) Name of test conductor.
(4) Respirators selected (indicate manufacturer, model, size and approval number).
(5) Testing agent.

ANNUAL RESPIRATOR PROGRAM EVALUATION

1. Number of people participating in the program _____.

2. Number and types of respirators available to personnel:

_____ Half-mask _____ Full-face

_____ Powered-Air Purifying _____ Supplied Air

3. Have the number and types of respirators available been adequate to meet needs?

_____ Yes _____ No

4. How much money was spent this year for:

_____ Respirators _____ Cartridges

_____ Spare Parts _____ Cleaning Supplies

_____ Manpower

5. Was the budget adequate? _____ Yes _____ No

Comment _____

6. Did all employees in the respirator program receive an annual medical exam?

_____ Yes _____ No

Comment _____

7. Did all employees in the respirator program receive training on the use and limitations of the respirators?

_____ Yes _____ No

Comment _____

8. Have all respirator users been qualitatively fit tested?

_____ Yes _____ No

Comment _____

9. Have standard operating procedures been written and implemented for respirator selection, donning, fit testing and cleaning?

_____ Yes _____ No

Comment _____

10. Are only NIOSH/MSHA approved respirators used:

_____ Yes _____ No

Comment _____

11. Have all employees complied with the need to be clean-shaven in the sealing areas of the respirator?

_____ Yes _____ No

Comment _____

12. Are all employees correctly wearing their respirators while removing asbestos?

_____ Yes _____ No

13. Are there any areas for improvement in the program?

_____

_____

_____ _____

Date Respirator Program Administrator

USA Environmental Management Inc.

RESPIRATOR FIT TEST

_____ Social Security # _____ - _____ - _____
(Print Name)

has been fit tested on the following respirator:

RESPIRATOR NAME:_____ MODEL NO. _____

RESPIRATOR TYPE: _____ RESPIRATOR SIZE: **(S) (M) (L)**

TC NUMBER:_____
(Non-serialized, permanently issued to employee)

I, _____, have performed this fit test as
(employee name)

outlined in 29 CFR 1926.1101, Appendix C-Qualitative Fit Test Procedures.

_____ _____
(Signature of Person Administering Fit Test) (Print Name)

_____ _____
(Address) (Date)

[ ] Smoke Test

[ ] Isoamyl Acetate

[ ] Saccharin Aerosol

_____
(Employee Signature)

8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Tel: (215) 365-5810 ♦ Fax: (215) 365-5870 ♦ Web: www.usaemi.com

FALL PROTECTION PLAN

Fall Protection Plan

Introduction

This Fall Protection Plan will address the use of conventional protection measures (guardrail systems, safety net systems, or personal fall arrest systems) as required by OSHA 1926.501 (refer to Attachment A), as well as the specific activities that require a non-conventional means of fall protection, Controlled Access Zone (CZA) Systems and Safety Monitoring Systems.

During the hand-demolition of buildings under forty-eight (48) feet high, while working in specific areas and/or performing specific tasks, it is sometimes impossible or may put the employee in danger of a greater hazard to use the conventional methods of fall protection. These areas or tasks may include, but are not limited to:

- demolition of floor sheathing and joists
- roof demolition
- demolition of exterior walls

In the above cases, the conventional methods of fall protection typically fail to be the safest. In consideration of this fact, the purpose of this plan is to allow the on-site employees to realize the fall hazards on each project site and to establish safe procedures that should be followed to prevent fall injuries to lower levels or through openings or holes in the work area. The ultimate goal of this safety plan is to inform the worker/s of how to achieve the optimum level of safety whether it is through conventional or non-conventional methods.

Therefore, in accordance with the requirements of OSHA 1926.501 and 1926.502(k), we have developed this Fall Protection Plan to be applicable to work on the NTI demolition project sites.

As part of our overall Company Health and Safety Program and in accordance with the requirements of our contract to perform demolition work under the Neighborhood Transformation Initiative (NTI) Program, Luzon, Inc. has a qualified individual perform a "Pre-Demolition Survey" of each and every demolition site under our contract ***prior*** to any work being performed onsite.

This survey documents numerous observations relative to the overall condition of the property, evaluates aspects of the work property as well as adjacent property or properties relative to Health and Safety issues, evaluates the property for environmental issues, and, most importantly, makes an initial evaluation of conditions as they exist in consideration of worker fall protection.

Following a hierarchal approach, the trained evaluator makes a judgment evaluating each OSHA approved fall protection methodology and its' possible use on the site. Evaluations are made for the potential use of Guardrail Systems, Safety Net Systems,

Personal Fall Arrest Systems, Controlled Access Zone (CZA) Systems, and Safety Monitoring Systems.

Demolition of roof rafters, exterior walls, roof sheathing, and joist/truss activities will be conducted only by employees who have been specifically trained to perform this type of work and have been trained to recognize the dangers and hazards of falling while involved in these tasks.

Every employee is to be trained in proper procedures prior to performing any on-site tasks. They will be required to strictly adhere to those standards, unless they feel they, or others, may be exposed to a greater danger or hazard as a result. If an employee or a subcontractor feels that the above is true, they are to inform the on-site job foreman and/or safety officer of their concerns. They are not to return to work until the issue/s has/have been resolved to the satisfaction of all parties involved.

The competent person in charge will assume the responsibility of enforcing this Fall Protection Plan and will constantly observe operations being undertaken and perform safety checks on the project. They will be required to enforce all safety policies and procedures and to immediately correct any condition that is deemed unsafe.

The employer bears the responsibility of ensuring that all employees and subcontractors understand the procedures and follow the instructions of the designated on-site supervisor. Likewise, it is the responsibility of the employee to bring any unsafe or hazardous condition that may arise to the attention of the supervisor immediately.

Fall Protection Systems to Be Used on Demolition Sites:

The following fall protection options will be evaluated on each site:

Guardrail System:

Guardrail systems shall be installed as required by OSHA 1926.502(b)(1) through 1926.502(b)(15). Refer to Attachment B – OSHA 1926.502 – subsection (b).

Safety Net System:

Safety Net systems shall be installed as required by OSHA 1926.502(c)(1) through 1926.502(c)(9). Refer to Attachment B – OSHA 1926.502 – subsection (c).

Personal Fall Arrest System:

Personal Fall Arrest systems shall be installed as required by OSHA 1926.502(d)(1) through 1926.502(d)(24). Refer to Attachment B – OSHA 1926.502 – subsection (d).

Positioning Device System:

Positioning Device systems shall be installed as required by OSHA 1926.502(e)(1) through 1926.502(e)(10). Refer to Attachment B – OSHA 1926.502 – subsection (e).

Warning Line System:

Warning Line systems shall be installed as required by OSHA 1926.502(f)(1) through 1926.502(f)(4). Refer to Attachment B – OSHA 1926.502 – subsection (f).

Controlled Access Zone (CAZ) System:

Controlled Access Zone systems shall be installed as required by OSHA 1926.502(g)(1) through 1926.502(g)(5). Refer to Attachment B – OSHA 1926.502 – subsection (g).

Safety Monitoring System:

Safety Monitoring systems shall be installed as required by OSHA 1926.502(h)(1) through 1926.502(h)(4). Refer to Attachment B – OSHA 1926.502 – subsection (h).

Covers:

Cover shall be installed as required by OSHA 1926.502(i)(1) through 1926.502(i)(4). Refer to Attachment B – OSHA 1926.502 – subsection (i).

Protection From Falling Objects:

Protection from falling objects shall be installed as required by OSHA 1926.502(j)(1) through 1926.502(j)(8). Refer to Attachment B – OSHA 1926.502 – subsection (j).

Issues Related to the use of Conventional Fall Protection Measures on Demolition Sites

The use of conventional fall protection measures during demolition of roof rafters as well as masonry walls and floor structure would likely cause a greater hazard to the workers. On this project conventional, methods such as guardrails, safety nets, or personal fall arrest equipment will not provide adequate fall protection. There are no structurally sound anchor points on the demolition buildings due to the condition of these structures and there is no way that anchor points can be found on adjoining properties such that the use of safety nets can take place. The nets will cause the walls to collapse and, therefore, create a greater safety hazard to the workers under these conditions spelled out above. Likewise, there are no suitable attachment or anchoring points for guardrails, personal fall arrest equipment or positioning device systems for similar reasons.

Furthermore, on this type of work, the workers will need to use both hands to remove the

truss and will not be able to use ladders in the proper manner. Ladders will cause a greater hazard since workers must stand on the ladder with their back or side to the front of the ladder.

Workers may also experience fatigue because of an increase in overhead work with heavy materials, which may cause a greater hazard.

Exterior scaffolds cannot be utilized on this project because the ground will not support the scaffolding correctly. In most cases, the erection and dismantling of the scaffolding would expose workers to a greater fall hazard than the actual demolition of the rafters and trusses.

In structures that have walls higher than six (6) feet and where scaffolds and ladders would be a greater hazard, safe procedures will be utilized when working on the top of plate. This work will be monitored by the on-site supervisor to ensure that all necessary safety steps have been or being taken. Only properly trained workers will be involved in this type of work.

Below is list of other fall protection measures available and an explanation of limitations for their use on demolition projects of this nature.

Scaffolds – Cannot be safely used in conjunction with demolition work on these sites and are not to be used in demolition phase. The leading edge of the building will be constantly changing and the scaffolding would have to be moved with a high level of frequency and erected on ground that would be extremely unstable. In addition, e~~E~~mployees erecting and dismantling the scaffolding would be exposed to too many risks. Power lines, terrain and other site conditions do not allow for safe use of scaffolding.

If a situation arises during the course of demolition of the buildings that shows the ability to be demolished in a safer manner by implementing one of the fall protection measures listed below, the on-site supervisor should be notified immediately.

Only qualified, experienced, workers will be able to work on the tasks involving the demolition or roof structures and joists, floor structures and joists and exterior walls.

Tools and debris shall be conveniently staged and stored to minimize fall hazards.

Minimum Fall Protection Methodology to be used at Demolition Sites

Where conventional fall protection methodologies are infeasible or would create a greater hazard to employees through their use, the following “Fall Protection Plan” shall be implemented in accordance with OSHA 1926.502(k), at a minimum.

Controlled Access Zones (CAZ):

When using this fall protection methodology, ~~plan~~, all workers must be protected through limited access to high hazard locations. Before any non-conventional fall protection system can be used as part of the work plan, the competent person (supervisor) must clearly define a controlled access zone (CAZ) as the area where a recognized hazard exists. The demarcation of the CAZ will be communicated by the competent person to all employees in a recognized manner, either through signs, wires, tapes, ropes, or chains.

The following steps will be taken to make the CAZ is clearly marked and controlled by the competent person in charge (supervisor):

- A painted line six (6) feet from the perimeter will be clearly marked prior to any wall demolition beginning as a precaution warning of the approach to an unprotected edge.
- Access to the CAZ will be restricted to authorized employees only.
- All workers will be notified by the competent person prior to working of their individual CAZ authorization status.
- The competent person will ensure that all protective elements of the CAZ be implemented prior to the beginning of work.

Safe Monitoring System:

In addition to establishing a Controlled Access Zone at each work level as work progresses from the roof to the lower floors and eventually to the ground, the site supervisor shall employ a separate individual on the worksite who will be located at the level that work using a Controlled Access Zone is being performed to act as a "Safety Watch".

This individual will be solely responsible for the observation of work activities at all times and shall be responsible for alerting workers who approach the edge of the perimeter work safety zone.

Enforcement

Constant awareness of and respect for falls hazards, and compliance with all safety rules, are considered conditions of employment. The on-site supervisor, as well as individuals in the safety and personnel department, reserves the right to issue disciplinary warnings to employees, up to and including job termination, for failure to comply with the guidelines set forth in this program.

Accident Investigation

All accidents that result in the injury of workers, regardless of their nature, must be reported immediately. It is an integral part of the safety program that documentation takes place as soon as possible so that means of prevention can be identified to prevent future recurrences.

This plan will be reviewed on a regular basis to determine if any additional practices, procedures, or training should be implemented in an effort to prevent similar types of incidents from occurring again. Employee input and feedback is encouraged.

Attachment A

OSHA 1926.501
Duty To Have Fall Protection

Regulations (Standards - 29 CFR)

Duty to have fall protection. - 1926.501

Regulations (Standards - 29 CFR) - Table of Contents

- **Part Number:** 1926
- **Part Title:** Safety and Health Regulations for Construction
- **Subpart:** M
- **Subpart Title:** Fall Protection
- **Standard Number:** 1926.501
- **Title:** Duty to have fall protection.

1926.501(a)

"General."

1926.501(a)(1)

This section sets forth requirements for employers to provide fall protection systems. All fall protection required by this section shall conform to the criteria set forth in 1926.502 of this subpart.

1926.501(a)(2)

The employer shall determine if the walking/working surfaces on which its employees are to work have the strength and structural integrity to support employees safely. Employees shall be allowed to work on those surfaces only when the surfaces have the requisite strength and structural integrity.

1926.501(b)

1926.501(b)(1)

"Unprotected sides and edges." Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

.1926.501(b)(2)

1926.501(b)(2)

"Leading edges."

1926.501(b)(2)(i)

Each employee who is constructing a leading edge 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems, safety net systems, or personal fall arrest systems. Exception: When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a fall protection plan which meets the requirements of paragraph (k) of 1926.502.

Note: There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the above-listed fall protection systems. Accordingly, the employer has the burden of establishing that it is appropriate to implement a fall protection plan which complies with 1926.502(k) for a particular workplace situation, in lieu of implementing any of those systems.

1926.501(b)(2)(ii)

Each employee on a walking/working surface 6 feet (1.8 m) or more above a lower level where leading edges are under construction, but who is not engaged in the leading edge work, shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system. If a guardrail system is chosen to provide the fall protection, and a controlled access zone has already been established for leading edge work, the control line may be used in lieu of a guardrail along the edge that parallels the leading edge.

1926.501(b)(3)

"Hoist areas." Each employee in a hoist area shall be protected from falling 6 feet (1.8 m) or more to lower levels by guardrail systems or personal fall arrest systems. If guardrail systems, [or chain, gate, or guardrail] or portions thereof, are removed to facilitate the hoisting operation (e.g., during landing of materials), and an employee must lean through the access opening or out over the edge of the access opening (to receive or guide equipment and materials, for example), that employee shall be protected from fall hazards by a personal fall arrest system.

..1926.501(b)(4)

1926.501(b)(4)

"Holes."

1926.501(b)(4)(i)

Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet (1.8 m) above lower levels, by personal fall arrest systems, covers, or guardrail systems erected around such holes.

1926.501(b)(4)(ii)

Each employee on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) by covers.

1926.501(b)(4)(iii)

Each employee on a walking/working surface shall be protected from objects falling through holes (including skylights) by covers.

1926.501(b)(5)

"Formwork and reinforcing steel." Each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet (1.8 m) or more to lower levels by personal fall arrest systems, safety net systems, or positioning device systems.

1926.501(b)(6)

"Ramps, runways, and other walkways." Each employee on ramps, runways, and other walkways shall be protected from falling 6 feet (1.8 m) or more to lower levels by guardrail systems.

1926.501(b)(7)

"Excavations."

1926.501(b)(7)(i)

Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier;

..1926.501(b)(7)(ii)

1926.501(b)(7)(ii)

Each employee at the edge of a well, pit, shaft, and similar excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

1926.501(b)(8)

"Dangerous equipment."

1926.501(b)(8)(i)

Each employee less than 6 feet (1.8 m) above dangerous equipment shall be protected from falling into or onto the dangerous equipment by guardrail systems or by equipment guards.

1926.501(b)(8)(ii)

Each employee 6 feet (1.8 m) or more above dangerous equipment shall be protected from fall hazards by guardrail systems, personal fall arrest systems, or safety net systems.

1926.501(b)(9)

"Overhand bricklaying and related work."

1926.501(b)(9)(i)

Except as otherwise provided in paragraph (b) of this section, each employee performing overhand bricklaying and related work 6 feet (1.8 m) or more above lower levels, shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or shall work in a controlled access zone.

1926.501(b)(9)(ii)

Each employee reaching more than 10 inches (25 cm) below the level of the walking/working surface on which they are working, shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system.

Note: Bricklaying operations performed on scaffolds are regulated by subpart L - Scaffolds of this part.

..1926.501(b)(10)

1926.501(b)(10)

"Roofing work on Low-slope roofs." Except as otherwise provided in paragraph (b) of this section, each employee engaged in roofing activities on low-slope roofs, with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or a combination of warning line system and guardrail system, warning line system and safety net system, or warning line system and personal fall arrest system, or warning line system and safety monitoring system. Or, on roofs 50-feet (15.25 m) or less in width (see Appendix A to subpart M of this part), the use of a safety monitoring system alone [i.e. without the warning line system] is permitted.

1926.501(b)(11)

"Steep roofs." Each employee on a steep roof with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems with toeboards, safety net systems, or personal fall arrest systems.

1926.501(b)(12)

"Precast concrete erection." Each employee engaged in the erection of precast concrete members (including, but not limited to the erection of wall panels, columns, beams, and floor and roof "tees") and related operations such as grouting of precast concrete members, who is 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail

systems, safety net systems, or personal fall arrest systems, unless another provision in paragraph (b) of this section provides for an alternative fall protection measure. Exception: When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a fall protection plan which meets the requirements of paragraph (k) of 1926.502.

Note: There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the above-listed fall protection systems. Accordingly, the employer has the burden of establishing that it is appropriate to implement a fall protection plan which complies with 1926.502(k) for a particular workplace situation, in lieu of implementing any of those systems.

..1926.501(b)(13)

1926.501(b)(13)

"Residential construction." Each employee engaged in residential construction activities 6 feet (1.8 m) or more above lower levels shall be protected by guardrail systems, safety net system, or personal fall arrest system unless another provision in paragraph (b) of this section provides for an alternative fall protection measure. Exception: When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a fall protection plan which meets the requirements of paragraph (k) of 1926.502.

Note: There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the above-listed fall protection systems. Accordingly, the employer has the burden of establishing that it is appropriate to implement a fall protection plan which complies with 1926.502(k) for a particular workplace situation, in lieu of implementing any of those systems.

1926.501(b)(14)

"Wall openings." Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet (1.8 m) or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches (1.0 m) above the walking/working surface, shall be protected from falling by the use of a guardrail system, a safety net system, or a personal fall arrest system.

1926.501(b)(15)

"Walking/working surfaces not otherwise addressed." Except as provided in 1926.500(a)(2) or in 1926.501 (b)(1) through (b)(14), each employee on a walking/working surface 6 feet (1.8 m) or more above lower levels shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system.

1926.501(c)

"Protection from falling objects." When an employee is exposed to falling objects, the employer shall have each employee wear a hard hat and shall implement one of the following

measures:

1926.501(c)(1)

Erect toeboards, screens, or guardrail systems to prevent objects from falling from higher levels; or,

..1926.501(c)(2)

1926.501(c)(2)

Erect a canopy structure and keep potential fall objects far enough from the edge of the higher level so that those objects would not go over the edge if they were accidentally displaced; or,

1926.501(c)(3)

Barricade the area to which objects could fall, prohibit employees from entering the barricaded area, and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced.

[59 FR 40732, Aug. 9, 1994; 60 FR 5131, Jan. 26, 1995]

Attachment B

OSHA 1926.502
Fall Protection Systems Criteria and Practices

UNITED STATES DEPARTMENT OF LABOR

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Regulations (Standards - 29 CFR) - Table of Contents

- **Part Number:** 1926
- **Part Title:** Safety and Health Regulations for Construction
- **Subpart:** M
- **Subpart Title:** Fall Protection
- **Standard Number:** 1926.502
- **Title:** Fall protection systems criteria and practices.

"General."

Fall protection systems required by this part shall comply with the applicable provisions of this section.

1926.502(a)(2)

Employers shall provide and install all fall protection systems required by this subpart for an employee, and shall comply with all other pertinent requirements of this subpart before that employee begins the work that necessitates the fall protection.

1926.502(b)

"Guardrail systems." Guardrail systems and their use shall comply with the following provisions:

1926.502(b)(1)

Top edge height of top rails, or equivalent guardrail system members, shall be 42 inches (1.1 m) plus or minus 3 inches (8 cm) above the walking/working level. When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria of this paragraph.

Note: When employees are using stilts, the top edge height of the top rail, or equivalent member, shall be increased an amount equal to the height of the stilts.

Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 21 inches (53 cm) high.

1926.502(b)(2)(i)

Midrails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level.

Screens and mesh, when used, shall extend from the top rail to the walking/working level and along the entire opening between top rail supports.

Intermediate members (such as balusters), when used between posts, shall be not more than 19 inches (48 cm) apart.

Other structural members (such as additional midrails and architectural panels) shall be installed such that there are no openings in the guardrail system that are more than 19 inches (.5 m) wide.

1926.502(b)(3)

Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds (890 N) applied within 2 inches (5.1 cm) of the top edge, in any outward or downward direction, at any point along the top edge.

1926.502(b)(4)

When the 200 pound (890 N) test load specified in paragraph (b)(3) of this section is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 39 inches (1.0 m) above the walking/working level. Guardrail system components selected and constructed in accordance with the Appendix B to subpart M of this part will be deemed to meet this requirement.

Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members shall be capable of withstanding, without failure, a force of at least 150 pounds (666 N) applied in any downward or outward direction at any point along the midrail or other member.

Guardrail systems shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.

The ends of all top rails and midrails shall not overhang the terminal posts, except where such overhang does not constitute a projection hazard.

Steel banding and plastic banding shall not be used as top rails or midrails.

Top rails and midrails shall be at least one-quarter inch (0.6 cm) nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for top rails, it shall be flagged at not more than 6-foot intervals with high-visibility material.

1926.502(b)(10)

When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section shall be placed across the access opening between guardrail sections when hoisting operations are not taking place.

When guardrail systems are used at holes, they shall be erected on all unprotected sides or edges of the hole.

When guardrail systems are used around holes used for the passage of materials, the hole shall have not more than two sides provided with removable guardrail sections to allow the passage of materials. When the hole is not in use, it shall be closed over with a cover, or a guardrail system shall be provided along all unprotected sides or edges.

When guardrail systems are used around holes which are used as points of access (such as ladderways), they shall be provided with a gate, or be so offset that a person cannot walk directly into the hole.

Guardrail systems used on ramps and runways shall be erected along each unprotected side or edge.

Manila, plastic or synthetic rope being used for top rails or midrails shall be inspected as frequently as necessary to ensure that it continues to meet the strength requirements of paragraph (b)(3) of this section.

"Safety net systems." Safety net systems and their use shall comply with the following provisions:

Safety nets shall be installed as close as practicable under the walking/working surface on which employees are working, but in no case more than 30 feet (9.1 m) below such level. When nets are used on bridges, the potential fall area from the walking/working surface to the net shall be unobstructed.

Safety nets shall extend outward from the outermost projection of the work surface as follows:

Vertical distance from working level to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet.
More than 5 feet up to 10 feet	10 feet.
More than 10 feet	13 feet.

Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified in paragraph (c)(4) of this section.

1926.502(c)(4)

Safety nets and their installations shall be capable of absorbing an impact force equal to that produced by the drop test specified in paragraph (c)(4)(i) of this section.

Except as provided in paragraph (c)(4)(ii) of this section, safety nets and safety net installations shall be drop-tested at the jobsite after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at 6-month intervals if left in one place. The drop-test shall consist of a 400 pound (180 kg) bag of sand 30 + or - 2 inches (76 + or - 5 cm) in diameter dropped into the net from the highest walking/working surface at which employees are exposed to fall hazards, but not from less than 42 inches (1.1 m) above that level.

1926.502(c)(4)(ii)

When the employer can demonstrate that it is unreasonable to perform the drop-test required by paragraph (c)(4)(i) of this section, the employer (or a designated competent person) shall certify that the net and net installation is in compliance with the provisions of paragraphs (c)(3) and (c)(4)(i) of this section by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification of the net and net installation for which the certification record is being prepared; the date that it was determined that the identified net and net installation were in compliance with paragraph (c)(3) of this section and the signature of the person making the determination and certification. The most recent certification record for each net and net installation shall be available at the jobsite for inspection.

Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. Defective components shall be removed from service. Safety nets shall also be inspected after any occurrence which could affect the integrity of the safety net system.

Materials, scrap pieces, equipment, and tools which have fallen into the safety net shall be removed as soon as possible from the net and at least before the next work shift.

The maximum size of each safety net mesh opening shall not exceed 36 square inches (230 cm) nor be longer than 6 inches (15 cm) on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than 6 inches (15 cm). All mesh crossings shall be secured to prevent enlargement of the mesh opening.

Each safety net (or section of it) shall have a border rope for webbing with a minimum breaking strength of 5,000 pounds (22.2 kN).

Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than 6 inches (15 cm) apart.

1926.502(d)

"Personal fall arrest systems." Personal fall arrest systems and their use shall comply with the provisions set forth below. Effective January 1, 1998, body belts are not acceptable as part of a personal fall arrest system. Note: The use of a body belt in a positioning device system is acceptable and is regulated under paragraph (e) of this section.

Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

1926.502(d)(3)

Dee-rings and snaphooks shall have a minimum tensile strength of 5,000 pounds (22.2 kN).

1926.502(d)(4)

Dee-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

1926.502(d)(5)

Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper by the connected member, or shall be a locking type snaphook designed and used to prevent disengagement of the snaphook by the contact of the snaphook keeper by the connected member. Effective January 1, 1998, only locking type snaphooks shall be used.

1926.502(d)(6)

Unless the snaphook is a locking type and designed for the following connections, snaphooks shall not be engaged:

directly to webbing, rope or wire rope;

to each other;

to a dee-ring to which another snaphook or other connector is attached;

to a horizontal lifeline; or

to any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

On suspended scaffolds or similar work platforms with horizontal lifelines which may become vertical lifelines, the devices used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.

1926.502(d)(8)

Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds (22.2 kN).

Except as provided in paragraph (d)(10)(ii) of this section, when vertical lifelines are used, each employee shall be attached to a separate lifeline.

During the construction of elevator shafts, two employees may be attached to the same lifeline in the hoistway, provided both employees are working atop a false car that is equipped with guardrails; the strength of the lifeline is 10,000 pounds [5,000 pounds per employee attached] (44.4 kN); and all other criteria specified in this paragraph for lifelines have been met.

Lifelines shall be protected against being cut or abraded.

Self-retracting lifelines and lanyards which automatically limit free fall distance to 2 feet (0.61 m) or less shall be capable of sustaining a minimum tensile load of 3,000 pounds (13.3 kN) applied to the device with the lifeline or lanyard in the fully extended position.

Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet (0.61 m) or less, ripstitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 kN) applied to the device with the lifeline or lanyard in the fully extended position.

1926.502(d)(14)

Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses shall be made from synthetic fibers.

1926.502(d)(15)

Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as follows:

1926.502(d)(15)(i)

as part of a complete personal fall arrest system which maintains a safety factor of at least two; and

1926.502(d)(15)(ii)

under the supervision of a qualified person.

1926.502(d)(16)

Personal fall arrest systems, when stopping a fall, shall:

limit maximum arresting force on an employee to 900 pounds (4 kN) when used with a body belt;

limit maximum arresting force on an employee to 1,800 pounds (8 kN) when used with a body harness;

1926.502(d)(16)(iii)

be rigged such that an employee can neither free fall more than 6 feet (1.8 m), nor contact any lower level;

1926.502(d)(16)(iv)

bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet (1.07 m); and,

1926.502(d)(16)(v)

have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (1.8 m), or the free fall distance permitted by the system, whichever is less.

Note: If the personal fall arrest system meets the criteria and protocols contained in Appendix C to subpart M, and if the system is being used by an employee having a combined person and tool weight of less than 310 pounds (140 kg), the system will be considered to be in compliance with the provisions of paragraph (d)(16) of this section. If the system is used by an employee having a combined tool and body weight of 310 pounds (140 kg) or more, then the employer must appropriately modify the criteria and protocols of the Appendix to provide proper protection for such heavier weights, or the system will not be deemed to be in compliance with the requirements of paragraph (d)(16) of this section.

1926.502(d)(17)

The attachment point of the body belt shall be located in the center of the wearer's back. The attachment point of the body

harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.

Body belts, harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

1926.502(d)(19)

Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse.

1926.502(d)(20)

The employer shall provide for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves.

1926.502(d)(21)

Personal fall arrest systems shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service.

Body belts shall be at least one and five-eighths (1 5/8) inches (4.1 cm) wide.

1926.502(d)(23)

Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists except as specified in other subparts of this Part.

When a personal fall arrest system is used at hoist areas, it shall be rigged to allow the movement of the employee only as far as the edge of the walking/working surface.

1926.502(e)

"Positioning device systems." Positioning device systems and their use shall conform to the following provisions:

Positioning devices shall be rigged such that an employee cannot free fall more than 2 feet (.6m).

Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds (13.3 kN), whichever is greater.

Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of this system.

Connecting assemblies shall have a minimum tensile strength of 5,000 pounds (22.2 kN)

Dee-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

1926.502(e)(7)

Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper by the connected member, or shall be a locking type snaphook designed and used to prevent disengagement of the snaphook by the contact of the snaphook keeper by the connected member. As of January 1, 1998, only locking type snaphooks shall be used.

1926.502(e)(8)

Unless the snaphook is a locking type and designed for the following connections, snaphooks shall not be engaged:

directly to webbing, rope or wire rope;

to each other;

to a dee-ring to which another snaphook or other connector is attached;

to a horizontal lifeline; or

to any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

Positioning device systems shall be inspected prior to each use for wear, damage, and other deterioration, and defective components shall be removed from service.

Body belts, harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

1926.502(f)

"Warning line systems." Warning line systems [See 1926.501(b)(10)] and their use shall comply with the following provisions:

1926.502(f)(1)

The warning line shall be erected around all sides of the roof work area.

When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet (1.8 m) from the roof edge.

When mechanical equipment is being used, the warning line shall be erected not less than 6 feet (1.8 m) from the roof edge which is parallel to the direction of mechanical equipment operation, and not less than 10 feet (3.1 m) from the roof edge which is perpendicular to the direction of mechanical equipment operation.

Points of access, materials handling areas, storage areas, and hoisting areas shall be connected to the work area by an access path formed by two warning lines.

When the path to a point of access is not in use, a rope, wire, chain, or other barricade, equivalent in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the work area, or the path shall be offset such that a person cannot walk directly into the work area.

1926.502(f)(2)

Warning lines shall consist of ropes, wires, or chains, and supporting stanchions erected as follows:

The rope, wire, or chain shall be flagged at not more than 6-foot (1.8 m) intervals with high-visibility material;

The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 inches (.9 m) from the walking/working surface and its highest point is no more than 39 inches (1.0 m) from the walking/working surface;

After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 N) applied horizontally against the stanchion, 30 inches (.8 m) above the walking/working surface, perpendicular to the warning line, and in the direction of the floor, roof, or platform edge;

1926.502(f)(2)(iv)

The rope, wire, or chain shall have a minimum tensile strength of 500 pounds (2.22 kN), and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions as prescribed in paragraph (f)(2)(iii) of this section; and

The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.

No employee shall be allowed in the area between a roof edge and a warning line unless the employee is performing roofing work in that area.

1926.502(f)(4)

Mechanical equipment on roofs shall be used or stored only in areas where employees are protected by a warning line system, guardrail system, or personal fall arrest system.

1926.502(g)

"Controlled access zones." Controlled access zones [See 1926.501(b)(9) and 1926.502(k)] and their use shall conform to the following provisions.

When used to control access to areas where leading edge and other operations are taking place the controlled access zone shall be defined by a control line or by any other means that restricts access.

When control lines are used, they shall be erected not less than 6 feet (1.8 m) nor more than 25 feet (7.7 m) from the unprotected or leading edge, except when erecting precast concrete members.

When erecting precast concrete members, the control line shall be erected not less than 6 feet (1.8 m) nor more than 60 feet (18 m) or half the length of the member being erected, whichever is less, from the leading edge.

The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.

The control line shall be connected on each side to a guardrail system or wall.

1926.502(g)(2)

When used to control access to areas where overhand bricklaying and related work are taking place:

The controlled access zone shall be defined by a control line erected not less than 10 feet (3.1 m) nor more than 15 feet (4.5 m) from the working edge.

The control line shall extend for a distance sufficient for the controlled access zone to enclose all employees performing overhand bricklaying and related work at the working edge and shall be approximately parallel to the working edge.

Additional control lines shall be erected at each end to enclose the controlled access zone.

Only employees engaged in overhand bricklaying or related work shall be permitted in the controlled access zone.

1926.502(g)(3)

Control lines shall consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:

Each line shall be flagged or otherwise clearly marked at not more than 6-foot (1.8 m) intervals with high-visibility material.

Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches (1 m) from the walking/working surface and its highest point is not more than 45 inches (1.3 m) [50 inches (1.3 m) when overhand bricklaying operations are being performed] from the walking/working surface.

Each line shall have a minimum breaking strength of 200 pounds (.88 kN).

On floors and roofs where guardrail systems are not in place prior to the beginning of overhand bricklaying operations, controlled access zones shall be enlarged, as necessary, to enclose all points of access, material handling areas, and storage areas.

On floors and roofs where guardrail systems are in place, but need to be removed to allow overhand bricklaying work or leading edge work to take place, only that portion of the guardrail necessary to accomplish that day's work shall be removed.

1926.502(h)

"Safety monitoring systems." Safety monitoring systems [See 1926.501(b)(10) and 1926.502(k)] and their use shall comply with the following provisions:

1926.502(h)(1)

The employer shall designate a competent person to monitor the safety of other employees and the employer shall ensure that the safety monitor complies with the following requirements:

1926.502(h)(1)(i)

The safety monitor shall be competent to recognize fall hazards;

1926.502(h)(1)(ii)

The safety monitor shall warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner;

1926.502(h)(1)(iii)

The safety monitor shall be on the same walking/working surface and within visual sighting distance of the employee being monitored;

1926.502(h)(1)(iv)

The safety monitor shall be close enough to communicate orally with the employee; and

1926.502(h)(1)(v)

The safety monitor shall not have other responsibilities which could take the monitor's attention from the monitoring function.

1926.502(h)(2)

Mechanical equipment shall not be used or stored in areas where safety monitoring systems are being used to monitor employees engaged in roofing operations on low-slope roofs.

No employee, other than an employee engaged in roofing work [on low-sloped roofs] or an employee covered by a fall protection plan, shall be allowed in an area where an employee is being protected by a safety monitoring system.

Each employee working in a controlled access zone shall be directed to comply promptly with fall hazard warnings from safety monitors.

1926.502(i)

"Covers." Covers for holes in floors, roofs, and other walking/working surfaces shall meet the following requirements:

1926.502(i)(1)

Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.

1926.502(i)(2)

All other covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.

1926.502(i)(3)

All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees.

1926.502(i)(4)

All covers shall be color coded or they shall be marked with the word "HOLE" or "COVER" to provide warning of the hazard.

Note: This provision does not apply to cast iron manhole covers or steel grates used on streets or roadways.

1926.502(j)

"Protection from falling objects." Falling object protection shall comply with the following provisions:

Toeboards, when used as falling object protection, shall be erected along the edge of the overhead walking/working surface for a distance sufficient to protect employees below.

Toeboards shall be capable of withstanding, without failure, a force of at least 50 pounds (222 N) applied in any downward or outward direction at any point along the toeboard.

Toeboards shall be a minimum of 3 1/2 inches (9 cm) in vertical height from their top edge to the level of the walking/working surface. They shall have not more than 1/4 inch (0.6 cm) clearance above the walking/working surface. They shall be solid or have openings not over 1 inch (2.5 cm) in greatest dimension.

Where tools, equipment, or materials are piled higher than the top edge of a toeboard, paneling or screening shall be erected from the walking/working surface or toeboard to the top of a guardrail system's top rail or midrail, for a distance sufficient to protect employees below.

Guardrail systems, when used as falling object protection, shall have all openings small enough to prevent passage of potential falling objects.

During the performance of overhand bricklaying and related work:

No materials or equipment except masonry and mortar shall be stored within 4 feet (1.2 m) of the working edge.

Excess mortar, broken or scattered masonry units, and all other materials and debris shall be kept clear from the work area by removal at regular intervals.

During the performance of roofing work:

Materials and equipment shall not be stored within 6 feet (1.8 m) of a roof edge unless guardrails are erected at the edge.

Materials which are piled, grouped, or stacked near a roof edge shall be stable and self-supporting.

Canopies, when used as falling object protection, shall be strong enough to prevent collapse and to prevent penetration by any objects which may fall onto the canopy.

1926.502(k)

"Fall protection plan." This option is available only to employees engaged in leading edge work, precast concrete erection work, or residential construction work (See 1926.501(b)(2), (b)(12), and (b)(13)) who can demonstrate that it is infeasible or it creates a greater hazard to use conventional fall protection equipment. The fall protection plan must conform to the following provisions.

The fall protection plan shall be prepared by a qualified person and developed specifically for the site where the leading edge work, precast concrete work, or residential construction work is being performed and the plan must be maintained up to date.

Any changes to the fall protection plan shall be approved by a qualified person.

A copy of the fall protection plan with all approved changes shall be maintained at the job site.

The implementation of the fall protection plan shall be under the supervision of a competent person.

The fall protection plan shall document the reasons why the use of conventional fall protection systems (guardrail systems, personal fall arrest systems, or safety nets systems) are infeasible or why their use would create a greater hazard.

The fall protection plan shall include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who cannot be provided with protection from the conventional fall protection systems. For example, the employer shall discuss the extent to which scaffolds, ladders, or vehicle mounted work platforms can be used to provide a safer working surface and thereby reduce the hazard of falling.

1926.502(k)(7)

The fall protection plan shall identify each location where conventional fall protection methods cannot be used. These locations shall then be classified as controlled access zones and the employer must comply with the criteria in paragraph (g) of this section.

Where no other alternative measure has been implemented, the employer shall implement a safety monitoring system in conformance with 1926.502(h).

The fall protection plan must include a statement which provides the name or other method of identification for each employee who is designated to work in controlled access zones. No other employees may enter controlled access zones.

In the event an employee falls, or some other related, serious incident occurs, (e.g., a near miss) the employer shall investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and shall implement those changes to prevent similar types of falls or incidents.

[44 FR 8577, Feb. 9, 1979; 44 FR 20940, Apr. 6, 1979, as amended at 45 FR 75626, Nov. 14, 1980; 55 FR 47687, Nov. 14, 1990; 59 FR 40733, Aug. 9, 1994; 60 FR 5131, Jan. 26, 1995]

Next Standard (1926.503)

Regulations (Standards - 29 CFR) - Table of Contents

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Telephone: 800-321-OSHA (6742) | TTY: 877-889-5627

www.OSHA.gov

Attachment C

Pre-Demolition Survey Form

USA Environmental Management, Inc.

Pre-Demolition Survey

Date: _____

Address: _____

_____

Type of Structure: _____

Description (stories/height): _____ Size of Structure: _____

Description of Site: _____ Basement: _____

Location of Party Walls: _____

Are Wall Ties Required? _____ How Many? _____ Types of Ties: _____

Structural Hazards: _____

_____

_____

Is Shoring of Walls/Floors required? _____

Type of Shoring & Location: _____

Protection Needed for Adjacent Structures: _____

Document existing damage to adjacent structures of areas not to be demolished. Photograph as necessary:

_____

_____

What public protection is needed? _____

_____

All demolition methods to be used: _____

_____

_____

Location of Power Lines: _____

_____

_____

Location of Tanks: _____

Contents of Tanks: _____

Luzon MSDS on site and owner's MSDS (if active facility): _____

_____

Asbestos survey or removal? _____

Open pits/holes delineate/located? _____

Demolition Personnel Fall Protection Evaluation:

Guardrail System: ☐ Yes ☐ No

If No, comments:

_____

_____

Safety Net System: ☐ Yes ☐ No

If No, comments:

_____

_____

Personal Fall Arrest System: ☐ Yes ☐ No

If No, comments:

_____

_____

Positioning Device System: ☐ Yes ☐ No

Comments:

Warning Line System: ☐ Yes ☐ No

Comments:

Controlled Access Zone System: ☐ Yes ☐ No

Comments:

Safety Monitoring System: ☐ Yes ☐ No

Comments:

Covers: ☐ Yes ☐ No

Comments:

Protection From Falling Objects: ☐ Yes ☐ No

Comments:

_____

_____

Special hazards and remedies for this specific location: _____

_____

_____

_____

_____

_____

Comments specific to this site: _____

_____

_____

_____

_____ _____

USA Environmental Management, Inc. Date

_____ _____

Date

_____ _____

Date

PROJECT SUPERINTENDENT INFORMATION

Kevin Meldrum

USA Environmental Management, Inc.

8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Tel: (215) 365-5810 ♦ Fax: (215) 365-5870

BIDDER'S KEY TEAM MEMBER RESUME

KEY TEAM MEMBER NAME: **Kevin Meldrum** **FIRM NAME:** **USA Environmental Management, Inc.**

KEY TEAM MEMBER TITLE:

Project Manager/Superintendent

YEARS OF EXPERIENCE:

28 Years

YEARS WITH FIRM:

8 Years

TECHNICAL SPECIALTIES:

Project Management
Field Superintendent
Asbestos Project Management/Superintendent

PROFESSIONAL HISTORY:

2016 – Present	Project Manager, Superintendent - USA Environmental Management, Inc.
2008 - 2016	Operations Manager, Superintendent - Luzon, Inc.
2004 - 2007	Operations Manager, Superintendent - USA Environmental Management, Inc.
1990 - 2004	Project Supervisor Delta-BJDS

EDUCATION:

North Catholic 1981-1985
Philadelphia Community College 1985-1986

PROFESSIONAL REGISTRATIONS & AFFILIATIONS:

Asbestos Abatement Safety Techniques
Laborers Training Academy/Asbestos Abatement Supervision, AHERA
Certified Asbestos Contractor & Supervisor – States of PA & NJ.
Certified Lead Abatement Supervisor – States of PA & NJ.
OSHA 10 Certified
First-Aide & CPR Trained
OSHA Trained in Demolition, Fall Protection Electrical Safety, and Personal Protective Equipment
Army Corps of Engineers Construction Management Planning Certified

REPRESENTATIVE PROJECT EXPERIENCE & QUALIFICATIONS:

Mr. Meldrum has over 20 years of experience in the construction industry with the last 17 in the remediation of asbestos; lead; and mold as well as demolition/renovation construction work. He has managed demolition and remediation projects for USA Environmental Management, Inc. In addition he has fulfilled the position of Operations Manager for the company for the last 11/2 years. Prior to that Mr. Meldrum supervised hundreds of abatement projects for Delta Removal Inc. over almost a 15 year employment period.

- Managed the remediation project of the Philadelphia Civic Center, which consisted of asbestos abatement and associated demolition while maintaining all safety guidelines and regulations. This project totaled in excess of 3 million dollars.
- Supervised projects for Philadelphia Housing Authority, School District of Philadelphia, and a number of public and private companies. Also managed multiple City of Philadelphia Asbestos, Lead, Mold and Demolition Projects in excess of a few million dollars.
- Managed the successful removal of lead based paint from over 300 Housing Urban Development (HUD) properties.
- Managed several hundred residential and commercial demolition projects.
- Managed (as Construction Superintendent) numerous renovation projects for USA Environmental Management, Inc.
- Managed (as Construction Superintendent) numerous renovation projects for Luzon, Inc.
- Managed a major asbestos abatement project for Merck, Sharpe and Dohme, Corp. in compliance with their stringent Health & Safety requirements on a fully occupied campus in Rahway, New Jersey.

GENERAL CONSTRUCTION:

Mr. Meldrum has over 25 years of experience in the construction industry with the last 17 in the remediation of asbestos; lead; and mold as well as demolition/renovation construction work. He has managed demolition and remediation projects for USA Environmental Management, Inc. for 3 years prior to his employment with Luzon, Inc. which lasted for 8 years. He has since returned to USA Environmental Management, Inc. as an Environmental Abatement Project Manager/Superintendent.

ASBESTOS ABATEMENT:

Mr. Meldrum has over 17 years of experience in the Asbestos Abatement industry. He has managed hundreds of projects involving work in both the governmental and private sector. These projects have involved work in federal, state and local governmental facilities as well as projects in most every kind of private sector environment.

He has managed numerous projects for the City of Philadelphia, the School District of Philadelphia, the Department of Housing and Urban Development as well as private entities such as the University of Pennsylvania, to name a few.

Mr. Meldrum was directly responsible for the management of a $ 3,000,000 + abatement project in the old City of Philadelphia Convention Hall in preparation for the demolition of this site for a new complex to be constructed by the University of Pennsylvania.

Projects managed have ranged in value between $ 10,000 to over $ 3,000,000.

LEAD REMEDIATION:

Mr. Meldrum has over 12 years of experience in the Lead Remediation industry. He has managed hundreds of projects involving work in both the governmental and private sector. These projects have involved work in federal, state and local governmental facilities including many projects in the public housing sector.

He was the Project Superintendent for over 300 separate projects involving lead remediation for public housing under a Housing and Urban Development contract.

MOLD REMEDIATION:

Mr. Meldrum has over 8 years of experience in the Mold Remediation industry. He has managed the remediation of mold contamination in schools, public housing, office environments, to name a few.

This experience includes government and private sector work

DEMOLITION:

Mr. Meldrum has been involved in the demolition industry for over 11 years and has been the Project Superintendent for projects ranging from interior demolition to single building structure demolitions to multi-building contracts requiring the demolition of numerous structures.

He has performed this work for government agencies; federal, state and local; as well as numerous private sector clients. His experience includes work in hundreds of buildings; both residential in size and commercial in size.

He has functioned as Project Superintendent for numerous USA contracts for the City of Philadelphia Neighborhood Transformation Initiative (NTI) program. These projects included, for the most part, the demolition of up to 3-story row type homes around the City. These projects presented challenges in that conventional equipment demolition could not be performed on most structures because they were attached to other structures on each side which were to remain. Project values in excess of $ 3,000,000 involved Mr. Meldrum's supervision.

Certificate of Completion

Kevin Meldrum

for successfully completing the prescribed course of study in

EPA/AHERA/New Jersey Asbestos Contractor/Supervisor Refresher Course

under TSCA Title II

presented by

ACCESS TRAINING SERVICES, INC.
7921 River Road, Pennsauken, NJ 08110
(856) 665-3449

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Course Date	***Exam Date***	***Expiration Date***
N/A	**ACC-0716-2-002**	***Mark K. Schläger***
Social Security Number	***Certificate Number***	***Training Director***

STATE OF NEW JERSEY
DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
ASBESTOS CONTROL AND LICENSING

KEVIN MELDRUM
105 Arch Street

Delran NJ 08075

27757 PERMIT	SUPVR TYPE		CLASS
		12/03/1967 DATE OF BIRTH	
M SEX	508 HEIGHT	5 WEIGHT	4 EYE COLOR
09/27/2016 ISSUE DATE		09/27/2017 EXPIRES DATE	

118834

ASBESTOS SUPERVISOR/WORKER TRAINING

& PERMITS

ASBESTOS CONRACTOR/SUPERVISOR

Juan Pastor

Number 741867

DUPLICATE

Expiration Date:
02/04/2017

Certificate of Training

CRITERIO N LABOR ATORI ES, INC.

HERE BY CERTIFI ES THAT

Juan Pa stor

HAS SUCCESS FULLY COM PLETE D AN 8 HOUR CO URSE ENT IT LED

Asbestos Contrac tor/Supe rvi sor Re fres her

INCLUDING CLASSROOM INSTRUCTION

on this 4th day of February 2016

Exam passed on this 4th day of February 2016 - Score - 80

- Approved by the states of New York and New Jersey (EPA Region 2)
- Approved by the state of Pennsylvania (EPA Region 3)

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1305 E Newport Pike

Wilmington DE 19804

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117104	03/21/2016	03/21/2017	

ASBESTOS CONTRACTOR/SUPERVISOR

Audie Pastor

Number 741775

Expiration Date:
01/21/2017

Certificate of Training

CRITERION LABORATORIES, INC.

HEREBY CERTIFIES THAT

Audie M. Pastor

HAS SUCCESSFULLY COMPLETED AN 8 HOUR COURSE ENTITLED

Asbestos Contractor/Supervisor Refresher

INCLUDING CLASSROOM INSTRUCTION

on this 21st day of January 2016

Exam passed on this 21st day of January 2016 - Score - 88

- Approved by the states of New York and New Jersey (EPA Region 2)
- Approved by the state of Pennsylvania (EPA Region 3)

Approved for AHERA Accreditation Under TSCA Title II

3370 Progress Drive, Suite J
Bensalem, PA 19020
(215) 244-1300 - Phone
(215) 244-4349 - Fax
www.criterionlabs.com

Course is conducted in English

DIRECTOR:

James A. Weitz, CIH, President

STATE OF NEW JERSEY
DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
ASBESTOS CONTROL AND LICENSING

AUDIE PASTOR
24-02 Milltown Road
Apt. 6 A
Wilmington DE 19804

032273 PERMIT	SUPVR TYPE	CLASS
	02/06/1960 DATE OF BIRTH	
M SEX	507 HEIGHT	3 WEIGHT	2 EYE COLOR
03/21/2016 ISSUE DATE	03/21/2017 EXPIRES DATE	

117033

ASBESTOS WORKER HANDLER

Emilio Pastor

ISES

INDUSTRIAL SAFETY AND
ENVIRONMENTAL SOLUTIONS

3300 Hudson Ave., Union City, NJ 07087
Tel: 201-325-0055 Fax: 201-325-0056

Certifies that:

Emilio Pastor

has successfully completed a 8 - hours NJ-DOH, NYS-DOH and US-EPA TSCA Title II

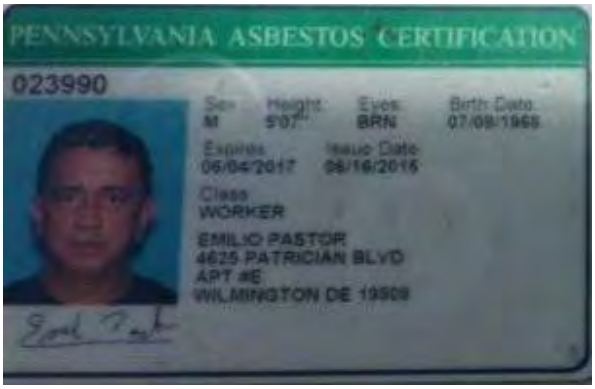
ASBESTOS HANDLER REFRESHER COURSE

Course language : Spanish Exam Grade : 96 % Exam date : 6/4/2016

Certificate Number : 24837 Course dates 6/4/2016 Expiration Date 6/4/2017

Brian Camacho Walsh
Program Director

Per 10NYCRR Part 73.2 (L) (1), DOH 2832 Certificate of Completion of Asbestos Safety Training is the *only* official record of training for New York State certification.
Per NJ Administrative Code Title 8 Department of Health Chapter 60 Asbestos Licenses and Permits, Form NJASB-24 is the *only* official record of training for New Jersey State certification.


PENNSYLVANIA ASBESTOS CERTIFICATION

023990

Sex: M
Height: 5'07"
Eyes: BRN
Birth Date: 07/09/1968

Expires: 06/04/2017
Issue Date: 06/16/2015

Class: WORKER

EMILIO PASTOR
4625 PATRICIAN BLVD
APT #E
WILMINGTON DE 19808

STATE OF NEW JERSEY
DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
ASBESTOS CONTROL AND LICENSING

EMILIO PASTOR
4625 Patrician Blvd
Apt. E
Wilmington DE 19808

030243

07/09/1968

M | 507 | 3 | 2

118053

06/09/2016

06/09/2017

ASBESTOS WORKER/HANDLER

Mario Barrera

Expiration Date:
07/08/2017

Certificate of Training

CRITERION LABORATORIES, INC.

HEREBY CERTIFIES THAT

Mario Barrera

HAS SUCCESSFULLY COMPLETED A 8 HOUR COURSE ENTITLED

Asbestos Worker/Handler Refresher

INCLUDING CLASSROOM INSTRUCTION

on this 8th day of July 2016

Exam passed on this 8th day of July 2016 - Score - 72

- Approved by the states of New York and New Jersey (EPA Region 2)
- Approved by the state of Pennsylvania (EPA Region 3)

Approved for AHERA Accreditation Under TSCA Title II

3370 Progress Drive, Suite J
Bensalem, PA 19020
(215) 244-1300 - Phone
(215) 244-4349 - Fax
www.criteriodabs.com

Course is conducted in English

DIRECTOR:

James A. Waltz, CIH, President

STATE OF NEW JERSEY
DEPARTMENT OF LABOR & WORKFORCE DEVELOPMENT
ASBESTOS CONTROL AND LICENSING

MARIO BARRERA
1314 West Newport Park

Wilmington DE 19804

26464			
			11/13/1957
M	509	3	2
SEX	HEIGHT	WEIGHT	EYE COLOR
116421	12/03/2015		12/03/2016
	ISSUE DATE		EXPIRES DATE

THIS PERMIT has been issued in accordance with and subject to the provisions of the Asbestos Control and Licensing Act N.J.S.A. 34:5A-32 et seq. You MUST have THIS PERMIT with you on the job.

THIS PERMIT may be revoked if you fail to follow established asbestos safety and health practices.

THIS PERMIT may be revoked if it is loaned, abandoned or allowed to pass from the personal control of the owner.

THIS PERMIT is invalid if it is altered, defaced, mutilated, or tampered with in any manner.

Any person performing the duties of an asbestos worker or supervisor after this permit has expired shall be subject to the penalty provisions of N.J.S.A. 34:5A-32 et seq.. as shall his employer.

For information, corrections, or changes, direct all inquires to the following:

New Jersey Department of Labor & Workforce Development, Division of Public Safety & Occupational Safety and Health.
Asbestos Control and
Licensing Section
P.O. Box 949
Trenton, NJ 08625-0949
(609) 633-3760

COMMISSIONER

EMPLOYEE TRAINING STATEMENT

USA Environmental Management, Inc.
Environmental ♦ Engineering ♦ Construction

EMPLOYEE TRAINING

ADDITIONAL ASBESTOS SUPERVISORS/ WORKER/HANDLERS

USA Environmental Management, Inc. (USAEMI) is a UNION contractor and as such from time to time will supplement our existing workforce based on project load at the time with other certified Asbestos Supervisors and/or Worker-Handlers from the union.

If that becomes necessary on this project, USAEMI will provide all current training information for any of these employees at the time of assignment to work on the project.

8436 Enterprise Avenue, Philadelphia, PA 19153-3802
Tel: (215) 365-5810 ♦ Fax: (215) 365-5870 ♦ Web: www.usaemi.com

Corporate Health & Safety Program Manual

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8436 Enterprise Avenue, Philadelphia, PA 19153 ◆ Off. (215) 365-5810 ◆ FAX (215) 365-5870

	TITLE	PAGES
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	Project Safety/Safety Meetings/Safety Inspections	**24 Forms**
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	Hazardous Communications Program	**8 Forms**
	Medical Program	**4 Forms**
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Safety Data Sheets (SDS) Manual

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SAFETY DATA SHEETS MANUAL
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Section 6	Microscopy Products
Section 7	Building Materials
Section 8	Building Maintenance Products
Section 9	Vehicle Maintenance Products
Section 10	Equipment Maintenance Products
Section 11	Office Cleaning Products
Section 12	Office Equipment Products
Section 13	
Section 14	
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SECTION 1

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Remediation Protective Materials

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Flame Retardant Polyolefin	Tyco Plastics	2	2/20/09	J. Schmidt
2	Polyolefin (CH2-CH2)n	Tyco Plastics	2	2/20/09	J. Schmidt
3	StarTex Flame Retardant Film	Covalence Plastics	5	2/20/09	J. Schmidt
4	Eyesaline Concentrate	Fendall, Inc.	1	2/20/09	J. Schmidt
5	Polyethylene	Westlake Polymers, Corp.	2	2/20/09	J. Schmidt
6	Nashua Duct Tape	Covalence Adhesives	3	3/11/09	J. Harris
7	One Component Polyurethane Foam Sealant	FOMO Products	2	3/11/09	J. Harris
8	Trim-Tex 847 Spray Adhesive	Trim-Tex Inc.	4	3/11/09	J. Harris
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SECTION 2

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Asbestos Remediation Chemicals

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Serpiloc White	W.R. Grace	6	2/20/09	J. Schmidt
2	Chemsafe 100	ARAMSCO	3	2/20/09	J. Schmidt
3	Bull High Strength Low Odor Mastic Remover	Bullseye Environmental	1	2/20/09	J. Schmidt
4	Aramsco RAMTACK Adhesive	ARAMSCO	1	2/20/09	J. Schmidt
5	Chemsafe 400 Carpet Glue Remover	ARAMSCO	2	3/12/09	J. Harris
6	Grayling Low Odor Mastic Remover	Grayling Industries, Inc.	7	3/13/09	J. Harris
7	Chemsafe 800 Liquid Concentrate TSP	ARAMSCO	2	4/22/09	J. Schmidt
8	Childers CP-10 Coating	Specialty Construction Brands	5	4/22/09	J. Schmidt
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SECTION 3

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Lead Remediation Chemicals

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Peel Away 1	Dumond Chemicals, Inc.	2	2/20/09	J. Schmidt
2	Peel Away 7	Dumond Chemicals, Inc.	2	2/20/09	J. Schmidt
3	Barrier Coat II Flat	W.R. Grace	10	2/20/09	J. Schmidt
4	L-B-C Lead Barrier Compound Type III	Fiberlock Technologies, Inc.	1	2/20/09	J. Schmidt
5	Power Rust Stop White	Fiberlock Technologies, Inc.	2	2/20/09	J. Schmidt
6	Bull Wax	Bullseye	1	3/11/09	J. Harris
7	Ledizolv	Ledizolv	2	3/11/09	J. Harris
8	Black Beauty Abrasives and Roofing Products	Reed Minerals, Harsco Corp.	1	3/11/09	J. Harris
9	ShockWave (8310)	Fiberlock Technologies, Inc.	1	3/11/09	J. Harris
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SECTION 4

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Mold Remediation Chemicals

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Oxine	Bio-Cide International, Inc.	6	2/20/09	J. Schmidt
2	Sentinel 805 Envirowash	Sentinel Chemical Company	2	2/20/09	J. Schmidt
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Updated: 11/4/2016

SECTION 5

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Painting Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Survey Marking Paint	Aervoe Industries, Inc.	1	3/11/09	J. Harris
2	Crown Paint Thinner	Packaging Service Co., Inc.	3	3/11/09	J. Harris
3	YOLO Colorhouse Inside - Semi-Gloss White	YOLO Colorhouse	2	3/11/09	J. Harris
4	Safecoat Acrylacq	American Formulating & Manufacturing	1	3/11/09	J. Harris
5	Cover Stain	Zinsser Company, Inc.	3	3/11/09	J. Harris
6	YOLO Colorhouse Inside - Flat White	YOLO Colorhouse	2	3/11/09	J. Harris
7	Rust-Oleum Stops Rust Clean Metal	Rust-Oleum Corporation	3	3/12/09	J. Harris
8	YOLO Colorhouse Inside - Eggshell White	YOLO Colorhouse	2	3/12/09	J. Harris
9	Methyl Ethyl Ketone (MEK)	The Sherwin Williams Company	2	3/12/09	J. Harris
10	MAB Fresh Kote Interior Latex Semi-Gloss, White	M.A. Bruder & Sons, Inc.	2	3/12/09	J. Harris
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SECTION 6
USA ENVIRONMENTAL MANAGEMENT, INC.
SDS - Microscopy Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Acetone, ACS, HPLC	LabChem, Inc.	3	2/25/09	J. Harris
2	Triacetin Glycerol Triacetate	Fisher Scientific	3	2/25/09	J. Harris
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SECTION 7

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Building Materials

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Diamond Drill Bits and Blades	Diamond Products	3	2/20/09	J. Schmidt
2	Sakrete Cement Mix Accelerator	Bonsal American	3	2/20/09	J. Schmidt
3	Sakrete Sand Mix	Bonsal American	6	2/20/09	J. Schmidt
4	Bonsal Portland Cement	Bonsal American	6	2/20/09	J. Schmidt
5	Amstone Foundation Coating	Bonsal American	4	2/20/09	J. Schmidt
6	Series 1000 Acousticork NRT HPS	Amorim Reinvestmentos, S.A.	2	2/24/09	J. Harris
7	Safecoat Grout Sealer	American Formulating & Manufacturing	1	3/11/09	J. Harris
8	LevelQuik Latex Primer	Custom Building Products	2	3/11/09	J. Harris
9	Loctite Spray Adhesive General Purpose	Henkel Consumer Adhesives	2	3/11/09	J. Harris
10	Seal-Krete CLEAN-N-ETCH	Seal-Krete	2	3/11/09	J. Harris
11	Oatey 95/5 Lead-Free Plumbing Solder	Oatey, Co.	2	3/11/09	J. Harris
12	Oatey Silver Lead-Free Plumbing Solder	Oatey, Co.	2	3/11/09	J. Harris
13	440 SF Supreme Commercial Multipurpose Adhesive	All Purpose Adhesive Co.	1	3/11/09	J. Harris
14	Rapid Coat Joint Compound - White	Lafarge North America Inc.	3	3/11/09	J. Harris
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SECTION 8

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Building Maintenance Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	System Clean Vandelism Mark Remover	Lagasse Brothers, Inc.	1	3/11/09	J. Harris
2	Roundup Weed & Grass Killer	Monsanto Company	5	3/11/09	J. Harris
3	ORTHO Weed-B-Gone MAX	The Scotts Company LLC	2	3/12/09	J. Harris
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SECTION 9

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Vehicle Maintenance Products

Item	Product Name	Manufacturer	Pages	Date Inserted
1	Hess Conventional Gasoline	Hess Corporation	9	2/20/09
2	BP Autogas	BP Australia Pty Ltd.	5	2/20/09
3	BP Regular Unleaded Petrol	BP Australia Pty Ltd.	6	2/20/09
4	Diesel Fuel (All Types)	Hess Corporation	8	2/20/09
5	Hess 10W30 Motor Oil	Hess Corporation	7	2/20/09
6	Power Multigrade Diesel Engine Oil 15W40	BP Australia Pty Ltd.	5	2/20/09
7	GOJO Natural Orange Pumice Hand Cleaner	GOJO Industries, Inc.	1	3/11/09
8	Splash RV and Marine Antifreeze	SuperClean Brands, Inc.	2	3/11/09
9	Prestone Bug n Tar Remover	Honeywell Consumer Products Group	4	3/11/09
10	Prestone Bug Wash Windshield Cleaner	Prestone Products Corporation	4	3/11/09
11	Castrol Type F Automatic Transmission Fluid	BP Lubricants USA Inc.	3	3/11/09
12	Valvoline Power Steering Fluid	Ashland, Inc.	5	3/11/09
13	Diesel Fuel Supplement +Cetane Boost	Power Services Products	3	3/11/09
14	WD-40	WD-40 Company	2	3/11/09
15	Valvoline Premium Starting Fluid	Ashland, Inc.	5	3/11/09
16	Super XL Motor Oil - Multiviscosity	American Agip Co., Inc.	4	3/11/09
17	Ultralene Motor Oil - Multiviscosity	American Agip Co., Inc.	8	3/11/09
18	Zerex Antifreeze	Ashland, Inc.	5	3/12/09
19	Krystal Kleer Windshield Washer Fluid	South Win Ltd.	2	3/12/09
20	Prestone Hi-Temp Brake Fluid DOT 3	Honeywell Consumer Products Group	4	3/12/09
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SECTION 9
USA ENVIRONMENTAL MANAGEMENT, INC.
SDS - Vehicle Maintenance Products

Inserted By
J. Schmidt
J. Schmidt
J. Schmidt
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J. Harris
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SECTION 10

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Equipment Maintenance Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Do All Heavy Duty Cleaner-Degreaser	Handy-Klenz Chemical	1	2/20/09	J. Schmidt
2	Stihl Bar and Chain Lubricant	Stihl, Inc.	2	2/20/09	J. Schmidt
3	Stihl 2-Cycle Ultra High Performance Eng. Oil	Stihl, Inc.	3	2/20/09	J. Schmidt
4	Titan LS-10 Wagner Easy Clean	D.K. Rosedale LLC	1	3/11/09	J. Harris
5	Stihl 2-Cycle High Performance Engine Oil	Stihl, Inc.	3	3/11/09	J. Harris
6	Air Compressor Oil - RARUS 427	Mobil Oil Corporation	2	3/12/09	J. Harris
7	Hydraulic Oil AW 46	Imperial Oil Products Division	4	3/12/09	J. Harris
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SECTION 11

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Office Cleaning Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Citrus Cleaner and Degreaser	ARAMSCO	1	2/24/09	J. Harris
2	Ant and Roach Killer 17 Country Fresh Scent	Raid	4	2/24/09	J. Harris
3	Acarosan Dust Mite Spray	Bissel	3	2/24/09	J. Harris
4	Murphy's Oil Soap Wood Cleaner-Orange	Colgate-Palmolive	2	2/24/09	J. Harris
5	Bona Hardwood Floor Cleaner	BonaKemi U.S.A., Inc.	2	2/24/09	J. Harris
6	Joy Liquid Detergent	Procter & Gamble	2	2/24/09	J. Harris
7	Lysol Brand II Disinfectant spray - crisp linen	Reckitt Benckiser N.A., Inc.	4	2/24/09	J. Harris
8	Softsoap brand Antibacterial Hand Soap	Colgate-Palmolive	1	2/24/09	J. Harris
9	Simple Green All-Purpose Cleaner	Sunshine Makers, Inc.	2	2/24/09	J. Harris
10	Clorox Clean-up Cleaner with Bleach	The Clorox Company	1	2/24/09	J. Harris
11	AirWick Ultra Freshmatic Spray	Reckitt Benckiser N.A., Inc.	5	2/24/09	J. Harris
12	Sweet Orange Liquid Castile Soap	Vermont Soap	1	2/25/09	J. Harris
13	Orange Plus RTU	Earth Friendly Products	1	2/25/09	J. Harris
14	Toilet Kleaner	Earth Friendly Products	1	2/25/09	J. Harris
15	Window Kleen	Earth Friendly Products	1	2/25/09	J. Harris
16	Orange Plus Complete	Earth Friendly Products	1	2/25/09	J. Harris
17	Wave - Auto Dish Powder	Earth Friendly Products	1	2/25/09	J. Harris
18	Wave Gel	Earth Friendly Products	1	2/25/09	J. Harris
19	EFP Bathroom Tissue	Earth Friendly Products	1	2/25/09	J. Harris
20	Paper Towels - White	Earth Friendly Products	1	2/25/09	J. Harris
21	Stain Remover with Peroxide	Zep Inc.	2	3/11/09	J. Harris
22	Mop & Glo Multi-Surface Floor Cleaner	Reckitt Benckiser, Inc.	3	3/11/09	J. Harris
23	Soilax Bathroom Cleaner	Ecolab, Inc.	1	3/11/09	J. Harris
24	Totally Awesome All Purpose Cleaner/Degreaser/Spot Remover	Awesome Products, Inc.	4	3/12/09	J. Harris
25	Mr. Clean Multi-Surfaces Antibacterial Spray	The Proctor & Gamble Co.	3	3/12/09	J. Harris
26	EXPO Dry Erase Board Cleaner	Sanford, L.P.	1	3/12/09	J. Harris
27	Windex Original Glass Cleaner	S.C. Johnson & Son, Inc.	4	3/12/09	J. Harris
28	Clorox Clean-up Cleaner with Bleach	Clorox Sales Company	1	3/12/09	J. Harris
29	Softsoap Liquid Hand Soap with Aloe	Colgate-Palmolive Company	2	3/12/09	J. Harris
30	Formula 409 Anitbacterial All Purpose Cleaner	Clorox Sales Company	1	3/12/09	J. Harris
31	Original Pine-Sol Brand Cleaner 1	Clorox Sales Company	1	3/12/09	J. Harris
32	Clorox Green Hand Wipes	Clorox Sales Company	1	4/22/09	J. Schmidt
33	Lysol Hand Wipes	Reckitt Benckiser, Inc.	8	4/22/09	J. Schmidt
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SECTION 12

Updated: 11/4/2016

USA ENVIRONMENTAL MANAGEMENT, INC.

SDS - Office Equipment Products

Item	Product Name	Manufacturer	Pages	Date Inserted	Inserted By
1	Black Inkjet Cartridge - DesignJet 800 Plotter	Hewlett-Packard Company	3	2/24/09	J. Harris
2	Cyan Inkjet Cartridge - DesignJet 800 Plotter	Hewlett-Packard Company	3	2/24/09	J. Harris
3	Magenta Inkjet Cartridge - DesignJet 800 Plotter	Hewlett-Packard Company	3	2/24/09	J. Harris
4	Yellow Inkjet Cartridge - DesignJet 800 Plotter	Hewlett-Packard Company	3	2/24/09	J. Harris
5	Black Inkjet Cartridge - LD445c Printer/Copier	Lanier	2	2/24/09	J. Harris
6	Cyan Inkjet Cartridge - LD445c Printer/Copier	Lanier	2	2/24/09	J. Harris
7	Magenta Inkjet Cartridge - LD445c Printer/Copier	Lanier	2	2/24/09	J. Harris
8	Yellow Inkjet Cartridge - LD445c Printer/Copier	Lanier	2	2/24/09	J. Harris
9	Wite Out Multi-Purpose Correction Fluid	Wite-Out Products, Inc.	2	2/24/09	J. Harris
10	Wite-Out Correction Fluid Quick Dry	Wite-Out Products, Inc.	2	2/24/09	J. Harris
11	Marks-A-Lot Permanent Marker	Avery Dennison	1	2/24/09	J. Harris
12	DabnSeal Envelope Moistener	Clarence J. Venne, Inc.	2	2/24/09	J. Harris
13	Paper Mate Flair	Sanford Corporation	1	2/24/09	J. Harris
14	Sharpie Accent Tank Highlighter	Sanford, L.P.	1	2/24/09	J. Harris
15	Dust Off Compressed Gas Duster	Falcon Safety Products, Inc.	3	2/25/09	J. Harris
16	Lexmark All-In-One Printer X7170 Black Cartridge	Lexmark International, Inc.	2	2/25/09	J. Harris
17	Lexmark All-In-One Printer X7170 Color Cartridge	Lexmark International, Inc.	2	2/25/09	J. Harris
18	HP DeskJet 842C Printer Black Cartridge	Hewlett-Packard Company	3	2/25/09	J. Harris
19	HP DeskJet 842C Printer Color Cartridge	Hewlett-Packard Company	4	2/25/09	J. Harris
20	HP DeskJet 960C/932C Printer Black Cartridge	Hewlett-Packard Company	3	2/25/09	J. Harris
21	HP DeskJet 960C/932C Printer Color Cartridge	Hewlett-Packard Company	4	2/25/09	J. Harris
22	HP DeskJet 710C Printer Black Cartridge	Hewlett-Packard Company	3	2/25/09	J. Harris
23	HP DeskJet 710C Printer Color Cartridge	Hewlett-Packard Company	4	2/25/09	J. Harris
24	HP LaserJet 4100N Printer Black Cartridge	Hewlett-Packard Company	3	2/25/09	J. Harris
25	Mita AI1810F Copier - Black Toner	Kyocera Mita America, Inc.	2	3/13/09	J. Harris
26	Kyocera KM 3050 Copier - Black Toner	Kyocera Mita America, Inc.	2	3/13/09	J. Harris
27	HP 1220c Printer - No. 78 Multi-color Cartridge	Hewlett-Packard Company	4	3/13/09	J. Harris
28	HP 1220c Printer - No. 45 Black Cartridge	Hewlett-Packard Company	3	3/13/09	J. Harris
29	HP 2550c Printer - Q3960A - Black Cartridge	Hewlett-Packard Company	3	3/13/09	J. Harris
30	HP 2550c Printer - Q3973A - Magenta Cartridge	Hewlett-Packard Company	3	3/13/09	J. Harris
31	HP 2550c Printer - Q3972A - Yellow Cartridge	Hewlett-Packard Company	3	3/13/09	J. Harris
32	HP 2550c Printer - Q3971A - Cyan Cartridge	Hewlett-Packard Company	3	3/13/09	J. Harris
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ACTIVITY HAZARD ANALYSIS (AHA) FORMS

Activity Hazard Analysis

Activity Project Mobilization **Analyzed By/Date** _____

Principal Steps	**Potential Safety/Health Hazards**	**Recommended Controls**
1. Site Safety and Emergency Procedures to be implemented immediately upon initiation of any site activities. 2. Stage Storage Trailer. 3. Stage Equipment & Materials. 4. Setup Project Field Office Operations.	1. Trip and Fall Hazards. 2. Site Vehicles.	1. Become familiar with general operations ongoing at the site.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. All site related mobilization work shall be accomplished using Hard Hats, Safety Glasses, work gloves and Safety Shoes.	1. Ensure that workers near building work site are using personal protective equipment (hard hats, safety glasses, safety shoes).	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety and emergency procedures.

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Activity Hazard Analysis

Activity Temporary Protection/Site Protection **Analyzed By/Date** _____

Principal Steps	**Potential Safety/Health Hazards**	**Recommended Controls**
1. Establish work building control perimeter. 2. Initiate Site Safety Program and Procedures. 3. Initiate site fire protective measures. 4. Setup Personnel Decontamination Units. 5. Erect temporary phase isolation barrier. 6. Install phase critical barriers.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders. 4. Erecting and working on Scaffolding. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Cuts using utility knives. 7. Power Tools. 8. Material lifting injury hazards.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal protective equipment (hard hats, safety glasses, safety shoes). 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4.Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Use caution and care when using sharp tools. 7. Use caution and understand proper, safe use of power tools. 8. Follow recommended, safe lifting procedures.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. All temporary protection/site protection work shall be accomplished using Hard Hats, Safety Glasses, work gloves and Safety Shoes. 2. Power Tools. 3. Ladders. 4. Scaffolding. 5. Powered Manlifts. 6. Lumber/Polyethylene Plastic/Tape/Spray Adhesive	1. Ensure that workers near building work site are using personal protective equipment cited. 2. Inspect all Power Tools daily. 3. Inspect Ladders, Scaffolding, Manlifts daily. 4. Check all warning devices, signage, etc. daily.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, power tools, etc.

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Activity Hazard Analysis

Activity Erecting Scaffolding **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Scaffolding may be used on this project. 2. Unloading scaffolding and support equipment from truck. 3. Temporary storage of scaffolding. 4. Erection of scaffolding – **Outside** work building. 5. Erection of scaffolding – **Inside** work building.	1. General building perimeter site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Unloading from truck – drop related injuries. 4. Unloading from truck – lifting related injuries. 5. Storage – material falling inflicting injuries. 6. **Exterior/Interior** – Unstable ground base for scaffold causing failure. 7. **Exterior/Interior** – Possible electrical contact hazard. 8. **Exterior** – Possible adverse weather effects hazard. 9. Erection of scaffolding – Drop hazards. 10. Erection of scaffolding – Fall hazards. 11. Failure to properly brace scaffolding during erection causing failure. 12. Scaffold frame section separation.	1. Become familiar with general operations ongoing at the site. Continue to use hard hats, safety glasses, safety shoes, etc. 2. Become familiar with the work building environment and warning devices installed at known trip hazards. 3. Employ care when unloading scaffolding. 4. Ensure stability and proper lifting procedures are employed during the unloading process. 5. Ensure stability of stored material. 6. Ensure safe, stable base for erection. 7. Review erection location for possible electrical contact. Safe off as necessary. 8. Ensure scaffolding is secured properly and tied down to withstand the elements (wind, rain, etc.) 9. Erection drop hazards – ensure scaffold/bracing sections secured by rope before lifting. Don't stand directly below material being hoisted. 10. Employ the use of fall protection procedures detailed in the Site Safety/Accident Prevention Plan. 11. Follow OSHA and manufac-turer's requirements for proper bracing. 12. Use proper section joining pins and pin locks at all times.

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Activity Hazard Analysis

Activity Erecting Scaffolding **Analyzed By/Date** _____

Equipment To Be Used	Inspection Requirements	Training Requirements
1. Scaffolding. 2. Cross bracing, leveling jacks, wheels, feet. 3. Miscellaneous hand tools.	1. Ensure that work is accomplished using personal protective equipment cited. 2. Inspect scaffold systems daily. 3. Check all warning devices, signage, etc. daily. 4. Check all anchorage devices daily and immediately before inclement weather. 5. Check all scaffolding safety devices such as guardrails, toe boards, etc. daily.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Follow EM 385-1-1 and the OSHA standards for proper use of scaffolding.

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Activity Hazard Analysis

Activity Work From Scaffolding **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Scaffolding may be used on this project. 2. Accessing the scaffold system for working. 3. Working on scaffolding. 4. Dismounting scaffold upon completion of work.	1. **Exterior/Interior** - General building perimeter site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Accessing scaffolding creates potential fall hazard. 4. Working on scaffolding presents potential fall hazard. 5. Worker working immediately beneath the perimeter of the erected scaffold may be faced with falling objects injury hazard. 6. Dismounting scaffolding presents potential fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use hard hats, safety glasses, safety shoes, etc. 2. Become familiar with the work building environment and warning devices installed at known trip hazards. 3. Use properly secured access ladder to ascend scaffold. If built-in ladder is to be used it must be manufactured for the purpose of personnel access and climbing. Use fall protection program for potential falls in excess of 6' during access. 4. Use proper fall protection at all times when working at heights in excess of 6'. 5. All workers must use personal protective equipment including hard hats, safety glasses and safety shoes. 6. Use properly secured access ladder to descend scaffold. If built-in ladder is to be used it must be manufactured for the purpose of personnel access and climbing. Use fall protection program for potential falls in excess of 6' during descent.

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Activity Hazard Analysis

Equipment To Be Used	Inspection Requirements	Training Requirements
1. Scaffolding. 2. Ladders – portable or built-in. 3. Fall protection devices and equipment.	1. Ensure that work is accomplished using personal protective equipment cited. 2. Inspect scaffold systems daily. 3. Check all warning devices, signage, etc. daily. 4. Check portable access ladders daily. 5. Check all scaffolding safety devices such as guardrails, toe boards, etc. daily. 6. Ensure that fall protection is being used properly at all times.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Follow EM 385-1-1 and the OSHA standards for proper use of scaffolding and personnel fall protection equipment.

Activity Dismantling Scaffolding **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Scaffolding may be used on this project. 2. Dismantlement of scaffolding – **Outside** work building. 3. Dismantlement of scaffolding – **Inside** work building.	1. General building perimeter site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. **Exterior/Interior** – Unstable ground base for scaffold causing failure. 4. **Exterior/Interior** – Possible electrical contact hazard. 5. **Exterior** – Possible adverse weather effects hazard. 6. Dismantlement of scaffolding – Drop hazards. 7. Dismantlement of scaffolding – Fall hazards. 8. Scaffold frame section separation – dropping sections. 9. Storage – material falling inflicting injuries. 10. Loading truck – drop related injuries. 11. Loading truck – lifting related injuries.	1. Become familiar with general operations ongoing at the site. Continue to use hard hats, safety glasses, safety shoes, etc. 2. Become familiar with the work building environment and warning devices installed at known trip hazards. 3. Ensure safe, stable base for dismantlement. 4. Review installation location for possible electrical contact. Safe off as necessary. 5. **Do not** attempt scaffold dismantlement during adverse weather conditions (wind, rain, etc.) 6. Dismantlement drop hazards – ensure scaffold/bracing sections secured by rope before lifting. Don't stand directly below material being hoisted. 7. Employ the use of fall protection procedures detailed in the Site Safety/Accident Prevention Plan. 8. Have each section and component secured by the lifting line **prior** to removing locking pins and removing section or bracing. 9. Ensure stability of stored material. 10. Employ care when loading scaffolding. 11. Ensure stability and proper lifting procedures are employed during the unloading process.

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Activity Dismantling Scaffolding **Analyzed By/Date** _____

Equipment To Be Used	Inspection Requirements	Training Requirements
1. Scaffolding. 2. Cross bracing, leveling jacks, wheels, feet. 3. Miscellaneous hand tools.	1. Ensure that work is accomplished using personal protective equipment cited. 2. Inspect scaffold-dismantling operation as accomplished. 3. Check all warning devices, signage, etc. daily. 4. Check all lifting and dismantlement equipment prior to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Follow EM 385-1-1 and the OSHA standards for proper use of scaffolding.

Activity Hazard Analysis

Activity Work From Ladders **Analyzed By/Date** _____

Principal Steps	**Potential Safety/Health Hazards**	**Recommended Controls**
1. Ladders will be used for a variety of work activities on the **exterior** of the work building during the course of work on this project. 2. Ladders will also be used periodically in support of work activities in the **interior** of the work building during the course of work on this project.	1. General building perimeter site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders above 6'. 4. Use of sharp tools while working on ladders increases the potential for cuts and other tool-inflicted injuries. 5. Use of power tools while working on ladders increases the potential for cuts and other tool-inflicted injuries. 6. Unstable base for ladders. 7. Reach hazards while working on ladders. 8. Standing too high on ladders.	1. Become familiar with general operations ongoing at the site. Continue to use hard hats, safety glasses, safety shoes, etc. 2. Become familiar with the work building environment and warning devices installed at known trip hazards. 3. Employ fall protection devices when working on ladders above 6'. Review Safety/Accident Prevention Program for proper use. 4. Use caution and care when using sharp tools. 5. Use caution and understand proper, safe use of power tools. 6. Ensure the ladder is sound on its base before using. 7. Reaching while working on ladders is one of the most common causes of accidents. DO NOT reach beyond the work limits of the ladder. Move it if necessary! 8. Do not stand above the next to last step on a stepladder.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Step Ladders (various heights). 2. Extension Ladders.	1. Ensure that work is accomplished using personal protective equipment cited. 2. Inspect Ladders daily. 3. Check all warning devices, signage, etc. daily.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Proper use of ladders.

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USA Environmental Management, Inc.

Activity Hazard Analysis

Activity Temporary Electric **Analyzed By/Date** _____

Principal Steps	**Potential Safety/Health Hazards**	**Recommended Controls**
1. Become familiar with Site Safety Program and Procedures and Site Emergency Procedures. 2. Initiate site fire protective measures. 3. Make electrical tie-in and meter installation on main pole along access road in front of work building. 4. Access pole to make proper tie-in. 5. Install meter. 6. Run temporary service line into work building. 7. Tie-in temporary service to electrical service panel. 8. Test installation.	1. General building site hazards, i.e. vehicles, etc. 2. Electrical Shock Hazards. 3. Trip and Fall Hazards. 4. Working on Ladders. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Cuts using utility knives, other hand tools. 7. Power Tools. 8. Material lifting injury hazards.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal protective equipment. 2. Follow all approved electrical tie-in procedures including, but not limited to, tag and lockout of main service until tie-in is completed, etc. 3. Become familiar with the work building environment and warning devices installed at known trip hazards. 4. Employ fall protection devices when working on ladders, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Use caution and care when using sharp tools. 7. Use caution and understand proper, safe use of power tools. 8. Follow recommended, safe lifting procedures.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. All temporary electric work shall be accomplished using Hard Hats, Safety Glasses, work gloves and Safety Shoes. 2. Power Tools. 3. Ladders. 4. Powered Manlifts. 5. Electrical equipment and materials such as wiring, meter, temporary service panel board.	1. Ensure workers at site and site manager are notified of the nature of the work and the work schedule. 2. Ensure that work is accomplished using personal protective equipment cited. 3. Inspect all Power Tools daily. 4. Inspect Ladders, Manlifts daily. 5. Check all warning devices, signage, and electrical lockout daily until temp. service install is complete.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Proper use of ladders, manlifts, power tools, etc. 5. Follow all electrical code procedures and standards.

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Activity Hazard Analysis

Activity Use of Power Tools **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. A variety of power tools shall be used on this project. 2. Drills, Screw guns, Cutting Saws, Hammers, etc. among others may be used from time-to-time.	1. Electrical shock hazards. 2. Skin cut hazards. 3. Clothing tangling hazards. 4. Hair tangling hazards.	1. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in conjunction with electrically powered hand tools. 2. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 3. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. Remove any tool without installed devices operating properly immediately from service. 4. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. Remove any tool without installed devices operating properly immediately from service. 5. Revise this Activity Hazard Analysis Sheet should new hand tools or equipment be put into use on the project presenting new hazards.

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Activity Hazard Analysis

Activity Use of Power Tools **Analyzed By/Date** _____

Equipment To Be Used	Inspection Requirements	Training Requirements
1. Drills, Screw guns, Cutting Saws, Hammers, etc. along with a variety of other small to medium size hand tools will be used on this project.	1. Ensure that workers near building work site are using personal protective equipment cited. 2. Inspect all Power Tools daily. 3. Inspect all power cords used in conjunction with any hand tools on a daily basis. 4. Inspect all safety guards and other such devices daily.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, power tools, etc.

Activity Hazard Analysis

Activity Work From Mechanical Lifts **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Mechanical manlifts may be used on this project. 2. Placing of mechanical equipment onsite – unloading from truck. 3. **Exterior** - Moving equipment to specific work location. 4. **Interior** - Moving equipment to specific work location. 5. If internal combustion powered – fumes evacuation for inside work. 6. Accessing the mechanical lift system for working. 7. Working on or below mechanical lift. 8. Dismounting mechanical lift upon completion of work. 9. Moving equipment from site to truck for removal from jobsite. 10. Loading of equipment onto truck.	1. **Exterior/Interior** - General building perimeter site hazards, i.e. vehicles, etc. 2. Equipment contact injury hazards. 3. Moving equipment across soft ground can create injury hazard – Personnel contact and/or roll-over hazard. Hard wheels vs. pneumatic wheels. 4. Moving equipment through building can create personnel contact hazard. 5. Fume exposure if internal combustion power is used. 6. Electrical hazard potential if operated electrically. 7. Accessing mechanical lift creates potential fall hazard. 8. Working on mechanical lift presents potential fall hazard for worker up and falling objects injury hazard for workers beneath. 9. Dismounting mechanical lift presents potential fall hazard. 10. Moving equipment throughout building inside or across soft ground outside can create injury hazard – Personnel contact and/or rollover hazard. Hard wheels vs. pneumatic wheels. 11. Equipment contact injury and/or rollover hazard.	1. Become familiar with general operations ongoing at the site. Continue to use hard hats, safety glasses, safety shoes, etc. 2. Be sure device has backup alarm – all workers should be aware of the location of the equipment at all times. Be sure unloading ramps, if needed, are sufficient to handle equipment weight and size. 3. Ensure equipment has pneumatic tires or is moved across solid ground at all times. Carefully test stability before placing into use. 4. Operator should be able to see all workers at all times during movement. Be sure to use a ground escort during movement. 5. If internal combustion powered – install exterior exhaust system during all motorized operations. 6. Check all electrics for proper operating condition. 7. Use properly secured ladder or fixed access ladder for accessing the equipment working area. 8. Use proper personnel fall protection at all times when working above 6’ in height. All workers on ground must use hard hats, safety glasses and safety shoes at a minimum. 9. Use properly secured ladder or fixed access ladder for dismounting the equipment working area. 10. Operator should be able to see all workers at all times during movement. Be sure to use a ground escort during movement.

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Activity Hazard Analysis

Activity Work From Mechanical Lifts **Analyzed By/Date** _____

		Recommended Controls (cont'd.)
		11. Ensure equipment has pneumatic tires or is moved across solid ground at all times. Be sure unloading ramps, if needed, are sufficient to handle equipment weight and size.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Mechanical manlifts. 2. Ladders – portable or built-in. 3. Fall protection devices and equipment. 4. Loading / Unloading Ramps.	1. Ensure that work is accomplished using personal protective equipment cited. 2. Inspect mechanical manlift systems daily. Run equipment through series of movements each morning prior to use. 3. Check all warning devices, signage, etc. daily. 4. Check exhaust elimination system daily (if internal combustion powered). 5. Check electrical service lines if portable cord power is needed. 6. Check portable access ladders daily. 7. Check all mechanical manlift safety devices such as guardrails, etc. daily. 8. Ensure that fall protection is being used properly at all times.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site safety/accident prevention plan and emergency procedures. 4. Follow all equipment manufacturers' instructions for use at all times. Review operations manual for the unit and be familiar with the proper operation of equipment at all times. 5. Operating employees shall undergo a field equipment operational test overseen by the project foreman and Project Safety Officer. 6. Follow EM 385-1-1 and the OSHA standards for proper use of mechanical manlift equipment and personnel fall protection equipment.

Activity Hazard Analysis

Activity Removal of Asbestos-containing Roofing and Chimney Flashing Cement **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of asbestos-containing roofing material and chimney flashing cement.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Asbestos exposure hazard to the workers performing the removals. 9. Wet removal of asbestos-containing material may present a slipping/fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

Activity Hazard Analysis

Activity Removal of Asbestos-containing Roofing and Chimney Flashing Cement **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Asbestos abatement procedures and requirements as included in the project specification and the asbestos hazard abatement plan which is an appendix to the Safety Program/Accident Prevention Plan. 6. Use of Personal Protective Equipment (PPE) for asbestos abatement work included in the Asbestos Hazard Abatement Plan, OSHA 1926.1101 and EPA 40 CFR, Part 61, Subparts A & M – NESHAP regulations.

Activity Hazard Analysis

Activity Asbestos-containing Materials Removal **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of asbestos-containing materials from the inside of the building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Asbestos exposure hazard to the workers performing the removals. 9. Wet removal of asbestos-containing material may present a slipping/fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

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Activity Hazard Analysis

Activity Asbestos-containing Materials Removal **Analyzed By/Date**_____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Asbestos abatement procedures and requirements as included in the project specification and the asbestos hazard abatement plan which is an appendix to the Safety Program/Accident Prevention Plan. 6. Use of Personal Protective Equipment (PPE) for asbestos abatement work included in the Asbestos Hazard Abatement Plan, OSHA 1926.1101 and EPA 40 CFR, Part 61, Subparts A & M – NESHAP regulations.

Activity Hazard Analysis

Activity Removal of Emergency & Exit Lighting and Fire Panel Backup Batteries **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of lead-containing backup batteries for the emergency and exit lighting throughout the school building and for the backup power for the Fire Panel.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Potential lead exposure hazard to the workers performing the removals.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

Activity Hazard Analysis

Activity Removal of Emergency & Exit Lighting and Fire Panel Backup Batteries **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Lead abatement procedures and requirements as included in the project specification. 6. Use of Personal Protective Equipment (PPE) for lead hazard abatement per OSHA regulations CFR 1926.62.

Activity Hazard Analysis

Activity Removal of Miscellaneous Asbestos-Containing Basboard Mastic/Door Caulk **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of miscellaneous asbestos-containing baseboard mastic and door caulking from certain areas inside of the building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Asbestos exposure hazard to the workers performing the removals. 9. Wet removal of asbestos-containing material may present a slipping/fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

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Activity Hazard Analysis

Activity Removal of Miscellaneous Asbestos-Containing Basboard Mastic/Door Caulk **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Asbestos abatement procedures and requirements as included in the project specification and the asbestos hazard abatement plan which is an appendix to the Safety Program/Accident Prevention Plan. 6. Use of Personal Protective Equipment (PPE) for asbestos abatement work included in the Asbestos Hazard Abatement Plan, OSHA 1926.1101 and EPA 40 CFR, Part 61, Subparts A & M – NESHAP regulations.

Activity Asbestos-containing Mastic Removal – Blackboards/Tackboards **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of asbestos-containing mastic removal from behind existing blackboards/tackboards inside of the building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Asbestos exposure hazard to the workers performing the removals. 9. Wet removal of asbestos-containing material may present a slipping/fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in conjunction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be constantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

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Activity Asbestos-containing Mastic Removal – Blackboards/Tackboards

Analyzed By/Date _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Asbestos abatement procedures and requirements as included in the project specification and the asbestos hazard abatement plan which is an appendix to the Safety Program/Accident Prevention Plan. 6. Use of Personal Protective Equipment (PPE) for asbestos abatement work included in the Asbestos Hazard Abatement Plan, OSHA 1926.1101 and EPA 40 CFR, Part 61, Subparts A & M – NESHAP regulations.

Activity Hazard Analysis

Activity Asbestos-containing Carpet Mastic Removal **Analyzed By/Date**

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of asbestos-containing carpet mastic removal from certain areas inside of the building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Asbestos exposure hazard to the workers performing the removals. 9. Wet removal of asbestos-containing material may present a slipping/fall hazard.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

Activity Hazard Analysis

Activity Asbestos-containing Carpet Mastic Removal **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Asbestos abatement procedures and requirements as included in the project specification and the asbestos hazard abatement plan which is an appendix to the Safety Program/Accident Prevention Plan. 6. Use of Personal Protective Equipment (PPE) for asbestos abatement work included in the Asbestos Hazard Abatement Plan, OSHA 1926.1101 and EPA 40 CFR, Part 61, Subparts A & M – NESHAP regulations.

Activity Hazard Analysis

Activity Removal of Fluorescent Light Ballasts **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of PCB-containing fluorescent light ballasts throughout the school building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Potential PCB exposure hazard to the workers performing the removals.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in con-junction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be con-stantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

Activity Hazard Analysis

Activity Removal of Fluorescent Light Ballasts **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Fluorescent light ballast abatement procedures and requirements as included in the project specification. 6. Use of Personal Protective Equipment (PPE) for PCB hazard abatement per OSHA regulations.

Activity Removal of Fluorescent Light Tubes **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Perform the removal of mercury-containing fluorescent light tubes throughout the school building.	1. General building site hazards, i.e. vehicles, etc. 2. Trip and Fall Hazards. 3. Working on Ladders – fall hazards. 4. Working on Scaffolding – fall hazards. 5. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 6. Use of power tools – electrical shock, skin cut, clothing and hair tangle hazards. 7. Falling materials hazard to workers below. 8. Mercury exposure hazard to the workers performing the removals.	1. Become familiar with general operations ongoing at the site. Continue to use appropriate personal safety equipment. 2. Become familiar with the work building environment. Have warning devices installed at known trip hazards. 3./4. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use. 5. Employ fall protection as in 3. & 4. above. Also be aware of operational parts of lifts and other such moveable equipment. 6. Check all electrical tools **prior** to using. Implement the assured grounding program for use of this type of equipment. Remove any unacceptable tool from service immediately. This applies also to things such as extension cords used in conjunction with electrically powered hand tools. Use all due care in the use of tools capable of causing cutting injuries. Be sure any and all manufacturer safety shield and / or guards are attached, remain attached during use and are in good working order. 7. All workers should be constantly aware of work ongoing overhead. All workers below the work activity must use personal safety equipment including hard hats, safety glasses and safety shoes at all times. 8. All workers involved with this work activity must use PPE to include respirator equipped with HEPA filters, full disposable

Activity Removal of Fluorescent Light Tubes **Analyzed By/Date** _____

		body coveralls, covering body, feet and head, and disposable or protective, reusable work gloves as appropriate. 9. Employ fall protection devices when working on ladders, scaffolding, etc. Review Safety/Accident Prevention Program for proper use.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
1. Ladders. 2. Scaffolding. 3. Powered Manlifts. 4. Hand Power Tools.	1. Ensure that all workers on project work site are using personal protective equipment including hard hats, safety glasses, safety shoes and fall protection as appropriate. 2. Inspect Ladders, Scaffolding, Manlifts daily. 3. Check all warning devices, signage, etc. daily. 4. Inspect all power tools and supporting electrical cords for proper function each day **prior** to use.	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal protective equipment. 3. Be familiar with the developed site emergency procedures. 4. Proper use of ladders, scaffolding, manlifts, etc. 5. Fluorescent light tube abatement procedures and requirements as included in the project specification. 6. Use of Personal Protective Equipment (PPE) for mercury hazard abatement per OSHA regulations.

Activity Hazard Analysis

Activity Project De-mobilization **Analyzed By/Date** _____

Principal Steps	Potential Safety/Health Hazards	Recommended Controls
1. Remove Storage Trailer. 2. Remove Balance of Stored Equipment & Materials. 3. Breakdown Project Field Office Operations. 4. Remove any temporary protection installed around or on the site. 5. Remove temporary electric installation.	1. Trip and Fall Hazards. 2. Site Vehicles. 3. Truck Loading Hazards (i.e. falling equipment, etc.) 4. Material and/or equipment dropping hazards (hand and foot injuries). 5. Electrical Shock hazards. 6. Working on Ladders. 7. Working on Powered Manlifts. Fall and pinching/clothing tangle hazards. 8. Cuts using utility knives, other hand tools. 9. Power Tools. 10. Material lifting injury hazards.	1. Become familiar with general operations ongoing at the site. 2. Use caution when working on active access roads in and around the site. 3. Use general care in handling and loading trucks with equipment, materials, etc. 4. Take care to handle equipment and materials with a firm grasp to avoid injury. 5. Follow all approved electrical procedures for the removal of temporary tie-in including, but not limited to, tag and lockout of main service until tie-in removal is completed, etc. 6. Employ fall protection devices when working on ladders, etc. Review Safety/Accident Prevention Program for proper use. 7. Employ fall protection as in 6. above. Also be aware of operational parts of lifts and other such moveable equipment. 8. Use caution and care when using sharp tools. 9. Use caution and understand proper, safe use of power tools. 10. Follow recommended, safe lifting procedures.

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Activity Hazard Analysis

Activity Project De-mobilization **Analyzed By/Date** _____

Equipment To Be Used	Inspection Requirements	Training Requirements
1. All site related de-mobilization work shall be accomplished using Hard Hats, Safety Glasses, work gloves and Safety Shoes. 2. Equipment/material handling carts. 3. Power Tools. 4. Ladders. 5. Powered Manlifts. 6. Electrical equipment and materials such as wiring, meter, temporary service panel board.	1. Ensure that workers near building work site are using personal safety equipment (hard hats, safety glasses, safety shoes).	1. Review normal site operations with site operation manager. 2. Proper use of hard hats, safety glasses and other applicable personal safety equipment. 3. Be familiar with the developed site safety and emergency procedures. 4. Proper use of ladders, manlifts, power tools, etc. 5. Follow all electrical code procedures and standards.

MISCELLANEOUS FIELD FORMS

Pre-Entry Briefing form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

PRE-ENTRY BRIEFING FORM

Project No.: 16-000701-01 **Date:** _____

Project Name: Syncon Resins Superfund Site OU2
77 Jacobus Avenue, South Kearny, New Jersey 07032

I hereby affirm that I have attended a Pre-entry Briefing Meeting presented by authorized management personnel of USA Environmental Management, Inc. (USAEMI), my employer. This meeting was held at the project site. During this meeting, the following items were discussed:

- General overview of the HASP
- Names of personnel and alternates responsible for site safety and health
- Lines of authority
- Safety, health and other hazards present on the site
- Personal protective equipment required for activities at the site
- Safe use of engineering controls and equipment at the site
- Level and degree of potential exposures
- Site emergency evacuation procedures
- Medical surveillance requirements, including recognition of symptoms and signs of heat stress and heat stroke
- Training requirements
- Review site vehicular traffic rules
- Existence of Lead-Based paint on various surfaces and/or lead components in various areas of the structures to be demolished.

I understand the items discussed during this briefing and will refer any questions to the Project Superintendent on site.

USA Environmental Management, Inc.:

USAEMI Safety Program Manager: _____
Signature

_____
Name Printed

USAEMI Employee: _____
Signature

_____
Name Printed

Subcontractor:

Subcontractor: _____
Subcontractor Company Name

Employee: _____
Signature

_____
Name Printed

Visitor:

Agency: _____
Agency Name

Employee: _____
Signature

_____
Name Printed

Health & Safety Plan (HASP) Acceptance form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

HEALTH AND SAFETY PLAN (HASP) ACCEPTANCE FORM

Project No.: 16-000701-01 **Date:** _____

Project Name: Syncon Resins Superfund Site
77 Jacobus Avenue, South Kearny, New Jersey 07032

I hereby affirm that I have read and fully understand all of the requirements of the Health and Safety Plan (HASP) developed for the above subject contract as well as the Company Health & Safety Program (CHSP). A copy of the aforementioned HASP is maintained at the project site for my continued reference.

I agree to abide by all of the applicable requirements of the HASP and CHSP as they apply to the performance of my assigned work on this contract. I further stipulate that I will follow the directions given me by the Project Superintendent and/or Joint Venture management, and/or Subcontractor (in the case of subcontractor employees) for whom I am working during the course of this project.

Project Superintendent: _____
Signature

_____
Name Printed

Project Employee: _____
Signature

_____
Name Printed

Subcontractor/Visitor: _____
Representative Signature

_____
Name Printed

Safety Meeting Sign-in form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

SAFETY MEETING SIGN-IN SHEET

Date: _____ Daily: ☒ Weekly: ☐ Monthly: ☐

Project Name: Syncon Resins Superfund Site
77 Jacobus Avenue, South Kearny, New Jersey 07032

Project No: 16-000701-01 Supervisor: _____

Describe safety topic discussed at meeting: _____

EMPLOYEE SIGN-IN

Print Name	Signature

Use extra sheets as necessary.

Date: _____ **EMPLOYEE SIGN-IN**

Print Name Signature

Daily Construction Quality Control Report form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

DAILY CONSTRUCTION QUALITY CONTROL REPORT

Project No.: 16-000701-01 **Date:**

Project Name: Syncon Resins Superfund site OU2
77 Jacobus Avenue
South Kearny, New Jersey 07032

Report No.: 001

Weather:

Phases of Construction in Progress:

Material and/or Equipment Delivered to Site:

Inspection Made:

Preparatory:

Initial:

Follow-up:

Tests Performed and Results of Tests:

Verbal Instructions Received:

Changed Conditions/Delays/Conflicts Encountered:

Remarks:

SIGNATURE: _____

Quality Control Inspector

Contractor's Verification: The above report is complete and correct and all material and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications except as noted above, and job safety and health requirements are in accordance with the USACE Safety and Health Requirements Manual EM 385-1-1.

SIGNATURE: _____

Contractor's Approved Authorized Representative

Project Emergency Telephone Numbers List

USA Environmental Management, Inc.
Environmental ♦ Engineering ♦ Construction
8436 Enterprise Avenue, Philadelphia, PA 19153-3802

PROJECT EMERGENCY PHONE NUMBERS LIST

Project Name: Syncon Resins Superfund Site
77 Jacobus Avenue, South Kearny, New Jersey 07032

Project No.: 16-000701-01

Ambulance	**911**
Hospital	**911**
Fire Department	**911**
Police	**911**
U.S. EPA (24-Hour Hotline)	913-281-0991
CHEMTREC	800-424-9300
National Poison Control Center	800-222-1222
National Response Center and Terrorist Hotline	800-424-8802
Center for Disease Control	800-232-4636
New Jersey DEP	1-877-WARNDEP

USA Environmental Management, Inc.:

USAEMI - Jim Harris - daytime office	215-365-5810 ext. 102
USAEMI - Jim Harris - (Cell)	215-778-4061
USAEMI – Kevin Meldrum – (Cell)	215-397-8168

Sevenson Environmental, Inc.:

SSI – Project Manager - TBD	TBD
SSI – Project Site Superintendent – TBD	TBD

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

State of New Jersey

Department of Community Affairs (DCA) -	609 - 292-7899
Department of Labor & Workforce Development, Asbestos Control and Licensing	TBD

US Army Corps of Engineers

Contracting Officer (CO)	TBD
Contracting Officer's Representative (COR)	TBD

CDM Smith

Project Manager	TBD

TTI Environmental, Inc.

Project Manager	TBD
Air Monitoring Technician (AST)	TBD

Other:

Worker Daily Sign-in form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

Worker Daily Sign In Log

PROJECT: Project Name: Syncon Resins Superfund Site **DATE:**
77 Jacobus Avenue, South Kearny, New Jersey 07032

PROJECT No.: 16-000701-01

			LUNCH PERIOD			
Employee Name (Print)	Employee Name (Signature)	Time In	Time Out	Time In	Time Out	Total Hours

Project Superintendent Name (Printed) _____

Project Superintendent's Signature _____

Visitor Daily Sign-in form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

Visitor Daily Sign In Log

PROJECT: **Project Name: Syncon Resins Superfund Site**

77 Jacobus Avenue, South Kearny, New Jersey 07032

Date: _____

PROJECT No.: 16-000701-01

Employee Name (Print)	Employee Name (Signature)	Time In	Time Out	Total Hours

Project Superintendent Name (Printed) _____

Project Superintendent's Signature _____

Hot Work Permit form

USA Environmental Management, Inc.

Environmental ♦ Engineering ♦ Construction

8436 Enterprise Avenue, Philadelphia, PA 19153-3802

DAILY HOT WORK PERMIT

Project No.: 16-000701-01 **Date:** _____

Project Name: Syncon Resins Superfund Site OU2
77 Jacobus Avenue, South Kearny
New Jersey 07032

Permit No.: _____

Work Location: _____

Work To Be Performed:

☐ WELDING ☐ BURNING ☐ BRAZING ☐ OTHER

Specific Work Activity Description:

_____

_____

Special Precautions:

_____

_____

Fire Watch Requirements:

_____

_____

The location where the work is to be performed has been examined. Necessary precautions have been taken and permission is granted for Hot Work to proceed.

_____ _____
(Supervisor Signature) (Name Printed)

FINAL CHECKUP: The work area and adjacent areas to which sparks and heat might have spread (including areas immediately above and below the hot work) have been inspected 30 minutes **after** the hot work was completed and all were found to be safe.

_____ _____
(Project Superintendent Signature) (Name Printed)

Appendix B

PCB-Ballasts and Lamp Removal Work and Disposal Plan

PCB-Ballasts and Lamp Removal Work and Disposal Plan

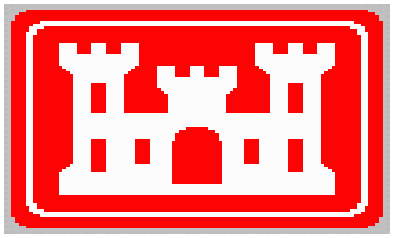
Syncon Resin Superfund Site
OU 2
South Kearny, New Jersey

Submitted by:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Prepared for:

U.S Army Engineer District
Corps of Engineers
Kansas City, Missouri



August 2016
Revision 1

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1.0 Introduction

Sevenson Environmental Services, Inc. (Sevenson) shall safely remove and segregate any Polychlorinated Bi-Phenyl (PCB)-containing lighting ballasts, associated mercury-containing fluorescent lamps in accordance with local, State of New Jersey, or federal regulations prior to any demolition work. If the Building's integrity necessitates removal prior to demolition, ballasts and lamps shall be included in the demolition debris and disposed without segregation.

Sevenson shall remove and salvage electrical fixtures and shall salvage unprotected glassware separate from the fixture. Incandescent, mercury-vapor, and fluorescent lamps and fluorescent ballasts manufactured after 1978 shall be salvaged, protected from breakage. As ballasts are removed from the lighting fixture, Sevenson shall inspect the label on ballast. Ballasts without a "No PCB" label shall be segregated demolition waste corresponding to their respective categories as listed in table 02410-1. All demolition waste shall be transported offsite to the appropriate disposal facilities for treatment, recycling, and/or disposal in accordance with section 02120 Offsite Transportation and Disposal.

2.0 Purpose

The purpose of this plan is to outline the hazards of removing lighting fixtures that have the potential to contain mercury fluorescent lamps and ballasts that contain PCB's.

3.0 Hazard

3.1 PCB Ballasts

PCB's were used in the capacitors of fluorescent lamp ballasts and in the capacitors of high intensity discharge (HID) lighting fixtures.

3.2 Mercury Fluorescent Lamps

All fluorescent lamps and most other types of energy-efficient lighting contain elemental mercury. Mercury has a unique combination of properties that make it the most efficient material for use in fluorescent and High Intensity Discharge (HID) lamps. The basic operating principles of fluorescent lamps depend on production of ultraviolet (UV) light and mercury is the most efficient product of the required UV. Safeguarding used lamps from breaking will minimize releases of mercury into the environment. Normal handling is a very low risk activity.

Mercury released from broken lamps and mercury contaminated materials vaporize at room temperature. Mercury vapor is extremely toxic. Mercury is the only heavy metal that is liquid at room temperature. Because of this and other useful properties its usage is commonplace. It can be more harmful to inhale the vapor from a bead of mercury than to ingest the same bead. At room temperature mercury vaporizes readily into an invisible, odorless, and tasteless and potentially harmful element.

Ambient mercury levels in the breathing zone can be controlled if personnel are aware of and trained in mercury management. Be conscious of the hazard of

unseen mercury contamination in cracks, corners and untreated storage containers.

4.0 Handling Procedures

4.1 PCB Ballasts

Procedure for removal of 'non leaking' PCB capacitors from fluorescent lamp ballasts. Employee shall wear the following safety equipment at a minimum.

- Gloves made of chemical resistant neoprene coated, butyl rubber, or leather.
- Safety glasses with side shields or full face shield

Step 1

Separate ballast by type (PCB, non PCB) and visually check for leakers, and place into drums.

A typical pre-1979 PCB-containing fluorescent light ballast (FLB)

A typical Non-PCB containing fluorescent light ballast. The ballast has a "No PCBs" marking on the top of the ballast and the text "electronic ballast". Only magnetic fluorescent light ballasts contained PCBs.

NOTE: Leaking PCB ballasts must be double bagged and placed in a drum containing at least 3 inches of vermiculite.

Step 2:

Properly label drums PCB or Non PCB. See sample labels below. Secure drum lid.

All protective equipment that comes into contact with any material leaking from a capacitor will be placed in proper containers for disposal. Employees shall wash hands with soap and water when beginning a work shift, before a break, and upon completion of the work shift. No tobacco materials, food, or beverages are permitted while working with lamp ballasts.

It is the employee's responsibility to ensure that these handling and disposal procedures are fully carried out. The proper use of the prescribed safety

equipment will protect the employee from the potential dangers of contamination from PCBs.

All employees who handle PCB ballast shall wash hands with soap and water when beginning a work shift, before a break, and upon completion of the work shift. No tobacco materials, food, or beverages are permitted while working with ballasts.

Step 3:

Storage time is maximum 30 days from the first date of accumulation. Longer periods may subject you to permitting and other compliance requirements. You are encouraged to contact your state agency or regional federal EPA office for any pre-notification, storage or other requirements that may apply. Then, schedule removal (and recycling) by contacting Ken Paisley at 716-284-0431.

PCB Drum Label (Example)

4.2 Mercury Fluorescent Lamps

Procedure for handling unbroken fluorescent lamps for packaging. Employee should wear the following safety equipment.

- Gloves made of chemical resistant neoprene coated, butyl rubber, or leather.
- Safety glasses with side shields or full face shield

Step 1:

Place used lamps into new or used lamp boxes (the original egg crate material does not have to be placed back into the boxes) and tape the ends to secure the box, but do not make it hermetically sealed (air tight). There are other suitable containers available commercially or from recyclers.

- Broken or crushed lamps should be packaged in an approved container (e.g. 55 gallon drum) or bagged into smaller containers.
- Badly damaged boxes, wet boxes, etc. may not be accepted for transport.
- Boxes shall be kept in a secure, dry area.

- For large quantities, cross stack and palletize lamp boxes to maximum of six feet. Secure boxes to pallet with shrink wrap or stretch film.
- All pallets need to be labeled as **Used Mercury Lamps** or **Universal Waste Mercury Lamps** (see sample label below).

Step 2:

All employees who handle Universal Wastes shall wash hands with soap and water when beginning a work shift, before a break, and upon completion of the work shift. No tobacco materials, food, or beverages are permitted while working with mercury lamps.

Step 3:

It is the employee's responsibility to ensure that these handling and disposal procedures are fully carried out. The proper use of the prescribed safety equipment will protect the employee from the potential dangers of contamination from mercury.

Step 4:

Storage time is maximum 1 year from the first date of accumulation. Schedule removal (and recycling) by contacting Ken Paisley 716-284-0431.

4.3 Emergency Procedures – Lamp Breakage

Purpose

To ensure that accidental breakage is cleaned up without spreading the mercury and with minimum exposure to employees.

Background

Lamps are fragile and they can easily break. The regulations distinguish between accidental breakage that occurs during normal transport and intentional breakage or crushing. While there is no specific amount of breakage that is considered accidental, less than 5% is typical. Anyone who chooses to recycle lamps under the Universal Waste Rule should take standard precautions to minimize breakage, such as using the boxes from new lamps to store old ones in. More specific guidance on this is available from recyclers.

Caution

EPA provides the following breakage advisory for THE HANDLING OF SMALL NUMBERS OF BROKEN FLUORESCENT LAMPS:

1. If a lamp breaks, close off the room to other parts of the building.
2. Open a window to disperse any vapor that may escape, and leave the room for at least 15 minutes.
3. Carefully scoop up the fragments with a stiff paper or a broom and dustpan (do not use your hands), do not generate dust and wipe the area with a disposable paper towel to remove all glass fragments.

4. Do not use a vacuum, as this disperses the mercury over a wider area. There are commercial grade vacuums available that contain the correct filtration system to safely vacuum up mercury containing material. These vacuums are permitted for this application as long as they are utilized within the manufacturer's recommendations.
5. All fragments (unless vacuumed) should be placed in a sealed plastic bag and properly disposed of. Under the Universal Waste Rule, a hazardous lamp that is broken must be cleaned up and placed in a container. The container must be closed, structurally sound, compatible with lamps, and lacking any evidence of spillage.
6. For larger quantities of lamps broken at the same time (for example, a box of lamps falling from a lift truck) the entire box shall be wrapped in plastic and placed inside an overpack (larger box or sealable container) container.

Waste Container Labels (example)

or

Storage Area Label (Example)

4.0 Training

All site workers who have the potential for exposure to PCBs will participate in the following training programs:

- 40 hour OSHA HAZWOPER and, if necessary, an 8 hour refresher.
- Site specific – this would include a review of the Site Specific Safety and Health Plan, work practices, activity hazard analyses, results of air monitoring program, and concerns including safety deficiencies and accidents.
- Daily safety meetings – all site personnel are required to attend and items to be discussed would include review of the day's activities and their associated hazards and controls, safety and health concerns, and action items.
- Hazard communication – as part of this OSHA required training, emphasis will be placed on the health effects of PCBs, exposure potential, and control programs.

5.0 Medical Surveillance

All workers who have the potential to be exposed to PCBs will participate in Sevenson's medical surveillance program.

The purposes of this program are to determine:

- The capability of the worker to perform the work. This will be accomplished by the physical examination by the physician and the review of the medical and work histories.
- The ability to wear respiratory protection. The pulmonary function test and X-ray will assist the physician in making this determination.
- Whether there are any prior physical and/or health conditions which may be advise affected by the work and/or exposure to the contaminants. The physician will primarily review the results of the liver enzyme blood tests and pre work serum PCB level.
- Whether any physical or biological systems have been affected by the work. As part of the medical surveillance program, pre and past work serum PCBs will be determined.

6.0 Personal Protective Equipment

The proper wearing of personal protective equipment is an integral component of the worker protection program. An evaluation of the potential for PCBs exposure and the proper ensemble of personal protective equipment has been made. The initial level of protection for workers exposed to PCBs is Level C which includes the wearing of protective clothing to protect against contact and respirators to prevent the inhalation hazard. The personal protective equipment will be continuously evaluated and may be modified depending upon actual work conditions.

7.0 Decontamination Procedures

7.1 PCBs

Building and fixture surfaces may need to be decontaminated upon discovery of a leaking ballast. The worker shall take the following steps to decontaminated affected building or fixture surfaces.

1. Isolate the affected area
2. Don Tyvek or other similar protective coverall
3. Remove the lamp cover or baffle of the light fixture (if present) to expose the fluorescent lamp.
4. If the fluorescent tube is not contaminated with PCBs, it can be reused or recycled as Universal Waste. If the fluorescent tube is contaminated with PCBs, carefully remove it and place it in an approved Department of Transportation (DOT) container.
5. Visually inspect the exposed section of the light fixture for potential PCB leakage or residue from a fire or smoking condition. If the light fixture shows signs of PCB leakage, clean up according to step 2 of Cleanup and Disposal then return to this step.
6. Remove the ballast enclosure cover (tray) within the light fixture to expose the ballast. Inspect the ballast for NO PCBs sticker. If no sticker or marking is present it must be treated as a PCB containing ballast.
7. If leaking or staining is identified on the ballast or light fixture, carefully remove them and place the items directly in an approved DOT container.
8. Clean up spills from PCB-contaminated light fixtures and leaking FLBs outside the light fixture (e.g., floors, desks, walls, etc.).
9. Place PCB remediation waste into a plastic bag and place inside drum with other PCB contaminated building material.
10. Remove PPE and place inside PCB contaminated drum.
11. Wash hands and face upon leaving the work area.

8.0 Disposal

Segregated or non-segregated PCB-ballasts and lamps shall be deposed in accordance with section 02120.

Appendix C

Underground Storage Tank Removal and Closure Plan

To be submitted under separate cover and will be incorporated upon approval

Dewatering Work Plan

Syncon Resins Superfund Site
South Kearny, New Jersey
Contract No. W912DQ-15-D-3002, TO 0002

Submitted by:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

March 2017
Revision 0

DEWATERING PLAN

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Figures

Figure 3-1 – Influent Pipe Run

Equipment Literature

Tsurumi Pump LB-480-62

Godwin CD103M Dri-Prime Pump

DEWATERING PLAN

1.0 Dewatering Plan Objectives

The purpose of the Dewatering Plan is to present the methods and procedures for handling, storage, treatment, and disposal of excavation derived water. Sevenson will be responsible for completing the work in accordance with Federal, State and local regulatory requirements.

2.0 Surface Water Control

Sevenson will install berms, swales, and other measures necessary to prevent surface water from entering and exiting excavations. Surface water will be directed away from excavation and construction sites so as to prevent erosion and undermining of existing foundations/slabs and to prevent surface water run on from becoming contaminated by accumulating in excavations. All diverted water will be directed to existing drain ways and storm sewer systems so as to not flood adjacent structures or properties. Backfill surfaces will be protected to prevent erosion and sloughing. Other measures include covering the excavated area with polyethylene so that clean water is diverted from the excavation will be utilized.

3.0 Water Handling

Pumping of water from excavation will be conducted in such a manner as to preserve the undisturbed bearing capacity of the sub-grade soils at the excavation. Well or sump installations will be constructed with sand/stone filters to prevent drawing of finer grained soil from the surrounding ground. Pumping will be performed from these sumps/wells.

All excavations are shallow, except for Area I, and a submersible pump is efficient in collecting water from the excavation. A submersible pump with a discharge hose/quick disconnect camlock fittings will be utilized to pump water from the shallow excavations to Area I (Tsurumi Pump LB-480-62 or equivalent).

To dewater the deeper excavation in Area I, Sevenson will establish as sump as close to the immediate excavation as possible. The sump will consist of a perforated plastic casing and will be set in location with stone around the outside of it. The stone will enable water to percolate into the sump and be removed from the excavation area. A 4" dry prime type pump, capable of at least 200 gpm will be used in the dewatering operation (Godwin CD103M Dri-Prime Pump or equivalent). Excavation water will be conveyed from the excavation area with flexible discharge and suction hose, to a 3" HDPE header that will convey water to the construction water treatment plant.

DEWATERING PLAN

4.0 Open Excavation

The Contractor shall minimize area of open excavation so as to limit the volume of dewatering required for the project. Since the amount of dewatering due to precipitation has a direct relationship with the size of the open excavation area, the Contractor will determine with the Contracting Officer by utilizing backfill and covering the excavated area with polyethylene so that clean water is diverted from the excavation. Control measures shall be taken by the time the excavation reaches the ground water level in order to maintain the integrity of the in site material. While the excavation is open, the ground water level shall be maintained below the bottom of the excavation at all times.

5.0 Water Treatment

Details of water treatment are covered under the Water Treatment Plan and was provided under separate cover.

DEWATERING PLAN

Figure 1

Influent Pipe Location

Coordinate Number	Northing	Easting
1	693939.40	598568.60
2	693930.76	598611.20
3	693792.89	598645.34
4	693797.92	598620.50
5	693880.03	598576.68
6	694168.69	598591.25
7	694179.35	598634.37
8	694088.13	598664.97
9	694008.08	598643.33
10	693977.29	598600.44
11	694044.80	598596.94
12	694115.75	598609.01
13	694202.70	598510.98
14	694196.68	598540.37
15	694167.29	598534.35
16	694173.31	598504.96
17	694268.24	598652.59

Coordinate Number	Northing	Easting
18	694229.39	598844.17
19	694150.09	598828.09
20	694016.97	598975.05
21	694011.80	598974.00
22	694001.98	598854.81
23	694040.49	598664.92
24	694089.87	598674.94
25	694249.34	598621.39
26	694207.18	599012.62
27	694169.26	599199.59
28	694133.32	599205.00
29	694019.69	599187.22
30	693977.54	599233.92
31	693964.41	599298.65
32	693857.49	599269.93
33	693768.48	599277.68
34	693664.44	599256.13

Coordinate Number	Northing	Easting
35	693692.38	599118.35
36	693702.23	599120.40
37	693726.67	599002.80
38	693783.46	599014.40
39	693859.27	598946.78
40	693909.06	598956.98
41	693915.97	598922.89
42	693936.46	598927.04
43	693948.89	598866.37
44	693928.29	598862.15
45	693961.43	598698.74
46	693938.30	598694.05
47	693942.73	598672.25
48	693844.16	598652.96
49	693795.18	598672.03
50	693799.04	598653.44
51	693973.09	598610.45

Coordinate Number	Northing	Easting
52	694009.58	598663.62
53	693976.00	598738.00
54	693966.81	598857.75
55	693945.97	598960.65
56	694078.18	599027.82
57	694156.25	599002.29
58	694117.22	599303.86
59	694109.74	599340.74
60	694039.02	599326.40
61	694046.21	599290.91
62	694014.40	599656.35
63	694010.92	599673.52
64	693964.00	599664.00
65	693961.16	599678.00
66	693912.99	599668.23
67	693917.43	599646.32
68	693909.11	599644.63

Coordinate Number	Northing	Easting
69	693928.25	599550.28
70	693943.53	599553.37
71	693926.27	599638.47
72	693758.26	599644.35
73	693754.11	599664.82
74	693724.54	599659.70
75	693728.86	599638.37
76	693942.57	598711.24
77	693909.44	598874.63
78	693929.92	598878.82
79	693923.96	598908.18
80	693903.47	598904.03
81	693896.59	598938.09
82	693848.83	598928.31
83	693847.24	598936.08
84	693778.80	598997.12
85	693729.88	598987.13

Coordinate Number	Northing	Easting
86	693791.32	598690.70
87	693845.64	598669.55
88	693923.84	598684.86
89	693919.44	598706.55
T1	693990.46	599153.27
T2	693984.50	599182.67
T3	693955.10	599176.71
T4	693961.06	599147.31
T5	693931.53	598960.46
T6	693925.57	598989.86
T7	693896.17	598983.90
T8	693902.13	598954.50
T9	693932.23	598762.23
T10	693922.92	598808.23
T11	693911.49	598864.59
T12	693907.73	598757.26
T13	693898.40	598803.26

Coordinate Number	Northing	Easting
T14	693897.30	598808.71
T15	693889.45	598807.12
T16	693879.13	598858.03
T17	693864.24	598931.46
T18	693886.47	598821.82
T19	693877.53	598865.92
T20	693884.45	598752.54
T21	693871.04	598818.69
T22	693862.10	598862.80

NOTES:

1. A GEOPHYSICAL SURVEY AND UTILITY MARKOUTS SHALL BE COMPLETED PRIOR TO EXCAVATION. THE CONTRACTOR SHALL VERIFY LOCATIONS OF TWO ABANDONED SAND FILLED UNDERGROUND STORAGE TANKS USING TEST PITS PRIOR TO THEIR REMOVAL. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL UNDERGROUND STORAGE TANKS AND ASSOCIATED PIPING IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS.

2. THE CONTRACTOR SHALL PROTECT GROUNDWATER COLLECTION SUMPS AND EXTRACTION WELLS AND ASSOCIATED CONCRETE PADS IDENTIFIED ON THE CONTRACT DRAWINGS FROM DAMAGE DURING ALL CONSTRUCTION ACTIVITIES. UNDERGROUND ELECTRICAL CONDUITS AND WATER LINES SHALL BE PROTECTED DURING EXCAVATION AND BACKFILL OPERATIONS, EXCEPT AS INDICATED ON THIS CONTRACT DRAWING.

3. ALL SURFACE GRAVEL SHALL BE SEGREGATED, WASHED, AND STOCKPILED DURING EXCAVATION OPERATIONS FOR REUSE DURING SITE RESTORATION. EXISTING GRAVEL COVER THICKNESS RANGES FROM APPROXIMATELY 0.5–3 FEET. EXCAVATION AREA I SHALL INITIALLY BE BACKFILLED TO A THICKNESS OF 2.5 FEET USING THE STOCKPILED GRAVEL. SUBSEQUENTLY, THE EXCAVATION SHALL BE BACKFILLED WITH COMMON BACKFILL.

4. THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE DEWATERING MEASURES AND CONSTRUCT A TEMPORARY WATER TREATMENT SYSTEM PRIOR TO EXCAVATION OF AREA I IN ACCORDANCE WITH SPECIFICATION SECTIONS 02111 AND 13300, AND THE CONTRACTOR'S APPROVED PLAN. TREATED WATER SHALL BE DISCHARGED TO THE PASSAIC RIVER AND SHALL MEET THE NJPDES DISCHARGE TO SURFACE WATER EFFLUENT CRITERIA. PRIOR TO INSTALLATION OF THE TEMPORARY WATER TREATMENT SYSTEM, IF GROUNDWATER IS ENCOUNTERED DURING EXCAVATION, IT SHALL BE EITHER CONTAINERIZED, TREATED AT THE EXISTING ONSITE TREATMENT SYSTEM, OR DISCHARGED TO AREA I, AS DIRECTED BY THE CONTRACTING OFFICER.

5. THE STOCKPILE AREA SHALL BE CONSTRUCTED IN AREA E IN ACCORDANCE WITH DETAIL B ON SHEET CD–1, OR THE CONTRACTOR'S APPROVED PLAN, AND SHALL BE MADE FULLY OPERATIONAL PRIOR TO EXCAVATION OF AREA I.

6. PRIOR TO THE EXCAVATION ALONG THE WEST SLOPE OF AREA I, A HAND–HOLE SHALL BE INSTALLED FOR DISCONNECTION OF ELECTRICAL AND CONTROL SERVICE IN ACCORDANCE WITH SHEET E–4. THE EXTRACTION WELL PUMP 124C SHALL BE LOCKED OUT AND TAGGED OUT, AND THE EXISTING GROUNDWATER TREATMENT SYSTEM SHALL BE SHUT DOWN TEMPORARILY DURING CONSTRUCTION.

7. PRIOR TO THE EXCAVATION ALONG THE WEST SLOPE OF AREA I, A TEST PIT SHALL BE INSTALLED AT THE EXCAVATION LIMIT OF AREA I TO CUT/CAP THE EXISTING INFLUENT PIPE. EXTRACTION WELL C AND THE ASSOCIATED VALVE BOX SHALL BE DISASSEMBLED AND REMOVED IN ACCORDANCE WITH THE INSTRUCTIONS ON SHEET CD–2; THE ASSOCIATED CONTROL PANEL SHALL BE DISCONNECTED AND REMOVED IN ACCORDANCE WITH THE INSTRUCTIONS ON SHEET E–4. WELL PUMPS, VALVES, LEVEL TRANSMITTERS, GAUGES, AND EXTRACTION WELL C AND ITS ASSOCIATED VALVE BOX AND CONTROL PANEL SHALL BE KEPT INTACT FOR REINSTALLATION AFTER COMPLETION OF EXCAVATION ACTIVITIES. THE GROUNDWATER COLLECTION TRENCH AND WATER AND ELECTRICAL CONDUITS WITHIN THE SLOPED EXCAVATION AREA SHALL BE REMOVED AS NECESSARY CONCURRENT WITH EXCAVATION OPERATIONS.

8. THE CONTRACTOR SHALL PERFORM REMEDIAL EXCAVATION TO THE DEPTH SHOWN ON THIS CONTRACT DRAWING IN ACCORDANCE WITH SPECIFICATION SECTION 02111. THE CONTRACTOR SHALL FOLLOW THE RECOMMENDED CONSTRUCTION SEQUENCE SHOWN ON SHEET G–1 OR AS APPROVED BY THE CONTRACTING OFFICER.

9. MONITORING WELLS AND PIEZOMETERS SHALL BE ABANDONED DURING THE REMEDIAL EXCAVATION AS INDICATED ON THE WELL ABANDONMENT DETAILS TABLE PROVIDED ON SHEET C–1 IN ACCORDANCE WITH SPECIFICATION SECTION 02525, EXCEPT MW–7, MW–12, MW–17 AND MW–18. MONITORING WELLS MW–7, MW–12, MW–17 AND MW–18 SHALL BE PROTECTED THROUGHOUT THE REMEDIAL CONSTRUCTION.

10. THE CONTRACTOR SHALL INSTALL A SLOPE AS SHOWN ON SHEET S–1 TO MAINTAIN THE STRUCTURAL INTEGRITY OF THE SLURRY WALL WHEN PERFORMING SHALLOW EXCAVATION (UP TO TWO FEET BELOW GRAVEL) IN THE IMMEDIATE VICINITY OF THE SLURRY WALL. IF SECONDARY EXCAVATION OF THE SLOPED SOIL ABUTTING THE SLURRY WALL IS REQUIRED, THE CONTRACTOR SHALL PERFORM EXCAVATION ALONG THE SLURRY WALL USING A TRENCH BOX OR SLIDE RAIL SYSTEM, AS APPROVED BY THE CONTRACTING OFFICER. NO FURTHER SECONDARY EXCAVATION SHALL BE PERFORMED UPON REACHING THE SLURRY WALL.

11. THE CONTRACTOR SHALL CONTINUALLY INSPECT, EVALUATE, AND MAINTAIN THE EXCAVATION SLOPE TO PREVENT CRACKS, BULGES, SLOUGHS, OR FAILURES. A MINIMUM EXCAVATION SLOPE RATIO OF 2H:1V SHALL BE MAINTAINED IN ACCORDANCE WITH NJDEP REQUIREMENTS FOR EXCAVATION IN FLOOD HAZARD AREAS. IF THE EXCAVATION IS TO REMAIN OPEN FOR AN EXTENDED PERIOD OF TIME, THE CONTRACTOR SHALL STABILIZE THE SLOPE BY BACKFILLING TO 3H:1V OR FLATTER.

12. SHEET PILING SHALL BE INSTALLED AND LEFT IN PLACE ALONG THE SLURRY WALL IN EXCAVATION AREA I IN ACCORDANCE WITH SPECIFICATION SECTIONS 02111 AND 02250 AND SHEET S–1.

13. FOLLOWING EXCAVATION, THE CONTRACTOR SHALL INSPECT EXCAVATION BOTTOMS AND SIDEWALLS FOR CONTAMINATION USING VISUAL AND OLFACTORY OBSERVATIONS, AND FIELD SCREENING WITH A PHOTOIONIZATION DETECTOR. THE CONTRACTOR SHALL PERFORM EXCAVATION OF CONTAMINATED MATERIALS AS DIRECTED BY THE CONTRACTING OFFICER BASED ON THE INSPECTION OBSERVATIONS. SUBSEQUENTLY, THE CONTRACTOR SHALL COLLECT POST–EXCAVATION SAMPLES IN ACCORDANCE WITH SPECIFICATION SECTION 02111 AND SHEET C–4.

14. BACKFILL OPERATIONS SHALL TAKE PLACE SIMULTANEOUSLY WITH EXCAVATION ACTIVITIES TO LIMIT THE OPEN EXCAVATION AREA IN AREA I AS INDICATED ON SHEET C–6.

15. SECONDARY EXCAVATION SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 02111 AND AS DIRECTED BY THE CONTRACTING OFFICER.

16. TO THE EXTENT POSSIBLE, THE CONTRACTOR SHALL PERFORM DIRECT LOADING OF EXCAVATED SOIL FOR OFF–SITE TRANSPORTATION AND DISPOSAL FROM ALL AREAS, EXCEPT AREA I. TSCA WASTE FROM AREAS E, H AND I SHALL BE SEGREGATED TO THE DEPTHS INDICATED ON THIS PLAN, CHARACTERIZED IF NECESSARY, AND SENT TO AN APPROVED TSCA PERMITTED LANDFILL FOR TREATMENT AND/OR DISPOSAL. BASED ON THE EXISTING DATA, SOME OF THE CONTAMINATED SOIL FROM AREA I MAY BE CLASSIFIED AS HAZARDOUS WASTE (CHARACTERISTIC WASTE). CONTAMINATED SOIL FROM AREA I SHALL BE STOCKPILED AND SAMPLED FOR WASTE CHARACTERIZATION. BASED ON THE WASTE CHARACTERIZATION RESULTS, CONTAMINATED SOIL FROM AREA I SHALL BE SENT TO AN APPROVED SUBTITLE D LANDFILL FOR DISPOSAL OR RCRA HAZARDOUS PERMITTED LANDFILL FOR TREATMENT AND/OR DISPOSAL. ALL WASTE CHARACTERIZATION SAMPLING SHALL BE PERFORMED IN ACCORDANCE WITH SPECIFICATION SECTION 01450 AND TRANSPORTATION AND DISPOSAL IN ACCORDANCE WITH SPECIFICATION SECTION 02120, AND CONTRACTOR'S APPROVED PLANS.

17. SURFACE WATER SHALL BE DIRECTED AWAY FROM THE EXCAVATION AND CONSTRUCTION AREAS TO PREVENT EROSION, TO PREVENT SURFACE WATER RUNOFF FROM BECOMING CONTAMINATED BY ACCUMULATING IN EXCAVATIONS, AND TO PREVENT ADDITIONAL PUMPING REQUIRED TO REMOVE THE WATER FROM THE EXCAVATIONS. DURING EXCAVATION OF AREAS A–D, RUNOFF THAT ENTERS EXCAVATIONS AND ACCUMULATED WATER FROM PRECIPITATION EVENTS SHALL BE CONTAINERIZED, TREATED AT THE EXISTING ONSITE TREATMENT SYSTEM, OR DISCHARGED TO AREA I, AS DIRECTED BY THE CONTRACTING OFFICER. ONCE INSTALLED, THE TEMPORARY WATER TREATMENT SYSTEM SHALL BE USED TO TREAT RUNOFF AND ACCUMULATED WATER FROM PRECIPITATION EVENTS.

18. EXCAVATION CUT LINE WITHIN THE BUILDING FOOTPRINT WILL BE REVISED BASED ON PRE–EXCAVATION SAMPLE RESULTS.

LEGEND

- (A) EXCAVATION AREA
- LIMITS OF TSCA WASTE
- EXCAVATION SLOPE 2H:1V

1" = 40'

US Army Corps of Engineers Kansas City District

KERSHU TAN

N.J. PROFESSIONAL ENGINEER

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS KANSAS CITY, MISSOURI

CDM Federal Programs Corporation

File name: CSTPL003.dwg

Designed by: A. BOURGEOIS | Dwn by: G. RODRIGUEZ | Ckd by: M. RAHMANI | Reviewed by: T. MATHEW | Submitted by: K. TAN

SYNCON RESINS SUPERFUND SITE
SOUTH KEARNY, HUDSON COUNTY, NEW JERSEY
REMEDIAL DESIGN

EXCAVATION PLAN

SHEET NO.
C-3

100% DESIGN – REVISION 2

DEWATERING PLAN

Equipment Literature

Tsurumi Pump LB-480-62

Godwin CD103M Dri-Prime Pump

TSURUMI PUMP

LB - SERIES
SEMI-VORTEX - DEWATERING PUMP

SPECIFICATIONS

FEATURES

1. Semi-vortex urethane rubber or high chrome cast iron impeller suspends solids and allows for pumping of sand and stringy Material.
2. Highly efficient, continuous duty Air-filled, copper wound motor with class E,B insulation minimizes the cost of operation.
3. Built in thermal protection prevents motor failure due to overloading, accidental run-dry and single phasing in three phase units.
4. Double inside mechanical seals with silicon carbide faces running in an oil filled chamber provide for one the most durable seal designs available.
5. Double shielded, permanently lubricated, high temperature C3 ball bearings rated for a provide for extended operational life.
6. Model LB-480A & LB-800A Automatic Submersible pump performs like the non-automatic version in every aspect of construction site usage requiring a tough and durable pump
7. Slim design allows pumps to fit Into 8" pipes. (Manual type only)

APPLICATIONS

1. Residential, commercial, industrial wastewater and site drainage.
2. Decorative waterfalls and fountains.
3. Raw water supply from lakes or rivers.
4. Sediment removal from small sumps or basins.

Intertek

OIL LIFTER EQUIPPED

SPECIFICATIONS

Discharge Size	2 - 3" NPT (50 - 80 mm)
Horsepower Range	1/2 - 2HP. (0.40 - 1.5kW)
Performance Range Capacity	15.9 - 111.0 GPM. (0.06 - 0.42 m^3/min)
Head	13.1 Ft. - 68.9 Ft. (4.0 - 18.9 m)
Maximum water temperature	104^0 F. (40^0 C.)
Materials of Construction	
Casing	Butadiene Rubber + Natural Rubber + Steel [LB(T)-1500]
Impeller	Urethane Rubber , High Chrome Cast Iron [LB(T)-1500]
Shaft	403 Stainless Steel
Motor Frame	Aluminum alloy
Fasteners	304 Stainless Steel
Mechanical Seal	Silicon Carbide
Elastomers	NBR (Nitrile Butadiene Rubber)
Impeller Type	Semi-vortex, solids handling.
Solids Handling Capability	0.236" (6.0mm)
Bearings	Prelubricated, Double Shielded
Motor Nomenclature	
Type, Speed, Hz.	Air Filled, 3600 RPM, 60 Hz.
Voltage, Phase	115 / 230V., 1 Phase 230 / 460 / 575V., 3 Phase
Insulation	Class E, B
Accessories	Submersible Power Cable 32 - 50' (10 - 15m) — Length as Required,
Operational Mode	Manual , Automatic(LB-480A / 800A) — TS-301 Float Switch

STANDARD

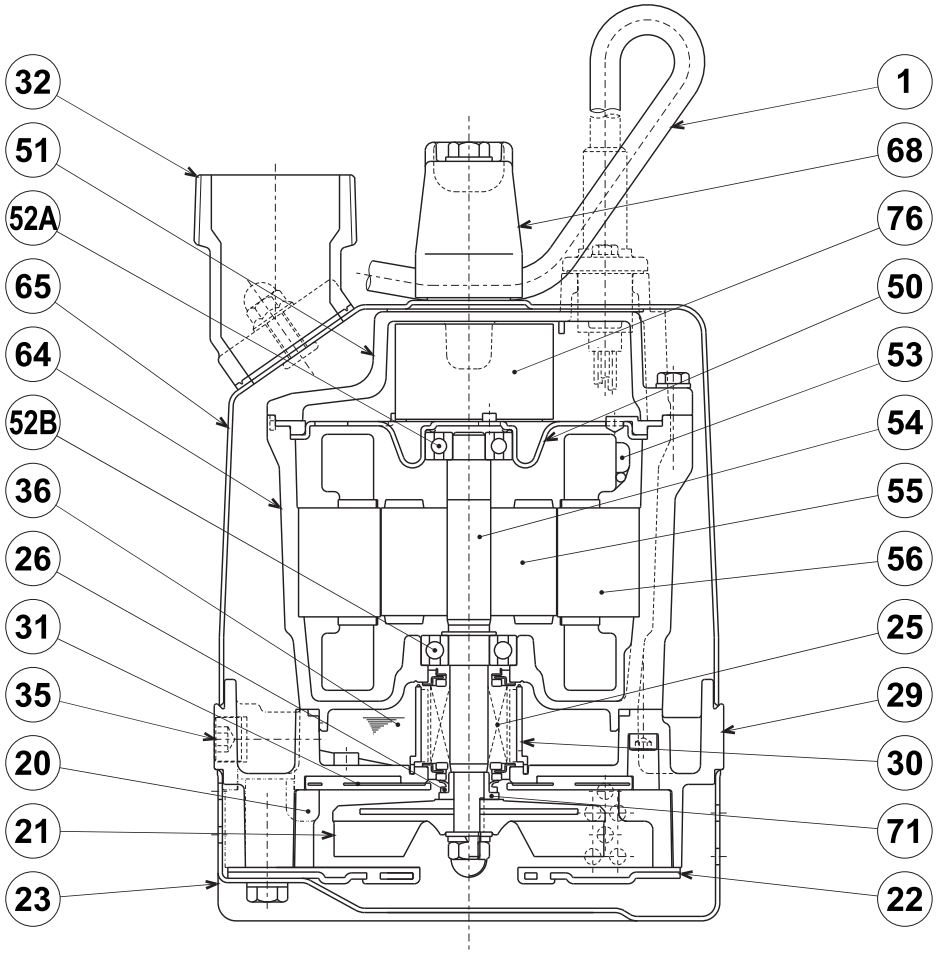
OPTIONS

TSURUMI PUMP

LB - SERIES
SEMI-VORTEX - DEWATERING PUMP

SECTIONAL VIEW

LB-480-62



ITEM#	DESCRIPTION	MAIN MATERIAL / NOTE	RELATED ASTM, AISI CODE	RELATED EN CODE	Q'TY
1	Power Cable	PVC Sheath AWG16/3-32ft			1
20	Pump Casing	Ethylene Propylene Rubber			1
21	Impeller	Urethane Rubber			1
22	Suction Cover	Urethane Rubber + Steel (Cold Rolled)	(A109/A1008)	(EN 10130)	1
23	Suction Strainer	Steel (Cold Rolled)	A109/A1008	EN 10130	1
25	Mechanical Seal	Silicon Carbide / W-14VL			1
26	V-Ring	Nitrile Butadiene Rubber			1
29	Oil Casing	Aluminum Alloy Die Casting	B85 383.0	EN 1706 AC-46100	1
30	Oil Lifter	PBT Resin			1
31	Wearing Plate	Urethane Rubber			1
32	Discharge Connection	Aluminum Alloy Die Casting / NPT 2"	B85 383.0	EN 1706 AC-46100	1
35	Oil Plug	Stainless Steel	S 30400	1.4301	1
36	Lubricant	Turbine Oil ISO VG32 or SAE10W-20			
50	Motor Bracket	Steel (Electro-Galvanized)	A591	EN 10152	1
51	Motor Head Cover	Aluminum Alloy Die Casting	B85 383.0	EN 1706 AC-46100	1
52A	Upper Bearing	#6201ZZC3			1
52B	Lower Bearing	#6202ZZC3			1
53	Motor Protector				1
54	Shaft	Stainless Steel	S 40300	1.4000	1
55	Rotor				1
56	Stator				1
64	Motor Housing	Aluminum Alloy Die Casting	B85 383.0	EN 1706 AC-46100	1
65	Outer Cover	Steel (Cold Rolled)	A109/A1008	EN 10130	1
68	Handle	ABS Resin			1
71	Shaft Sleeve	Stainless Steel	S 30400	1.4301	1
76	Capacitor				1

TSURUMI PUMP

LB - SERIES
SEMI-VORTEX - DEWATERING PUMP

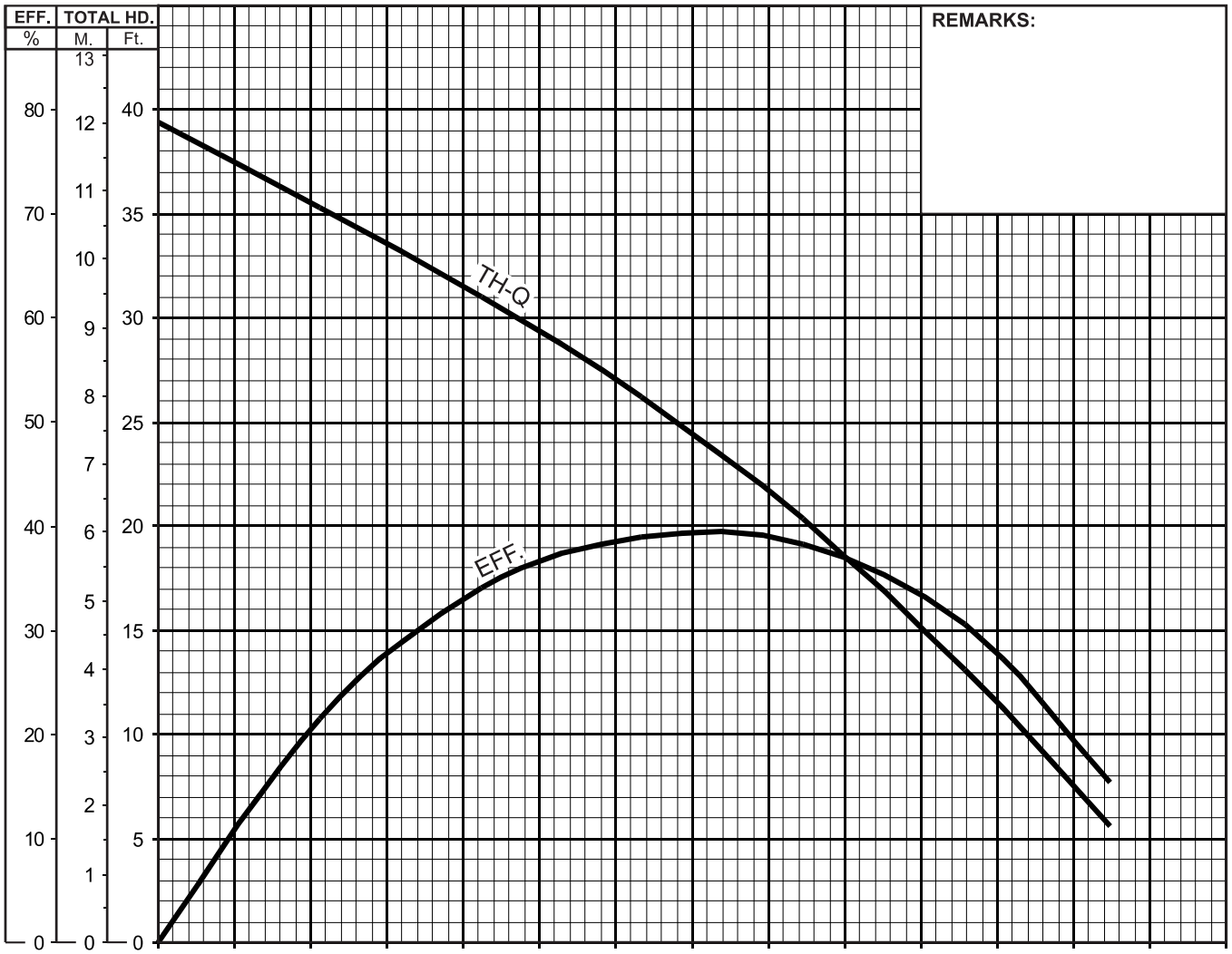
PERFORMANCE CURVE

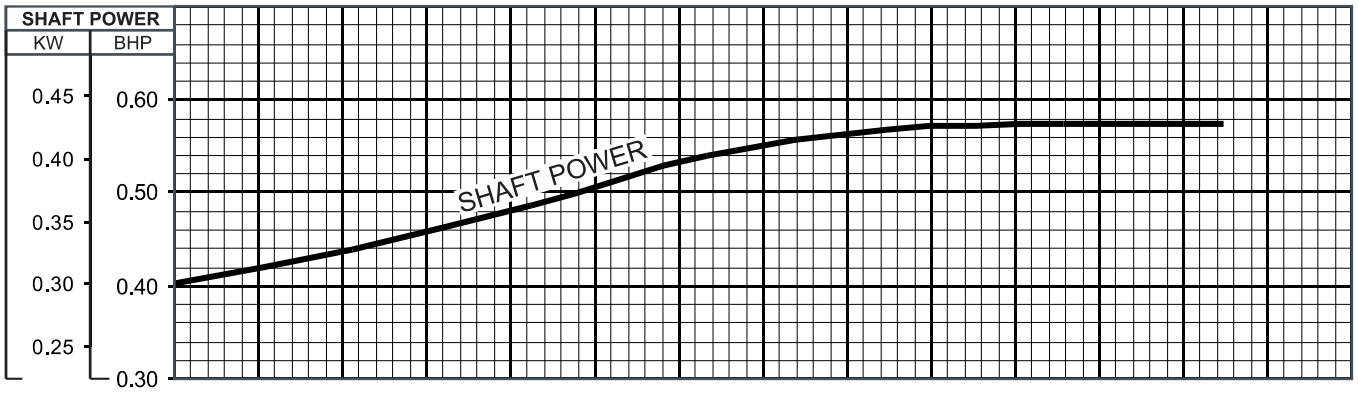
MODEL	BORE	HP	KW	RPM	SOLIDS DIA	LIQUID	SG.	VISCOSITY	TEMP.
LB(Z)-480(A)-62	2"/50mm	0.64	0.48	3255	0.236"/6mm	Water	1.0	1.123 cSt.	60°F

PUMP TYPE	PHASE	VOLTAGE	AMPERAGE	HZ	STARTING METHOD	INS. CLASS
Semi-Vortex - Dewatering Pump	Single	110/115/120, 230	6.1 / 5.9 / 5.7 , 3.0	60	Capacitor Start	E

CURVE No.	DATE	PHASE	VOLTAGE	AMPERAGE	HZ	STARTING METHOD	INS. CLASS
-	-	-	-	-	-	-	-

REMARKS:





TSURUMI PUMP

17200238/B-10121-1

LB Submersible Portable Dewatering Pump

●LB-250/480 ●LBT-250/480
●LB-250A/480A ●LBZ-480
●LB-800 ●LBT-800
●LB-800A ●LBZ-800

OPERATION MANUAL

INTRODUCTION

Thank you for selecting the Tsurumi LB Submersible General Dewatering Portable Pump for your application.

This equipment should not be used for applications other than those listed in this manual. Failure to observe this precaution may lead to a malfunction or an accident. In the event of a malfunction or an accident, the manufacturer will not assume any liability. After reading this Operation Manual, keep it in a location that is easily accessible, so that it can be referred to whenever information is needed while operating the equipment.

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TSURUMI MANUFACTURING CO., LTD.

1 BE SURE TO READ FOR YOUR SAFETY

Be sure to thoroughly read and understand the SAFETY PRECAUTIONS given in this section before using the equipment in order to operate the equipment correctly.
The precautionary measures described in this section are intended to prevent danger or damage to you or to others. The contents of this manual that could possibly be performed improperly are classified into two categories: ⚠**WARNING**, and ⚠**CAUTION**. The categories indicate the extent of possible damage or the urgency of the precaution. Note however, that what is included under ⚠**CAUTION** may at times lead to a more serious problem. In either case, the categories pertain to safety-related items, and as such, must be observed carefully.

- ⚠**WARNING** : Operating the equipment improperly by failing to observe this precaution may possibly lead to death or injury to humans.
- ⚠**CAUTION** : Operating the equipment improperly by failing to observe this precaution may possibly cause injury to humans and other physical damage.
- **NOTE** : Gives information that does not fall in the WARNING or CAUTION categories.
- Explanation of Symbols:

: The △ mark indicates a WARNING or CAUTION item. The symbol inside the mark describes the precaution in more detail ("electrical shock", in the case of the example on the left).

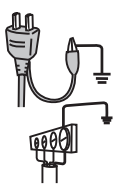
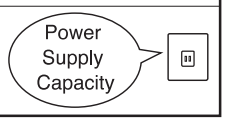
: The ⃠ mark indicates a prohibited action. The symbol inside the mark, or a notation in the vicinity of the mark describes the precaution in more detail ("disassembly prohibited", in the case of the example on the left).

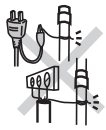
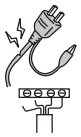
: The ● mark indicates an action that must be taken, or instructs how to perform a task. The symbol inside the mark describes the precaution in more detail ("provide ground work", in the case of the example on the left).

PRECAUTIONS TO THE PRODUCT SPECIFICATIONS

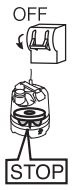
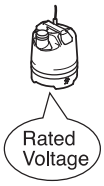
⚠ CAUTION	
	●Do not operate the product under any conditions other than those for which it is specified. **Failure to observe the precaution can lead to electrical leakage, electrical shock, fire, water overflow or other problems.**

PRECAUTIONS DURING TRANSPORT AND INSTALLTION

⚠ WARNING			
	●When transporting the product, pay close attention to its center of gravity and mass. Use an appropriate lifting equipment to lift the unit. **Improper lifting may result in the fall of the product which could cause damage of the product or human injury.**		●Install the product properly in accordance with this instruction manual. **Improper installation may result in electrical leakage, electrical shock, fire, water leakage, or injury.**
	●Electrical wiring should be performed in accordance with all applicable regulations in your country. **Imperfect wiring or neglecting the installation of proper equipment will cause electrical leakage or fire.**		●Provide a secure grounding dedicated for the product. Never fail to provide an earth leakage circuit breaker and a thermal overload relay in your starter or control panel (Both available on the market). **If an electrical leakage occurs by due to a product failure, it may cause electrical shock.** 
	●Use a power outlet that has a sufficient rating and has been exclusively provided for the pump. **If the power outlet is shared with other equipment, it can lead to an abnormal heat of the outlet and can cause fire as a result.** 		

⚠ CAUTION			
	●Be sure to provide a ground wire securely. Do not connect the ground wire to a gas pipe, water pipe, lightening rod, or telephone ground wire. **Improper grounding could cause electrical shock.** 		●Prevent a metallic object or dust from sticking to the power plug. **Adhesion of foreign object to the plug could cause electrical shock, short-circuit, or fire.**
	●Do not scratch, fold, twist, make alterations, or bundle the cable, or use it as a lifting device. **The cable may be damaged, which may cause electrical leakage, short-circuit, electrical shock, or fire.**		●Do not use the cabtyre cable, power plug, or power outlet if it is damaged or it is not closely fitted. Connect every conductor of the cabtyre cable securely to the terminals. **Failure to observe this can lead to electrical shock, short-circuit, or fire.** 
	●This pump is neither dust-proof nor explosion-proof. Do not use it at a dusty place or at a place where toxic, corrosive or explosive gas is present. **Use in such places could cause fire or explosion.**		●When the product will be carried by hand, decide the number of persons considering the mass of the product. **When lifting up the product, do not attempt to do it by simply bowing from the waist. Use the knees, too, to protect your back.**

PRECAUTIONS DURING TEST OPERATION AND OPERATION

⚠ WARNING			
	●Never try to operate the pump if somebody is present in the pump sump. **If an electrical leakage occurs, it can cause electrical shock.**		●Never start the pump while it is suspended, as **the unit may jerk and could lead to injury.**
	●When changing power connection is needed to correct the direction of rotation, be sure to turn off the power supply (earth leakage circuit breaker, etc.), and perform the work after making sure that the impeller has stopped completely. **Failure to do so may lead to electrical shock, short-circuit, or injury.** 		●When inspecting the pump, be sure to turn off the power supply (earth leakage circuit breaker, etc.) so that the pump may not start accidentally. **Failure to do so may lead to a serious accident.**
⚠ CAUTION			
	●Do not operate the product under any voltage other than described on the nameplate with the voltage variation limit within ±10%. If it is operated with a generator, it is strongly suggested not to operate other equipment with the same generator. **Failure to observe this caution may cause malfunction and breakdown of the product, which may lead to electrical leakage or electrical shock.** 		●Do not touch the product with bare hands during or immediate after the operation, as the product may become very hot during operation. **Failure to observe this caution may lead to be burned.**
	●Do not use the product in a liquid other than water. **Use in oil, salt water or organic solvents will damage it, which may lead to electrical leakage or electrical shock.**		●Do not run the product dry or operate it with its gate valve closed, as **doing so will damage the product, which may lead to electrical leakage or electrical shock.**

⚠ CAUTION

- Do not use the product for hot or warm liquid over 40°C, as **doing so will damage the product, which may lead to electrical leakage or electrical shock.**

- Do not allow foreign object (pin, wire, etc.) to enter the suction inlet of the pump. **Failure to observe this caution could cause it to malfunction or to operate abnormally, which may lead to electrical leakage or electrical shock.**

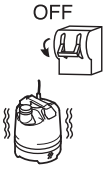
- When the product will not be used for an extended period, be sure to turn off the power supply (earth leakage circuit breaker, etc.). **Deterioration of the insulation may lead to electrical leakage, electrical shock, or fire.**

PRECAUTIONS DURING MAINTENANCE AND INSPECTION

⚠ WARNING

- Absolutely turn off the power supply or disconnect the plug before starting maintenance or inspection. Do not work with wet hands. **Failure to observe these cautions may lead to electrical shock or injury.**

- In case any abnormality (excessive vibration, unusual noise or odor) is found in the operation, turn the power off immediately and consult with the dealer where it was purchased or Tsurumi representative. **Continuing to operate the product under abnormal conditions may result in electrical shock, fire, or water leakage.**



- Do not disassemble or repair any parts other than those designated in the operation manual. If repairs are necessary in any other than the designated parts, consult with the dealer where it was purchased or Tsurumi representative. **Improper repairs can result in electrical leakage, electrical shock, fire, or water leakage.**

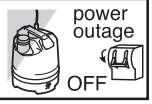
⚠ CAUTION

- After reassembly, always perform a test operation before resuming use of the product. **Improper assembly can result in electrical leakage, electrical shock, fire, or water leakage.**

PRECAUTION TO POWER OUTAGE

⚠ WARNING

- In case of power outage, turn off the power supply. **The product will resume operation when the power is restored, which presents serious danger to people in the vicinity.**



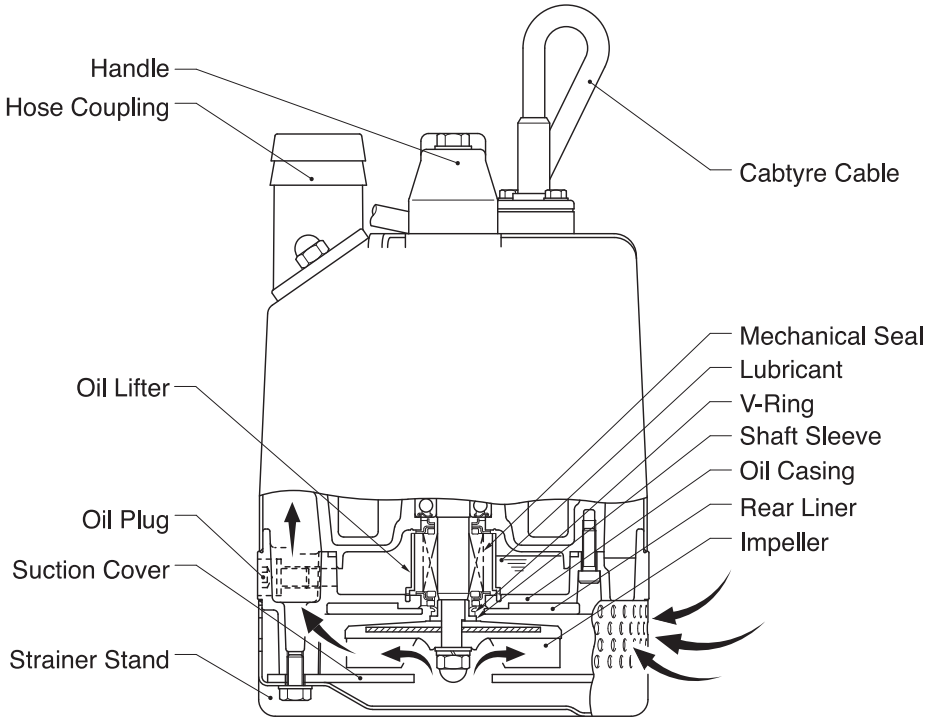
OTHER PRECAUTION

⚠ CAUTION

- Never use the product for potable water. **It may present a danger to human health.**

2 PART NAMES

■ **Example**



3 PRIOR TO OPERATION

After unpacking, verify the contents.

Product Inspection

Inspect the product for damage during shipment, and make sure all bolts and nuts are tightened properly.

Specification Check

Check the nameplate of the unit to verify that it is the product that you have ordered. Pay particular attention to its voltage and frequency specifications.

Note: *If you discover any damage or discrepancy in the product, please contact the dealer where this equipment was purchased or the Tsurumi sales office in your area.*

Accessory Check

Verify that all accessory items are included in the package.

- Hose Band ..... 1 pc
- Operation Manual 1

Note: *If you discover any damage or discrepancy in the product, please contact the dealer where this equipment was purchased or the Tsurumi sales office in your area.*

Product Specifications

⚠CAUTION **Do not operate this product under any conditions other than those that have been specified.**

■Major Standard Specifications

Applicable Liquids	Consistency and Temperature	Water, Rain Water, Font Water, Sand carring Water, Ground Water ; 0 ~ 40°C
Pump	Impeller	Semi-Vortex-Type
	Shaft Seal	Double Mechanical Seal
	Bearing	Shielded Ball Bearing
Motor	Specifications	Dry Submersible Induction Motor, 2-Pole
	Insulation	Class E
	Protection System (built-in)	Miniature protector [LB-250(A),LB-480(A)(Z)] Circle thermal protector (other models)
	Lubricant	Turbine oil VG32 (non-additive)
Connection		Hose Coupling

■Standard specifications (50/60Hz)

Model	Bore mm	Phase	Starting Method	Output kW	Max.Head m ft.	Max.capacity m^3/min GPM	WHT kg
LB-250	40	1	Capacitor-Run	0.25	8.8/8.6 28.9/28.2	0.190 50.2	10.4
LBT-250	40	3	Direct-on-line	0.25	8.8/8.6 28.9/28.2	0.190 50.2	10.0
LB-480	50	1	Capacitor-Run	0.48	11.0/12.0 36.1/39.5	0.220/0.240 58.1/63.4	10.4
LBT-480	50	3	Direct-on-line	0.48	11.0/12.0 36.1/39.5	0.220/0.240 58.1/63.4	10.0
LB-250A	40	1	Capacitor-Run	0.25	8.8/8.6 28.9/28.2	0.190 50.2	11.0
LB-480A	50	1	Capacitor-Run	0.48	11.0/12.0 36.1/39.5	0.220/0.240 58.1/63.4	11.0
LBZ-480	50	1	Capacitor-Run	0.48	11.0/12.0 36.1/39.5	0.220/0.240 58.1/63.4	10.4
LB-800	50	1	Capacitor-Run	0.75	15.0/18.0 49.0/59.0	0.31 82.0	13.2
LBT-800	50	3	Direct-on-line	0.75	15.0/18.0 49.0/59.0	0.31 82.0	12.8
LB-800A	50	1	Capacitor-Run	0.75	15.0/18.0 49.0/59.0	0.31 82.0	13.8
LBZ-800	50	1	Capacitor-Run	0.75	15.0/18.0 49.0/59.0	0.31 82.0	13.2

Note: *The weight (mass) given above is the operating weight of the pump itself, not including the cabtyre cable.*

4 INSTALLATION

⚠CAUTION

- **The supply voltage should be within ± 10% of the rated voltage.**
- **The water temperature for operating the pump should be between 0 ~ 40°C.**

Failure to observe the precautions given above could cause the pump to malfunction, which may lead to current leakage or electrical shock.

Note: *To use the pump for a special solution, contact the dealer where it was purchased, or the Tsurumi sales office in your area.*

■Critical Use Pressure

⚠CAUTION **Do not operate the pump in an area that is exposed to a water pressure that exceeds the values given below.**

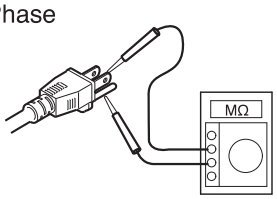
Critical Use Pressure	0.2MPa (2kgf/cm^2) – discharge pressure during use

Preparation for Installation

■ Single-phase power supply:

Use a megger to measure the resistance between the tip of the cabtyre cable plug and the ground terminal to verify the insulation resistance of the motor.
Measure twice the resistance between each of the two tips of the plug and ground.
(This diagram shows a 2-pin plug type.)

Single-Phase

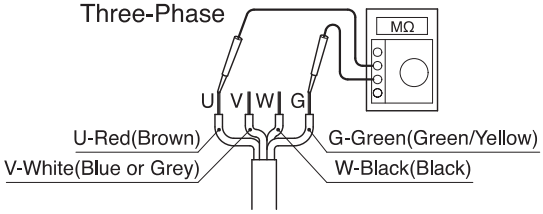


⚠CAUTION **Beware that the power plug varies by country or region.**

■ Three-phase power supply:

Use a megger to measure the resistance between each core of the cabtyre cable and the (green) ground wire to verify the insulation resistance of the motor.

Three-Phase



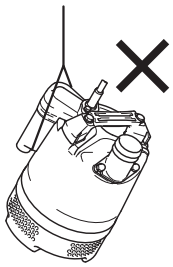
Insulation resistance reference value = 20MΩ minimum

Note: *The insulation resistance reference value of 20MΩ minimum is based on a new or repaired pump. For reference values of a pump that has already been put into operation, refer to "7. Maintenance and Inspection" of this manual.*

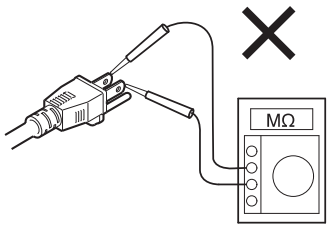
■ How to use level relay unit (LB-250A/480A/800A ,LBZ-480/800)

⚠CAUTION

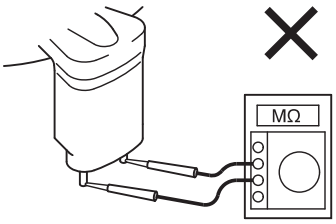
- **Do not measure the insulation resistance with insulation resistance tester for following parts. It causes a trouble.**
- **Do not lift or hang the level relay unit.It will damage and cause a leakage, an electric shock, and a fire.**
- **In the case of the float type, do not lift it by the float cable, as it will damage the cable, and lead to a leakage, electrical shock, and fire.**



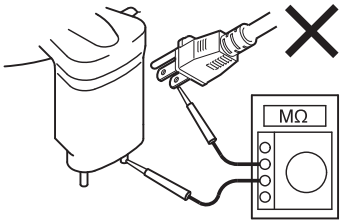
(1) between the plug



(2) between the electrode of a level relay unit



(3) between the electrode of a level relay unit and a plug



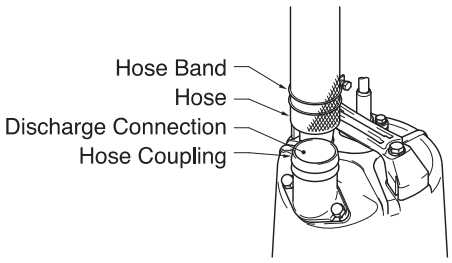
(4) Do not make “on”period between the other level relay unit.

Precautions During Installation

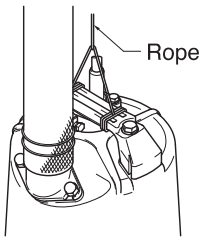
⚠WARNING **When installing the pump, be mindful of the pump's center of gravity and weight. If the pump is not suspended properly, the pump may fall and break, which may lead to injury.**

⚠CAUTION **When installing or moving the pump, never suspend the pump by the cabtyre cable. Doing so will damage the cable, which may cause a current leakage, electrical shock, or fire.**

(1) When a hose is used, attach the hose to the hose coupling as far as it will go, then fasten it securely with a hose band.



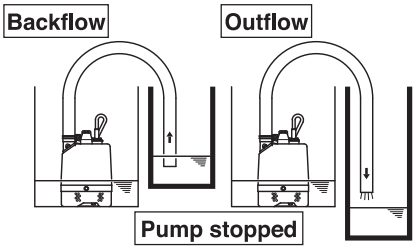
(2) Handle the pump carefully without applying shock to it, such as by dropping it. To suspend the pump, do so manually or by attaching a rope or chain to its handles.



⚠CAUTION **The rope for suspending the pump during its installation must be of a thickness that accommodates the weight of the pump. When using a chain, make sure that the chain does not become twisted. Failure to observe these precautions could cause the rope or chain to break and the pump to fall and break, which could lead to personal injury.**

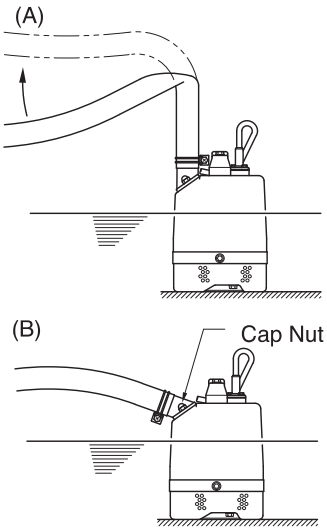
(3) Operate the pump in a location that has a sufficient water level and collects water easily.

Note: *For the water level required for operating the pump, refer to the external dimension drawing, which is provided separately.*
Extend the end of the hose (discharge side) above the water surface. If the end of the hose is submerged in water, it may cause the water to flow back when the pump has been stopped. Conversely, if the end of the hose is located at a level that is lower than the source water surface, water may continue to flow out even after the pump has been stopped.



(4) Route the hose as straight as possible. Excessive bending of the hose could obstruct the flow of water, reduce the pumping volume, or clog the pump with mud, thus disabling the pumping function. If the hose is kinked at its base, it will create air pockets in the pump, causing the pump to operate dry. To prevent this from occurring, straighten the bend while operating the pump.

If the hose becomes kinked as shown in (A), reposition the hose coupling so that it faces as shown in (B). Loosen the cap nut on the hose coupling to change its direction.



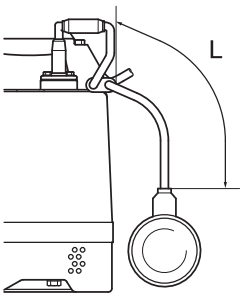
⚠CAUTION **If the pump draws in a large amount of mud, it could cause the pump to wear prematurely and lead to a malfunction, current leakage, and electrical shock.**

(5) Operate the pump upright. If there is the likelihood of the pump drawing in excess mud, place a concrete block under the pump.

Installing the Float

Set the length of the float lead wire to the dimension indicated below. Failure to observe this will lead to an improper operation.

Pump model	L
LBZ-480	150mm
LBZ-800	200mm



5 ELECTRICAL WIRING

Electrical Wiring Work

⚠WARNING

- **All electrical work must be performed by an authorized electrician, in compliance with local electrical equipment standards and internal wiring codes. Never allow an unauthorized person to perform electrical work because it is not only against the law, but it can also be extremely dangerous.**
- **Improper wiring can lead to current leakage, electrical shock, or fire.**
- **Abusolutely provide a dedicated earth leakage circuit breaker and a thermal overload realy suitable for the pump(available on the market). Failure to follow this warning can cause electrical shock or explosion when the product fails or an electrical leakage occurs.**

Operate well within the capacity of the power supply and wiring.

Grounding

⚠WARNING **Be sure to install the ground wire securely. Failure to observe this precaution could damage the pump and cause current leakage, which may lead to electrical shock.**

⚠CAUTION **Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or telephone ground wire. Improper grounding could cause electrical shock.**

Connecting the Power Plug

⚠WARNING **Before inserting the power plug or connecting the wires to the terminal board, make sure that the power supply (i.e. circuit breaker) is properly disconnected. Failure to do so may lead to electrical shock, short, or injury caused by the unintended starting of the pump.**

⚠CAUTION **Do not use damaged cabtyre cables, power plugs, or loose power outlets. Failure to observe this precaution could lead to electrical shock, short circuit, or fire.**

Follow the diagram on the right to connect the power.

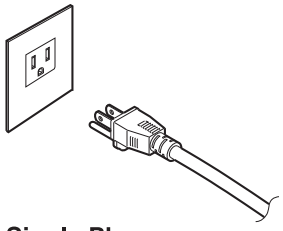
When using a three-prong grounded plug,connect as shown in the drawing.

⚠CAUTION **Be sure to use a dedicated power supply with a ground leakage circuit breaker.**

(This diagram shows a 2-pin plug type.)

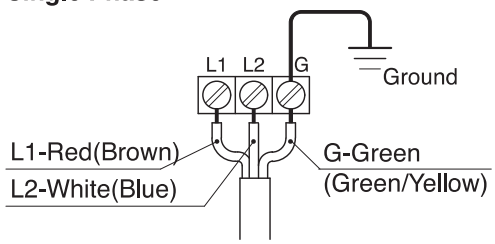
⚠CAUTION **Beware that the power plug varies by country or region.**

Note: *The shape of the plug may differ from that shown in the illustration.*



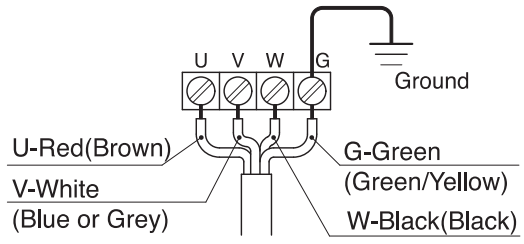
Single Phase

When a single-phase power source is used, connect the leads to the control panel terminals as shown in the diagram, making sure they do not become twisted together.



Three Phase

When a three-phase power source is used, connect the leads to the control panel terminals as shown in the diagram, making sure they do not become twisted together.



Motor Protector

The pump is equipped with a built-in motor protector (circle thermal protector / miniature protector).
If a current overload or overheating occurs under the symptoms given below, the pump will stop automatically to protect the motor regardless of the water level at the time of operation.

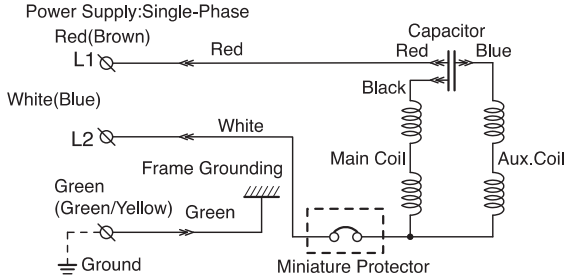
- Extreme fluctuation of power supply voltage
- Pump operated under overload condition
- Pump operated at open phase or binding condition

Note: *After the motor protector has tripped, the motor automatically resumes its operation. Therefore, make sure to disconnect the cabtyre cable from the terminal board or the power outlet, and eliminate the cause of the problem.*

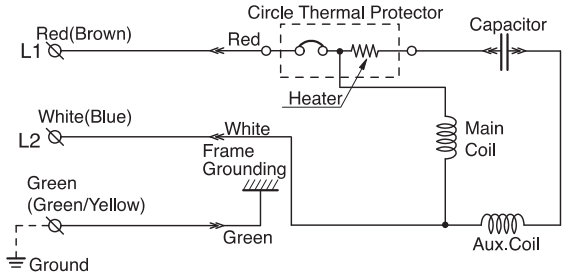
Do not operate the pump at unusually low head, or with the impeller clogged with debris. Doing so will not only prevent the pump from attaining its full potential, but may also generate abnormal noise and vibration and damage the pump.

Electrical Circuit Diagrams

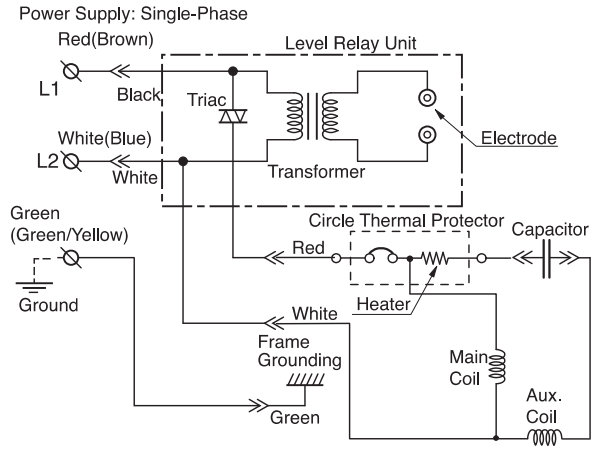
■Non-Automatic Circuit
LB-250 , LB-480



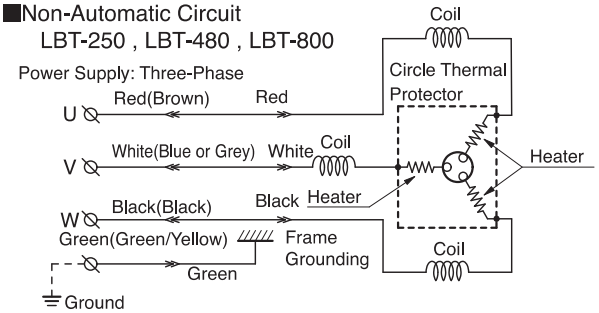
■Non-Automatic Circuit
LB-800



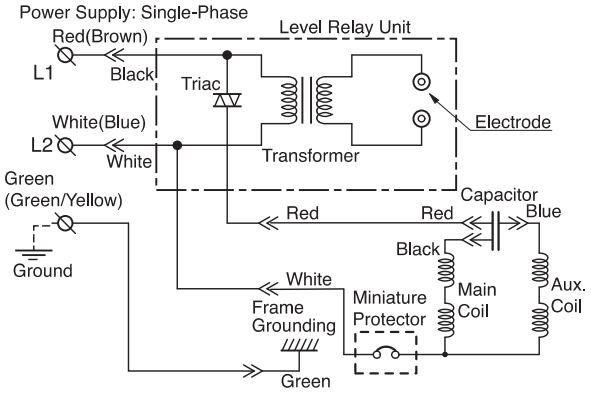
■Automatic Operation Circuit (for electrode type)
LB-800A



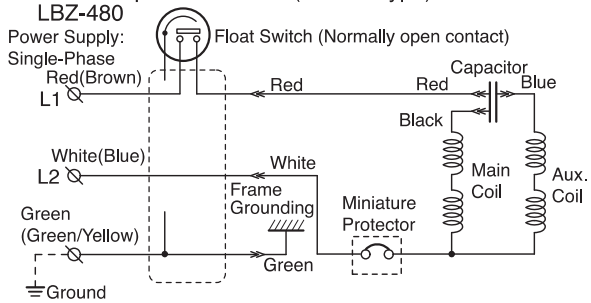
■Non-Automatic Circuit
LBT-250 , LBT-480 , LBT-800



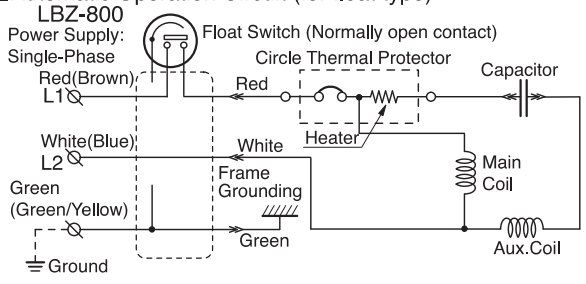
■Automatic Operation Circuit (Level Relay Uint)
LB-250A , LB-480A



■Automatic Operation Circuit (for float type)
LBZ-480



■Automatic Operation Circuit (for float type)
LBZ-800



6 OPERATION

Prior to Operation

(1) Once again, check the nameplate of the pump to verify that its voltage and frequency are correct.

⚠CAUTION **Improper voltage and frequency of the power supply will prevent the pump from attaining its full potential, and may also damage the pump.**

Note: *Verify the specs on the pump's nameplate.*

(2) Check the wiring, power supply voltage, the capacity of the ground leakage circuit breaker, and the insulation resistance of the motor.

■ Insulation resistance reference value = 20MΩ minimum

Note: *The insulation resistance reference value of 20MΩ minimum is based on a new or repaired pump. For reference values of a pump that has already been put into operation, refer to "Maintenance and Inspection".*

(3) Adjust the setting of the thermal relay (i.e. 3E relay) to the pump's rated current.

Note: *Verify the rated current on the pump's nameplate.*

(4) When using a generator, as much as possible avoid operating the pump in conjunction with other types of equipment.

6-1 NON-AUTOMATIC OPERATION

Trial Operation

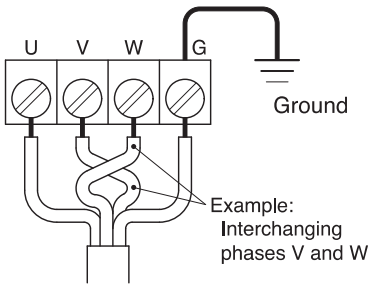
⚠WARNING **Never start the pump while it is suspended, as the pump may jerk and cause a serious accident involving injury.**

(1) Operate the pump for a short time (1 to 2 seconds) and verify the direction of the rotation of the impeller. Observe the pump unit from above, and if its recoil is in the counterclockwise direction, the direction of its rotation is correct.

⚠CAUTION **Make sure to check the pump's direction of rotation with the pump exposed to the atmosphere. Operating the pump in reverse while it is submerged in water will damage the pump, which may lead to current leakage and electrical shock.**

(2) To reverse the rotation, the following countermeasures must be taken.

⚠WARNING **Before changing the connections for reverse rotation, make sure that the power supply (i.e. circuit breaker) is properly disconnected and that the impeller has stopped completely. Failure to observe this may lead to electrical shock, short, or injury.**



COUNTERMEASURE

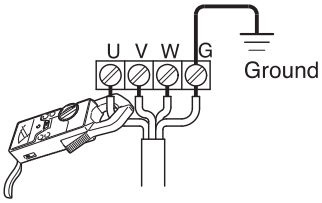
Interchange any two of the three wires designated U, V, and W, respectively.

Note: *(1) and (2) are applied to the three-phase pumps.*

(3) Connect the pump to the pipe and submerge it in water.

(4) Operate the pump for a short time (3 to 10 minutes) and perform the following checks:

Using an AC ammeter (clamp), measure the operating current at the phases U, V, and W that are connected to the terminal board.

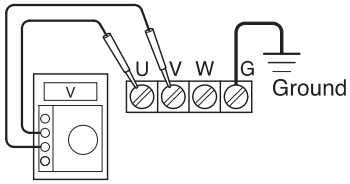


COUNTERMEASURE

Because an overload condition may be present at the pump motor if the operating current exceeds the rated current, follow the instructions in section "4. Installation" to operate the pump in the correct manner.

Using an AC voltmeter (tester), measure the voltage at the terminal board.

■ Power supply voltage variation = within ± 10% of the rated voltage



COUNTERMEASURE

If the power supply voltage deviates from the variation value, the cause of the deviation may be the capacity of the power supply or the extension cable that is used. Refer to section "5. Electrical Wiring" to operate the pump in the correct manner.

⚠CAUTION **In case the pump exhibits an abnormal condition (such as a considerable amount of vibration, noise, or smell), disconnect the power supply immediately and contact the dealer where you purchased the equipment, or Tsurumi's sales office in your area. If the pump continues to be used in the abnormal state, it may cause current leakage, electrical shock, or fire.**

(5) Proceed with the normal operation if no abnormal conditions are found during the trial operation.

Operation

⚠WARNING **The pump unit may be extremely hot during operation. To prevent burns, do not touch the pump unit with bare hands during or after the operation.**

Pay attention to the water level during the pump operation. The pump may become damaged if it is allowed to operate dry.

Due to an overload operation or a pump malfunction, if the motor protector trips to stop the pump, make sure to eliminate the cause of the problem before restarting.

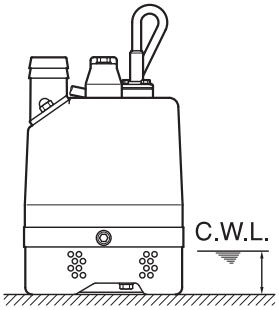
To operate a submersible pump (including automatic operation), set the water level so that the pump will operate about 10 times per hour.

Note: *A large amount of amperage flows when a submergible pump is started, causing the temperature of its windings to rise rapidly. Beware that a frequent stop-and-go operation of the pump will accelerate the deterioration of the insulation of the motor windings and thus affect the use life of the motor.*

Operating Water Level

⚠CAUTION **Do not operate the pump below the C.W.L. (Continuous Running Water Level) indicated below. Failure to observe this condition may result in damage to the pump, electrical leakage or electrical shock.**

Pump Model	C.W.L. (mm)
LB-250	50
LBT-250	50
LB-480	50
LBT-480	50
LB-800	50
LBT-800	50

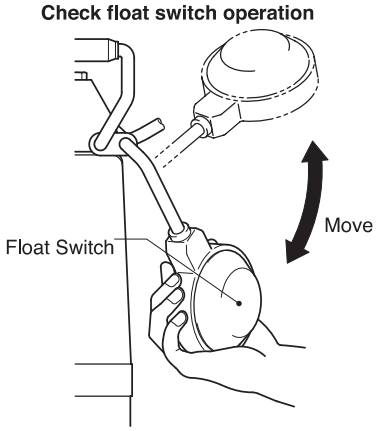


6-2 Automatic Operation (for float type)

Trial Operation

Equipped with floats to detect the water level the automatic type (LBZ) pump can perform an automatic drainage operation alone by merely connecting its cable to a power supply.
Connect the power and perform a trial operation as follows:

(1) Direct all the floats downward.
(2) Raise the (yellow) float. This will cause the pump to start.
(3) Next, return the (yellow) float to their original positions. This will cause the pump to stop.
(4) Perform steps (2) and (3) consecutively two or more times to verify the operation.



Note: *The trial operation must be completed within 1 minute.*

⚠CAUTION **In case the pump exhibits an abnormal condition (such as a considerable amount of vibration, noise, or smell), disconnect the power supply immediately and contact the dealer where you purchased the equipment, or Tsurumi's sales office in your area. If the pump continues to be used in the abnormal state, it may cause current leakage, electrical shock, or fire.**

6-3 Automatic Operation (for electrode type)

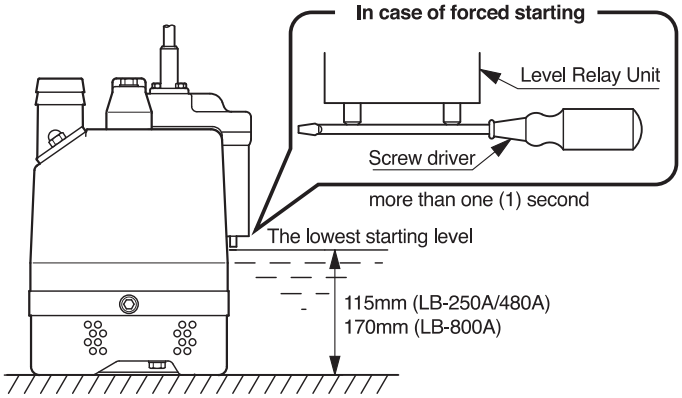
Operation Water Level

■Start of the pump

The pump starts when the current continuously flows between the two electrodes for more than one (1) second.

Note: *The electrode may not detect the water surface under conditions such as purified water or distillated water which the current does not flow cause of high specific resistance.*

Note: *The necessary water level to operate the pump is 115mm or 170mm from the bottom of a pump.*
In case of start by racing during the trial operation, please short-circuit for more than one (1) second with exciting items (screw driver etc.) between the electrodes, and start forcibly.
Please keep away from those that may clog in a pump.(wire, nail, cord, etc.)



Trial Operation

⚠WARNING **Never start the pump while it is suspended, as the pump may jerk and cause a serious accident involving injury.**

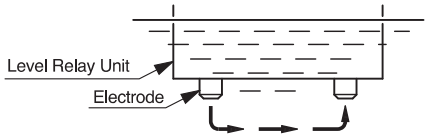
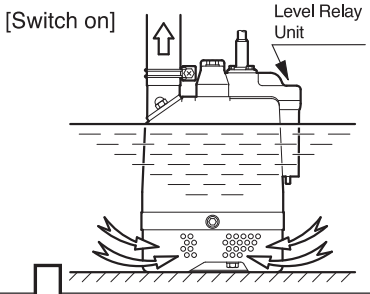
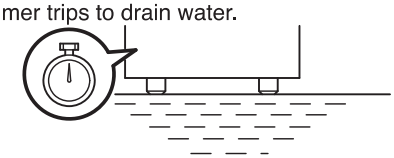
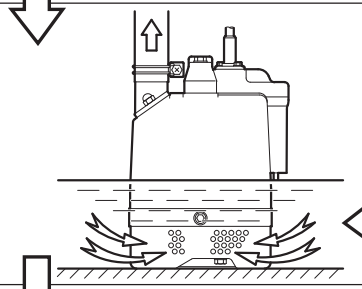
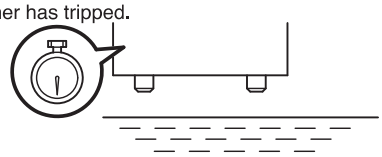
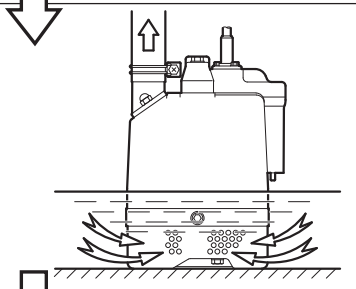
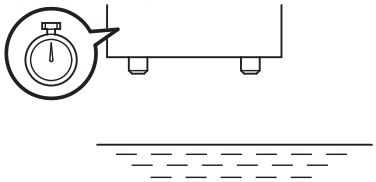
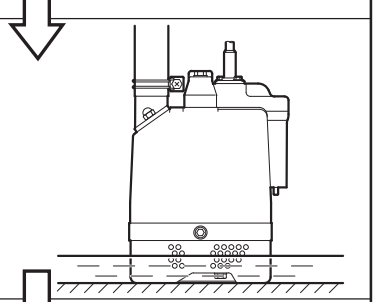
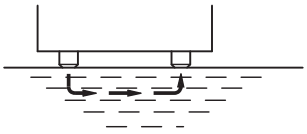
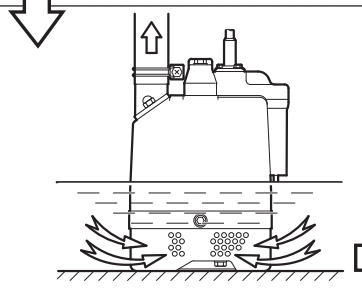
(1) Operate the pump 3 to 10 minutes to verify the conditions listed below.

⚠CAUTION **In case the pump exhibits an abnormal condition (such as a considerable amount of vibration, noise, or smell), disconnect the power supply immediately and contact the dealer where you purchased the equipment, or Tsurumi's sales office in your area. If the pump continues to be used in the abnormal state, it may cause current leakage, electrical shock, or fire.**

(2) Proceed with the normal operation if no abnormal conditions are found during the trial operation.

Operation Flow Chart

To enable the user to bring the pumps ability into full play, this chart describes the various control modes that are made possible by the combinations of the electrode and timer functions.

Level Relay Unit	Pump	Water Level	Condition
The electrodes of the level relay unit are submerged, causing the current to operate the pump.  (Detection Time : more than one (1) second)	Start Operation (Drainage)	Drop	[Switch on] 
As the water level drops and the water surface recedes from the electrodes, the timer trips to drain water.  (Electrodes open Trips the timer)	Operation (Drainage)	Drop	
The draining of water by the timer lasts approximately 1 minute. ※ If the water surface comes in contact for more than one (1) second with the electrodes within 1 minute, the pump will operate continuously even though the timer has tripped. 	Operation (Drainage)	Drop	
The pump will stop 1 minute later.  ※ The pump will also stop after a continuous dry run, in some cases.	Stop	Rise	
When the water level rises and the water surface comes in contact for more than one (1) second with the electrodes, the pump will restart.  (Detection Time : more than one (1) second)	Start Operation (Drainage)	Drop	

7 MAINTENANCE AND INSPECTION

Regular maintenance and inspection are indispensable to maintaining the pump's performance. If the pump behaves differently from its normal operating condition, refer to section "9. Troubleshooting" and take appropriate measures at an early stage. We also recommend that you have a spare pump on hand for an emergency.

Prior to Inspection

⚠WARNING **Make sure that the power supply (i.e. circuit breaker) is disconnected and disconnect the cabtyre cable from the power outlet or remove it from the terminal board. Failure to do so may cause electrical shock or unintended starting of the pump, which may lead to serious accidents.**

(1) Washing the Pump
Remove any debris attached to the pump's outer surface, and wash the pump with tap water. Pay particular attention to the impeller area, and completely remove any debris from the impeller.

(2) Inspecting the Pump Exterior
Verify that there is no damage, and that the bolts and nuts have not loosened.

Note: *If the pump must be disassembled for repair due to damage or loose bolts or nuts, contact the dealer where it was purchased, or the Tsurumi sales office in your area.*

Daily and Periodic Inspection

Interval	Inspection Item
Daily	Measuring the operating current ■ To be within the rated current Measuring the power voltage ■ Power supply voltage variation = within ±10% of the rated voltage
Monthly	Measuring the insulation resistance ■ Insulation resistance reference value = 1MΩ minimum [NOTE] The motor must be inspected if the insulation resistance is considerably lower than the last inspection.
Semi-yearly	Inspecting oil ■ 1,000 hours or 6 months, whichever comes first. Inspection of liffting rope ■ Replace if damage, corrosion, or wear has occurred to the rope. Remove if foreign object is attaching to it.
Yearly	Changing oil ■ 2,000 hours or 12 months, whichever comes first. Changing the mechanical seal [NOTE] The inspection and replacement of the mechanical seal requires specialized equipment. To have this operation performed, contact the dealer where this equipment was purchased, or the Tsurumi sales office in your area.
Once every 2 to 5 years	Overhaul ■ The pump must be overhauled even if the pump appears normal during operation. Especially, the pump may need to be overhauled earlier if it is used continuously. [NOTE] To overhaul the pump, contact the dealer where it was purchased, or the Tsurumi sales office in your area.

Note: *Refer to section "Oil Inspection and Change Procedures" below for further detail.*

Storage

If the pump will not be operated for a long period of time, pull the pump up, wash the pump, allow it to dry, and store it indoors.

Note: *For reinstallation, be sure to perform a trial operation before putting the pump into operation.*

If the pump remains immersed in water, operate it on a regular basis (i.e. once a week).

Oil Inspection and Changing Procedures

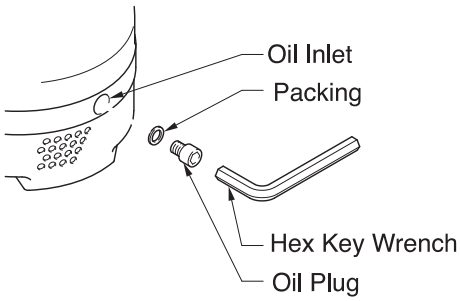
Inspecting Oil

Remove the oil plug and take out a small amount of oil. The oil can be extracted easily by tilting the pump so that the oil filler plug faces downward. If the oil appears milky or intermixed with water, a likely cause is a defective shaft sealing device (i.e. mechanical seal), which requires that the pump be disassembled and repaired.

Changing Oil

Remove the oil plug and drain the oil completely. Pour a specified volume of oil into the oil filler inlet.

Note: *The drained oil must be disposed of properly to prevent it from being released into the sewer or rivers. The packing or the O-ring for the oil plug must be replaced with a new part at each oil inspection and change.*



Specified Oil: Turbine Oil VG32 (non-additive)

Unit : mℓ

Pump Model	Specified Volume
LB-250, LBT-250, LB-250A	155
LB-480, LBT-480, LB-480A, LBZ-480	155
LB-800, LBT-800, LB-800A, LBZ-800	155

Replacement Parts

The table lists the parts that need to be replaced periodically. Replace these using the recommended frequency as a guideline.

Part	Replacement condition
Mechanical Seal	When oil in oil compartment becomes milky.
Lubricant ; Turbine Oil VG 32 (non-additive)	Every 12 mouths or after 2,000 hours of use, whichever comes first.
Packing, O-Ring	Each time pump is disassembled or inspected
V-Ring	When ring is worn, and each time pump is disassembled or inspected
Shaft sleeve	When it becomes worn

8 DISASSEMBLY AND REASSEMBLY PROCEDURE

Prior to Disassembly and Reassembly

⚠WARNING **Before disassembling and reassembling the pump, be sure that the power supply (i.e. circuit breaker) is disconnected, and remove the cabtyre cable from the outlet or the terminal board. Do not connect or disconnect the power plug with a wet hand, in order to prevent electrical shock. Do not perform an activation test (to check the rotation of the impeller) during disassembly and reassembly. Failure to observe this precaution could lead to a serious accident, including injury.**

This section explains the disassembly and reassembly processes that are involved up to the replacement of the impeller itself. Operations involving the disassembly and reassembly of the sealing portion (i.e. mechanical seal) and of the motor require a specialized facility including vacuum and electrical test equipment. For these operations, contact the dealer where this equipment was purchased, or the Tsurumi sales office in your area.

Disassembly Procedure

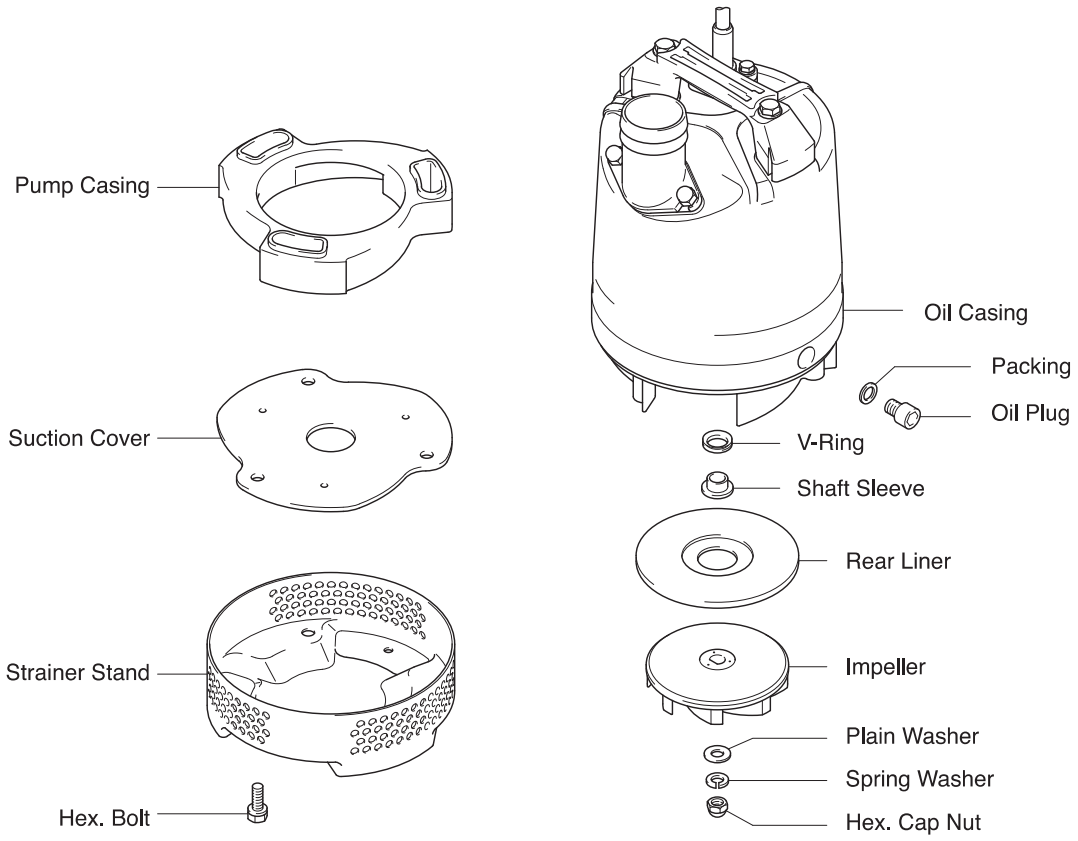
(1) Removing the strainer stand, suction cover, and the pump casing
Remove the hex bolts from under the strainer stand; then, remove the strainer stand, suction cover, and the pump casing from the pump body.

(2) Removing the impeller
Using a box wrench, remove the impeller nut, spring washer and plain washer, then, remove the impeller, the shaft sleeve, and the v-ring from the shaft.

(3) Removing the rear liner
Remove the rear liner from the oil casing.

Disassembly Diagram

■ Example



Reassembly Procedure

Observe the precautions given below and reassemble the unit in the reverse order of disassembly.

Note: *After completing the reassembly, make sure to fill the pump with the specified amount of oil. The packings must be replaced with a new part. If any part is worn or damaged, make sure to replace it with a new part.*

After reinstalling the impeller or the suction cover, check that the impeller rotates smoothly and that there is no interference between the pump casing and the suction cover.

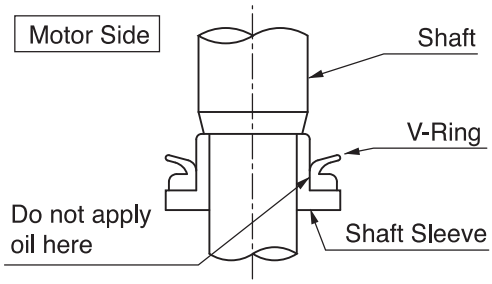
■ Reassembling models

(1) Assemble the rubber parts (rear face liner, impeller, and pump casing) after removing debris from them such as sand.

(2) Mount the v-ring onto the outside of the shaft sleeve as shown in the drawing.When doing so, do not apply oil or other lubrication to the surface where the v-ring contacts the shaft sleeve.

(3) When attaching the rear liner, make sure the front and back are oriented correctly, and press the liner firmly onto the surface.

(4) After reinstalling the impeller or the suction cover, check that the impeller rotates smoothly and that there is no interference between it and the suction cover.



9 TROUBLESHOOTING

⚠WARNING **To prevent serious accidents, disconnect the power supply before inspecting the pump.**

Read this Operation Manual carefully before requesting repair. After re-inspecting the pump, if it does not operate normally, contact the dealer where this equipment was purchased, or the Tsurumi sales office in your area.

Problem	Possible cause	Countermeasure
Pump fails to start; or, starts but stops immediately.	① No proper power is supplied (i.e. power outage). ② Plug is not inserted. ③ Open circuit in cabtyre cable or poor connection. ④ Malfunction in float. ⑤ Electrode is insulated by debris. ⑥ Malfunction in level relay unit.	① Contact the electric power company or an electrical repair shop. ② Connect the plug. ③ Check whether there is an open circuit in the cabtyre cable or wiring. ④ Remove obstacles and check the operation of the float. ⑤ Use sandpaper to remove the debris. ⑥ Repair or replace the level relay unit.
Pump starts but stops immediately, causing the motor protector to trip.	① Foreign matter is wedged in the impeller, causing the motor protector to trip. ② The movement of the stop float is obstructed, causing the start float alone to perform the start and stop operations. ③ The voltage is too low. ④ A 50Hz unit is used at 60Hz. ⑤ The pump has been operated for a long time with its strainer stand clogged. ⑥ Malfunction of motor (seizure or water leakage). ⑦ The pump is drawing in too much mud.	① Inspect the pump and remove the debris. ② Remove obstacles and check the operation of the stop float. ③ Provide the rated voltage or use an extension cable that meets the specifications. ④ Check the nameplate and replace the pump or the impeller. ⑤ Remove the debris from the strainer stand. ⑥ Repair or replace. ⑦ Place a concrete block under the pump to prevent the pump from drawing in excess mud.
The pumping volume is low.	① The impeller is worn. ② The hose is clogged or kinked at its midspan. ③ The strainer stand is clogged or is buried. ④ The motor rotates in reverse. ⑤ A 60Hz pump is used at 50Hz.	① Replace the impeller. ② Minimize the bends of the hose, and if the pump is used in a dusty area, place it inside a mesh basket during operation. ③ Remove the debris from the strainer stand.Place a concrete block under the pump to prevent the pump from drawing in excess mud. ④ Change the power connection. ⑤ Check the nameplate and replace the pump or the impeller.
Pump generates vibration or noise.	① Motor bearings are damaged.	① Replace the bearings.
The pump does not stop automatically.	① The movement of the floats is obstructed. The switch in a float is faulty. ② The water level of the (stop) float is set lower than the pump's minimum possible operating water level. ③ Malfunction in level relay unit ④ Electrode is shorted by debris. ⑤ Influence by electrical device in the vicinity of the pump.	① Remove the blockage. Or, replace the part. ② Set the water level of the (stop) float higher than the pump's minimum possible operating water level. ③ Repair or replace the level relay unit. ④ Use sandpaper to remove the debris. ⑤ Check whether there are any wires that are tangled around the electrode. Check whether there are any electrical devices that could generate electro-magnetic interference, and relocate the unit as necessary.

The following information is required when ordering repairs or making other inquiries.

Product model	
Manufacturing number	
Purchase date	
Remarks	

Disposal of Product

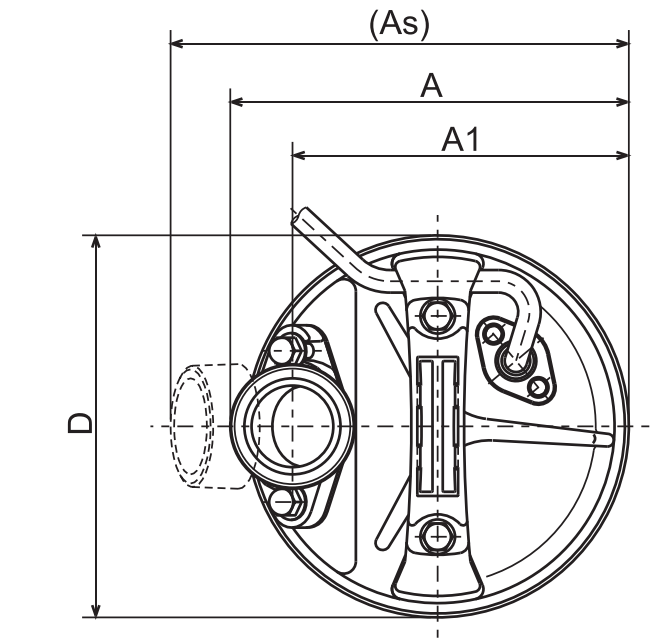
Properly dispose of the product by disassembling it, presorting the contents, and sending them to the waste material treatment site.

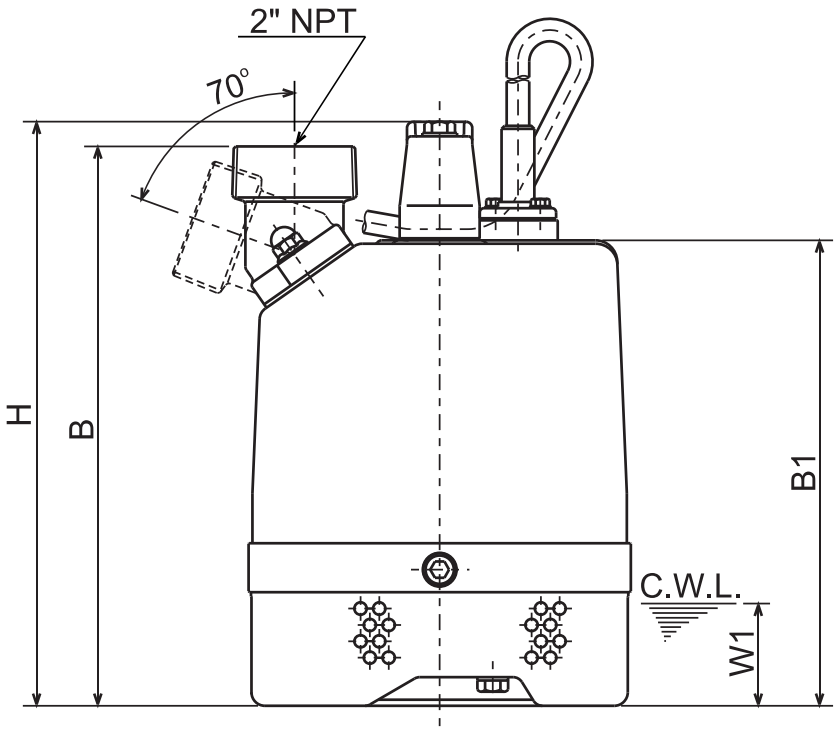
TSURUMI PUMP

LB - SERIES
SEMI-VORTEX - DEWATERING PUMP

DIMENSIONS

LB-480-62





C.W.L. : Continuous running Water Level

DIMENSIONS:USCS (Inch)

Model	HP	NOM. SIZE	Pump & Motor							C.W.L.	Wt.
			A	As	A1	B	B1	D	H	W1	(lbs.)
LB-480-62	2/3	2"	7 11/16	8 13/16	6 1/2	10 3/4	8 15/16	7 3/8	11 1/4	2	21

DIMENSIONS:METRIC (mm)

Model	kW	NOM. SIZE	Pump & Motor							C.W.L.	Wt.
			A	As	A1	B	B1	D	H	W1	(kg)
LB-480-62	0.48	50	195	224	165	274	228	187	286	50	9.5

CD103M Dri-Prime® Pump

The Godwin Dri-Prime CD103M pump offers flow rates to 1020 USGPM and has the capability of handling solids up to 3.0" in diameter.

The CD103M is able to automatically prime to 28' of suction lift from dry. Automatic or manual starting/stopping available through integral mounted control panel or optional wireless-remote access.

Indefinite dry-running is no problem due to the unique Godwin liquid bath mechanical seal design. Solids handling, dry-running, and portability make the CD103M the perfect choice for dewatering and bypass applications.

Features and Benefits

- Simple maintenance normally limited to checking fluid levels and filters.
- Dri-Prime (continuously operated Venturi air ejector priming device) requiring no periodic adjustment. Optional compressor clutch available.
- Extensive application flexibility handling sewage, slurries, and liquids with solids up to 3.0" in diameter.
- Dry-running high pressure liquid bath mechanical seal with high abrasion resistant solid silicon carbide faces.
- Close-coupled centrifugal pump with Dri-Prime system coupled to a diesel engine or electric motor.
- All cast iron construction (stainless steel construction option available) with cast steel impeller.
- Also available in a critically silenced unit which reduces noise levels to less than 70 dBA at 30'.
- Standard engine Caterpillar C2.2T (IT4 Flex). Also available with John Deere 4024TF281 (IT4 Flex).

Specifications

Suction connection	4" 150# ANSI B16.5
Delivery connection	4" 150# ANSI B16.5
Max capacity	1020 USGPM †
Max solids handling	3.0"
Max impeller diameter	10.1"
Max operating temp	176°F*
Max pressure	75 psi
Max suction pressure	58 psi
Max casing pressure	113 psi
Max operating speed	2200 rpm

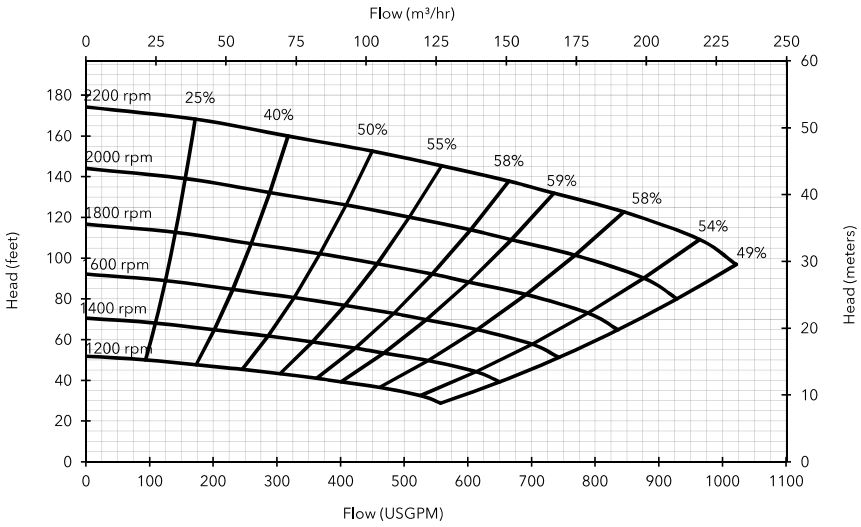
* Please contact our office for applications in excess of 176°F.

† Larger diameter pipes may be required for maximum flows.

Please contact the factory or office for further details. A typical picture of the pump is shown.
All information is approximate and for general guidance only.

godwin
a xylem brand

Performance Curve



Materials

Pump casing & suction cover	Cast iron BS EN 1561 - 1997
Wearplates	Cast iron BS EN 1561 - 1997
Pump Shaft	Carbon steel BS 970 - 1991 817M40T
Impeller	Cast Steel BS3100 A5 Hardness to 200 HB Brinell
Non-return valve body	Cast iron BS EN 1561 - 1997
Mechanical seal	Silicon carbide face; Viton elastomers; Stainless steel body

Engine option 1

Caterpillar C2.2T (IT4 Flex), 41 HP @ 2200 rpm

Impeller diameter 10.1"

Pump speed 2200 rpm

Suction Lift Table

Total Suction Head (feet)	Total Delivery Head (feet)				
	78	103	127	152	176
	Output (USGPM)				
10	1022	915	646	350	-
15	996	834	538	215	-
20	888	753	431	-	-
25	807	646	269	-	-

Fuel capacity: 60 US Gal

Max Fuel consumption @ 2200 rpm: 2.4 US Gal/hr

Max Fuel consumption @ 1800 rpm: 2.0 US Gal/hr

Weight (Dry): 2,240 lbs

Weight (Wet): 2,650 lbs

Dim.: (L) 119" x (W) 66" x (H) 77"

Performance data provided in tables is based on water tests at sea level and 20°C ambient. All information is approximate and for general guidance only. Please contact the factory or office for further details.

Engine option 2

John Deere 4024TF281 (IT4 Flex), 46 HP @ 2200 rpm

Impeller diameter 10.1"

Pump speed 2200 rpm

Suction Lift Table

Total Suction Head (feet)	Total Delivery Head (feet)				
	78	103	127	152	176
	Output (USGPM)				
10	1022	915	646	350	-
15	996	834	538	215	-
20	888	753	431	-	-
25	807	646	269	-	-

Fuel capacity: 60 US Gal

Max Fuel consumption @ 2200 rpm: 2.6 US Gal/hr

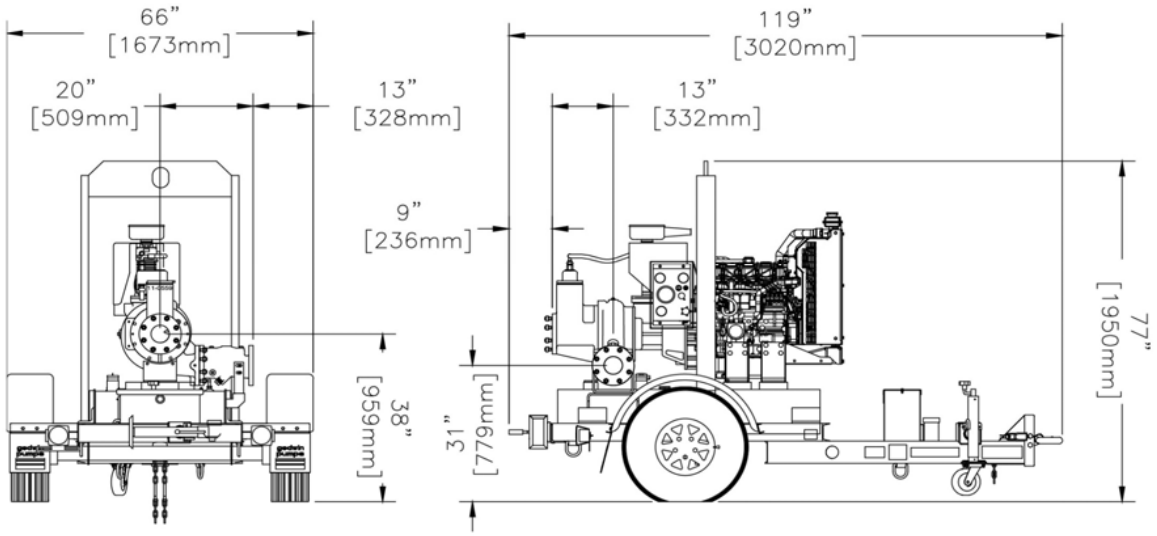
Max Fuel consumption @ 1800 rpm: 2.3 US Gal/hr

Weight (Dry): 2,400 lbs

Weight (Wet): 2,800 lbs

Dim.: (L) 119" x (W) 66" x (H) 77"

Performance data provided in tables is based on water tests at sea level and 20°C ambient. All information is approximate and for general guidance only. Please contact the factory or office for further details.



xylem
Let's Solve Water

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Reference number : 95-1008-3000
Date of issue : February 26, 2014
Issue : 5

www.godwinpumps.com

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TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE		DATE	TRANSMITTAL NO. 01355-4.1
PROJECT TITLE	Syncon Resins Superfund Site OU2	CONTRACT NO. W912DQ-15-D-3002 0002	PAGE 1 of 1
LOCATION	77 Jacobus Ave, Kearny, NJ		

Item	*Description*	*Variation*	*QA Code*
2	Environmental Protection Plan Rev 1	No	C

SECTION III - GOVERNMENT REVIEW REMARKS

Ensure that NJDEP spill control reporting porcedures are in the report. These include:

"Reportable quantities notwithstanding, if the contaminated water/liquid/etc entered the "waters of the state, or onto land to which it could flow to the waters of the state (groundwater included)" it's reportable to the DEP Hotline; 1-877-WARN DEP.

Normally the licensed operator or site manager at the plant or project would be reporting this as soon as possible after the spill was noted unless the spilled materials remained inside a leak proof containment system.

When the spill incident is called in, identify the site as a superfund site, and mention that the incident should be referred to Fred Mumford in SR&WMP. Also be sure to mention if the discharge has been stopped, and what response, if any, was taken to remediate the spill. Then Fred will need a letter (or e-mail) from EPA or the USACE documenting the incident, the response, and any corrective action for NJDEP and project records."

RESPONSE: Suggested text was added to Appendix C, Spill Control Plan - Section III, Reporting.

In addition, this revision was updated to reflect the replacement of Davis Raver with Ron Scarborough

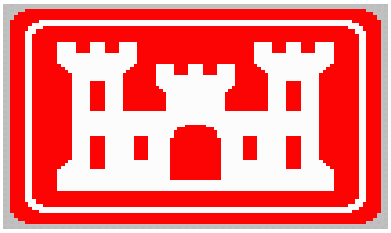
Environmental Protection Plan

Syncon Resins Superfund Site
OU-2
South Kearny, New Jersey
Contract No. W912DQ-15-D-3002, TO 0002

Submitted by:
Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Prepared for:

U.S Army Engineer District
Corps of Engineers
Kansas City, Missouri



October 2016

Revision 2

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Appendix A – List of Applicable Laws & Regulations

Appendix B – Soil Erosion & Sediment Control Plan

Appendix C – Spill Control Plan / SDS

Appendix D – Traffic Control Plan

Appendix E – Site Preparation Plan

Appendix F – Waste Management and Transportation Plan

Appendix G –Water Treatment Plan

Appendix H – Permits

I. Definition

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

II. General Information

Sevenson Environmental Services, Inc. will take every step possible to minimize potential and actual impact to the environment. All land resources to be preserved within the project boundaries and adjacent to the limits of the work area will be identified prior to the start of construction, and will be protected during the entire duration of the Project. All activities will be limited to those areas defined by the contract drawings and specifications. Prior to beginning any demolition/excavation operations, a meeting between Sevenson and USACE will be held to develop a mutual understanding relative to compliance with the Environmental Protection Program.

Approval of the Environmental Protection Plan will not relieve Sevenson or its subcontractors of the responsibility for adequate and continual control of pollutants. This plan will be updated to include any additional requirements identified during work progress. During the life of the contract, Sevenson will maintain and inspect all facilities constructed for pollution control. The Quality Control Systems Manager (QCSM), Eric DeLellis will, in the course of his/her duties, inspect all measures implemented in this regard, and will document these inspections as part of the Daily Quality Control Report. Mr. DeLellis's resume and certifications are located in Appendix I for reference.

There are numerous waste streams associated with the work at the Syncon Resins Superfund Site. Sevenson Alternate QCSM and Environmental Sampler, William Zambrana, will manage transportation and disposal activities, including preparing and tracking all waste manifests. Mr. Zambrana's resume and certifications are located in Appendix I for reference.

III. Implementation and Training

The Plan will be implemented under the auspices of the Contractor's Quality Control Program (CQCP). The QCSM, Eric DeLellis, will be the individual within the CQCP who ensures the provisions within the Environmental Protection Plan are being met. The QCSM will report directly to Sevenson's Corporate Project Manager, and he/she or their representative will complete daily site inspections to ensure compliance. Activities in non-compliance with the Plan will be recorded on the Quality Control Daily Report as well as the "List of Outstanding Quality Control Deficiencies".

The QCSM will stop work on any item or feature of work pending satisfactory correction of any deficiency noted by their staff or USACE. Construction will not proceed upon any feature of work until the deficiency is corrected.

Sevenson will conduct periodic training sessions on environmental protection through the life of the project. This training will be conducted by the Site Safety and Health Officer (SSHO), Mr. Davis Raver. Mr. Raver's resume and certifications are located in Appendix I. These discussions will be held on-site, and will include participation of all personnel. Items to be discussed will include methods of detecting and avoiding pollution; familiarity with pollution standards; and operation and maintenance of the water treatment facility, where applicable, to prevent and correct environmental pollution. Topics to be discussed will correspond with work activities, and the possible impact of the proposed activities on the environment. Initial and additional periodic training sessions will be conducted on the following topics: Spill Prevention and Emergency Spill Response training, Hazard Recognition, Safe Storage and Segregation of Chemicals, Safe Handling Practices for Flammable and Combustible Materials, and NFPA Rules and Regulations. The SSHO will log a brief summary of the discussions to his / her daily report.

IV. Protection of Land Resources

All future construction activities will commence with the following objectives in mind:

- Sevenson, or its subcontractors, will not deface, injure, destroy, remove, cut or damage vegetation except in those areas defined on the Contract Drawings and Specifications. Exceptions will be made in the event a new scope of work is added to the remedial

contract and approval has been given by USACE.

- All survey monuments and markers will be located and protected before construction activities commence.
- Temporary Facilities Offices, storage space and other construction buildings and appurtenances will be located in portions of the Contract work area in accordance with the specifications as shown in the Site Plan.
- The preservation of the landscape will be an important consideration in all activities, including the selection of all work sites and in the construction of any temporary facilities.
- Any items appearing to have historical or archaeological significance that are encountered during construction activities will be carefully identified and preserved. The archaeological find will be left undisturbed, and Sevenson will immediately report such finds to USACE. Artifacts historical or archaeological will be handled in accordance with the United States Code of Federal Regulations 36, Part 79, section 4 are applicable (U.S. Department of Interior 1991).
- Disposal of any materials, trash, garbage, oil, grease or chemicals will be in accordance with all local, State and Federal regulations. Dumpsters and containers for such items will be conveniently located at the work areas.
- No on site burning will be permitted.
- Upon project completion, Sevenson will remove all signs of temporary construction or any other vestiges of construction to the approval of USACE. The project site will be restored as necessary to permit the growth of vegetation.

V. Protection of Water Resources

All demolition, excavation and restoration activities will be completed with the following objectives in mind:

- Sevenson, or its subcontractors, will investigate and comply with all applicable Federal, State, and local laws regarding potential and actual contamination of surface water and groundwater and soil erosion and sediment control, in accordance with the Contract

Specifications. At all times, Sevenson will comply with the Project's approved Soil Erosion and Sediment Control Plan, which will be included in Appendix B once approved.

- Sevenson, and its subcontractors, will at all times perform all work and take such steps required to minimize interference with or disturbance to fish and wildlife.
- Water handled from all sources on the site will be processed through the Wastewater Treatment System as detailed in the Water Treatment Plan (submitted under separate cover). These sources include Stockpile Containment Area and decontamination wash-down water. During O&M of the Wastewater Treatment System, monitoring of the treated effluent will be conducted as noted in the UFP-QAPP and in accordance with project specifications.

VI. Protection of Air Resources

All demolition and excavation activities will be completed by Sevenson, or its subcontractors, in compliance with all applicable Federal and State laws regarding air emission and performance.

Dust Management & Air Pollution Control

Dust will be controlled within the work areas in accordance with EPA 540/2-85/003 – "Dust Control at Hazardous Waste Sites" (Nov 1985). At a minimum, dust control procedures will be implemented to protect workers and public health by employing practices in accordance with the Health and Safety Plan and local ordinances. Normal protocol for controlling dust will be implemented; a water truck or hoses from a potable water source will hydrate the soils and demolition debris as necessary to control dust. Dust control implemented outside of the construction and containment area will utilize potable water from the nearby fire hydrant accessed through an approved, metered valve and coordinated with the local water utility. The maximum speed limit in any area within the project site will be 5 miles per hour, or less if required for safety. Truck beds, roll-off boxes, or any other container used for hauling soil, sediment or debris will be tightly covered if necessary in order to prevent the uncontrolled release of dust into the air.

Sevenson will implement a perimeter air monitoring program and will execute in accordance with the approved Perimeter Air Monitoring Plan.

Odor control will be implemented if necessary during excavation material handling activities, at the discretion of Sevenson and the Contracting Officer. Odors noted by adjacent property owners will be mitigated to the maximum extent practical. An odor control product such as poly sheeting (or a similar alternative) will be applied to the exposed surface of odorous materials should it be deemed necessary. Additional measures for odor control can be found in the Odor Control Plan, as required by Contract Specification Section 02145, which will be submitted under separate cover.

Asbestos Hazard Control

Asbestos encountered will be addressed through the Projects's approved Asbestos Abatement and Disposal Plan, submitted under separate cover.

VII. Noise Control

Sevenson will make the maximum use of low-noise emissions equipment, as practical, according to USEPA Regulations. South Kearny does not have noise ordinance requirements.

Monitoring of noise will be the responsibility of the SSHO. Typically, noise emitted by equipment will be maintained to the following levels:

Table VII. Maximum Allowable Noise Levels

Equipment	***Noise Level in dB(A) at 50 ft.***
EARTHMOVING	
FRONT LOADER	75
BACKHOES	75
DOZERS	75
TRACTORS	75
SCRAPERS	80
GRADERS	75
TRUCK	75
PAVER	80
MATERIALS HANDLING	
CONCRETE MIXER	75
CONCRETE PUMP	75
CRANE	75

STATIONARY	
PUMPS	75
GENERATORS	75
COMPRESSORS	75
IMPACT	
JACK HAMMERS	75
ROCK DRILLS	80
PNEUMATIC TOOLS	80
OTHER	
SAWS	75
VIBRATOR	75

(Source – Table 9.9 FTA Construction Equipment Noise Emissions Levels – Construction Noise Handbook- Modified for Community Noise and Worker Protection Exposure)

Where noise levels have been found to exceed maximum acceptable levels as outlined in Table VII, earplugs, earmuffs, or other OSHA-approved hearing protection devices shall be donned by workers within the vicinity of the equipment. The areas will be posted to reflect the requirement for hearing protection.

Appendix A

Applicable Standards and Legislation

Sevenson will notify the Contracting Officer a minimum of 14 calendar days in advance of beginning any work that would typically require a permit. Sevenson will meet the requirements of applicable or relevant and appropriate requirements, as listed below:

- OSHA
- RCRA
- CERCLA
- Rivers and Harbors Act, Section 10
- Clean Water Act
- Endangered Species Act
- Fish and Wildlife Conservation Act
- Migratory Bird Treaty Act
- National Historic Preservation Act
- National Environmental Policy Act, specifically; Floodplain Management and Protection of Wetlands
- Federal Coastal Zone Management Act
- Federal Surface Water Quality Criteria
- New Jersey Coastal Area Facility Review Act
- New Jersey Waterfront Development Upland Waterfront Permit
- New Jersey Endangered Non-Game Species Act
- New Jersey State Water Surface Water Quality Standards
- New Jersey State Water Pollution Control Act
- NJDEP, Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters
- New Jersey Flood Hazard Control Act
- New Jersey Freshwater Protection Act
- New Jersey Tidal Resources Council
- New Jersey Soil Erosion and Sediment Control Act
- New Jersey Direct Contact Soil Cleanup Criteria
- New Jersey Solid Waste Management Act
- New Jersey Hazardous Waste Regulations
- New Jersey Statutes Governing Floodplains and Protection of Wetlands
- New Jersey Coastal Zone Management Program
- New Jersey State Air Quality Law and Noise Control

Appendix B

Soil Erosion & Sediment Control Plan

The Soil Erosion & Sediment Control will be submitted under separate cover.

Once accepted by the USACE, it will be included for reference

Appendix C

Spill Control Plan

Spill Control Plan

Syncon Resins Superfund Site
OU-2
South Kearny, New Jersey
Contract No. W912DQ-15-D-3002, TO 0002

Submitted by:
Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Prepared for:

U.S Army Engineer District
Corps of Engineers
Kansas City, Missouri

September 2016

I. Spill Response and Control Plan

The purpose of this section is to define practices and procedures for the prevention, containment, and cleanup of accidental discharges of hazardous substances during the project. These substances include both the contaminated material managed as a result of the remedial project, such as contaminated soils and decontamination liquids, and construction materials typically found on any construction site, such as lubricating fluids, diesel fuel, gasoline, etc.

Spill prevention applies to all types of spills and can be described as the first and simplest approach to spill control. Human error is a major contributing factor to spills and releases. An awareness of spill consequences, preventive measures, and countermeasures will greatly reduce spill occurrences. A sound prevention program includes careful work practices, constant inspection, and immediate notification and correction of deficiencies. In the event that a spill does occur, proper containment and cleanup procedures must then be followed in order to reduce the effect of the spill.

II. Prevention

Prevention of unnecessary spills is of first priority. Prevention measures include:

- Operators and drivers will exercise extreme caution when transporting material around the site.

- When removing hoses from machines an appropriate and adequate supply of absorbents will be on hand. A supply of the following absorbents will be kept on-site, oil sorbent booms, rolls and pillows, universal towels and sheets, and vermiculite.

- Hoses will be capped when not connected to their appropriate fitting.

- All containers will be inspected daily for decay. No open container will be exposed to rainfall, snowfall, etc. without being emptied and cleaned of residue.

- All equipment will be inspected for leaks before and after service.

- Storage of material such as fuels, oils, and solvents on-site will be limited to the minimum required. All fluids will be stored in individual fluid containers appropriate and approved for the material. Most of the individual fluids containers will be further secured by storage in large, locked tool and equipment storage containers. Drums or other containers too large to be stored in containers will be stored raised off the ground on a liner and covered by plastic.

III. Reporting

All spills will be reported immediately to appropriate field and office management personnel. The sequence of reporting will be as follows:

- Notification by workers to the Project Superintendent or SSHO.
- The Project Superintendent or SSHO will immediately notify the Contracting Officer Representative verbally and receive a written notification within 24 hours, regardless of the size of the spill. The report shall include the following items:
    - Name, organization, telephone number, and location of the Contractor.
    - Name and title of the person(s) reporting.
    - Date and time of the incident.
    - Location of the incident, i.e., site location, facility name.
    - Brief summary of the incident giving pertinent details including type of operation ongoing at the time of the incident.
    - Cause of the incident, if known.
    - Casualties (fatalities, disabling injuries).
    - Details of any existing chemical hazard or contamination.
    - Estimated property damage, if applicable.
    - Nature of damage and effect on contract schedule.
    - Action taken to ensure safety and security.
    - Other damage or injuries sustained, public or private.
- Sevenson and the Contracting Officer Representative will jointly determine the nature of the spill, its size, direction of travel, if anyone has been injured as a result of the spill and whether it requires immediate notification to regulatory agencies.

- The Contracting Officer Representative will have primary responsibility for notifying the regulatory agencies. Sevenson will have follow-up responsibility to verify that the notification is made in a timely manner. A full list of emergency contacts and telephone numbers is included this plan. This list includes Sevenson personnel, as well as federal, state and local authorities. This list will be posted in all trailers on-site.

- Reportable quantities notwithstanding, if the contaminated water/liquid/etc. entered the "waters of the state, or onto land to which it could flow to the waters of the state (groundwater included)" it's reportable to the DEP Hotline; 1-877-WARN DEP.

- Normally the licensed operator or site manager at the plant or project would be reporting this as soon as possible after the spill was noted unless the spilled materials remained inside a leak proof containment system.

- When the spill incident is called in, identify the site as a superfund site, and mention that the incident should be referred to Fred Mumford in SR&WMP. Also be sure to mention if the discharge has been stopped, and what response, if any, was taken to remediate the spill. Then Fred will need a letter (or e-mail) from EPA or the USACE documenting the incident, the response, and any corrective action for NJDEP and project records.

Upon notification of a spill, all project activity will be immediately suspended and all necessary equipment and personnel will be diverted to spill control and containment. In the event of a spill, and regardless of the size, a Spill Incident Report will be submitted to the Contracting Officer Representative with a copy to the USEPA within 48 hours of the incident.

IV. Spill Response Equipment

Given the nature of this project, all the necessary equipment and personnel necessary to deal with a release of hazardous substances will be available on site. In addition to the heavy equipment and personal protective equipment, which is critical to spill control, Sevenson will have on hand an ample amount of sorbent materials, UN1A2 open top drums and overpacks kept in the onsite (PPE) seabox.

V. Confinement and Containment

Prior to entering a spill area, all workers must be protected from any adverse effects of the spilled material. No one will enter any spill area alone. The SSHO will determine the level of protection required for response activities. To the extent practicable, the area will immediately be cordoned off and, if appropriate, exclusion, contamination reduction, and support zones will be established.

The decision to use confinement techniques such as diversion, diking and retention, are generally based on time, personnel, equipment, and supplies. As mentioned above, all necessary resources will be available on-site at all times. To the extent the nature of the material is known, the decision shall be made based upon a review of the harmful effects of the material. In the event of a large migrating spill, an unlikely circumstance, diversion techniques, such as placing a soil wall or absorbent boom ahead of the spill, will be implemented first. Subsequently, diking techniques, such as using material such as sand covered with liner material (PVC, hypalon) shall be implemented.

VI. Cleanup

Once a spill has been contained and the source of the spill corrected and controlled, cleanup can begin. Spill cleanup can proceed at the same time as containment, if feasible. Supervisory personnel will determine the appropriate cleanup methods. The SSHO will determine the appropriate level of protection depending upon the nature of the material.

- The first action will be to absorb free liquids with absorbent pads, booms, pillows, or clay. The absorbent material will be placed in drums and moved to an appropriate storage location. Subsequent to the removal of free liquids, soil believed to be contaminated will be

excavated and containerized in drums or stockpiled on poly sheeting and covered for further testing.

- Dry spills, while posing less of a risk of migration, will still require appropriate and immediate action. The nature of the spilled material will be ascertained. The spilled material will be recovered for reuse if appropriate. Material which cannot be recovered, and residual contaminated soil will be shoveled into 55-gallon drums, placed in the drum storage area, and sampled and analyzed for waste characterization and disposal.

- Once containerized, Sevenson Environmental will provide for the appropriate sampling and analysis for waste characterization and disposal facility acceptance. Results of waste characterization analysis, waste profiles, and manifests will be provided to the Construction Representative for review.

- All spilled material and visually contaminated soil will be excavated and containerized in the initial spill response. If there appears to be a possibility that contaminants have migrated into the surrounding soil, post-remedial sampling will be initiated. Soil samples will be taken from the areas of suspected contamination and analyzed for the compounds, which were released.

- NJDEP requires the immediate notification for spills (regardless of their size) to the NJDEP Hot Line.

Personnel Decontamination - In general, all spill response operations will be performed in accordance with the provisions of the approved SSHP.

VII. Report/Review

An immediate verbal notification will be given to the Contracting Officer representative and the appropriate government agencies (EPA, NJDEP, Coast Guard) and the COR with a written report to follow within 24 hours of the incident resolution. The Contracting Officer Representative will be provided with a copy. In addition, all key personnel will have a meeting within 48 hours of the incident to discuss and critique all of the aspects of the Emergency Contingency Plan according to new site conditions and lessons learned. Records of all previous incidents and spills will be maintained onsite by Sevenson.

Emergency Hotline Telephone Numbers Syncon Resins Superfund Site	
Response Agency	**Telephone**
Ambulance	911
Fire Department	911
Police Department	911
Raritan Bay Medical Center	732-442-3700
US EPA Spill Control	800-424-8802
NJ DEP Spill Control	877-WARN DEP
National Response Center	800-424-8802
Sevenson Steve Gillespie, PM Perry Novak, Super. Ron Scarborough, SSHO	 716-609-1416 (mobile) 973-462-1155 (mobile) 856-873-3614 (mobile) 77 Jacobus Ave South Kearny, NJ 07032
USACE Michael Johnson Matthew Creamer	 201-909-0019 (office) 347-495-6570 (mobile)

TABLE OF HAZARDOUS SUBSTANCES

Substance	**Quantity** (Max. at any time)
Gasoline	250 gallons
Diesel Fuel	250 gallons
Engine Oil	55 gallons
Hydraulic Oil	55 gallons

SAFETY DATA SHEETS (SDS)

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950
US GHS

Synonyms: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquid - Category 2
Skin Corrosion/Irritation - Category 2
Germ Cell Mutagenicity - Category 1B
Carcinogenicity - Category 1B
Toxic to Reproduction - Category 1A
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)
Specific Target Organ Toxicity (Repeat Exposure) - Category 1 (liver, kidneys, bladder, blood, bone marrow, nervous system)
Aspiration Hazard - Category 1
Hazardous to the Aquatic Environment – Acute Hazard - Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

DANGER

Hazard Statements

Highly flammable liquid and vapour.
Causes skin irritation.
May cause genetic defects.
May cause cancer.
May damage fertility or the unborn child.
May cause respiratory irritation.
May cause drowsiness or dizziness.
Causes damage to organs (liver, kidneys, bladder, blood, bone marrow, nervous system) through prolonged or repeated exposure.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe mist/vapours/spray.
Use only outdoors or in well-ventilated area.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.

Response

In case of fire: Use water spray, fog, dry chemical fire extinguishers or hand held fire extinguisher.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash before reuse. If skin irritation occurs, get medical advice/attention.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
Get medical advice/attention if you feel unwell.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting.

Storage

Store in a well-ventilated place.
Keep cool. Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
86290-81-5	Gasoline, motor fuel	100
108-88-3	Toluene	1-25
106-97-8	Butane	<10
1330-20-7	Xylenes (o-, m-, p- isomers)	1-15
95-63-6	Benzene, 1,2,4-trimethyl-	<6
64-17-5	Ethyl alcohol	0-10
100-41-4	Ethylbenzene	<3
71-43-2	Benzene	0.1-4.9

110-54-3	Hexane	0.5-4

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol). Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

USE ONLY AS A MOTOR FUEL.
DO NOT SIPHON BY MOUTH

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

Incompatibilities

Keep away from strong oxidizers.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Gasoline, motor fuel (86290-81-5)

ACGIH: 300 ppm TWA
500 ppm STEL

Toluene (108-88-3)

ACGIH: 20 ppm TWA
OSHA: 200 ppm TWA; 375 mg/m3 TWA
150 ppm STEL; 560 mg/m3 STEL
NIOSH: 100 ppm TWA; 375 mg/m3 TWA
150 ppm STEL; 560 mg/m3 STEL

Butane (106-97-8)

ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases: Alkane C1-4)
OSHA: 800 ppm TWA; 1900 mg/m3 TWA
NIOSH: 800 ppm TWA; 1900 mg/m3 TWA

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: 100 ppm TWA
150 ppm STEL
OSHA: 100 ppm TWA; 435 mg/m3 TWA
150 ppm STEL; 655 mg/m3 STEL

Benzene, 1,2,4-trimethyl- (95-63-6)

NIOSH: 25 ppm TWA; 125 mg/m3 TWA

Ethyl alcohol (64-17-5)

ACGIH: 1000 ppm STEL
OSHA: 1000 ppm TWA; 1900 mg/m3 TWA
NIOSH: 1000 ppm TWA; 1900 mg/m3 TWA

Ethylbenzene (100-41-4)

ACGIH: 20 ppm TWA
OSHA: 100 ppm TWA; 435 mg/m3 TWA
125 ppm STEL; 545 mg/m3 STEL
NIOSH: 100 ppm TWA; 435 mg/m3 TWA
125 ppm STEL; 545 mg/m3 STEL

Benzene (71-43-2)

ACGIH: 0.5 ppm TWA
2.5 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA
NIOSH: 0.1 ppm TWA
1 ppm STEL

Hexane (110-54-3)

ACGIH: 50 ppm TWA
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 500 ppm TWA; 1800 mg/m3 TWA
NIOSH: 50 ppm TWA; 180 mg/m3 TWA

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Translucent, straw-colored or light yellow	**Odor:**	Strong, characteristic aromatic hydrocarbon odor. Sweet-ether like
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C)	**Vapor Density:**	AP 3-4
Boiling Point:	85-437 °F (39-200 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible to Slight	**Specific Gravity:**	0.70-0.78
Evaporation Rate:	10-11	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	-45 °F (-43 °C)	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.6%	**Lower Flammability Limit (LFL):**	1.4%
Burning Rate:	ND	**Auto Ignition:**	>530°F (>280°C)

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Gasoline, motor fuel (86290-81-5)

Inhalation LC50 Rat >5.2 mg/L 4 h; Oral LD50 Rat 14000 mg/kg; Dermal LD50 Rabbit >2000 mg/kg

Toluene (108-88-3)

Inhalation LC50 Rat 12.5 mg/L 4 h; Inhalation LC50 Rat >26700 ppm 1 h; Oral LD50 Rat 636 mg/kg; Dermal LD50 Rabbit 8390 mg/kg; Dermal LD50 Rat 12124 mg/kg

Butane (106-97-8)

Inhalation LC50 Rat 658 mg/L 4 h

Xylenes (o-, m-, p- isomers) (1330-20-7)
Inhalation LC50 Rat 5000 ppm 4 h; Inhalation LC50 Rat 47635 mg/L 4 h; Oral LD50 Rat 4300 mg/kg; Dermal LD50 Rabbit >1700 mg/kg

Benzene, 1,2,4-trimethyl- (95-63-6)
Inhalation LC50 Rat 18 g/m3 4 h; Oral LD50 Rat 3400 mg/kg; Dermal LD50 Rabbit >3160 mg/kg

Ethyl alcohol (64-17-5)
Oral LD50 Rat 7060 mg/kg; Inhalation LC50 Rat 124.7 mg/L 4 h

Ethylbenzene (100-41-4)
Inhalation LC50 Rat 17.2 mg/L 4 h; Oral LD50 Rat 3500 mg/kg; Dermal LD50 Rabbit 15354 mg/kg

Benzene (71-43-2)
Inhalation LC50 Rat 13050-14380 ppm 4 h; Oral LD50 Rat 1800 mg/kg

Hexane (110-54-3)
Inhalation LC50 Rat 48000 ppm 4 h; Oral LD50 Rat 25 g/kg; Dermal LD50 Rabbit 3000 mg/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Moderate irritant. Contact with liquid or vapor may cause irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This product may cause genetic defects.

Carcinogenicity

A: General Product Information

May cause cancer.

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

B: Component Carcinogenicity

Gasoline, motor fuel (86290-81-5)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Toluene (108-88-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Ethyl alcohol (64-17-5)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 100E [in preparation] (in alcoholic beverages); Monograph 96 [2010] (in alcoholic beverages) (Group 1 (carcinogenic to humans))

Ethylbenzene (100-41-4)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))

Benzene (71-43-2)

ACGIH: A1 - Confirmed Human Carcinogen
OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA
NIOSH: potential occupational carcinogen
NTP: Known Human Carcinogen (Select Carcinogen)
IARC: Monograph 100F [in preparation]; Supplement 7 [1987]; Monograph 29 [1982] (Group 1 (carcinogenic to humans))

Reproductive Toxicity

This product is suspected of damaging fertility or the unborn child.

Specified Target Organ General Toxicity: Single Exposure

This product may cause drowsiness or dizziness.

Specified Target Organ General Toxicity: Repeated Exposure

This product causes damage to organs through prolonged or repeated exposure.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Very toxic to aquatic life with long lasting effects. Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Gasoline, motor fuel (86290-81-5)

Test & Species		Conditions
96 Hr LC50 Alburnus alburnus	119 mg/L [static]	
96 Hr LC50 Cyprinodon variegatus	82 mg/L [static]	
72 Hr EC50 Pseudokirchneriella subcapitata	56 mg/L	
24 Hr EC50 Daphnia magna	170 mg/L	

Toluene (108-88-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	15.22-19.05 mg/L [flow-through]	1 day old
96 Hr LC50 Pimephales promelas	12.6 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.89-7.81 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	14.1-17.16 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.8 mg/L [semi-static]	
96 Hr LC50 Lepomis macrochirus	11.0-15.0 mg/L [static]	
96 Hr LC50 Oryzias latipes	54 mg/L [static]	
96 Hr LC50 Poecilia reticulata	28.2 mg/L [semi-static]	
96 Hr LC50 Poecilia reticulata	50.87-70.34 mg/L [static]	
96 Hr EC50 Pseudokirchneriella subcapitata	>433 mg/L	
72 Hr EC50 Pseudokirchneriella subcapitata	12.5 mg/L [static]	
48 Hr EC50 Daphnia magna	5.46 - 9.83 mg/L [Static]	
48 Hr EC50 Daphnia magna	11.5 mg/L	

Xylenes (o-, m-, p- isomers) (1330-20-7)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	13.4 mg/L [flow-through]	

96 Hr LC50 Oncorhynchus mykiss	2.661-4.093 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	13.5-17.3 mg/L
96 Hr LC50 Lepomis macrochirus	13.1-16.5 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	19 mg/L
96 Hr LC50 Lepomis macrochirus	7.711-9.591 mg/L [static]
96 Hr LC50 Pimephales promelas	23.53-29.97 mg/L [static]
96 Hr LC50 Cyprinus carpio	780 mg/L [semi-static]
96 Hr LC50 Cyprinus carpio	>780 mg/L
96 Hr LC50 Poecilia reticulata	30.26-40.75 mg/L [static]
48 Hr EC50 water flea	3.82 mg/L
48 Hr LC50 Gammarus lacustris	0.6 mg/L

Benzene, 1,2,4-trimethyl- (95-63-6)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	7.19-8.28 mg/L [flow-through]
48 Hr EC50 Daphnia magna	6.14 mg/L

Ethyl alcohol (64-17-5)

Test & Species	Conditions
96 Hr LC50 Oncorhynchus mykiss	12.0 - 16.0 mL/L [static]
96 Hr LC50 Pimephales promelas	>100 mg/L [static]
96 Hr LC50 Pimephales promelas	13400 - 15100 mg/L [flow-through]
48 Hr LC50 Daphnia magna	9268 - 14221 mg/L
24 Hr EC50 Daphnia magna	10800 mg/L
48 Hr EC50 Daphnia magna	2 mg/L [Static]

Ethylbenzene (100-41-4)

Test & Species	Conditions
96 Hr LC50 Oncorhynchus mykiss	11.0-18.0 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	4.2 mg/L [semi-static]
96 Hr LC50 Pimephales promelas	7.55-11 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	32 mg/L [static]
96 Hr LC50 Pimephales promelas	9.1-15.6 mg/L [static]
96 Hr LC50 Poecilia reticulata	9.6 mg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	4.6 mg/L
96 Hr EC50 Pseudokirchneriella subcapitata	>438 mg/L
72 Hr EC50 Pseudokirchneriella subcapitata	2.6 - 11.3 mg/L [static]

96 Hr EC50 Pseudokirchneriella subcapitata	1.7 - 7.6 mg/L [static]
48 Hr EC50 Daphnia magna	1.8 - 2.4 mg/L

Benzene (71-43-2)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	10.7-14.7 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	22.49 mg/L [static]
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]
96 Hr LC50 Pimephales promelas	22330-41160 µg/L [static]
96 Hr LC50 Lepomis macrochirus	70000-142000 µg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	29 mg/L
48 Hr EC50 Daphnia magna	8.76 - 15.6 mg/L [Static]
48 Hr EC50 Daphnia magna	10 mg/L

Hexane (110-54-3)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	2.1-2.98 mg/L [flow-through]
24 Hr EC50 Daphnia magna	>1000 mg/L

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

DOT Information

Shipping Name: Gasoline
UN #: 1203 **Hazard Class:** 3 **Packing Group:** II
Placard:

* * * Section 15 - Regulatory Information * * *

Regulatory Information

A: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Toluene (108-88-3)
SARA 313: 1.0 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Xylenes (o-, m-, p- isomers) (1330-20-7)
SARA 313: 1.0 % de minimis concentration
CERCLA: 100 lb final RQ; 45.4 kg final RQ

Benzene, 1,2,4-trimethyl- (95-63-6)
SARA 313: 1.0 % de minimis concentration

Ethylbenzene (100-41-4)
SARA 313: 0.1 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Benzene (71-43-2)
SARA 313: 0.1 % de minimis concentration
CERCLA: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

Hexane (110-54-3)

SARA 313: 1.0 % de minimis concentration
CERCLA: 5000 lb final RQ; 2270 kg final RQ

SARA Section 311/312 – Hazard Classes

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	X	--	--

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Gasoline, motor fuel	86290-81-5	No	No	No	No	Yes	No
Toluene	108-88-3	Yes	Yes	Yes	Yes	Yes	No
Butane	106-97-8	Yes	Yes	Yes	Yes	Yes	No
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	Yes	Yes	Yes	Yes	No
Benzene, 1,2,4-trimethyl-	95-63-6	No	Yes	Yes	Yes	Yes	No
Ethyl alcohol	64-17-5	Yes	Yes	Yes	Yes	Yes	No
Ethylbenzene	100-41-4	Yes	Yes	Yes	Yes	Yes	No
Benzene	71-43-2	Yes	Yes	Yes	Yes	Yes	No
Hexane	110-54-3	No	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.
WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Toluene	108-88-3	1 %
Butane	106-97-8	1 %
Benzene, 1,2,4-trimethyl-	95-63-6	0.1 %
Ethyl alcohol	64-17-5	0.1 %
Ethylbenzene	100-41-4	0.1 %
Benzene	71-43-2	0.1 %
Hexane	110-54-3	1 %

Additional Regulatory Information

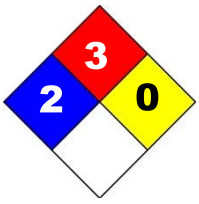
Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Gasoline, motor fuel	86290-81-5	No	DSL	EINECS
Toluene	108-88-3	Yes	DSL	EINECS
Butane	106-97-8	Yes	DSL	EINECS
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	DSL	EINECS
Benzene, 1,2,4-trimethyl-	95-63-6	Yes	DSL	EINECS
Ethyl alcohol	64-17-5	Yes	DSL	EINECS
Ethylbenzene	100-41-4	Yes	DSL	EINECS
Benzene	71-43-2	Yes	DSL	EINECS
Hexane	110-54-3	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating

Health	2
Fire	3
Reactivity	0



HMIS® Hazard Rating

Health	2	Moderate
Fire	3	Serious
Physical	0	Minimal
		*Chronic

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration., NJTSR = New Jersey Trade Secret Registry.

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

SAFETY DATA SHEET

CITGO No. 1 Diesel Fuel, Ultra Low Sulfur, All Grades

Section 1. Identification

GHS product identifier : CITGO No. 1 Diesel Fuel, Ultra Low Sulfur, All Grades

Synonyms : Kerosene, Kerosine, Low Sulfur Diesel Fuel

Material uses : Fuel.

Code : 08703, 08704, 08706, 08709, 08720,

MSDS # : ULS-AG1DF

Supplier's details : CITGO Petroleum Corporation
P.O. Box 4689
Houston, TX 77210
sdsvend@citgo.com

Emergency telephone number : Technical Contact: (832) 486-4000
Medical Emergency: (832) 486-4700
CHEMTREC Emergency: (800) 424-9300
(United States Only)

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 3
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B
CARCINOGENICITY (dermal) - Category 2
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
ASPIRATION HAZARD - Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Flammable liquid and vapor.
Causes serious eye irritation.
Causes skin irritation.
Suspected of causing cancer in contact with skin.
May be fatal if swallowed and enters airways.
May cause respiratory irritation.

Precautionary statements

General : Diesel engine exhaust can cause upper respiratory tract irritation and reversible pulmonary effects. Long-term exposure to diesel engine exhaust may cause cancer. Do not syphon by mouth.

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid breathing vapor. Wash hands thoroughly after handling.

Section 2. Hazards identification

Response : IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up. Store in a well-ventilated place. Keep cool.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : Defatting to the skin.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Other means of identification : Kerosene, Kerosine, Low Sulfur Diesel Fuel

CAS number/other identifiers

CAS number : 64742-81-0

Ingredient name	%	CAS number
Kerosine (petroleum), hydrodesulfurized	100	64742-81-0
Naphthalene	0.1 - 1	91-20-3
Ethylbenzene	0.1 - 1	100-41-4
Xylenes, mixed isomers	0.1 - 1	1330-20-7

* = Various ** = Mixture *** = Proprietary

Any concentration shown as a range is to protect confidentiality or is due to process variation.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that gas or vapor is still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar,

Section 4. First aid measures

Most important symptoms/effects, acute

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : May cause respiratory irritation.

Skin contact : Causes skin irritation. Defatting to the skin.

Ingestion : May be fatal if swallowed and enters airways.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Skin contact : Adverse symptoms may include the following:
irritation
redness
dryness
cracking

Ingestion : Adverse symptoms may include the following:
nausea or vomiting

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended. Consider activated charcoal and/or gastric lavage. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.

Specific treatments : Treat symptomatically and supportively.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that gas or vapor is still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Specific hazards arising from the chemical : Flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Extinguishing media

Suitable extinguishing media : Use caution when applying carbon dioxide in confined spaces.
SMALL FIRE: Steam, CO_2, dry chemical or inert gas (e.g., nitrogen). LARGE FIRE: Use foam, water fog or water spray. Water fog and spray are effective in cooling containers and adjacent structures. However, water can cause frothing and/or may not extinguish the fire. Water can be used to cool the external walls of vessels to prevent excessive pressure, ignition or explosion.

Unsuitable extinguishing media : Do not use water jet.

Section 5. Fire-fighting measures

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
Diesel engine exhaust

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not swallow. Avoid breathing vapor or mist. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container. Non equilibrium conditions may increase the fire hazard associated with this product. Always bond receiving containers

Section 7. Handling and storage

properly grounded. Bonding and grounding alone may be inadequate to eliminate fire and explosion hazards. Carefully review operations that may increase the risks such as tank and container filling, tank cleaning, sampling, gauging, loading, filtering, mixing, agitation, etc. In addition to bonding and grounding, efforts to mitigate the hazards may include, but are not limited to, ventilation, inerting and/or reduction of transfer velocities. Always keep nozzle in contact with the container throughout the loading process. Do NOT fill any portable container in or on a vehicle.

Special precautions, such as reduced loading rates and increased monitoring, must be observed during "switch loading" operations (i.e., loading this material in tanks or shipping compartments that previously contained a dissimilar product).

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Bulk Storage Conditions: Maintain all storage tanks in accordance with applicable regulations. Use necessary controls to monitor tank inventories. Inspect all storage tanks on a periodic basis. Test tanks and associated piping for tightness. Maintain the automatic leak detection devices to assure proper working condition.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Kerosine (petroleum), hydrodesulfurized	**ACGIH TLV (United States, 4/2014). Absorbed through skin.** TWA: 200 mg/m³, (as total hydrocarbon vapor) 8 hours.
Naphthalene	**ACGIH (United States). Absorbed through skin.** TWA: 10 ppm 8 hours. STEL: 15 ppm 15 minutes. **OSHA (United States).** TWA: 10 ppm 8 hours. **ACGIH TLV (United States, 4/2014). Absorbed through skin.** TWA: 10 ppm 8 hours. TWA: 52 mg/m³ 8 hours. **OSHA PEL (United States, 2/2013).** TWA: 10 ppm 8 hours. TWA: 50 mg/m³ 8 hours.
Ethylbenzene	**ACGIH TLV (United States, 4/2014).** TWA: 20 ppm 8 hours. **OSHA PEL (United States, 2/2013).** TWA: 100 ppm 8 hours. TWA: 435 mg/m³ 8 hours.
Xylenes, mixed isomers	**ACGIH TLV (United States, 4/2014).** TWA: 100 ppm 8 hours. TWA: 434 mg/m³ 8 hours. STEL: 150 ppm 15 minutes. STEL: 651 mg/m³ 15 minutes. **OSHA PEL (United States, 2/2013).**

Section 8. Exposure controls/personal protection

Cumene	TWA: 435 mg/m³ 8 hours. **ACGIH TLV (United States, 4/2014).** TWA: 50 ppm 8 hours. **OSHA PEL (United States, 2/2013). Absorbed through skin.** TWA: 50 ppm 8 hours. TWA: 245 mg/m³ 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, vapor controls, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Avoid skin contact with liquid. Chemical-resistant gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: Heavy duty, industrial grade chemically resistant gloves constructed of nitrile, neoprene, polyethylene, fluoroelastomer rubber or polyvinyl chloride as approved by glove manufacturer. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. Leather gloves are not protective for liquid contact.

Body protection : Avoid skin contact with liquid. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Avoid skin contact with liquid. Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Leather boots are not protective for liquid contact.

Respiratory protection : Avoid inhalation of gases, vapors, mists or dusts. Use a properly fitted, air-purifying or supplied-air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If an air purifying respirator is appropriate, use one equipped with cartridges rated for organic vapors.

Section 9. Physical and chemical properties

Physical state : Liquid.

Color : Colorless to light yellow or Red.

Odor : Characteristic. Hydrocarbon.

pH : Not available.

Melting point : -20°C (-4°F)

Boiling point/boiling range : 150 to 300°C (302 to 572°F)

Flash point : Closed cup: 38°C (100°F) [Pensky-Martens. (Minimum)]

Evaporation rate : 0.2 (butyl acetate = 1)

Lower and upper explosive (flammable) limits : Lower: 0.7%
Upper: 5%

Vapor pressure : <0.27 kPa (<2 mm Hg) [room temperature]

Vapor density : 4.5 [Air = 1]

Relative density : 0.8

Density lbs/gal : Estimated 6.67 lbs/gal

Gravity, °API : Estimated 45 @ 60 F

Solubility : Very slightly soluble in the following materials: cold water.

Auto-ignition temperature : 229°C (444°F)

Viscosity : Kinematic (room temperature): 0.01 cm^2/s (1 cSt)

Conductivity : 25 picosiemens/meter (minimum)

Section 10. Stability and reactivity

Reactivity : Not expected to be Explosive, Self-Reactive, Self-Heating, or an Organic Peroxide under US GHS Definition(s).

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas. Do not store with strong oxidizing agents.

Incompatible materials : Reactive or incompatible with the following materials:
oxidizing materials

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Kerosine (petroleum), hydrodesulfurized	LD50 Oral	Rat	>5000 mg/kg	-
Naphthalene	LD50 Oral	Rat	490 mg/kg	-
Ethylbenzene	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-
Xylenes, mixed isomers	LC50 Inhalation Gas.	Cat	9500 ppm	2 hours
	LC50 Inhalation Gas.	Rat	5000 ppm	4 hours

Section 11. Toxicological information

Cumene	LC50 Inhalation Gas. LD50 Oral LD50 Oral LD50 Oral LC50 Inhalation Vapor LD50 Dermal LD50 Oral LD50 Oral	Rat Mouse Rat Rat Mouse Rabbit Rat Rat	6670 ppm 2119 mg/kg 4300 mg/kg 4300 mg/kg 10 g/m³ 12300 uL/kg 2.9 g/kg 4000 mg/kg	4 hours - - - 7 hours - - -

Conclusion/Summary : No additional information.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Kerosine (petroleum), hydrodesulfurized	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
Naphthalene	Skin - Mild irritant	Rabbit	-	495 milligrams	-
Ethylbenzene	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-
Xylenes, mixed isomers	Skin - Mild irritant	Rat	-	8 hours 60 microliters	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Moderate irritant	Rabbit	-	100 Percent	-
Cumene	Eyes - Mild irritant	Rabbit	-	86 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 10 milligrams	-

Skin : No additional information.

Eyes : No additional information.

Respiratory : No additional information.

Sensitization

Skin : No additional information.

Respiratory : No additional information.

Mutagenicity

Conclusion/Summary : No additional information.

Carcinogenicity

Conclusion/Summary : **Diesel exhaust particulate**: Lung tumor and lymphomas were identified in rats and mice exposed to unflitered diesel fuel exhaust in chronic inhalation studies. Further, epidemiological studies have identified increase incidences of lung cancer in US railroad workers and bladder cancer in bus and truck drivers possibly associated with exposure to diesel engine exhaust. NTP has determined that exposure to diesel exhaust particulates, a complex mixture of combustion products of diesel fuel, is reasonably anticipated to be a human carcinogen. In addition, NIOSH has identified complete diesel exhaust as a potential carcinogen.

Classification

Product/ingredient name	OSHA	IARC	NTP
Naphthalene	-	2B	Reasonably anticipated to be a human carcinogen.
Ethylbenzene	-	2B	-
Xylenes, mixed isomers	-	3	-

Reproductive toxicity

Conclusion/Summary : No additional information.

Teratogenicity

Conclusion/Summary : No additional information.

Specific target organ toxicity (single exposure)

Section 11. Toxicological information

Name	Category	Route of exposure	Target organs
Kerosine (petroleum), hydrodesulfurized	Category 3	Not applicable.	Narcotic effects
Ethylbenzene	Category 3	Not applicable.	Respiratory tract irritation
Cumene	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Xylenes, mixed isomers	Category 2	Not determined	hearing organs

Aspiration hazard

Name	Result
Kerosine (petroleum), hydrodesulfurized	ASPIRATION HAZARD - Category 1
Ethylbenzene	ASPIRATION HAZARD - Category 1
Cumene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure : Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : May cause respiratory irritation.

Skin contact : Causes skin irritation. Defatting to the skin.

Ingestion : May be fatal if swallowed and enters airways.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Skin contact : Adverse symptoms may include the following:
irritation
redness
dryness
cracking

Ingestion : Adverse symptoms may include the following:
nausea or vomiting

Potential chronic health effects

General : No known significant effects or critical hazards.

Carcinogenicity : Suspected of causing cancer in contact with skin. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Xylenes, mixed isomers	Acute EC50 90 mg/l Fresh water	Crustaceans - Cypris subglobosa	48 hours
	Acute LC50 8.5 ppm Marine water	Crustaceans - Palaemonetes pugio - Adult	48 hours
	Acute LC50 8500 µg/l Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 15700 µg/l Fresh water	Fish - Lepomis macrochirus - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
	Acute LC50 19000 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours
	Acute LC50 13400 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Acute LC50 16940 µg/l Fresh water	Fish - Carassius auratus	96 hours
Ethylbenzene	Acute EC50 4600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 3600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute EC50 6530 µg/l Fresh water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 2930 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 4200 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
Naphthalene	Acute EC50 1.6 ppm Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 2350 µg/l Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 213 µg/l Fresh water	Fish - Melanotaenia fluviatilis - Larvae	96 hours

Conclusion/Summary : Not available.

Persistence and degradability

Conclusion/Summary : Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Xylenes, mixed isomers	3.12	8.1 to 25.9	low
Ethylbenzene	3.6	-	low
Naphthalene	3.4	36.5 to 168	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they

Section 13. Disposal considerations

and contact with soil, waterways, drains and sewers.

RCRA classification : D001, D018

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	NA 1993	UN 1202	UN 1202
UN proper shipping name	NA 1993, Diesel Fuel, 3, III	UN 1202, Diesel Fuel, 3, III	UN 1223, Diesel Fuel, 3, III
Transport hazard class(es)	3	3	3
Packing group	III	III	III
Environmental hazards	No.	No.	No.
Additional information	**Packaging instruction** **Passenger aircraft** Quantity limitation: 60 L Packaging instructions: 309 **Cargo aircraft** Quantity limitation: 220 L Packaging instructions: 310 **Remarks** 49 CFR 173.150 (f)(1) states that a flammable liquid with a flash point at or above 38ºC (100ºF) that does not meet the definition of any other hazard class may be reclassed as a combustible liquid. This provision does not apply to transportation by vessel or aircraft except where other means of transportaion is impracticable.	-	**Passenger and Cargo Aircraft** Quantity limitation: 60 L Packaging instructions: 309 **Cargo Aircraft Only**Quantity limitation: 220 L Packaging instructions: 310

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b)**: All components are listed or exempted.

Clean Water Act (CWA) 307: Naphthalene; Ethylbenzene; Toluene; Benzene

Clean Water Act (CWA) 311: Naphthalene; Ethylbenzene; Xylenes, mixed isomers; Toluene; Benzene

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

SARA 302/304

Composition/information on ingredients

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

Name	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Kerosine (petroleum)	Yes.	No.	No.	Yes.	Yes.
Naphthalene	Yes.	No.	No.	Yes.	Yes.
Ethylbenzene	Yes.	No.	No.	Yes.	Yes.
Xylenes, mixed isomers	Yes.	No.	No.	Yes.	Yes.
Cumene	Yes.	No.	No.	Yes.	Yes.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	Naphthalene Ethylbenzene	91-20-3 100-41-4	<1 <1
Supplier notification	Naphthalene Ethylbenzene	91-20-3 100-41-4	<1 <1

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: KEROSINE

New York : The following components are listed: Naphthalene; Ethylbenzene

New Jersey : The following components are listed: KEROSENE; FUEL OIL #1

Pennsylvania : The following components are listed: KEROSINE (PETROLEUM)

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.
WARNING: This product contains less than 1% of a chemical known to the State of California to cause birth defects or other reproductive harm.

Ingredient name	%	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level

Section 15. Regulatory information

Diesel exhaust particulate	<2	Yes.	No.	No.	No.
Naphthalene	<1	Yes.	No.	Yes.	No.
Ethylbenzene	<1	Yes.	No.	41 µg/day (ingestion) 54 µg/day (inhalation)	No.
Toluene	<0.1	No.	Yes.	No.	7000 µg/day (ingestion)
Benzene	<0.1	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)

International regulations

International lists : **Australia inventory (AICS)**: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: Not determined.
Korea inventory: All components are listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
Taiwan inventory (CSNN): Not determined.

Canada inventory : All components are listed or exempted.

EU Inventory : All components are listed or exempted.

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2B: Material causing other toxic effects (Toxic).

Section 16. Other information

National Fire Protection Association (U.S.A.)

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of issue/Date of revision : 12/10/2015

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Notice to reader

Section 16. Other information

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Polychlorinated Biphenyls (PCBs)

CAS Number: 1336-36-3

What are PCBs?

Polychlorinated biphenyls (PCBs) were developed in the 1940's and were used extensively in the manufacture of transformers, capacitors, and other heat transfer devices through the late 1970's. PCBs are a group of chemicals that have extremely high boiling points and are practically nonflammable. Because of this, they were used extensively as heat transfer fluids in transformers and capacitors. In 1979 their manufacture and importation was banned in the United States, based on mounting evidence that they were toxic to humans and wildlife. Today they are classified as probable human carcinogens and are listed in the top 10% of EPA's most toxic chemicals. At older federal facilities today, there are still many PCB-containing transformers and capacitors. Many of these transformers are at or close to the end of their useful life and proper disposal of them is required to prevent the unnecessary (and unlawful) release of PCBs into the environment.

How might I be exposed to PCBs?

Fish consumption appears to be the major pathway of exposure. PCBs do not easily break down, and can bioaccumulate in the fatty tissues of fish and mammals. A significant trend of increasing body burden is associated with increased fish consumption. People who eat sport-caught fish consumed 2-3 times more fish than the overall U.S. population.

Concentrations of PCBs in subsurface soil at a Superfund site have been as high as 750 ppm. People who live near hazardous waste sites may be exposed to PCBs by consuming PCB-contaminated sportfish and game animals, by breathing PCBs in air, or by drinking PCB-contaminated well water.

Although PCBs are no longer made in the United States, people can still be exposed to them. Many older transformers and capacitors may still contain PCBs, and this equipment can be used for 30 years or more. Old fluorescent lighting fixtures and old electrical devices and appliances, such as television sets and refrigerators, may contain PCBs if they were made before PCB use was stopped. When these electric devices get hot during operation, small amounts of PCBs may get into the air and raise the level of PCBs in indoor air. Because devices that contain PCBs can leak with age, they could also be a source of skin exposure to PCBs.

Workplace exposure to PCBs can occur during the repair and maintenance of PCB transformers, accidents, fires, or spills involving PCB transformers and older computers and instruments, and disposal of PCB materials. In addition to older electrical instruments and fluorescent lights that contain

PCB-filled capacitors, caulking materials, elastic sealants, and heat insulation have also been known to contain PCBs. Contact with PCBs at hazardous waste sites can happen when workers breathe air and touch soil containing PCBs. Exposure in the contaminated workplace occurs mostly by breathing air containing PCBs and by touching substances that contain PCBs.

How can PCBs enter and leave my body?

If you breathe air that contains PCBs, they can enter your body through your lungs and pass into the bloodstream. We do not know how fast or how much of the PCBs that are breathed will pass into the blood. A common way for PCBs to enter your body is by eating meat or fish products or other foods that contain PCBs. Exposure from drinking water is less than from food. It is also possible that PCBs can enter your body by breathing indoor air or by skin contact in buildings that have the kinds of old electrical devices that contain and can leak PCBs. For people living near waste sites or processing or storage facilities, and for people who work with or around PCBs, the most likely ways that PCBs will enter their bodies are from skin contact with contaminated soil and from breathing PCB vapors. Once PCBs are in your body, some may be changed by your body into other related chemicals called metabolites. Some metabolites of PCBs may have the potential to be as harmful as some unchanged PCBs. Some of the metabolites may leave your body in the feces in a few days, but others may remain in your body fat for months. Unchanged PCBs may also remain in your body and be stored for years mainly in the fat and liver, but smaller amounts can be found in other organs as well. PCBs collect in milk fat and can enter the bodies of infants through breast-feeding.

How can PCBs affect my health?

Many studies have looked at how PCBs can affect human health. Some of these studies investigated people exposed in the workplace, and others have examined members of the general population. Skin conditions, such as acne and rashes, may occur in people exposed to high levels of PCBs. These effects on the skin are well documented, but are not likely to result from exposures in the general population. Most of the human studies have many shortcomings, which make it difficult for scientists to establish a clear association between PCB exposure levels and health effects. Some studies in workers suggest that exposure to PCBs may also cause irritation of the nose and lungs, gastrointestinal discomfort, changes in the blood and liver, and depression and fatigue. Workplace concentrations of PCBs, such as those in areas where PCB transformers are repaired and maintained, are higher than levels in other places, such as air in buildings that have electrical devices containing PCBs or in outdoor air, including air at hazardous waste sites. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Is there a medical test to determine if I have been exposed to PCBs?

Levels of PCBs in the environment were zero before PCBs were manufactured. Now, all people in industrial countries have some PCBs in their bodies. There are tests to determine whether PCBs are in the blood, body fat, and breast milk. These are not regular or routine clinical tests, such as the one for cholesterol, but could be ordered by a doctor to detect PCBs in people exposed to them in the environment and at work. If your PCB levels are higher than the background levels, this will show that you have been exposed to high

levels of PCBs. However, these measurements cannot determine the exact amount or type of PCBs that you have been exposed to, or how long you have been exposed. Although these tests can indicate whether you have been exposed to PCBs to a greater extent than the general population, they do not predict whether you will develop harmful health effects. Blood tests are the easiest, safest, and probably the best method for detecting recent exposures to large amounts of PCBs. Results of such tests should be reviewed and carefully interpreted by physicians with a background in environmental and occupational medicine. Nearly everyone has been exposed to PCBs because they are found throughout the environment, and people are likely to have detectable amounts of PCBs in their blood, fat, and breast milk. Recent studies have shown that PCB levels in tissues from United States population are now declining.

What levels of exposure have resulted in harmful health effects?

Human health studies indicate that: 1) reproductive function may be disrupted by high levels of exposure to PCBs; 2) neurobehavioral and developmental deficits occur in newborns and continue through school-aged children who had in-utero exposure to PCBs; 3) other systemic effects (e.g., self-reported liver disease and diabetes, and effects on the thyroid and immune systems) are associated with elevated serum levels of PCBs; and 4) increased cancer risks, e.g., non-Hodgkin's lymphoma, are associated with PCB exposures.

What recommendations has the federal government made to protect human health?

The federal government has developed regulations, guidelines, and standards to protect people from the possible health effects of exposure to PCBs.

The federal government develops regulations and recommendations to protect public health. Regulations can be enforced by law. Federal agencies that develop regulations for toxic substances include the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the Food and Drug Administration (FDA). Recommendations provide valuable guidelines to protect public health but cannot be enforced by law. Federal organizations that develop recommendations for toxic substances include the Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Occupational Safety and Health (NIOSH).

Regulations and recommendations can be expressed in not-to-exceed levels in air, water, soil, or food that are usually based on levels that affect animals; then they are adjusted to help protect people. Sometimes these not-to-exceed levels differ among federal organizations because of different exposure times (an 8-hour workday or a 24-hour day), the use of different animal studies, or other factors.

Recommendations and regulations are periodically updated as more information becomes available. For the most current information, check with the federal agency or organization that provides it. Some regulations and recommendations for PCBs include the following:

The EPA standard for PCBs in drinking water is 0.5 parts of PCBs per billion parts (ppb) of water. For the protection of human health from the possible effects of drinking the water or eating the fish or shellfish from lakes and streams that are contaminated with PCBs, the EPA regulates that the level of PCBs in these waters be no greater than 0.17 parts of PCBs per trillion parts (ppt) of water.

The FDA has set residue limits for PCBs in

various foods to protect from harmful health effects. FDA required limits include 0.2 parts of PCBs per million parts (ppm) in infant and junior foods, 0.3 ppm in eggs, 1.5 ppm in milk and other dairy products (fat basis), 2 ppm in fish and shellfish (edible portions), and 3 ppm in poultry and red meat (fat basis).

OSHA regulates that workers not be exposed by inhalation over a period of 8 hours for 5 days per week to more than 1 milligram per cubic meter of air (mg/m^3) for 42% chlorine PCBs, or to 0.5 mg/m^3 for 54% chlorine PCBs.

NIOSH recommends that workers not breathe air containing 42 or 54% chlorine PCB levels higher than 1 microgram per cubic meter of air ($\mu g/m^3$) for a 10-hour workday, 40-hour workweek.

EPA requires that companies that transport, store, or dispose of PCBs follow the rules and regulations of the federal hazardous waste management program. EPA also limits the amount of PCBs put into publicly owned waste water treatment plants. To minimize exposure of people to PCBs, EPA requires that industry tell the National Response Center each time one pound or more of PCBs has been released to the environment.

Where can I get more information?

If you have more questions or concerns, please contact your state health or environmental department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road, E-29
Atlanta, Georgia 30333

References

1. Agency for Toxic Substances and Disease Registry (ATSDR). *Public Health Statement for PCBs*. Atlanta, GA: U.S. Department of Health and Human Services, 1990.
2. Birmingham et al. 1989
3. Newhook 1988
4. Fitzgerald et al. 1996
5. Courval et al. 1996

Material Safety Data Sheet
Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C6-H6

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction

of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m3) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m3) [Canada] TWA: 0.5 (ppm) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Aromatic. Gasoline-like, rather pleasant. (Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:
Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia)) Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism,and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients

for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:35 PM

Last Updated: 05/21/2013 12:00 PM

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C8H10

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (irritant, sensitizer). CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:
CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001) CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001) CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States] TWA: 435 STEL: 545 from OSHA (PEL) [United States] TWA: 435 STEL: 545 (mg/m3) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States] TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)] TWA: 100 STEL: 125 (ppm) [Belgium] TWA: 100 STEL: 125 (ppm) [Finland] TWA: 50 (ppm) [Norway] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:
Easily soluble in diethyl ether. Very slightly soluble in cold water or practically insoluble in water. Soluble in all proportions in Ethyl alcohol. Soluble in Carbon tetrachloride, Benzene. Insoluble in Ammonia. Slightly soluble in Chloroform. Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:
Lethal Dose/Conc 50% Kill: LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg Lowest Published Lethal Dose/Conc: LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data. May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate. May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Can cause mild skin irritation. It can be absorbed through intact skin. Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm , it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS) Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include

headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and conciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987). Ingestion: Do not drink, pipet or siphon by mouth. May cause gastroinestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Ethylbenzene Illinois toxic substances disclosure to employee act: Ethylbenzene Illinois chemical safety act: Ethylbenzene New York release reporting list: Ethylbenzene Rhode Island RTK hazardous substances: Ethylbenzene Pennsylvania RTK: Ethylbenzene Minnesota: Ethylbenzene Massachusetts RTK: Ethylbenzene Massachusetts spill list: Ethylbenzene New Jersey: Ethylbenzene New Jersey spill list: Ethylbenzene Louisiana spill reporting: Ethylbenzene California Director's List of Hazardous Substances: Ethylbenzene TSCA 8(b) inventory: Ethylbenzene TSCA 4(a) proposed test rules: Ethylbenzene TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97 SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Manufacturer's Material Safety Data Sheet. -Fire Protection Guide to Hazardous Materials, 13th ed., National Fire Protection Association (NFPA) -Registry of Toxic Effects of Chemical Substances (RTECS) -Chemical Hazard Response Information System (CHRIS) -Hazardous Substance Data Bank (HSDB) -New Jersey Hazardous Substance Fact Sheet -Ariel Global View -Reprotext System

Other Special Considerations: Not available.

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C6-H5-CH3 or C7-H8

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:
Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N2O4; AgClO4; BrF3; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m3) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Cauess mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abraisons. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophostatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Xylenes MSDS

Section 1: Chemical Product and Company Identification

Product Name: Xylenes

Catalog Codes: SLX1075, SLX1129, SLX1042, SLX1096

CAS#: 1330-20-7

RTECS: ZE2100000

TSCA: TSCA 8(b) inventory: Xylenes

CI#: Not available.

Synonym: Xylenes; Dimethylbenzene; xylol; methyltoluene

Chemical Name: Xylenes (o-, m-, p- isomers)

Chemical Formula: C6H4(CH3)2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Xylenes	1330-20-7	100

Toxicological Data on Ingredients: Xylenes: ORAL (LD50): Acute: 4300 mg/kg [Rat]. 2119 mg/kg [Mouse]. DERMAL (LD50): Acute: >1700 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 464°C (867.2°F)

Flash Points: CLOSED CUP: 24°C (75.2°F). (Tagliabue.) OPEN CUP: 37.8°C (100°F).

Flammable Limits: LOWER: 1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Vapors may travel to source of ignition and flash back.

Special Remarks on Explosion Hazards:
Vapors may form explosive mixtures with air. Containers may explode when heated. May polymerize explosively when heated. An attempt to chlorinate xylene with 1,3-Dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin) caused a violent explosion

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined

areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 (ppm) [Canada] TWA: 435 (mg/m3) [Canada] TWA: 434 STEL: 651 (mg/m3) from ACGIH (TLV) [United States] TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 138.5°C (281.3°F)

Melting Point: -47.4°C (-53.3°F)

Critical Temperature: Not available.

Specific Gravity: 0.864 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 1 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Miscible with absolute alcohol, ether, and many other organic liquids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles

Incompatibility with various substances: Reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Store away from acetic acid, nitric acid, chlorine, bromine, and fluorine.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2119 mg/kg [Mouse]. Acute dermal toxicity (LD50): >1700 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5000 4 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS).

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:
Lowest Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Man] - Route: Oral; Dose: 10000 ppm/6H

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in animal. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects (male and femael fertility (spontaneous abortion and fetotoxicity)) and birth defects based animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. Can be absorbed through skin. Eyes: Causes eye irritation. Inhalation: Vapor causes respiratory tract and mucous membrane irritation. May affect central nervous system and behavior (General anesthetic/CNS depressant with effects including headache, weakness, memory loss, irritability, dizziness, giddiness, loss of coordination and judgement, respiratory depression/arrest or difficulty breathing, loss of appetite, nausea, vomiting, shivering, and possible coma and death). May also affects blood, sense organs, liver, and peripheral nerves. Ingestion: May cause gastrointestinal irritation including abdominal pain, vomiting, and nausea. May also affect liver and urinary system/ kidneys. May cause effects similar to those of acute inhalation. Chronic Potential Health Effects: Chronic inhalation may affect the urinary system (kidneys) blood (anemia), bone marrow (hyperplasia of bone marrow) brain/behavior/Central Nervous system. Chronic inhalation may alsocause mucosal bleeding. Chronic ingestion may affect the liver and metabolism (loss of appetite) and may affect urinary system (kidney damage)

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Xylenes UNNA: 1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Xylenes Illinois chemical safety act: Xylenes New York acutely hazardous substances: Xylenes Rhode Island RTK hazardous substances: Xylenes Pennsylvania RTK: Xylenes Minnesota: Xylenes Michigan critical material: Xylenes Massachusetts RTK: Xylenes Massachusetts spill list: Xylenes New Jersey: Xylenes New Jersey spill list: Xylenes Louisiana spill reporting: Xylenes California Director's List of Hazardous Substances: Xylenes TSCA 8(b) inventory: Xylenes SARA 302/304/311/312 hazardous chemicals: Xylenes SARA 313 toxic chemical notification and release reporting: Xylenes CERCLA: Hazardous substances.: Xylenes: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R10- Flammable. R21- Harmful in contact with skin. R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S36/37- Wear suitable protective clothing and gloves. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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United States Environmental Protection Agency
Office of Solid Waste Washington, DC 20460
January 2008

Polycyclic Aromatic Hydrocarbons (PAHs)

What are PAHs?

Short for polycyclic aromatic hydrocarbons, PAHs describe chemicals that are often found together in groups of two or more. PAHs are found naturally in the environment but they can also be man-made. In their purest form, PAHs are solid and range in appearance from colorless to white or pale yellow-green. PAHs are created when products like coal, oil, gas, and garbage are burned but the burning process is not complete. Although PAHs can exist in over 100 different combinations, the National Waste Minimization Program defines this group using the Toxic Release Inventory reporting category for polycyclic aromatic compounds.

Chemicals included in this category, by name and CAS number, are:

1. Benzo(a)anthracene, 56-55-3
2. Benzo(a)phenanthrene (chrysene), 218-01-9
3. Benzo(a)pyrene, 50-32-8
4. Benzo(b)fluoranthene, 205-99-2
5. Benzo(j)fluoranthene, 205-82-3
6. Benzo(k)fluoranthene, 207-08-9
7. Benzo(j,k)fluorene (fluoranthene), 206-44-0
8. Benzo(r,s,t)pentaphene, 189-55-9
9. Dibenz(a,h)acridine, 226-36-8
10. Dibenz(a,j)acridine, 224-42-0
11. Dibenzo(a,h)anthracene, 53-70-3
12. Dibenzo(a,e)fluoranthene, 5385-75-1
13. Dibenzo(a,e)pyrene, 192-65-4
14. Dibenzo(a,h)pyrene, 189-64-0
15. Dibenzo(a,l)pyrene, 191-30-0
16. 7H-Dibenzo(c,g)carbazole, 194-59-2
17. 7,12-Dimethylbenz(a)anthracene, 57-97-6
18. Indeno(1,2,3-cd)pyrene 193-39-5
19. 3-Methylcholanthrene, 56-49-5
20. 5-Methylchrysene, 3697-24-3
21. 1-Nitropyrene, 5522-43-0

It should be noted that some PAHs are listed individually on EPA's Priority Chemical list. They are:

1. Acenaphthene, 83-32-9
2. Acenaphtylene, 208-96-8
3. Anthracene, 120-12-7
4. Benzo(g,h,i)perylene, 191-24-2
5. Fluorene, 86-73-7
6. Phenanthrene, 85-01-8
7. Pyrene, 129-00-0

Why are PAHs bad actors?

PAHs are a concern because they are persistent. Because they do not burn very easily, they can stay in the environment for long periods of time. Individual PAHs vary in behavior. Some can turn into a vapor in the air very easily. Most do not break down easily in the water.

What are PAHs used for?

Most PAHs are used to conduct research. However, some PAHs are used to make dyes, plastics, and pesticides. Some are even used in medicines.

How can PAHs enter and leave your body?

One of the most common ways PAHs can enter the body is through breathing contaminated air. PAHs get into your lungs when you breathe them. If you live near a hazardous waste site where PAHs are disposed, you are likely to breathe PAHs. If you eat or drink food and water contaminated with PAHs, you could be

exposed. Exposure to PAHs can also occur if your skin contacts PAH-contaminated soil or products like heavy oils, coal tar, roofing tar, or creosote. Creosote is an oily liquid found in coal tar and is used to preserve wood. Once in your body, PAHs can spread and target fat tissues. Target organs include the kidneys and liver. However, PAHs will leave your body through urine and feces in a matter of days.

How can you be exposed to PAHs?

You can be exposed to PAHs in the environment, in your home, and in the workplace. Because PAHs exist naturally in the environment and are man-made, you can be exposed in a number of ways. Fumes from vehicle exhaust, coal, coal tar, asphalt, wildfires, agricultural burning and hazardous waste sites are all sources of exposure.

You could be exposed to PAHs by breathing cigarette and tobacco smoke, eating foods grown in contaminated soil, or by eating meat or other food that you grilled. Grilling and charring food actually increases the amount of PAHs in the food.

If you work in a plant that makes coal tar, asphalt and aluminum, or that burns trash, you can be exposed to PAHs. You can also be exposed if you work in a facility that uses petroleum or coal, or where wood, corn, and oil are burned.

How can PAHs affect your health?

A number of PAHs have caused tumors in laboratory animals that were exposed to PAHs through their food, from breathing contaminated air, and when it was applied to their skin. When pregnant mice ate high doses of a PAH (benzo(a)pyrene) they experienced reproductive problems. In addition, the offspring of the pregnant mice showed birth defects and a decrease in their body weight. Other effects include damage to the skin, body fluids, and the immune system. However, these effects have not been seen in humans.

Is there a medical test to determine if you have been exposed to PAHs?

There is a test that can measure the presence of PAH in your urine. This test can only tell you if you have been exposed; but it can't reveal how harmful the effects of the exposure will be. This test would have to be performed in a laboratory that has special equipment to detect the PAHs. Another test currently being developed will be able to measure PAHs in your body tissue and blood.

What are the medical treatments in cases of exposure?

Most exposures to PAHs happen every day at very low levels in the air we breathe and the foods we eat. Treatment for a short-term exposure is unlikely. Contact your doctor if you experience symptoms of PAHs poisoning.

What levels of exposure have resulted in harmful health effects?

There is no information available from studies on humans to tell what effects can result from being exposed to individual PAHs at certain levels. However, breathing PAHs and skin contact seem to be associated with cancer in humans. Animal studies showed that mice exposed to 308 parts per million (ppm) of PAHs (specifically benzo (a) pyrene) in food for 10 days (short term exposure) caused birth defects. Mice exposed to 923 ppm of benzo (a) pyrene in food for months caused problems in the liver and blood.

Where can I get more information?

Contact your state health or environmental department, or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road, N.E., E-29
Atlanta, Georgia 30333

References

1. Agency for Toxic Substances and Disease

Registry (ATSDR), Public Health Statement, *Polycyclic Aromatic Hydrocarbons, December 1990.* U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA, December 1990.

2. United States Environmental Protection Agency, Office of Environmental Information, *Emergency Planning and Community Right-to-Know Act – Section 313: Guidance for Reporting Toxic Chemicals: Polycyclic Aromatic Compounds Category*, EPA 260-B-01-03, Washington, DC, August 2001.

Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m3) from OSHA (PEL) [United States] TWA: 0.03 (mg/m3) from NIOSH [United States] TWA: 0.05 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungsby mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually abssorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, deliriuim, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead cholic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Health	3
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet
Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.01 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R22- Harmful if swallowed. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Material Safety Data Sheet

SWX-630/531/240 Cadmium

Shieldwerx
4529 Arrowhead Ridge Dr. SE
Rio Rancho, NM 87124

Tel: 505.892.5144
Fax: 505.890.8319

Section 1. PRODUCT AND COMPANY NAME

Product Identity: Cadmium Metal

Manufacturer:
Shieldwerx a division of Bladewerx
4529 Arrowhead Ridge Dr. SE
Rio Rancho, New Mexico 87124

Section 2. – COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredient	Approximate % by Weight	CAS Number	Occupational Exposure Limits (OELs)	
Cadmium	99.95+%	7440-43-9	OSHA PEL	0.005mg/m³
			OSHA SECAL*	0.015 or 0.05mg/m³
			ACGIH TLV	0.01mg/m³ Total
				0.002mg/m³ Respirable
			NIOSH REL	Lowest feasible level

Section 3. – HAZARDS IDENTIFICATION

Emergency Overview: A bluish-silver lustrous metal that does not burn in bulk. Clouds of finely-divided dust are a fire and explosion hazard, however. When heated strongly in air cadmium oxide fumes can be generated. Freshly formed cadmium fume is an intense pulmonary irritant and may result in development of pulmonary edema several hours after exposure. Inhalation or ingestion of dust or fumes may produce both acute and chronic health effects. Probable cancer hazard. A self-contained breathing apparatus (SCBA) and full protective clothing are required for all emergency response personnel when cadmium is involved in a fire situation. Do NOT use water or foam. Apply dry chemical, dry sand, or special powder extinguishing media.

Continued

Potential Health Effects: Cadmium dust and fume have both acute and chronic health effects. Cadmium dust is a pulmonary irritant. Freshly formed cadmium is an intense pulmonary irritant, resulting in respiratory distress and possible pulmonary edema that may develop 4 to 10 hours after exposure. In severe cases death may result. Long term exposures may cause kidney dysfunction and lung injury (emphysema) as well as other symptoms. Cadmium is classified as a carcinogen or probable carcinogen by IARC, ACGIH, NTP, OSHA, and the EU.

Potential Environmental Effects: Cadmium metal has low bioavailability but its compounds are hazardous in the environment at low concentrations. Bioaccumulation of cadmium readily occurs in the aquatic and terrestrial food chains, specifically in plants and aquatic organisms.

SECTION 4. – FIRST AID MEASURES

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, immediately obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: *Dust: Remove* contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Quickly and gently blot or brush away excess chemical. Wash gently and thoroughly with lukewarm gently flowing water and non-abrasive soap for 5 minutes. If irritation persists, repeat flushing. Obtain medical advice. Completely decontaminate clothing, shoes and leather goods before reuse or else discard. *Molten Metal:* Flush contact area to solidify and cool, but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Inhalation: remove source of contamination or move victim from exposure area to fresh air immediately. If breathing is difficult, trained personnel should administer medical oxygen. DO NOT allow victim to move around unnecessarily. Treat pulmonary edema as a priority, even is no symptoms (i.e. wheezing, coughing, shortness of breath, tec.) are apparent. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Quickly transport victim to an emergency care facility.

Ingestion: NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 2-8 oz. (60-240ml) of water. The irritant and emetic action of swallowed cadmium usually leads to spontaneous vomiting. If vomiting occurs naturally, have victim rise mouth with water again. Immediately obtain medical attention and bring a copy of this MSDS.

SECTION 5. - FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is not flammable or combustible. Finely-divided metallic dust or powder is a moderate fire hazard and moderate explosion hazard when dispersed is air at high concentrations and exposed to heat, flame or other ignition sources. Freshly oxidized cadmium powder, in contact with limited amounts of water, may heat spontaneously and may ignite combustible materials in contact with the powder. Fires and explosions may also occur upon contact with certain incompatible materials.

Continued

Extinguishing Media: Do NOT use water or foam. Burning metal reacts violently with extinguishing agents such as water, foam, carbon dioxide, and Holons. Apply dry chemical, dry sand, or special powder extinguishing media.

Fire Fighting: If possible, move material from fire area and cool material exposed to flame. Apply dry chemical, sand or special powder extinguishing media to burning cadmium. Highly toxic cadmium oxide fumes evolve in fires. Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask.

Flashpoint and Method: Not applicable.

Upper and Lower Flammable Limit: Not Applicable.

Autoingnition Temperature. Not Applicable.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible. Restrict access to the area until completion of clean-up. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection. Molten metal should be allowed to solidify prior to clean-up. If solid metal, wear gloves, pick up and return to process. If dust, wear recommended personal protective equipment (see Section 8) and use methods that will minimize dust generation (e.g. vacuum solids). Return uncontaminated spilled material to the process if possible. Place contaminated and non-recyclable material in suitable labeled containers for later disposal. Treat or dispose of waste material in accordance with all local, state and federal requirements, as applicable.

Personal Precautions: Persons responding to an accidental release should wear protective clothing; gloves and a respirator (see Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with dust and fume. Where molten metal is involved, wear heat-resistant gloves and suitable clothing for protection from hot-metal splash as well as a respirator to protect against inhalation of cadmium fume. Workers should wash and change clothing following clean-up of a cadmium spill to prevent personal contamination with cadmium dust.

Environmental Precautions: Cadmium metal has limited bioavailability but its compounds can pose a severe threat to the aquatic and terrestrial environments. Contamination of water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Store cadmium in a DRY, covered area, away from incompatible materials and food or feedstuffs. Cadmium ingots suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Otherwise, entrained moisture could expand explosively and spatter molten metal out of the bath. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking or smoking in appropriate, designating areas, as well as at the end of the workday. No special packaging materials are required.

Continued

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective Clothing: Gloves and coveralls or other work clothing are recommended to prevent prolonged or repeated direct skin contact when cadmium is processed. Appropriate eye protection should be worn where fume or dust is generated. Where hot or molten metal is handled, heat resistant gloves, goggles or face shield, respirator and clothing to protect from hot metal splash should be worn. Safety type boots are recommended.

Ventilation: Use adequate local or general ventilation to maintain the concentration of cadmium fumes in the working environment will below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system. Local exhaust is strongly recommended for melting, casting grinding and welding or flame cutting of cadmium.

Respirators: Where cadmium dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-100 particulate filter cartridge). When exposure levels are unknown, a self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask should be worn.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Soft bluish-silver lustrous metal	**Odor:** None	**Physical State:** Solid	**pH:** Not Applicable
Vapor Pressure: 1 mm at 394ºC Negligible @ 20ºC	**Vapor Density:** Not Applicable	**Boiling Point:** 765ºC	**Freezing/Melt Point Range:** 321ºC
Specific Gravity: 8.65	**Evaporation Rate:** Not Applicable	**Coefficient of Water/Oil:** Not Applicable	
Solubility: Insoluble in Water	**Odor Threshold:** None		

SECTION 10. STABILITY AND REACTIVITY

Stability and Reactivity: Massive metal is stable under normal temperatures and pressures. Metal surfaces tarnish on exposure to moist air. Finely powdered metal or dust can be ignited from a dust cloud in air. Freshly oxidized cadmium powder, in contact with limited amounts of water, may spontaneously and may ignite combustible materials in contact with the powder.

Incompatibilities: Cadmium reacts vigorously with oxidizing agents such as peroxides, chlorates, nitrates and halogens or interhalogen compounds such as chlorine trifluoride as well as with elemental sulfur, zinc, selenium, or tellurium. Mixtures with nitric acid liberate toxic fumes of nitrogen oxides. Violent explosions can occur when the metal is in contact with fused ammonium nitrate or immersed in hydrazoic acid. Burning metal reacts violently with fire extinguishing agents such as water, foam, carbon dioxide or Halons. Cadmium metal reacts with strong acids giving off flammable hydrogen gas.

Continued

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting or burning, electric arc welding or overheating a molten bath will generate highly toxic cadmium oxide fumes. They are highly soluble in body fluids and the particle size of the metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body.

SECTION 11. TOXICOLOGICAL INFORMATION

General: Cadmium dust and fume are both pulmonary irritants, but freshly generated cadmium fume is an intense irritant and its small particle size allows it to reach into the lung more easily. The onset of symptoms is frequently delayed by 4 to 10 hours after exposure. Pulmonary edema may then develop rapidly. The mortality rate from acute pulmonary disease is about 20% according to the ACGH. Those surviving an episode of acute poisoning generally recover slowly but without apparent residual effects.

Chronic exposure to cadmium has been associated with a wide variety of gastrointestinal symptoms, pulmonary edema and kidney malfunction with increased excretion of a specific low molecular weight protein (beta-2-microglobulin). The body to a large extent retains absorbed cadmium, and excretion is very slow. Cadmium has been linked to both prostate cancer and lung cancer, though several researchers have questioned the association with prostate cancer recently.

Individuals with pre-existing lung, liver, kidney and blood ailments should be precluded from exposure until approved by a physician. Initial and periodic medical examinations are recommended for persons exposed to levels above the exposure limits of cadmium.

Acute:
Skin/Eyes: Contact with dust or fume may cause irritation but would not cause tissue damage.

Inhalation: Fumes of cadmium (i.e. cadmium oxide) are highly toxic by inhalation. They may cause serious systemic poisoning and possible permanent damage to the lungs. Early symptoms of excessive exposure include dryness of the throat, irritation of the nose, throat, and respiratory tract, headache, coughing, and a metallic taste. After a delay of several hours (up to 10), a person may develop constriction of the chest, persistent cough, and progressive shortness of breath. There may be headache, chills, diarrhea, muscle aches, nausea, vomiting, irritability, and restlessness. Pulmonary congestion may progress rapidly causing wheezing and symptoms of oxygen deficiency. Death may follow. Recovery from an acute exposure episode is slow but generally without ongoing or lingering effects. Milder cases of acute exposure have produced symptoms resembling metal fume fever with some symptoms and signs of acute gastroenteritis as well.

Ingestion: Ingestion of excessive quantities of cadmium dust may cause salivation, choking, nausea, vomiting, diarrhea, abdominal pain, tenseness, blurred vision, dizziness, vertigo, and headache. Convulsions, exhaustion, collapse, shock, and unconsciousness may occur. Death has followed within 24 hours from shock or after 7 to 14 days from acute kidney failure or cardiopulmonary depression.

Continued

Chronic:
Prolonged exposure to cadmium dust and/or fume may cause loss of sense of smell, occasional ulcerations of the nasal passages, rhino laryngitis, cough, shortness of breath, mild anemia, sleeplessness, irritability, loss of appetite, and cadmium-yellow fringe on teeth. The primary target organ for chronic cadmium effects is the kidney with increased excretion of a specific low molecular weight protein (beta-2-microgloblulin). Damage to the lungs (of the emphysematous type) has been reported in some studies of cadmium-exposed workers but not found in other studies. Cigarette tobacco contains cadmium and smoking adds to the daily intake of cadmium which may increase the risk of cumulative toxic effects. Clinical evidence of the cumulative effects of cadmium may appear after exposure has ceased. Disease then may be progressive.

The International Agency for Research on Cancer (IARC) has classified cadmium and certain cadmium compounds as Group 1 carcinogens (carcinogenic to humans). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies cadmium as a suspected human carcinogen (A2). The National Toxicology Program (NTP) classifies cadmium as a know human carcinogen and OSHA lists cadmium as a carcinogen. The European Union (EU) classifies cadmium as a Category 2 (probable) carcinogen.

SECTION 12. ECOLOGICAL INFROMATION

White cadmium metal is insoluble, it's processing or extended exposure in the aquatic and terrestrial environments may lead to the release of cadmium in bioavailable forms. Compared to most other heavy metals, cadmium is relatively mobile and highly toxic in the aqueous environment. Water hardness, PH and dissolved organic carbon content are factors which regulate the degree of toxicity. In soils, higher acidity results in the release of cadmium ions, causing higher toxicity to soil organisms and the uptake of cadmium by plants.

Cadmium is strongly accumulated by all organisms through both food and water. Bioaccumulation in aquatic organisms is greatest in invertebrates, followed by fish, and aquatic plants. Bioaccumulation in terrestrial plants results in higher levels of cadmium in land mammals that feed on the plants.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process, dispose of in accordance with applicable regulations.

Notice to Reader:
Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Bladewerx/Shieldwerx extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This material safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations, therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

Appendix D

Traffic Control Plan

The Traffic Control Plan will be submitted under separate cover.

Once accepted by the USACE, it will be included for reference

Appendix E

Site Preparation Plan

The Site Preparation Plan will be submitted under separate cover.

Once accepted by the USACE, it will be included for reference

Appendix F

Waste Management and Transportation Plan

The Waste Management and Transportation Plan will be submitted under separate cover.

Once accepted by the USACE, it will be included for reference

Appendix G

Water Treatment Plan

The Water Treatment Plan will be submitted under separate cover.

Once accepted by the USACE, it will be included for reference

Appendix H

Permits

As the permits become available they will be attached.

Appendix I

Resumes and Certificates

- William Zambrana
- Eric Delellis
- Ron Scarborough

William Zambrana, Environmental Sampler

Education and Training: A.S., Radiation Health Physics, Central Florida College, Ocala, FL
OSHA 40 Hour HAZWOPER Training
OSHA 8 Hour HAZWOPER Refresher
Hazardous Waste Manifest Certificate
Radiation Worker I & II Certificate
Construction Quality Management for Contractors Certificate
First Aid / CPR / AED

Awards:
US Radium Superfund Site - Commander Certificate of Appreciation – Feb. 14, 2005
Federal Creosote Superfund Site - Certificate of appreciation – 500,000 Safe Man Hours – Feb. 9, 2007
Cornell-Dubilier Superfund Site - Citation of Merit Award - May 3, 2012

Years Experience: 26
Years with Sevenson: 24 years
HTRW Years Exp.: 18 Years
Radiological Years Exp.: 18 Years
USACE Years Exp.: 24 Years
EPA Years Exp.: 24 Years

Role and Responsibility:

- Collect all onsite samples and perform all field screening tests.
- Support and review through recording, processing, and tracking status of contaminated Materials.
- Maintain communications with engineering oversight to ensure proper execution of procedures, specifications, and standards.
- Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.
- Review material quantities, procedural submittals, and documentation.
- Create, update, and maintain computer log of various sampling documents.
- Formulate status reports and agenda, supply necessary logs and documentation.

Project Experience

US Radium Superfund Site –Orange, NJ: OU-1 Property Remediation Project (*2015 - 2016*) Contract Number Contract No. W912DQ-10-D-3006 T.O-0003

QC Manager/Environmental Sampler for the excavation, sampling, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Addresses the remedial action of residential property with contaminated basement, chimney, front yard, deck and backyard. The scope of work requires the excavation of over 859 cubic yards of radium

contaminated soil at concentrations greater than 5 pCi/g. Manifested soil that was transported to designated landfill facility, followed by backfilling of excavated areas with approved material. Support and review through recording, processing, and tracking status of submittals. Maintain communications with superintendent to ensure proper execution of procedures, specifications, and standards. Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.

Review material quantities, procedural submittals, and documentation. Create, update, and maintain computer log of various construction management documents. Prepare construction progress meetings. Formulate status reports and agenda, supply necessary logs and documentation, record and prepare minutes for distribution. Support project management through preparation of maintaining construction schedules. Procurement of equipment and materials. Coordination of subcontractors. Daily Safety Logs and QA/QC reports.

Cornell Dubilier Superfund Site –South Plainfield, NJ: **OU-1 Property Remediation Project** (***2012 - 2014***) **Contract Contract Number W912DQ-10-D-3006 Task Order: 0002**

Operable Unit 1 addresses the remedial action of 15 residential property contaminated Yards and Streets. The scope of work requires the excavation of over 6,000 cubic yards of PCB contaminated soil at concentrations greater than 500 ppm and additional contaminated soils that exceed New Jersey's IGWSC criteria for contaminants other than PCBs. Excavated soil will be transported to designated landfill facility, followed by backfilling of excavated areas with approved material. Property restoration.

QA/QC Manager/*CQC Systems Manager/Engineer/ Environmental Sampler.*

- Support and review through recording, processing, and tracking status of submittals. Maintain communications with engineering oversight to ensure proper execution of procedures, specifications, and standards. Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.

Review material quantities, procedural submittals, and documentation. Create, update, and maintain computer log of various construction management documents. Attend construction progress meetings. Formulate status reports and agenda, supply necessary logs and documentation, record and prepare minutes for distribution. Sampled contaminated material for site characterization. Support project management through preparation of maintaining construction schedules.. Procurement of equipment and materials. Coordination of subcontractors. Daily Safety Logs and QA/QC reports.

Cornell Dubilier Superfund Site – OU-2, Phase 1 and II South Plainfield, NJ: **, Soil Remedial (LTTD) Project** (***2008 - 2012***)
Contract Number W912DQ-04-D-00023 Task Order: 0011

Operable Unit 2 addresses the remedial action of contaminated facility site soils and buildings. The scope of work requires the excavation of over 100,000 cubic yards of PCB contaminated soil at concentrations greater than 500 ppm and additional contaminated soils that exceed New Jersey's IGWSC criteria for contaminants other than PCBs. Excavated soil will be treated by low temperature

thermal desorption (LTTD), followed by backfilling of excavated areas with treated soils. Contaminated soil and debris, including capacitors, will be transported offsite for disposal. Installation of a multi-layer cap and engineering controls. Property restoration.

QA/QC Manager/CQC Systems Manager/Engineer /Environmental Sampler.

- Support and review through recording, processing, and tracking status of submittals. Maintain communications with engineering oversight to ensure proper execution of procedures, specifications, and standards. Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.

Review material quantities, procedural submittals, and documentation. Create, update, and maintain computer log of various construction management documents. Attend construction progress meetings. Formulate status reports and agenda, supply necessary logs and documentation, record and prepare minutes for distribution. Sampled contaminated material for site characterization. Support project management through preparation of maintaining construction schedules. Procurement of equipment and materials. Coordination of subcontractors. Daily Safety Logs and QA/QC reports.

Cornel Dubilier superfund Site, South Plainfield, NJ: **OU-2 Remedial Action** (2006 - 2008) **Contract Number W912DQ-04-D-00023Task Order: 0005** Demolition, excavation, transportation, restoration and disposal of Lead, PCB's contaminated soil and debris from an Industrial site.

CQC Systems Manager/Engineer/Environmental Sampler

Responsibilities include: Managed fixed-price contract for the demolition of the industrial park. Work tasks include the demolition and environmental decommissioning of 18 industrial buildings, excavation, characterization, Sampling, transportation, and off-site disposal of both PCB contaminated soils and all debris generated from demolition operations; and rough grading the site upon completion of schedule work. Acquiring all permits form state and local levels. Extensive safety procedures are in place to protect the health of residents in and near the site.

Federal Creosote Superfund Site, Lagoon A, Phase II, Manville, NJ: (2004 - 2006) Excavation, transportation, restoration and disposal contaminated soil and debris from residential housing.

Quality Control Manager/ Project Engineer: Responsibilities include: Managed for the excavation, characterization, transportation and disposal of 69,000 cy of creosote contaminated soils. 770 linear feet of soldier pile and lagging, and 590 lf of sheet pile installed as protective shoring for deep excavation (35' depths). Extraction well system installed to aid site dewatering and installation of O+M of portable WWTP. Odor control measures implemented with extensive site restoration.

US Radium Superfund Site Phase IV, V, VI and VII Orange NJ: (1998 - 2006) Excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Quality Control Manager/ Assistant Project Manager/ Project Manager: Responsibilities include: Job administration, coordinating site work with USACOE, monthly payment submittal, payroll, and project documentation, contract modification, scheduling, public relations. Also responsible for assuming Project Manager responsibilities when regular Project Manager is off-site.

Glen Ridge, Bloomfield Superfund Site Phase VII, VIII and IX Bloomfield NJ*:* (1998 - 2005) Excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Quality Control Manager/ Assistant Superintendent: Responsibilities include: Job administration, Coordinating with Superintendent on the different tasks on site, coordinating site work with USACOE, monthly payment submittal, payroll, and project documentation, contract modification, scheduling, public relations.

US Radium Superfund Site Phase III, Orange NJ: (1997 - 1999) Quality Control Manager/Project Manager for the excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Quality Control Manager: Responsibilities include: Daily reports, progress payment, payroll, submittal, project documentation, and general job administration.

Whitmoyer, PA: (1997) Hazardous material excavation and transportation of Arsenic and Aniline.

Quality Control Manager: Responsibilities include: Daily logging and placard control of the transportation of hazardous material. Level B protection.

Montclair Radium Superfund Site Phase IV/V and VI, Montclair NJ*:(*1994 - 1998) Excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Health and Safety Officer, Radiological Safety Officer and Assistant Superintendent: Responsibilities include: Conduct initial site specific training, Develop, implement and enforce the site specific Safety and Health plan. Conduct air monitoring, radiological monitoring, Prepared, Wrote, designed and produced SSHP, CCRQC, QAPP, SAP, FSP. Site safety inspections and accident investigations, work operations, Daily reports.

Clevite, Cleveland, OH: (1995) Building decontamination and rehabilitation.

Radiological Control Technician: Responsibilities include: Mapping and gridding for the determination of work completed. Gamma and Alpha scanning of interior and exterior of the building. Air monitoring and daily reports. Level C protection.

Montclair Radium Superfund Site, Pilot Project Thru Phase III, Montclair, NJ: (1990 - 1994)

Senior Radiological Technician: Responsibilities include: Trained incoming personal in procedures and hazards, soil excavation with extensive air monitoring and site control program, Level C protection. Performed sampling and packaging of soil for analysis.

Cherry Island DPW Site, Cherry Island, DE**:** (1993) Hazardous material pipe / vessel decontamination

Radiological Control Technician*:* Responsibilities include: Sole Radiation personnel on-site, Initiated work operations, Daily reports and daily air monitoring. Level C protection.

Shoreham Nuclear power Plant, Shoreham, NY**:** (1992 - 1993) Decommission of the Power plant

Radiological Control Technician: Responsibilities include: Provided support and monitoring of personal protection level requirements

Keawani Nuclear power Plant, Keawani, WI**:** (1992) 3 months re-fueling

Radiological Control Technician: Responsibilities include: Provided support and monitoring of personal protection level requirements

Experience Working With Regulations and Regulators

RCRA	CERCLA	TSCA	CWA	CAA	NEPA	OSHA	DOT	NRC	Corps	EPA
•	•	•	•			•	•	•	•	•

EPA Region Experience	Region II
Other Regulatory Agency/Reg's	NJDEP, NJSCD

Certificate of Achievement

This certificate is awarded to:

William Zambrana

For successful completion of Lion Technology's Online Training Program:

The Hazardous Waste Manifest Online Course

This training is designed to review the details of the United States Environmental Protection Agency Uniform Hazardous Waste Manifest per 40 CFR 262, Appendix.

Successful completion includes attaining a passing grade on the final proficiency test. The US EPA requires annual retraining for hazardous waste personnel working at large quantity generator sites and TSDFs [40 CFR 262.34(a)(4) and 265.16].

on

January 5, 2016

Training was conducted by Lion Technology Inc., 21 Sunset Inn Rd., Lafayette, NJ 07848 (973-383-0800).

0.1 CEUs awarded

Jennifer M. Harris
Director, EHS Online Training

LION TECHNOLOGY INC.
www.lion.com

U.S. ARMY CORPS OF ENGINEERS

PROFESSIONAL DEVELOPMENT SUPPORT CENTER
HUNTSVILLE, ALABAMA

CERTIFICATE

This is to certify that

William Zambrana

has completed the Corps of Engineers Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

Given at NEW YORK CITY (Location) By NEW YORK (Instructional District) 21-22 May 2013 (Date)

Peter De Stefano (212) 264-0123
Facilitator

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

Chief, USACE Professional Development Support Center

Eric DeLellis – On-site Contractor Quality Control (CQC) Supervisor

Company: Sevenson Environmental Services, Inc.	Currently Employed By: ☒ Prime 15 Yrs Employed
Education and Training: BS, Environmental Science, minor in Business Management, Lock Haven University, 1993; USACE CQCM —2013; Active US Government secret level clearance—2013; OSHA HAZWOPER 40 Hour and 8 Hour refresher training—1994/2013; DuPont project QC Implementation course and safety audit training/safety programs training—1995; Lieutenant Colonel/Logistics Officer, U.S. Army Reserve—1993 – Present	Professional Registration/Certification(s): None
	HTRW Years Exp.: 20 / USACE Years Exp.: 10

Relevant Qualifications and Experience Record

Project Name and Location: Removal and Disposal of Radiologically Contaminated Soil, Welsbach/General Gas Mantle Superfund Site, Gloucester City and Camden, NJ
Owner Name, Organization/Company, Contact Information: USACE, Philadelphia District; Brian Duffy (856) 842-5630

Start Date: 06/2011	Completion Date: ongoing	Project Cost: $72.3M	FFP ☐ CR ☒ Other ☐

Description And Specific Role: On-Site CQC Supervisor. Managed on-site quality control for this CENWK/EPA R2 project involving deep excavation of 108,000 tons of contaminated material, dewatering, water treatment, soil disposal, backfill, and restoration. Implemented the 3-phase inspection process, performing soil boring, sampling and geotechnical analyses throughout excavation activities ensuring proper depths were achieved. Oversaw the successful remediation of five industrial/commercial properties. Supervised the safe ACM removal and cleanup of biological hazards and decontamination of the Armstrong Building in the active Port. Oversaw work zone and perimeter air monitoring maintaining compliance with OSHA and EPA standards. Working with Sevenson's in-house chemist to maintain stringent chemical data quality control including data validation for RCRA, TSCA, and radiological factors. He coordinated data management and validation between the chemist and NJDEP-certified on-site laboratory and catalogs data analysis for chemical, geotechnical, and radiological factors into RMS daily for USACE review. Provided quality oversight for all radiological controls and oversaw follow-up inspections verifying containment/decontamination procedures are meeting goals by checking/recording air monitoring results and taking random samples of decontaminated equipment. Coordinated with transportation coordinator to confirm transport is performed in compliance with local, state, and federal regulations, i.e., supervises scanning of railcars, preparing shipping documentation, and confirming railcars are properly inspected, sealed and placarded.

Project Name and Location: Removal and Disposal of Radiologically Contaminated Soil, Welsbach/General Gas Mantle Superfund Site, Gloucester City and Camden, NJ
Owner Name, Organization/Company, Contact Information: USACE, Philadelphia District; Brian Duffy (856) 842-5630

Start Date: 10/2007	Completion Date: 03/2013	Project Cost: $66.2M	FFP ☐ CR ☒ Other ☐

Description And Specific Role: *On-Site CQC Supervisor.* Eric oversaw all aspects of quality control for this CENWK/EPA R2 large-scale LLRW remediation project at three anchor sites and 13 residences involving the excavation and disposal of radiological contaminated materials and site restoration. Implemented a 3-phase inspection process including conducting initial surveys, prior to excavation, to designate limits of primary and secondary excavation where the depth of excavation was 1' to 17' BGS, resulting in a defined construction grid, preventing over-excavation, and minimizing costs. Directed periodic soil sampling during excavation activities to screen for contamination in secondary excavations to ensure compliance. Held daily QC meetings with the project team to review planned activities and reviewed safety AHAs. Developed and implemented daily checklists to assist with follow-up inspections to ensure continuing compliance with contract requirements. Utilized RMS for daily quality reporting. Attended all progress meetings and provided updates on quality control aspects of the project and discussed scope variances with the Resident Engineer.

Project Name and Location: GWTP Design and Construction, Emmell's Septic Landfill Superfund Site, Galloway Township, NJ
Owner Name, Organization/Company, Contact Information: USACE, NY District, Thomas Roche, PE (856) 287-0494

Start Date: 06/2010	Completion Date: 06/2012	Project Cost: $18.6M	FFP ☐ CR ☒ Other ☐

Description And Specific Role: *On-Site CQC Supervisor.* He managed all aspects of quality control in accordance with project specifications and all applicable federal and state regulations on this $18M CENWK/EPA R2 project. Employed the 3-phase CQC process for construction and remediation on this project which included the design, construction, mobilization, and O&M of a permanent groundwater treatment plant as well as excavation, characterization, and T&D of PCB contaminated soil. Supervised the safe demolition of a structure prior to excavation, including the identification of asbestos and lead paint contamination and disposal at approved facilities. Oversaw a USACE-directed limited subsurface soil sampling program, early in the GWTP design process, in areas associated with GWTP construction (GWTP footprint, effluent piping trench layout, effluent basins, and access roads) where PCB soil contamination above the NJDEP residential cleanup standard was identified. Performed chemical quality data management on analytical results. Documented all QC activities in RMS and had direct interface with the on-site Resident Engineer. Supervised the excavation, stockpile, and transportation of contaminated soil off-site for disposal in accordance with USACE direction.

Other Relevant Information/Experience (Include description of years of experience listed above)

- Key team member performing the same role at Welsbach, project submitted for Volume I, Factor 1, as well as at various USACE projects in New Jersey
- Supervised and oversaw four projects that included significant demolition work over the last ten years all in NJ.
- 10 years of experience as a quality control manager working on USACE and Region 2 PRAC and LTRA contracts

USACE LEARNING CENTER
HUNTSVILLE, ALABAMA

Eric Delellis

NAB011214023

has completed the Corps of Engineers and Naval Facility Engineering Command Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS - #784

Timonium, Maryland	March 22, 2012	NAB/WA9 CEU:0.8 LU:8 PDH:8	Randy W. Sitton
Location	Training Date(s)	Instructional District/ NAVFAC	CQM-C Manager

Randy Sitton/ Tom Trulli	theodore.j.schorr@usace.army.mi	410-962-3032	Randy W. Sitton
Facilitator/Instructor	Email	Telephone	Facilitator/Instructor Signature

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE
CQM-C Recertification online course: https://www.myuln.net

Director, USACE Learning Center

Years of Experience:
21

Education:

- AS, Radiation Protection Technology, Central Florida Community College

Certifications:

- Board Certificated CHST (Number C2739)
- 40 hour Industrial Hygiene Cross Training
- OSHA 30 Hour Construction Outreach Training
- OSHA 40 Hour Training/OSHA 8 Hour Refresher
- NFPA 70E Training
- Supervisor Drug and Alcohol Awareness Training
- First Aid Training/CPR-AED
- USACE CQM for Contractors Course

Role and Responsibility:

- Responsible for implementation of the project-specific worker health and safety plans.
- Responsible for overseeing the medical monitoring of project-specific field employees.
- Performs audits and safety inspections at the sites.
- Oversees the health and safety aspects on assigned project.
- Assists in training all field personnel
- Conducts informational meetings.
- Repairs and maintains field instruments.
- Manages air monitoring and sampling programs.
- Evaluates analytical data.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving: demolition; excavation and earthwork; innovative and traditional steel sheeting systems; sediment remediation; temporary and mobile water treatment systems; slurry wall and trench construction; construction and operation of collection, recovery and treatment systems and facilities.

Ronald P. Scarborough, CHST

Onsite Health and Safety Officer

Past Project Experience:

USACE Atlantic Wood Industries Superfund Site, Portsmouth, VA (6/2015-4/2016): Health and Safety Officer. Contaminated sediments were mechanically dredged, amended with Portland cement, and consolidated in two on-site designated containment areas. Other activities associated with this project include approximately 425,000 vertical linear feet of prefabricated vertical drains installation, geotechnical engineering instrumentation installation, underwater debris removal, and site grading.

USACE Vineland Chemical Company Superfund Site, Vineland, NJ (9/2014-3/2015): Health and Safety Officer. Demolition and off site disposal of an arsenic contaminated 144' x 90' x 42' tall pre-engineered metal building.

DuPont Pond Dredging and Pressure Filtration Project, New Johnsonville, TN (5/2014 – 9/2014): Health and Safety Officer. Hydraulic dredging and mechanical dewatering of two settling ponds at an active manufacturing plant. O+M requires bank of six (6) 220 cubic feet filter presses.

Shpack Landfill Superfund Site Remedial Action, Attleboro/Norton, MA (6/2013-11/2013): Health and Safety Officer. Excavation of chemically and radiologically contaminated soils and sediments from former landfill areas and adjacent wetland. Excavated material from several areas of the site required characterization, transport and offsite disposal. Dewatering/stabilization and water management was also required. Excavation near high voltage (115 kV and 345 kV) public utility power transmission lines. Construct and create new wetlands, place topsoil, install plants and restore the site

Amenia Town Landfill, Amenia, New York (4/2013 – 6/2013):
Health and Safety Officer. The remediating (remove and dispose of on-site) PCB and heavy metals contaminated sediments. Close and cap the approximately 8.43 acre Amenia Town Landfill. Installation of a low permeability cap/cover system. Install additional intermediate grading material to meet slope requirements; restoration of wetland following sediment remediation; entrance and access roads; temporary and permanent fencing; and site restoration.

USACE Vineland Chemical Company Superfund Site, Vineland, NJ (1/2006-2/2013): Health and Safety Officer. Start-up, optimization, and operation for an innovative soil washing treatment technology to remove arsenic from soils at a rate of 70 tons per hour. Installation of approximately 2,000 LF of steel sheet piling for construciton of a diversion channel. Provided on-site Safety Supervison during excavation and processing of more than 420,000 tons of contaminated soil through the

Soil Washing Plant. Oversaw four phases of flood plain remediation; ~8000 LF of stream diversion (using a combination of sheet piling and soil berms); and three stream by-pass pumping operations. Oversaw more than 99 acres of clearing and grubbing; shipment of approximately 320,000 tons (14,976 truck loads) of contaminated soil for disposal; construction of almost 9,000 LF of restored stream bed. Oversaw field activities to restore 99 acres of flood plain and upland areas. Multiple field crews of up to 18 persons performed micrograding, plant procurment and planting, installation of slash pile habitat as well as long term monitoring. Provided direct safety supervision of seven major subcontractors and a dozen smaller ones in addition to field staff consisting of 25 to 30 union electricians, laborers, dock workers, operators, and teamsters. Job-site logged over 1,000,000 safe man-hours with zero lost work time accidents or injuries while working in Level B, Level C, and Level D (modified) PPE. Received USACE, Philadelphia District, Million Safe Man-Hours Award.

USACE Welsbach/GGM Superfund Site, Camden, NJ (10/2004-1/2006): Health and Safety Officer. This project required the excavation, characterize, transport and dispose off-site, soils contaminated with thorium and radium. Completed demolition of various building structures. Installation of a steel sheet pile wall along the roadways to protect utilities and homes in this residential neighborhood during excavation operations. Existing utilities (gas, electric and sewer) were capped, removed and relocated. Waste water treatment from excavation operations was required.

USACE Montclair/Glen Ridge/West Orange Radium Superfund Sites, NJ (8/1997-10/2004): Health Physics Technician and Health and Safety Officer. Low-level radiological remediation of 400 residential and commercial properties and 14 streets resulting in the excavation and shipment of 125,000 cubic yards of low-level radiological waste materials to a permitted facility via rail. Remedial actions ranged from selective to extensive demolition; excavation and removal of contaminated materials; reconstruction and site restoration. Use of sophisticated shoring and underpinning systems stabilized homes. Successful community relations plan focused on an “open door” policy. Established support zones including medical facilities, administrative offices, safety equipment storage, and decontamination facilities. Oversaw bypass pumping operations for storm and sanitary sewers throughout the remediation activities. Prepared inventories (including photo-documentation) of properties on a house-by-house basis, including landscaping and condition of structures. These inventories proved invaluable in controlling homeowner-requested property improvements. Job-site logged over 1,250,000 safe man-hours with zero lost work time accidents or injuries while working in Level B, Level C, and Level D (modified) PPE. Received USACE, New York District, CENAN’s Million Safe Man-Hours Award

RCRA Lagoon Closure, Perth Amboy, NJ (11/1998-1/1999): Assistant Health and Safety Officer. Provided IH coverage (air monitoring, personal protective equipment selection/decon, and analyzed air samples) during dredging approximately 60,000 cy of oil refinery sludge from two impoundments. Pumped sludge to treatment area for processing. Treatment included centrifugation and separation of sludges and waste

water treatment. Contaminated underlying soils not meeting closure guidelines were removed and placed in stockpiles for treatment or disposal.

Past Project Experience – Other Firms

Shepherd-Miller, Fort Collins, CO (4/1997-8/1997): Lead Radiation Control Technician. Responsible for the sampling, excavation, transport, and on-site disposal of radiological contaminated soils during final verification of a former uranium mill.

Safety and Ecology Corporation, Knoxville, TN (10/1996-4/1997): DOE Radiation Control Technician/Industrial Hygiene Technician. Responsible for all aspects of radiological and hazardous material safety at vicinity property. Provided personnel, area, and confined space monitoring. Collected and shipped radiological, mixed waste, and PCB samples. Calibrated air monitoring, alpha, and beta-gamma count instruments. Provided Health and Safety support for removal of asbestos roofing materials.

Thermo NU Tech, Oak Ridge, TN (5/1995-10/1996): DOE Radiation Control Technician/Industrial Hygiene Technician. Responsible for personnel air and area and industrial hazard monitoring during uranium rafinate solidification operation. Collected, monitored, and shipped radiological and mixed waste samples. Calibrated air monitoring, alpha, and beta-gamma count instruments. Performed radiological surveys for remedial action and post-remedial action activities. Analyzed alpha and beta-gamma samples.

Board of Certified Safety Professionals

Upon the recommendation of the
Board of Certified Safety Professionals,
by virtue of the authority vested in it,
has conferred on

Ronald P Scarborough

the credential of

Construction Health and Safety Technician

and has granted the title as evidence of meeting the qualifications and passing the required examination so long as this credential is not suspended or revoked and is renewed annually and meets all recertification requirements.

CHST®

BOARD OF CERTIFIED SAFETY PROFESSIONALS

January 26, 2012
DATE ISSUED

C2739
CERTIFICATION NUMBER

BOARD PRESIDENT SIGNATURE

BOARD SECRETARY SIGNATURE

Certificate of Completion

360training.com™

This Certifies That

Ron Scarborough

is awarded this certificate for

OSHA 30 Hour Outreach Training Program - Construction

Credit Hours: 30.00

Completion Date: 03/22/2015

Marie Athey

Marie Athey, Trainer C 0026383 and G 0034871

"As an OSHA authorized trainer, I verify that I have conducted this OSHA outreach training class in accordance with OSHA Outreach Training Program requirements. I will document this class to my authorizing OSHA training organization. Upon successful review of my documentation, I will provide each student their completion card within 90 days of the end of the class."

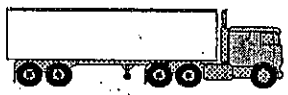
360training.com ♦ 13801 Burnet Rd., Suite 100 ♦ Austin, TX 78727 ♦ 888-360-TRNG ♦ www.360training.com

Ronald P. Scarborough

HAS MET THE REQUIREMENTS OF

29 CFR 1910.120

40 HOUR HAZARDOUS WASTE SITE SAFETY TRAINING



PRESENTED BY CATAMOUNT ENVIRONMENTAL

INSTRUCTOR _____ 02/19/95

295007 Charles E. Davis CHMM 1438

LEVEL B

CHARLES DAVIS 5270 S. BANYAN ROMOSASSA FL 34448 904-628-5707

CONSTRUCTION SAFETY COUNCIL

This is to certify that

Ronald P. Scarborough

has successfully completed the

Online Excavation Safety for the Competent Person Class

March 26, 2015

Gayla L. Hurson

Executive Director

©1998 GOES 34625

LITHO. IN U.S.A.

Certificate of Training

This Certifies That

Ronald Scarborough

has successfully completed classroom instruction training in

CONFINED SPACE ENTRY

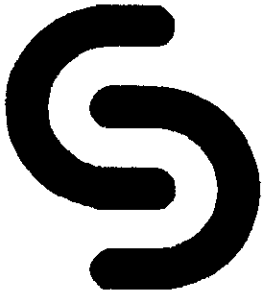
Competent Person

prepared and conducted by

Sevenson Environmental Services, Inc.

December 2, 2009
date of award

Trainer
Paul Jung



Certificate of Training

This Certifies That

Ronald Scarborough

has successfully demonstrated through theoretical and practical exercises sufficient knowledge and is considered competent in

Air Monitoring Programs

use and selection methodologies for air monitoring equipment

evaluated by

Sevenson Environmental Services, Inc.

October 10, 2012
date of award

Paul Hitcho

Evaluator
Paul Hitcho, Ph.D., CIH

Certificate of Completion

This is to certify that

Ron Scarborough

has completed

Bill Judge 60/60 DOT Supervisor Training

Completion Date 03/27/2015

Course Duration 2.0

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Certificate of Completion

This is to certify that

Ron Scarborough

has completed

NFPA 70E - 2012 Standard for Electrical Safety in the Workplace

Completion Date 03/28/2015

Course Duration 4.0

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TMA Eberline
Thermo Analytical Inc.

Oak Ridge, Tennessee

This Certifies That

RON SCARBOROUGH

SUCCESSFULLY COMPLETED 40 HOURS OF TRAINING IN BASIC INDUSTRIAL HYGIENE/SAFETY CONCEPTS AND MEASUREMENTS IN OAK RIDGE, TENNESSEE.

This 2nd day of June, 1995

Katherine Dendahl

KATHERINE DENDAHL
INDUSTRIAL HYGIENIST

Nels R. Johnson, CHP
President

SAFETY AND ECOLOGY CORPORATION

Under Contract to Bechtel National, Inc., hereby certifies that

RONALD SCARBOROUGH

has completed SEC-FUSRAP's INDUSTRIAL HYGIENE CROSS-TRAINING PROGRAM

This 11th and 12th *day of* November, *1996*

Neil C. Kiely
SEC-FUSRAP HP Training Coordinator

Christopher P. Leichtweis, CIH
SEC-FUSRAP Project Manager

Certificate of Completion

360training.com™

This Certifies That

Ron Scarborough

is awarded this certificate for

Confined Space Entry Training

Complying with OSHA Standard 29 CFR 1910.146, Entrant, Attendant, Supervisor

Credit Hours: 8

Completion Date: 04/13/2015

Marie Athey

Marie Athey, OSHA Trainer

Certificate of Training

Ron Scarborough

Satisfactorily completed the 8 hour refresher course in ***Hazardous Waste Operations*** *in accordance with 29 CFR Sections 1910.120 and 1926.65 prepared and conducted on* *January 13, 2016* *by:*

Sevenson Environmental Services, Inc.

Sevenson Environmental Services, Inc.

Instructor

Steven Wilson, OHST
Health & Safety Officer
Sevenson Environmental Services, Inc
2749 Lockport Road
Niagara Falls, NY 14305

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE	DATE	TRANSMITTAL NO.
	11/23/2016	02111-20.1
PROJECT TITLE: Syncon Resins Superfund Site OU2	CONTRACT NO.	PAGE
LOCATION: 77 Jacobus Ave, Kearny, NJ	W912DQ-15-D-3002 0002	1 of 1

Item	*Description*	*Variation*	*QA Code*
4	Excavation and Handling Plan Rev 1	No	C

SECTION III - GOVERNMENT REVIEW REMARKS

1) Section IV (RTC #11) - Agreed. However, revise "21,00" to "21,000". Corrected.

2) Section II (RTC #24) - RTC reads regarding a trench box/slide raid system: "None are anticipated. The deepest excavation has sloped walls. Where the excavation abutts to the slurry wall, sheet pile is installed." Section II makes multiple references to the use of a trench box or slide rail system if SES performs secondary excavation of the slope abutting the slurry wall. Please also note that Contract Drawing C-3, Note 10 states that "if secondary excavation of the sloped soil abutting the slurry wall is required, the Contractor shall perform excavation along the slurry wall using a trench box or slide rail system, as approved by the Contracting Officer." Please rectify.

As discussed, SES feels that the use of a trench box or a slide rail system will not accomplish the task of stabilizing the slurry wall in the shallow excavation areas if secondary excavations are needed. SES suggests the conditions be evaluated by a licensed, professional geotechnical engineer to determine the appropriate shoring methods.

To address this comment for plan re-submission, SES removed references to the use of a trench box or slide rail system in the body of the Plan and added text referring to the need for further evaluation by a licensed, geotechnical engineer.

Excavation and Materials Handling Plan

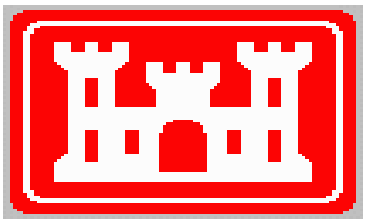
Syncon Resins Superfund Site
OU-2
South Kearny, New Jersey
Contract No. W912DQ-15-D-3002, TO 0002

Submitted by:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Prepared for:

U.S Army Corps of Engineers
Kansas City District
Kansas City, Missouri



January 2017
Revision 2

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Appendix A – Dewatering Plan

Acronyms and Abbreviations

ABIH	American Board of Industrial Hygiene
AHA	Activity Hazard Analysis
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
APP	Accident Prevention Plan
AST	Above Ground Storage Tank
ASTM	American Society for Testing and Materials
bgs	Below Ground Surface
cc	Cubic centimeter
CFR	Code of Federal Regulation
CHMM	Certified Hazardous Materials Manager
CHST	Certified Health and Safety Technician
CIH	Certified Industrial Hygienist
COC	Contaminants of Concern
COR	Contracting Officers Representative
CPM	Corporate Project Manager
CPR	Cardiopulmonary resuscitation
CQ	Contractor Quality
CQC	Contractor Quality Control
CQCM	Corporate Quality Control Manager
CQCS	Contractor Quality Control Supervisor
CRZ	Contamination Reduction Zone
CSP	Certified Safety Professional
CY	Cubic yard
DOT	Department of Transportation
EM	Engineering Manual
EMS	Emergency Medical Service
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	Hazardous, Toxic and Radioactive Wastes
mg/m3	milligram per cubic meter
MSDS	Material Safety Data Sheets

NIOSH	National Institute for Occupational Safety and Health
NJDEP	New Jersey Department of Environmental Protection
OSHA	Occupational Safety and Health Administration
O2	Oxygen gas
PCB	Polychlorinated Biphenyl
PPE	Personal Protective Equipment
ppm	parts per million
QCP	Quality Control Plan
RMS	Resident Management System
SAP	Sampling and Analysis Plan
SHM	Safety and Health Manager
SSHO	Site Safety and Health Officer
SVOC	Semi-Volatile Organic Compound
T&D	Transportation and Disposal
TCLP	Toxicity Characteristic Leachate Procedure
TSCA	Toxic Substances Control Act
ug/m3	microgram per cubic meter
UST	Underground Storage Tank
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

Excavation & Materials Handling Plan

Rev. 2

I. Introduction

The purpose of the Excavation and Materials Handling Plan is to present the methods and procedures for excavation of contaminated soil, gravel cover removal, stockpile, dewatering during excavation, sheet piles, back fill and sampling procedures. Sevenson will be responsible for obtaining any and all permits including those necessary for removal of abandoned sand filled underground storage tanks (UST's).

It is not anticipated that demo/building material loadout will overlap with excavation activities.

II. Excavation

Before the start of excavation, Sevenson Environmental Services, Inc. (SES) will obtain a New Jersey-licensed surveyor to layout and document the limits of excavation for the purposes of measurement and payment, and for preparation of As-Built Drawings.

Prior to the commencement of excavation and during excavation, the existing stone cap will be excavated, moved to the decon pad, washed and stockpiled. It is to be re-used in the bottom of the excavation Area I as indicated in Note 3 of Drawing C-3 and then subsequently used during site restoration.

After the completion of building demolition and loadout, and prior to excavation, Sevenson will conduct Pre-excavation sampling as per project specifications and Design Drawing C-2 in the eastern part of Area E and east of Area E. Depending on the results of the sampling and analysis, Sevenson may have to revise the excavation limits and perform building slab removal and excavation in the areas of the pre-excavation sampling. Building foundations, footers and slabs, if required to be removed, will be removed per the approved Demolition Plan, submitted under separate cover.

Excavation will include areas and depths of the excavation as indicated on the Contract Drawings.

Personnel shall be familiar with and coordinate activities in compliance with the Spill Control Plan located in Appendix C of the Environmental Protection Plan. Personnel shall be familiar with spill response equipment and location of such equipment, spill prevention, reporting procedures, containment procedures and cleanup procedures.

Clearing and grubbing will be performed prior to any excavation. All excavation work

will start following completion of staging areas and all of the control measures (surveys, soil erosion, fencing, CRZ's, air monitoring, etc.) have been performed and installed. Odor control material will be on site in accordance with the approved odor control plan.

The excavation will be sequenced to start in areas A, B, C and D. Any water generated will be containerized until the water treatment system is in operation. Areas F, G and H will follow while concurrently installing sheet piles in area I. TSCA waste from areas E, H and I will be segregated to the depths indicated on sheet C-3, characterized if necessary and sent to an approved TSCA permitted landfill for treatment and/or disposal. Excavation will be performed by the use of an excavator (Komatsu PC 300 or equal) excavating to the depths indicated in the contract drawings. Direct loading will be used with the exception of areas I where the materials will be loaded into end dump trucks and stock piled in Area E's separate characterized stockpiles. Stockpiles will be labeled with temporary signage to identify each stockpile until it is characterized and loaded out. Where applicable, Sevenson will perform in-situ sampling prior to excavation in order to help characterize material. Excavation in area I will begin when all conditions have been met, sheet piles installed and the temporary water treatment system is in operation. A hand-hole will be installed for electrical disconnect and control service in accordance with sheet E-4. Extraction Well 124C will be locked out and tagged out and the existing groundwater system will be shut down temporarily during construction. A test pit will be installed to cut/cap the existing influent pipe. Excavation in area I varies from 9' to 12.6', ramps will be constructed for safe ingress and egress. The final excavation area will be Area E for the removal and complete load out of the stockpiles. All excavations will be conducted based on the approved Excavation and Materials Handling Plan to the limits and depths shown on the Contract Drawings. Excavation areas shall be excavated to within 0.2 feet of the depth and extent shown on the Contract Drawings or as directed by the Contracting Officer.

Extraction well C and the associated valve box will be disassembled and removed as per the procedures outlined on Contract Drawing CD-2. The associated control panel will be disconnected, well pumps, valves, level transmitters; gauges will be kept intact for reinstallation following the completion of excavation.

A slope will be installed to protect and maintain the integrity of the slurry wall during any shallow excavation (up to two feet below gravel). A minimum excavation slope ratio of 2H:1V will be maintained in accordance with NJDEP requirements for excavation in flood hazard areas. If the excavation remains open for an extended length of time the

slope will be stabilized by backfilling to 3H:1V or flatter. All slopes shall be inspected daily by Superintendent, Mr. Perry Novak, for cracks in the soil at the head or along the face of the slopes and other changed conditions such as bulges or sloughs on the slopes. Inspection results shall be documented in a Daily Inspection Log and any unusual or changed conditions shall be brought to the attention of the Contracting Officer. If secondary excavation of the sloped soil abutting the slurry wall is required, a method of shoring the slurry wall will need to be determined. Sevenson will consult a licensed, professional geotechnical engineer, team member Glynn Geotechnical Engineering. Sheet piles will be installed in Area I in accordance with the approved sheet pile plan. SES will inspect excavation bottoms and sidewalls for contamination using visual and olfactory observations, and field screening with photo ionization detector. Upon completion of the excavation to the lines and grades indicated a survey would be performed to ensure that excavation elevations have been achieved. Once backfill operations have commenced, excavation activities will be started at the next area to be remediated.

Waste characterization sampling and analysis will be performed in accordance with Sevenson's Sampling and Analysis Plan (SAP).

Soil erosion and sediment control measures will be implemented during excavation activities. Control measures include the installation of silt fences, hay bales and geotextile, as applicable. Spraying soils with a water mist, utilizing water obtained from local fire hydrants, will control dust. A water truck will be utilized to keep dust off of haul roads and as an additional source of water for excavation locations.

Sevenson will protect existing trees, shrubs, facilities, structures, etc., that are beyond the limits of excavation by use of temporary orange safety fencing, flagging, plywood or other means, as required.

Any items appearing to have historical or archaeological significance that are encountered during excavation activities will be carefully identified and preserved. The archaeological find will be left undisturbed, and Sevenson will immediately report such finds to USACE. Artifacts historical or archaeological will be handled in accordance with the United States Code of Federal Regulations 36, Part 79, section 4 are applicable (U.S. Department of Interior 1991).

Open excavations will be barricaded and fenced to delineate this hazard.

The contaminated material will be excavated by a track backhoe. Polyethylene will be utilized to cover the sidewalls of the vehicle to be loaded to prevent contamination coming into contact with the exterior sidewalls of the vehicle. Polyethylene will also be place on the ground where the truck is being loaded to prevent the ground surface coming into contact with contaminated material. If there are signs of contamination on the truck, the truck will be broom swept prior to moving to the scale for weighing. Alternately, Sevenson will setup a decontamination station at the egress of the exclusion zone to decontaminate vehicles thus preventing contamination leaving the zone. Sevenson will not excavate or load material in severe rain. Additionally, no material will be excavated in areas where water is standing. Once the truck is loaded, the truck will be weighed using a portable site scale, manifested and released for shipping. Trucks will be tarped at the loading area prior to proceeding to the staging area. No vehicle will be shipped from the site that has free liquids in the container. Once the vehicle is weighed and covered/tarped, it will be transported to the disposal facility. Please refer to the approved Waste Management and Transportation Plan (to be submitted under separate cover) for more detailed waste management procedures.

Surface surveying will be performed once the remedial excavation depths have been achieved, sampled and released. Sevenson will track quantities on site.

III. Post Excavation Sampling

Sevenson shall collect post-excavation bottom and sidewall samples at the locations shown on the Contract Drawings. All sidewall post-excavation samples collected from 0 to 2 feet below ground surface (bgs) shall be analyzed for surface COCs and shall be compared to the Surface Remediation Goals, Table 02111-1. All bottom samples, and sidewall samples collected below 4 feet bgs, shall be analyzed for PCBs and shall be compared to the Subsurface Remediation Goals, Table 02111-1. Post-excavation sample results above the Remediation Goals may trigger secondary excavation for samples designated as confirmation samples; post-excavation samples designated as documentation samples shall not trigger secondary excavation based on the results. Post-excavation confirmation and documentation samples to be collected are identified on the Contract Drawings.

Sevenson shall collect post-excavation bottom samples at the locations shown on the Contract Drawings. If excavation associated with UST removal exceeds the depth indicated for soil excavation on the Contract Drawings, post-excavation bottom samples shall be taken at the bottom of all excavation and the depth shall be noted. If analytical

results of a bottom post-excavation sample exceed the Subsurface Remediation Goals (PCBs ≥ 500 mg/kg), Sevenson shall perform secondary excavation in 2-foot vertical increments within that grid, and then collect a new bottom sample. This process shall be repeated until the Subsurface Remediation Goals are met, or as otherwise directed by the Contracting Officer.

Sevenson shall collect post-excavation sidewall samples from 0 to 2 feet bgs in Excavation Areas A through H and below 4 feet bgs in Excavation Area I at the locations shown on the Post-Excavation Sampling Plan. If any analytical results of the sidewall samples collected from Excavation Areas A through H exceed the Surface Remediation Goals, with the exception of samples collected along the slurry wall's support slope, or if any analytical results of the sidewall samples collected from Excavation Area I exceed the Subsurface Remediation Goal, the Contractor shall perform secondary excavation of the entire sidewall of that grid, as shown on the Contract Drawings, in 5-foot horizontal increments, and then collect new post-excavation sidewall samples. This process shall be repeated until the Remediation Goals are met, or as otherwise directed by the Contracting Officer. As the excavation expands horizontally, Sevenson shall monitor the overall excavation area to determine whether additional bottom samples are required to ensure that the post-excavation sampling criteria are met.

For post-excavation sidewall samples collected along the slurry wall's slope that exceed the Surface Remediation Goals, the Contractor will perform secondary excavation of the sloped soil abutting the slurry wall using limited excavation size or some acceptable method of shoring the slurry wall that still needs to be determined. As stated earlier in the Plan, Sevenson will consult a professional geotechnical engineer, team member Glynn Geotechnical Engineering. No further post-excavation sampling or secondary excavation will be performed upon reaching the slurry wall.

All required sampling and chemical analysis shall be conducted in accordance with the approved UFP-QAPP and the requirements of SECTION 01450 – CHEMICAL DATA QUALITY CONTROL.

IV. Dewatering

SES will construct a water treatment system prior to excavation in area I. During excavation in areas A, B, C, D, F, G and H ground water that may be encountered can be pumped to area I or into a 21,000 gallon closed top tank to be used for temporary containment of water until the water treatment system is in operation. Areas I and E

(stock pile area) will be pumped into the temporary water treatment system. Sevenson will install berms, swales, and other measures necessary for preventing surface water from entering and exiting excavations. Surface water will be directed away from excavation and construction sites so as to prevent erosion and to prevent surface water run off from becoming contaminated by accumulating in excavations.

Sevenson shall furnish, install, operate, monitor, control, maintain and remove a temporary dewatering and drainage systems in Excavation Area I and other areas as required to lower and maintain groundwater levels below subgrades of excavations. Sumps and/or well points shall be the primary means of dewatering to maintain the Site "in-the-dry" and groundwater table to approximately 2 ft. below the bottom of the excavation. Surface water and groundwater will be controlled such that excavation to final grade is made "in-the-dry", and bearing soils are maintained undisturbed.

All dewatering will be accomplished per the project specifications and the approved Dewatering Plan, contained in Appendix A.

V. Existing Structures and Utilities

Sevenson will contact the New Jersey One Call System (1-800-272-1000), Public utilities, New Jersey American Water (NJA), and other local utility authorities to mark out underground utilities prior to performing any excavation activities. The locations of these lines are approximate on the Contract Drawings and will be field-verified by the utility authorities. Prior to any excavation work, utility clearances will be documented with a completed Field Safety Checklist.

Sevenson will protect existing trees, shrubs, facilities, structures, etc., that are beyond the limits of excavation by use of temporary orange safety fencing, flagging, plywood or other means, as required.

SES will protect groundwater collection sumps, extraction wells and associated concrete pads identified on the contract drawings. A mark out of on-site utilities will be conducted, using geophysical survey techniques, to prevent damaging, or disturbing utilities during construction. During excavation activities, barricades, fencing, or flagging will be utilized to delineate the areas of underground utilities so that heavy machinery does not disturb the utility. If piping, conduit or other structure is encountered during excavation, heavy machinery activities will cease and the item will be uncovered by hand digging. Sevenson will determine the item's status and will proceed appropriately. Precautions will be made

to protect and ensure that no damage occurs to existing structures such as fence to remain, the existing slurry wall, adjacent properties and monitoring wells, MW-7, MW-12, MW-17 and MW-18.

VI. Underground Storage Tanks

Two abandoned sand filled underground storage tanks UST's will be located by survey and test pits. UST's and piping will be removed and disposed of in accordance with the approved Underground Storage Tank Removal and Closure Plan. Disposal shall comply with the requirements specified in section 02120. All contents will be removed and atmosphere around the UST's will be tested for flammable and combustible vapor concentrations. Any flammable or toxic vapors using approved methods. Tanks will be removed from the excavation and placed on a lined level surface with wood blocks to prevent movement. In the event that additional UST's are encountered during excavation the USACE will be immediately notify. Additional UST's found shall be removed and disposed of in accordance with the approved Tank Removal and Closure Plan in accordance with all Federal, State and local requirements.

VII. Decontamination of Subsurface Structures

Upon the completion of excavations where utilities or foundations are exposed the surface will be decontaminated prior to backfilling. Sevenson will remove all attached soil material and debris from the structures using trowels, scrapers, wire brushes, vacuuming, or other methods approved by the USACE.

VIII. Preparation of Ground Surface for Fill

After contaminated material excavation has been completed, and prior to placement of fill material, the collection of post-excavation verification samples will be collect subsequent to primary and secondary excavation to confirm remediation goals have been met. Backfill operations will not commence until samples are confirmed in accordance with NJDEP post-remedial action requirements defined in NJAC 7:26F, Subchapter5.

Survey shall be performed after excavation to determine the volume of contaminated material removed. Survey will also be performed after the backfill has been completed to show final grade.

The exposed surface of the excavations will be examined to determine the presence of ruts, disturbed ground, wet spots, soft areas, organic matter, or other features undesirable

in the sub-grade. Undesirable features will be removed and corrected before placing fill material.

Fill material will be moisture conditioned, as required, to obtain the specified moisture content and density for compaction. Compaction over underground utilities will be performed by hand tamping techniques.

IX. Backfilling

Backfill operations will take place simultaneously with excavation activities in areas indicated in the sequence. Backfill material will be obtained from an off-site source. Prior to backfill being brought to the site, the material will be sampled and analyzed in accordance with ASTM D421, ASTM D422 and for chemical and radiological parameters in accordance with Specification Section 01450 and the approved UFP-QAPP to ensure the material complies with the backfill requirements every 5,000 yards. All backfill will comply with NJDEP Non-Residential Cleanup Criteria as specified in Specification Section 01450, Table 01450-2. Sevenson will coordinate the delivery of off site backfill material. Backfill will not be placed within excavations without the notification or approval of the USACE.

Direct loads of backfill shall be placed. In the event that direct loads are not possible, stockpile management will consist of preparing areas so that earthen berms encompass the stockpiles to prevent water running into the stockpiled material. Stockpiles will be covered daily, using 6-mil polyethylene, held down with sand bags. Sevenson will utilize the methods described in the Soil Erosion and Sediment Control Plan to manage the stockpiles.

Frozen materials will not be placed in the excavations, nor will fill be placed upon frozen material. All such materials will be removed from the excavations prior to backfilling.

Scrap metal, wood, utilities, pipes, concrete, asphalt, or any other deleterious material will not be used as backfill.

Backfilling of excavations will not commence until bottom/side sample analysis has been received and the excavation has been approved for backfilling, underground utilities systems have been inspected, tested, and approved, forms removed, and the excavation cleaned of trash and debris. It is Sevenson intention to minimize the amount of open excavations and trenches. Trenches will only stay open long enough to complete and

inspect the work and will not be any larger than what can be backfilled by the end of the work day. Any excavation or trench that cannot be backfilled by the end of the work day will have safety fence installed around it.

Backfill will be placed in eight- inch (8") loose lifts. A track bulldozer or utility backhoe will spread fill material. Fill material will be compacted by vibratory drum rollers. Vibratory Compaction using heavy equipment shall be kept at a safe distance, at a minimum of 25 feet, from the slurry wall and other existing structures. Heavy equipment will not be used within five feet (5') of an existing underground utility or foundation.

In Area I, the segregated, washed and re-claimed stone will be placed in the bottom of the excavation, in a thickness not to exceed 2.5 feet thick, or as directed by the Contracting Officer.

Fill material will be backfilled to the lines and grades shown on the Contract Drawings. Backfilling will not commence until excavations depths have been achieved, all temporary supports have been removed, and approval has been received from the USACE. Backfill will not be placed on snow, ice, standing water, or frozen ground surfaces. Backfill will not be placed when the temperature is below 32º F, unless approval is received from the USACE.

Prior to compacting, each fill layer will be plowed, tilled, or broken up; moistened or aerated; and thoroughly mixed, to obtain the moisture content for compaction.

Backfill areas, determined to be inadequately compacted, will be re-compacted and retested until the specified criteria have been met.

The following minimum values, expressed as a maximum dry density in accordance with ASTM D1556, will be used for compaction of clean fill: 90%

All disturbed areas will be graded to provide a smooth and uniform condition/grade.

APPENDIX A

Dewatering Plan

Dewatering Plan to be submitted under separate cover. Plan to be added once approved.

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE	DATE 04/11/2017	TRANSMITTAL NO. 02145-151
PROJECT TITLE Syncon Resins Superfund Site OU2	CONTRACT NO. W912DQ-15-D-3002 0002	PAGE 1 of 1
LOCATION 77 Jacobus Ave, Kearny, NJ		

Item	*Description*	*Variation*	*QA Code*
1	Odor Control Plan	No	C

SECTION III - GOVERNMENT REVIEW REMARKS

1) General - The Odor Control Plan does not meet the specification section 02145 requirements for planning, monitoring, and implementing. The Odor Control Plan shall be revised to meet the following specification requirements:
- Per spec section 1.1.3, a minimum of 3 odor control methods shall be planned to be incrementally implemented to control odors. Currently only 2 odor control methods are included. Agreed - 3rd method added.
- Include odor monitoring requirements in accordance with spec section 3.4, which include establishing baseline line level for ambient odor, performing odor monitoring using a field olfactometer, measuring and maintaining a dilution to threshold (D/T) ratio for offsite odor below 5 at the property line, and completing perimeter monitoring at multiple locations downwind in addition to a minimum of one location upwind. See explanation below.
- Per spec section 3.2, include performance of an odor control test using a test pit. Agreed - revised Section 2.1
- Per spec section 1.3.4, include the qualification requirements of the odor control specialty subcontractor. See below.
- Specify if any permits will be necessary for implementation of odor control (spec section 1.4). Agreed - Added Sect 3.0

2) Section 2.1 - This section incorrectly states that odor control activities will be performed based on the real-time VOC monitoring via a hand held PID using a MultiRAE Multigas meter. Please see general comment regarding odor monitoring requirements. Indicate the general location and number of planned odor monitoring locations, and planned monitoring frequency Agreed - This section is renumbered to Sect 2.2 and the agreed upon methods are added.

3) Section 2.2 - Indicate transition time/requirements for employing contingency methods. Agreed - added text.

4) Vendor Literature - Provide SDS for AC-645 and AC-904 foams, and for any additional products proposed.
Agreed - Added SDS sheets for all proposed products.

1) It has been agreed that an olfactometer, such as the Nasal Ranger or equivalent equipment, will not be used and the inspector's olfactory sense (nose) will be used per discussions with CDM (Ali Rahmani) and USACE (Ray Low and Matt Creamer) however, procedures, as described here, were added to the text.

Sevenson does not intend to procure the services of an odor control specialty subcontractor. However, the names and the positions of the inspectors have been added to the plan.

Odor Control Plan

Syncon Resins Superfund Site
South Kearny, New Jersey
Contract No. W912DQ-15-D-3002, TO 0002

Submitted by:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

April 2017
Revision 1

ODOR CONTROL PLAN

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3.0 Permits …….. 5

Appendix A - Vendor Literature

Rusmar Foam AC-645

Rusmar Foam AC-904

Rusmar Unit PFU-400/25

BioSolv Pinkwater

ODOR CONTROL PLAN

1.0 Odor Control Plan Objectives

The purpose of the Odor Control Plan is to present the methods and procedures for controlling odors during excavation and loadout activities. Sevenson realizes that odors can not only be a nuisance, but can also can be a health & safety issue.

2.0 Odor Control

Sevenson's odor control procedures include; 1. Performance of Odor Control Test, 2. Monitoring for odors and, 3. Controlling odors.

2.1 Performance of Odor Control Test

Through the construction of more than 40 test pits and shallow characterization sample pits, Sevenson has determined that the only areas that will require odor suppression is the southeastern corner of Area E and Area I. Other areas were fairly free of noticeable odors.

Prior to the start of excavation activities in those areas, Sevenson will perform odor control tests to ensure that the control methods proposed Section 2.3 are effective. The tests will be conducted with 2 tests pits. One test pit will be representative of the shallow excavation in Area E and the other test pit will be representative of the deeper excavation in Area I. Sevenson will locate the test pits to produce the most odors. Each odor control method will be tested at each test pit to demonstrate odor minimization of the proposed methods.

2.2 Monitoring For Odors

Sevenson's SSHO, Mr. Ron Scarborough, will be the primary person performing the monitoring. His backups will be the Environmental Technician, Mr. William Zambrana, and the QCSM, Mr. Eric Delellis. Sevenson will ensure that all field personnel assigned to the task of on-site monitoring are properly trained in the basic principles and procedures of field odor investigations.

Sevenson will conduct on-site monitoring using the inspector's olfactory senses to monitor the daily waste excavation and backfilling operations, especially during the initial exposure of contaminated soil. This method is selected since it has been determined that the olfactory senses are more sensitive to the type of odors expected from the site and adequate for the industrial setting surrounding the site.

ODOR CONTROL PLAN

Sevenson will conduct perimeter monitoring at multiple locations downwind in addition to a minimum of one location upwind of exposed contaminated soil in excavations or stockpiles. Monitoring locations will be on the property boundary line to determine odors observed by the neighboring community. Monitoring shall be conducted at a frequency of at least three times a day: before the start of work, during peak work, and at the completion of the day, but will be increased if conditions warrant it. Additional monitoring shall be conducted whenever a significant change in weather conditions occurs. Weather data shall be verified regularly throughout the day to determine wind speed, direction, pressure, and temperature. If odors from the Site are detected, Sevenson will take additional steps immediately to mitigate the on-site odors as described in Section 2.3.

In addition, Sevenson will be performing real-time VOC monitoring via a hand held PID using a MultiRAE Multigas meter. If VOC readings exceed the limits set in the approved Air Monitoring Plan (submitted under separate cover), odor control activities will be performed.

Finally, in addition to field inspections and handheld PID readings performed by the inspectors, detectable odors by workers will also trigger odor control activities.

2.3 Controlling Odors

Sevenson will control odors 3 ways:

- The most economical way to control odors is the use of poly. Sevenson will attempt to control odors by covering open excavations and potential stockpiles with poly whenever there is no active excavation taking place (breaks, end of the day, weekends). Also, poly will be used to cover the open excavations and stockpiles at the end of each day and at the end of each work week.
- If the use of poly does not work and does not control odors sufficiently, Sevenson will use the Government-owned Rusmar Foam Sprayer (PFU 400/25) to apply odor control foam to exposed excavation areas and stock piles. Sevenson will have on hand two types of foam. Foam AC-645 will be applied during excavation activities and at the end of each day. This material has a duration of approximately 12 – 17 hours. It will be applied as per the manufacture's recommended application rate and dilution factor. At the end of the work week, Foam AC-904 will be applied. This material has a duration of approximately 15 – 30 days. It will be applied as per the manufacture's recommended application rate and dilution factor. Equipment information and material cut sheets are provided with this plan.

- The third method of odor control Sevenson would use is to apply BioSolv Pinkwater to the area to neutralize the odors. It will be applied as per the manufacture's recommended application rate and dilution factor. Equipment to be used to apply the product are a mix tank and pressure washer. The product will sprayed onto the exposed soil and mixed in as recommended. Product information is included with this plan.
- The use of odor control devices and products will be under the supervision and direction of Sevenson's Project Superintendent, Mr. Perry Novak. Mr. Novak is experience with the use and application of all proposed control methods listed above. Sevenson does not intend to use a specialized odor control subcontractor on the project.
- Again, Sevenson will attempt to control odors with poly first, since it is the more economical option, and will reserve the use of foam or BioSolv Pinkwater only if the poly does not control odors sufficiently.

Sevenson will have several drums of Rusmar Foam onsite at the beginning of excavation of the areas described above. In the event that the primary odor control method, deploying poly, is not effective, Sevenson will be able to deploy the Rusmar foam immediately and be deployed within minutes. If the Rusmar foam is also not effective, Sevenson will have a contract in place to order the BioSolv, however, this option may require excavation activites to cease for a few days while the BioSolv is delivered to the site

3.0 Permits

There are no permits required for the implementation of the 3 odor control methods proposed in this plan. In the event that the 3 proposed methods do not perform as intended, Sevenson will revisit the need for permits based on the selected method of odor control.

ODOR CONTROL PLAN

Appendix A – Vendor Literature

Syncon Resins Superfund Site

South Kearny, NJ

Revision 1

ODOR CONTROL PLAN

Rusmar Foam AC-645

RUSMAR INCORPORATED

PRODUCT SELECTION GUIDE

Compatible Products

(can be fed from same machine, sequentially without machine being flushed clean)

Product	Most Common Use	Duration	Recommended Depth	Most Common Dilution	Coverage per 450lb Drum at Recommended Depth	Color	Scent
AC-645	Active excavation and short-term emission control	12-17 Hours	3 Inches	6.5 : 1	4,500 ft^2	White	• Unscented • Wintergreen* • Vanilla*
AC-904	Medium-Term Emission Control & Sealing	15-30 Days	2 Inches	Direct Use	800-900 ft^2	• Black • Red* • Green* • Brown*	• Unscented • Wintergreen* • Vanilla*
AC-912	Long-Term Emission Control & Sealing	60-90 Days	2 Inches	Direct Use	800-900 ft^2	• Black • Red* • Green* • Brown*	• Unscented • Wintergreen* • Vanilla*
AC-920	Extreme-Term Emission Control & Sealing	90-180 Days	2 Inches	Direct Use	800-900 ft^2	• Black • Red* • Green* • Brown*	• Unscented • Wintergreen* • Vanilla*
AC-667SE	Landfill Daily Cover	24-48 Hours 72 Hours	3 Inches 6-7 Inches	6.5 : 1 4 : 1	4,500 ft^2 1,830 ft^2	White/Tan	Cinnamon

***Indicates a Special Order item**

RUSMAR INCORPORATED • 216 Garfield Avenue • West Chester, PA 19380

Toll Free: 1.800.SEE.FOAM • P: 610.436.4314 • F: 610.436.8436 • www.rusmarinc.com

PRODUCT DATA SHEET

LONG DURATION FOAM AC-645

GENERAL DESCRIPTION

AC-645 Long Duration Foam is a patented product which produces a thick, long-lasting, viscous foam barrier for immediate control of dust, odors and volatile organic compounds (VOCs). AC-645 is designed for use with Rusmar Pneumatic Foam Units.

AC-645 foam is recognized by the Environmental Protection Agency and the U.S. Army Corps of Engineers as providing superior emission control for a period up to 17 hours. AC-645 has been specified for use at Superfund and other hazardous waste sites across the United States and Canada.

FEATURES

- Biodegradable
- Will not add to treatment costs
- No ambient temperature limitations
- Easy to use
- More effective than tarps
- Non-reactive
- Non-hazardous
- Safe for workers and the environment
- Requires only water dilution
- No clean up necessary
- Non-combustible
- Covers any contamination source

APPLICATIONS

The primary application for AC-645 is control of odors, VOCs and dust during active excavation and for overnight coverage of contaminated soils at hazardous waste sites. AC-645 can also be applied on top of liquid surfaces.

SPECIAL ODOR CONTROL PROBLEMS

The remediation of hazardous waste sites often includes excavation of soil contaminated with odorous compounds. AC-645 has little or no odor itself, although a pleasant wintergreen or vanilla scent can be added. It forms a barrier between contaminants and the atmosphere and can be applied during active excavation to provide an immediate and effective barrier to minimize odors. It is completely biodegradable and poses no threat to workers, neighboring residents or ground water. AC-645 will not add to soil volume or treatment costs.

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PRODUCT DATA SHEET

LONG DURATION FOAM AC-645

AC-645 can also be applied on top of trucks for emission control during transport of materials such as contaminated soils or sewage sludge. Ammonia tests performed on trucks containing sewage sludge resulted in a drop of concentration levels from 170 ppm prior to foaming down to 6 ppm after coverage with AC-645.

- Minimizes worker exposure
- Maintains fence-line odor and VOC emission limits
- Works on lagoon and pond closures
- Can be applied to near vertical or liquid surfaces

FUGITIVE DUST

At hazardous waste sites, fugitive dust can present a health hazard. AC-645 can be applied on top of the dusty material to prevent any wind-borne emissions. There is no need to mobilize equipment to immediately cover with soil or tarps. The Pneumatic Foam Unit can be filled and placed at the site to be used at a moment's notice.

EMERGENCY SPILL CLEAN UP

In emergency spills, odor and VOC control is often difficult because of the terrain and accident conditions. AC-645 Long Duration Foam can be applied to any shaped object, as well as steep slopes, water, mud, snow and ice. It is non-flammable and non-reactive - difficult spill problems can be accommodated.

METHOD OF APPLICATION

AC-645 Long Duration Foam is supplied in either 450 pound (55 gal.) drums or by bulk load (approximately 46,000 pounds). Bulk shipments can be stored outside in a Rusmar Bulk Storage-Dilution System. The Bulk Storage and Dilution system is comprised of a 7000 gallon heated and stirred chemical storage tank and a microprocessor to accurately dilute and transfer the chemical. AC-645 is designed to be applied with a Rusmar Pneumatic Foam Unit. The Pneumatic Foam Units are available in a variety of sizes to accommodate a range of site conditions and application needs.

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SAFETY DATA SHEET

LONG DURATION FOAM AC-645

Section 1. Identification

GHS product identifier : LONG DURATION FOAM AC-645

Chemical name : Proprietary Surfactant.

Other means of identification : Aqueous anionic surfactant mixture.

Product type : Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Product use : Aqueous Surfactant. Spray application for VOC and Odor control.

Area of application : Industrial applications.

Supplier/Manufacturer : Rusmar, Inc.
216 Garfield Avenue
West Chester, PA 19380
Phone: 610-436-4314
Fax: 610-436-8436

e-mail address of person responsible for this SDS : info@rusmarinc.com
Website: www.rusmarinc.com

Emergency telephone number (with hours of operation) : 888 488 8044 or 212 682 1200
CHEMTREC 800 424 9300

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : No signal word.

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Proprietary Surfactant.

Other means of identification : Aqueous anionic surfactant mixture.

CAS number/other identifiers

CAS number : Not available.

Product code : Not available.

Ingredient name	Other names	%	CAS number
Proprietary Surfactant.	-	100	-

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
sulfur oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

Large spill : Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid. [Clear viscous liquid.]

Color : Translucent. White.

Odor : Odorless.

Odor threshold : Not available.

pH : Not available.

Melting point : Not available.

Boiling point : 99°C (210.2°F)

Flash point : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not applicable.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : 3.3 kPa (25 mm Hg) [room temperature]

Vapor density : Not available.

Relative density : 1.01 to 1.06

Solubility : Easily soluble in the following materials: cold water and hot water.

Solubility in water : Easily soluble.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

SADT : Not available.

Viscosity : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid : Keep away from heat.

Incompatible materials : No specific data.

Hazardous decomposition products : Low levels of sulfur oxides on exposure to high temperatures (concentrate).

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Conclusion/Summary : Not expected.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Section 11. Toxicological information

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

United States

Section 12. Ecological information

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b)**: Not determined.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Not applicable.

Composition/information on ingredients

No products were found.

SARA 313

Not applicable.

State regulations

Massachusetts : This material is not listed.

New York : This material is not listed.

New Jersey : This material is not listed.

Pennsylvania : This material is not listed.

California Prop. 65

None of the components are listed.

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

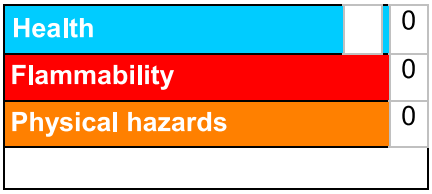
UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

United States

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Not classified.	

History

Date of issue/Date of revision : 05/28/2015

Date of previous issue : No previous validation

Version : 1

Prepared by : IHS

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Section 16. Other information

References : HCS (U.S.A.)- Hazard Communication Standard
International transport regulations

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Syncon Resins Superfund Site

South Kearny, NJ

Revision 1

ODOR CONTROL PLAN

Rusmar Foam AC-904

RUSMAR INCORPORATED

PRODUCT SELECTION GUIDE

Compatible Products

(can be fed from same machine, sequentially without machine being flushed clean)

Product	Most Common Use	Duration	Recommended Depth	Most Common Dilution	Coverage per 450lb Drum at Recommended Depth	Color	Scent
AC-645	Active excavation and short-term emission control	12-17 Hours	3 Inches	6.5 : 1	4,500 ft^2	White	• Unscented • Wintergreen* • Vanilla*
AC-904	Medium-Term Emission Control & Sealing	15-30 Days	2 Inches	Direct Use	800-900 ft^2	• Black • Red* • Green* • Brown*	• Unscented • Wintergreen* • Vanilla*
AC-912	Long-Term Emission Control & Sealing	60-90 Days	2 Inches	Direct Use	800-900 ft^2	• Black • Red* • Green* • Brown*	• Unscented • Wintergreen* • Vanilla*
AC-920	Extreme-Term Emission Control & Sealing	90-180 Days	2 Inches	Direct Use	800-900 ft^2	• Black • Red* • Green* • Brown*	• Unscented • Wintergreen* • Vanilla*
AC-667SE	Landfill Daily Cover	24-48 Hours 72 Hours	3 Inches 6-7 Inches	6.5 : 1 4 : 1	4,500 ft^2 1,830 ft^2	White/Tan	Cinnamon

***Indicates a Special Order item**

RUSMAR INCORPORATED • 216 Garfield Avenue • West Chester, PA 19380

Toll Free: 1.800.SEE.FOAM • P: 610.436.4314 • F: 610.436.8436 • www.rusmarinc.com

PRODUCT DATA SHEET

LONG DURATION FOAM AC-900 SERIES

GENERAL DESCRIPTION

The AC-900 Series Long Duration Foam products produce an impermeable, flexible membrane that seals a surface to prevent emissions. AC-900 Series foam products utilize foam as a distribution method for latex. After the foam has been applied, the air bubbles begin to collapse and the latex coagulates to form a continuous flexible membrane that adheres to the substrate. AC-900 Series products are designed for use with Rusmar Pneumatic Foam Units.

AC-900 Series foams are recognized by the Environmental Protection Agency and the U.S. Army Corps of Engineers as providing superior emission control for periods up to 6 months. AC-900 Series foams have been specified for use at Superfund and other hazardous waste sites across the United States and Canada.

FEATURES

- Adheres to vertical and irregular surfaces
- Completely controls odors & VOCs
- Prevents erosion
- Easy to use, no mixing necessary
- Available in black, red, green or brown
- Non-hazardous
- Controls dusting
- Repels water
- No temperature limitations
- More effective than tarps

APPLICATIONS

AC-900 Series foams are the technology of choice when conditions demand superior coverage for periods up to 6 months. Some of the more common uses are:

ODOR AND VOC CONTROL

As a medium for controlling odors and VOCs, AC-900 Series has proven to be very effective with diverse applications.

- Can be left in place or disposed of with soil - will not interfere with thermal or bioremediation process
- Extended odor & VOC control of open excavations or exposed trash
- Extended odor & VOC control of stockpiled soils or debris
- Special odor control problems, such as sewage sludge
- Baled trash cover – the membrane seals the surface completely

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PRODUCT DATA SHEET

LONG DURATION FOAM AC-900 SERIES

FUGITIVE DUST

Exposed soil can often become a dust problem in windy locations, presenting a potential health hazard. Hazardous waste sites, receiving periodic shipments of dusty materials, can prevent windborne dust by immediately applying AC-900 Series foam.

- No need to mobilize equipment to immediately cover with soil or tarps. The Pneumatic Foam Unit can be filled and placed at the site to be used at a moment's notice.
- Extended dust control of stockpiled soils or debris

EROSION CONTROL

Graded areas can be covered with AC-900 Series Membrane reducing erosion damage caused by rain, melting snow or ice and wind.

- On outside slopes of the landfill – prevents trash from being exposed
- On landfill caps - prevents erosion before growth of new vegetation
- Stockpiles

SEALING HIGH PERCOLATION SOILS

Sand and other high percolation soils do not effectively repel rain water or melting snow and ice. Covering areas with AC-900 Series foam dramatically reduces soil permeability.

- Improved run-off from inside surfaces of the landfill
- Reduced leachate generation

WASTE TRANSPORTATION

Trucks or railcars transporting trash, odorous or dusty materials can be quickly covered with AC-900 Series foam to form a complete barrier between emissions and the atmosphere.

- No wind blown losses
- Produces a better visual appearance

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PRODUCT DATA SHEET

LONG DURATION FOAM AC-900 SERIES

METHOD OF APPLICATION

AC-900 Series Long Duration Foam products are supplied in either 450 pound (55 gal.) drums or by bulk load (approximately 46,000 pounds). Bulk shipments can be stored outside in a Rusmar Bulk Storage-Dilution System. The Bulk Storage and Dilution system is comprised of a 7000 gallon heated and stirred chemical storage tank and a microprocessor to accurately transfer the chemical.

AC-900 Series products are designed to be applied with a Rusmar Pneumatic Foam Unit. The Pneumatic Foam Units are available in a variety of sizes to accommodate a range of site conditions and application needs.

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SAFETY DATA SHEET

LONG DURATION FOAM AC-900 SERIES

Section 1. Identification

GHS product identifier : LONG DURATION FOAM AC-900 SERIES

Other means of identification : Aqueous anionic surfactant, polymer latex mixture.

Product type : Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Product use : Aqueous Surfactant. Spray application for VOC and Odor control.

Area of application : Industrial applications.

Supplier/Manufacturer : Rusmar, Inc.
216 Garfield Avenue
West Chester, PA 19380
Phone: 610-436-4314
Fax: 610-436-8436

e-mail address of person responsible for this SDS : info@rusmarinc.com
Website: www.rusmarinc.com

Emergency telephone number (with hours of operation) : 888 488 8044 or 212 682 1200
CHEMTREC 800 424 9300

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : No signal word.

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Other means of identification : Aqueous anionic surfactant, polymer latex mixture.

CAS number/other identifiers

CAS number : Not available.

Product code : Not available.

Ingredient name	Other names	%	CAS number
Proprietary Surfactant.	-	100	-

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

Section 4. First aid measures

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
sulfur oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Section 8. Exposure controls/personal protection

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid. [Viscous liquid.]

Color : Opaque. Gray.

Odor : Not available.

Odor threshold : Not available.

pH : Not available.

Melting point : Not available.

Boiling point : 99°C (210.2°F)

Flash point : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not applicable.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : 3.3 kPa (25 mm Hg) [room temperature]

Vapor density : Not available.

Relative density : 1.01 to 1.06

Solubility : Easily soluble in the following materials: cold water and hot water.

Solubility in water : Easily soluble.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

SADT : Not available.

Viscosity : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid : Keep from freezing.

Incompatible materials : No specific data.

Section 10. Stability and reactivity

Hazardous decomposition products : Low levels of sulfur oxides on combustion.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Conclusion/Summary : Not expected.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Section 11. Toxicological information

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b)**: Not determined.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

Section 15. Regulatory information

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Not applicable.

Composition/information on ingredients

No products were found.

SARA 313

Not applicable.

State regulations

Massachusetts : None of the components are listed.

New York : None of the components are listed.

New Jersey : None of the components are listed.

Pennsylvania : None of the components are listed.

California Prop. 65

WARNING: This product contains less than 0.1% of a chemical known to the State of California to cause cancer. This product contains trace amounts of 1,4 Dioxane, a condition which creates the potential for human exposure. If this product is handled according to the recommendations in the MSDS, the presence of these trace amounts of 1,4 Dioxane is not expected to result in any short term or long term hazard.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
1,4-dioxane	Yes.	No.	Yes.	No.

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

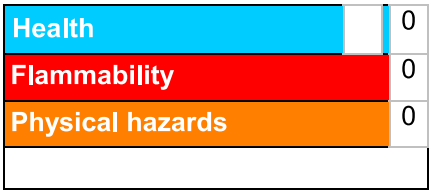
UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

United States

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Not classified.	

History

Date of issue/Date of revision : 05/28/2015

Date of previous issue : No previous validation

Version : 1

Prepared by : IHS

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Section 16. Other information

References : HCS (U.S.A.)- Hazard Communication Standard
International transport regulations

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Syncon Resins Superfund Site

South Kearny, NJ

Revision 1

ODOR CONTROL PLAN

Rusmar Foam Unit PFU 400/25

RUSMAR INCORPORATED

EQUIPMENT SELECTION GUIDE

Pneumatic Foam Unit	Self-Contained?	Freeze-Protected?	Throw Range	Coverage/min. at 3" Depth	Tank Capacity	Approximate Coverage per Tank with 600 Series	Approximate Coverage per Tank with 900 Series	Compatible with all Products?	Self-Propelled?
NTC/8	No. Requires compressed air supply.	No	25 Feet	86 ft^2/min.	Varies. Customer Supplied	Varies.	Varies.	No. Not compatible with AC-667SE	No. Skid Mounted
PFU 400/25	Yes	Yes	35 Feet	267 ft^2/min.	400 Gallon	4,500 ft^2 @3" depth	5,600 ft^2 @2" depth	Yes	No. Trailer Mounted
PFU 1600/40	Yes	Yes	60 Feet	428 ft^2/min.	1,600 Gallon	18,000 ft^2 @3" depth	22,400 ft^2 @2" depth	Yes	No. Trailer Mounted
PFU 2500/60	Yes	Yes	80 Feet or Spray Manifold	642 ft^2/min.	2,500 Gallon	28,000 ft^2 @3" depth	35,000 ft^2 @2" depth	Yes	Yes

RUSMAR INCORPORATED • 216 Garfield Avenue • West Chester, PA 19380
Toll Free: 1.800.SEE.FOAM • P: 610.436.4314 • F: 610.436.8436 • www.rusmarinc.com

REMEDIATION PRODUCT DATA SHEET

PNEUMATIC FOAM UNIT 400/25

A completely self-contained and portable foam generating system designed to withstand the rugged demands and harsh elements found at remediation sites. Quick start-up time means that emission control is available when you need it. Recommended for small to medium size remediation projects, dredging operations and hazardous waste sites. Can be towed around site with a pick-up truck. Foam is applied using a hand-line.

System includes air compressor, pump, hoses, nozzles, solution storage tank and proprietary foam generating technology. Unit has freeze protection for outdoor storage year-round.

FEATURES

- Simple to operate
- Durable, rugged construction
- No clean-up necessary
- Can be filled and placed aside until needed

SPECIFICATIONS

Solution Storage Tank	400 Gallons
Coverage Rate	270 Sq. Ft./Min. @ 3" depth
Coverage Area per fill	2,000 - 6,000 Sq. Ft.
Size	16'8" L x 8'6" W x 7'8" H
Dry Weight	6,880 Pounds
Hose	200 Feet of 1-1/2" Diameter
Products	All Long Duration and Soil Equivalent Foam Products
Freeze Protection System	120V or 230V, 30 amp, single phase

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Syncon Resins Superfund Site

South Kearny, NJ

Revision 1

ODOR CONTROL PLAN

BioSolv Pinkwater

Remediation and Decontamination Benefits

BioSolve Pinkwater is a well-known hydrocarbon mitigation agent: proven effective, safe and easy to use. BioSolve Pinkwater has been a trusted solution for hydrocarbon cleanup for over thirty years. It is used worldwide by:

- industrial contractors
- oil production, refining and distribution companies
- environmental engineers and contractors
- water & power utilities
- fire departments & haz mat teams

Vapor Suppression

Spill Clean-up

Tank Cleaning & Degassing

Pinkwater and associated products are a highly specialized formulation of primarily non-ionic surfactants plus various performance additives. Pinkwater is formulated to provide **four benefits**:

1. Aggressively Removes Stubborn Hydrocarbons

The formulation of non-ionic surfactants in BioSolve products is strongly lipophilic or "oil-loving". Pinkwater will first aggressively **pull** the hydrocarbons away from the contaminated surface (whether it be soil, stone, steel, cement or sand). The mobilized hydrocarbon is then **emulsified** within the Pinkwater solution, making *it non-volatile, non-combustible, and miscible* in water.

This dual functionality is of universal benefit in addressing hydrocarbon contamination:

- Hazardous vapors become non-volatile
- Residual NAPL is mobilized and solubilized
- Contaminating grease and sludge is removed

Subway Axle Bearings Before Treatment

After Treatment

PRODUCTS
Overview
Product Benefits
Markets
Preparing Pinkwater Solution
Using BioSolve Pinkwater
Product Line
Introducing BioSolve®Activator ™

INTRODUCING BIOSOLVE® ACTIVATOR ™ »

HOW TO BUY »

DOWNLOADABLE SDS »

REQUEST INFORMATION »

DOWNLOAD OUR BROCHURE »

RECENT NEWS

The BioSolve® Company Adding New Bioremediation Product

Read More »

2. Safe and Easy to Use

Pinkwater is not a solvent, not a cutter stock, not even a foam. Pinkwater (concentrate) and Pinkwater solution are water-based. Working solutions are typically 94% to 98% water. This makes the product easy to mix, easy to handle, easy to apply.

Pinkwater concentrate (left) and dilute solution (right) are both water-based

Health	1	Minimal
Flammability	0	None
Reactivity	0	None
Special Hazard	0	None

3. Predictable Performance

Stable Formula. A major breakthrough of the Pinkwater formulation is that it holds otherwise incompatible ingredients together in a highly stable, water-based solution. An unopened container of Pinkwater has virtually an unlimited shelf life – at least 10 years based on customer testimonials.

Broadly Effective. Pinkwater works with fresh water or brackish water and works on a wide range of surfaces, including most soil types. It can be used on most liquid and gaseous hydrocarbons that are not water soluble. Effective performance does not depend on precise measuring and application.

Controllable Emulsion. The emulsion formed with Pinkwater and oil contaminants will remain stable in a two-phase aqueous solution. In time, most emulsions will “collapse.” For Pinkwater, that time frame can be measured in weeks or months, depending on field conditions. On the other hand, a stable emulsion can be "broken" on demand by lowering the pH (for Pinkwater) or by using a commercial emulsion breaker (for Pinkwater or Activator). Breaking the Emulsion allows for the immediate recovery of free product in an oil-water separator. Please call The BioSolve Company for more information on breaking Pinkwater or Activator emulsions.

Effluent containing Pinkwater solution forms a stable
two-phase emulsion with hydrocarbons:
Top layer - Oil in water emulsion
Bottom layer - Remaining Pinkwater solution

4. Non-Hazardous

BioSolve Pinkwater contains no hazardous ingredients, as defined by:

- EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
- Massachusetts Right to Know Law
- California Proposition 65

BioSolve products are TSCA Compliant (Toxic Substances Control Act)

SDS FAQs Testimonials

329 Massachusetts Avenue, Lexington, MA 02420 USA
+1 (781) 482-7900 Toll Free +1 (800) 225-3909 Fax +1 (781) 482-7909

Arabic Hebrew Indonesian Korean Malay Portuguese Simplified Chinese Traditional Chinese Spanish

How to Use: Vapor Suppression

- Prepare a 3% - 5% dilute solution of BioSolve Pinkwater concentrate with water in a mixing tank
- Apply with backpack sprayer, pressure washer or fire hose
- Apply Pinkwater solution to exposed soil in active work areas until surface is saturated
- For small areas, apply at the rate of about 1 gallon dilute solution per 30 square feet
- Reapply when soil surface becomes dry or odor is again detected
- For active excavations and large work areas, apply continuously using multiple pressure washer systems. Some sites may require stationary misters

BACK TO APPLICATION »

HOW TO USE »

Summary guidelines on the use of BioSolve Pinkwater in this application.

SELECTED CUSTOMERS »

A brief list of illustrative customers who use Pinkwater in this application

WHAT CUSTOMERS SAY »

This is what we hear from customers over the phone and at project sites

329 Massachusetts Avenue, Lexington, MA 02420 USA
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APPLICATIONS

Vapor Suppression

BioSolve Pinkwater is used at major remediation and construction work-sites where excavation of contaminated soils may release noxious organic odors or hazardous VOCs. The dilute solution is sprayed directly onto newly exposed soil surfaces or stockpiles of contaminated material where volatilization is taking place.

Used as an alternative to foam, Pinkwater creates a barrier that keeps vapors in the soil, allowing work to continue safely without disruption to workers or neighbors.

Objectives

- Protect workers and neighbors from potentially harmful VOC emissions
- Reduce nuisance odors

Advantages of Pinkwater

- Works by “locking” VOCs in the soil, no need to maintain a foam “blanket”
- Can be applied in wet or windy conditions and on vertical surfaces
- Can be applied during active excavation
- Only standard equipment is required: mixing tank, hoses, pressure washers

An Information Sheet with more detailed application protocols is available from The BioSolve Company.

Call The BioSolve for assistance in determining the volume of Pinkwater your project requires. We can deliver directly to your project site according to your work schedule.

HOW TO USE »

Summary guidelines on the use of BioSolve Pinkwater in this application.

SELECTED CUSTOMERS »

A brief list of illustrative customers who use Pinkwater in this application

WHAT CUSTOMERS SAY »

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Safety Data Sheet

Section 1 – Chemical Products and Company Identification

Product Names: BioSolve® Pinkwater®

Product Uses: Remediation of hydrocarbon (oil, fuel, petrochemical) contamination, including: impacted soils, suppression of VOCs, surface cleaning of equipment and protective clothing.

Manufacturer:
The BioSolve Company
329 Massachusetts Avenue
Lexington, MA 02420 USA

Contact Information:

+1 (800) 225-3909	US, Canada, Mexico and Puerto Rico
+1 (781) 482-7900	All other locations

Section 2 – Hazards Identification

Health Hazards:

Eye Contact:	Causes transient eye irritation
Skin Contact:	May cause mild, transient irritation
Ingestion:	May be harmful if swallowed; can cause gastrointestinal irritation, nausea, vomiting and/or diarrhea

Hazard Mitigation: Wear protective gloves and eye/face protection
Avoid prolonged breathing of spray

Environmental Hazards: Moderately toxic to aquatic life. Avoid discharge to storm drains and waterways

GHS Classification: Toxic to aquatic life, Acute Category 2

Section 3 – Composition/Information on Ingredients

Proprietary formulation with nonionic surfactants (32% active ingredients in water)

BioSolve products contain no caustic, d-limonene or hydrocarbon solvents.

BioSolve products do not contain any hazardous ingredients as defined by CERCLA, Massachusetts Right to Know Law and California Prop 65. All ingredients are TSCA compliant.

Section 4 – First Aid Measures

Eyes: Immediately flush eyes with water for at least 15 minutes. Hold eyelids apart while flushing to rinse entire surface of eye and lids with water. Seek medical attention for lasting irritation.

Skin: Rinse exposed area and wash with mild soap and water for several minutes. Seek medical attention if irritation develops.

Ingestion: Seek medical attention in the event of serious or persistent abdominal discomfort, nausea or diarrhea.

Inhalation: Inhalation of concentrated vapors resulting from spraying or heating in confined or poorly ventilated areas may cause irritation of nose and throat. Remove person to fresh air and seek medical attention if irritation persists.

Section 5 – Fire Fighting Measures

Suitable Extinguishing Media: None required; BioSolve products are non-flammable

Special Protective Equipment for Firefighters: None necessary

Unusual Fire or Explosive Hazards: None

Section 6 – Accidental Release Measures

In case of accidental release, breakage or leakage: Eliminate or contain source with inert material, such as sand, earth, absorbent pads, etc. Transfer liquid to suitable containers for recovery, re-use or disposal. Wipe up or mop up using water. Hard surfaces (e.g., floors, driveways) may be slippery; use care to avoid falling.

Rinse area with water. Avoid flow of run-off to surface waters. Always check with local regulations before discharging effluent to storm drains or sewers.

Section 7 – Handling and Storage

Handling: Minimize periods of exposure to extreme temperatures. Keep from freezing. If frozen, separation may occur; thaw and stir thoroughly prior to use. Freezing will not affect product performance.

Precautions: Chemical resistant gloves and eye protection are recommended while mixing and using.

Incompatibilities: Avoid contact with strong acids or strong oxidants.

Storage: Recommended storage temperature: 35° – 120° F (1° – 48° C).

Shelf Life: If unopened, more than 10 years.

Section 8 – Exposure Controls / Personal Protection

Eyes Protection: Safety glasses; chemical goggles or face shield recommended when spraying to protect against backsplash and drift.

Skin Protection: Rubber or latex gloves recommended.

Respiratory Protection: None required, except if application results in significant misting of product. If so, use of an approved air purifying respirator is recommended.

Engineering Controls: For indoor use or for use in a confined space, normal ventilation is generally satisfactory.

Section 9 – Physical and Chemical Properties

Appearance: Deep red

Odor: Mild, pleasant sassafras fragrance

Concentration: ~32% active ingredients as sold

Boiling Point	265°F/129°C	**Vapor Pressure mm/Hg**	Not available
Melting/Freezing Point	28°F/-2°C	**Vapor Density (Air=1)**	Not available
Flash Point	Non-flammable	**Surface Tension***	29 Dyne/cm @25°C
Flammability Limits	Not applicable	**Viscosity (concentrate)**	490 centipoise
Reactivity with Water	None	**Viscosity (6% solution)**	1.5 centipoise
Evaporation Rate	Not determined	**Solubility in Water**	100%
Specific Gravity	1.01 gms/cc	**VOC Content**	Not determined
	8.43 lbs/U.S. gal	**pH**	9.1 +/- 0.3

*6% solution

Section 10 – Stability and Reactivity

Chemical Stability: Stable; will not decompose if used according to manufacturer's directions.

Conditions to Avoid: Prolonged exposure to heat may cause product degradation. Freezing should also be avoided as discussed in Section 7.

Incompatible Materials: Normally unreactive. Avoid strong alkalis, strong acids, strong oxidizing agents and materials with reactive hydroxyl compounds. These materials could damage the product and reduce its effectiveness during application.

Hazardous Decomposition Products: None are known.

Hazardous Polymerization: Will not occur.

Section 11 – Toxicological Information

Overview: No adverse acute or chronic health effects expected if product used in accordance with manufacturer's directions.

Carcinogenicity: No ingredient has been shown to cause cancer in laboratory animals.

Specific Organ Toxicity: None are known.

Section 12 – Ecological Considerations

Persistence and Degradability: The total of the organic components contained in this product is not classified as readily biodegradable (OECD-301 A-F). However, this product is inherently biodegradable with 60% degradation in 28 days (OECD-301B) and estimated >95% degradation in 120 days.

Bioaccumulation Potential: The bioaccumulation factor in fish has been estimated to be low, ranging from 87 to 344.

Mobility: No data available

Aquatic Toxicity:

LC_{50} of Concentrate (As shipped)		
Mysidopsis bahia	48-hours	3.6 mg/L
Menidia beryllina	96-hours	6.4 mg/L
LC50 of 3% Dilute Solution (As Used)		
Mysidopsis bahia	48-hours	185 mg/L
Menidia beryllina	96-hours	247 mg/L
LC50 of 6% Dilute Solution (As Used)		
Daphnia magna	48-hours	287 mg/L
Pimephales promelas	96-hours	124 mg/L
Onchorhynchus mykiss	96-hours	177 mg/L

Section 13 - Disposal

DO NOT DUMP INTO STORM DRAINS OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. As manufactured, BioSolve products do not meet the definition of a hazardous waste. Small quantities of unused and uncontaminated product may be discharged to a qualified wastewater treatment facility. Always obtain approval from local and Federal regulatory agencies prior to discarding this product into public sewers.

As your supplier, we have no control over your handling and use of this product. However, the intended use of this product as a remediation and/or surface washing agent may produce wastewater containing emulsified or dispersed hydrocarbons that may be classified as a hazardous waste and should be treated and disposed of accordingly.

Section 14 – Transportation Information

USDOT Freight Class 55 (Liquid Cleaning Compound, Non-Hazardous)
This product is not regulated by USDOT or Canadian TDG when shipped domestically by land.

North American Industry Classification System (NAICS) # 325613

U.S. ITC, Harmonized Tariff Schedule B Classification: 3402.90.30.00

Section 15 – Regulatory Information

This product is considered non-hazardous as defined by CERCLA, according to OSHA, Massachusetts Right to Know Law and California Prop 65.

Toxic Substances Control Act:	All components of this product are on the TSCA inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30.
CEPA – Domestic Substances List:	All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or not required to be listed.
Canadian CPR Compliance:	This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR
WHMIS Classification:	D2B Eye or skin irritant

Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with Federal, state or provincial and local laws.

Section 16 – Other Information

HMIS Rating	Health Hazard:	1 (Eye/Skin Irritant)
	Fire Hazard:	0
	Reactivity:	0
	Personal Protective Equipment:	Rubber gloves, safety glasses or face shield
NFPA Rating	Health:	1 (Eye/Skin Irritant)
	Flammability:	0
	Reactivity:	0
	Other Hazard:	None

BioSolve Pinkwater is on the US Environmental Protection Agency's NCP Product Schedule. This listing does NOT mean that EPA approves, recommends, licenses, certifies or authorizes the use of BioSolve Pinkwater on an oil discharge. This listing means only that data have been submitted to EPA as required by Subpart J of the National Contingency Plan, 40 CFR Section 300.915.

SDS Effective Date: May 12, 2016

The information contained herein is accurate to the best of our knowledge. The BioSolve Company makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or application or in combination with other substances.

For more information, visit: www.biosolve.com

PCB-Ballasts and Lamp Removal Work and Disposal Plan

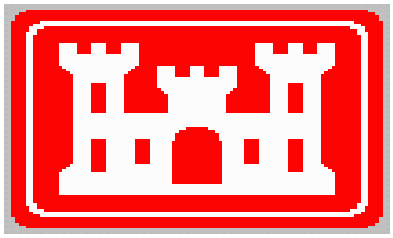
Syncon Resin Superfund Site
OU 2
South Kearny, New Jersey

Submitted by:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Prepared for:

U.S Army Engineer District
Corps of Engineers
Kansas City, Missouri



August 2016
Revision 1

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1.0 Introduction

Sevenson Environmental Services, Inc. (Sevenson) shall safely remove and segregate any Polychlorinated Bi-Phenyl (PCB)-containing lighting ballasts, associated mercury-containing fluorescent lamps in accordance with local, State of New Jersey, or federal regulations prior to any demolition work. If the Building's integrity necessitates removal prior to demolition, ballasts and lamps shall be included in the demolition debris and disposed without segregation.

Sevenson shall remove and salvage electrical fixtures and shall salvage unprotected glassware separate from the fixture. Incandescent, mercury-vapor, and fluorescent lamps and fluorescent ballasts manufactured after 1978 shall be salvaged, protected from breakage. As ballasts are removed from the lighting fixture, Sevenson shall inspect the label on ballast. Ballasts without a "No PCB" label shall be segregated demolition waste corresponding to their respective categories as listed in table 02410-1. All demolition waste shall be transported offsite to the appropriate disposal facilities for treatment, recycling, and/or disposal in accordance with section 02120 Offsite Transportation and Disposal.

2.0 Purpose

The purpose of this plan is to outline the hazards of removing lighting fixtures that have the potential to contain mercury fluorescent lamps and ballasts that contain PCB's.

3.0 Hazard

3.1 PCB Ballasts

PCB's were used in the capacitors of fluorescent lamp ballasts and in the capacitors of high intensity discharge (HID) lighting fixtures.

3.2 Mercury Fluorescent Lamps

All fluorescent lamps and most other types of energy-efficient lighting contain elemental mercury. Mercury has a unique combination of properties that make it the most efficient material for use in fluorescent and High Intensity Discharge (HID) lamps. The basic operating principles of fluorescent lamps depend on production of ultraviolet (UV) light and mercury is the most efficient product of the required UV. Safeguarding used lamps from breaking will minimize releases of mercury into the environment. Normal handling is a very low risk activity.

Mercury released from broken lamps and mercury contaminated materials vaporize at room temperature. Mercury vapor is extremely toxic. Mercury is the only heavy metal that is liquid at room temperature. Because of this and other useful properties its usage is commonplace. It can be more harmful to inhale the vapor from a bead of mercury than to ingest the same bead. At room temperature mercury vaporizes readily into an invisible, odorless, and tasteless and potentially harmful element.

Ambient mercury levels in the breathing zone can be controlled if personnel are aware of and trained in mercury management. Be conscious of the hazard of

unseen mercury contamination in cracks, corners and untreated storage containers.

4.0 Handling Procedures

4.1 PCB Ballasts

Procedure for removal of 'non leaking' PCB capacitors from fluorescent lamp ballasts. Employee shall wear the following safety equipment at a minimum.

- Gloves made of chemical resistant neoprene coated, butyl rubber, or leather.
- Safety glasses with side shields or full face shield

Step 1

Separate ballast by type (PCB, non PCB) and visually check for leakers, and place into drums.

A typical pre-1979 PCB-containing fluorescent light ballast (FLB)

A typical Non-PCB containing fluorescent light ballast. The ballast has a "No PCBs" marking on the top of the ballast and the text "electronic ballast". Only magnetic fluorescent light ballasts contained PCBs.

NOTE: Leaking PCB ballasts must be double bagged and placed in a drum containing at least 3 inches of vermiculite.

Step 2:

Properly label drums PCB or Non PCB. See sample labels below. Secure drum lid.

All protective equipment that comes into contact with any material leaking from a capacitor will be placed in proper containers for disposal. Employees shall wash hands with soap and water when beginning a work shift, before a break, and upon completion of the work shift. No tobacco materials, food, or beverages are permitted while working with lamp ballasts.

It is the employee's responsibility to ensure that these handling and disposal procedures are fully carried out. The proper use of the prescribed safety

equipment will protect the employee from the potential dangers of contamination from PCBs.

All employees who handle PCB ballast shall wash hands with soap and water when beginning a work shift, before a break, and upon completion of the work shift. No tobacco materials, food, or beverages are permitted while working with ballasts.

Step 3:

Storage time is maximum 30 days from the first date of accumulation. Longer periods may subject you to permitting and other compliance requirements. You are encouraged to contact your state agency or regional federal EPA office for any pre-notification, storage or other requirements that may apply. Then, schedule removal (and recycling) by contacting Ken Paisley at 716-284-0431.

PCB Drum Label (Example)

4.2 Mercury Fluorescent Lamps

Procedure for handling unbroken fluorescent lamps for packaging. Employee should wear the following safety equipment.

- Gloves made of chemical resistant neoprene coated, butyl rubber, or leather.
- Safety glasses with side shields or full face shield

Step 1:

Place used lamps into new or used lamp boxes (the original egg crate material does not have to be placed back into the boxes) and tape the ends to secure the box, but do not make it hermetically sealed (air tight). There are other suitable containers available commercially or from recyclers.

- Broken or crushed lamps should be packaged in an approved container (e.g. 55 gallon drum) or bagged into smaller containers.
- Badly damaged boxes, wet boxes, etc. may not be accepted for transport.
- Boxes shall be kept in a secure, dry area.

- For large quantities, cross stack and palletize lamp boxes to maximum of six feet. Secure boxes to pallet with shrink wrap or stretch film.
- All pallets need to be labeled as **Used Mercury Lamps** or **Universal Waste Mercury Lamps** (see sample label below).

Step 2:

All employees who handle Universal Wastes shall wash hands with soap and water when beginning a work shift, before a break, and upon completion of the work shift. No tobacco materials, food, or beverages are permitted while working with mercury lamps.

Step 3:

It is the employee's responsibility to ensure that these handling and disposal procedures are fully carried out. The proper use of the prescribed safety equipment will protect the employee from the potential dangers of contamination from mercury.

Step 4:

Storage time is maximum 1 year from the first date of accumulation. Schedule removal (and recycling) by contacting Ken Paisley 716-284-0431.

4.3 Emergency Procedures – Lamp Breakage

Purpose

To ensure that accidental breakage is cleaned up without spreading the mercury and with minimum exposure to employees.

Background

Lamps are fragile and they can easily break. The regulations distinguish between accidental breakage that occurs during normal transport and intentional breakage or crushing. While there is no specific amount of breakage that is considered accidental, less than 5% is typical. Anyone who chooses to recycle lamps under the Universal Waste Rule should take standard precautions to minimize breakage, such as using the boxes from new lamps to store old ones in. More specific guidance on this is available from recyclers.

Caution

EPA provides the following breakage advisory for THE HANDLING OF SMALL NUMBERS OF BROKEN FLUORESCENT LAMPS:

1. If a lamp breaks, close off the room to other parts of the building.
2. Open a window to disperse any vapor that may escape, and leave the room for at least 15 minutes.
3. Carefully scoop up the fragments with a stiff paper or a broom and dustpan (do not use your hands), do not generate dust and wipe the area with a disposable paper towel to remove all glass fragments.

4. Do not use a vacuum, as this disperses the mercury over a wider area. There are commercial grade vacuums available that contain the correct filtration system to safely vacuum up mercury containing material. These vacuums are permitted for this application as long as they are utilized within the manufacturer's recommendations.
5. All fragments (unless vacuumed) should be placed in a sealed plastic bag and properly disposed of. Under the Universal Waste Rule, a hazardous lamp that is broken must be cleaned up and placed in a container. The container must be closed, structurally sound, compatible with lamps, and lacking any evidence of spillage.
6. For larger quantities of lamps broken at the same time (for example, a box of lamps falling from a lift truck) the entire box shall be wrapped in plastic and placed inside an overpack (larger box or sealable container) container.

Waste Container Labels (example)

or

Storage Area Label (Example)

4.0 Training

All site workers who have the potential for exposure to PCBs will participate in the following training programs:

- 40 hour OSHA HAZWOPER and, if necessary, an 8 hour refresher.
- Site specific – this would include a review of the Site Specific Safety and Health Plan, work practices, activity hazard analyses, results of air monitoring program, and concerns including safety deficiencies and accidents.
- Daily safety meetings – all site personnel are required to attend and items to be discussed would include review of the day's activities and their associated hazards and controls, safety and health concerns, and action items.
- Hazard communication – as part of this OSHA required training, emphasis will be placed on the health effects of PCBs, exposure potential, and control programs.

5.0 Medical Surveillance

All workers who have the potential to be exposed to PCBs will participate in Sevenson's medical surveillance program.

The purposes of this program are to determine:

- The capability of the worker to perform the work. This will be accomplished by the physical examination by the physician and the review of the medical and work histories.
- The ability to wear respiratory protection. The pulmonary function test and X-ray will assist the physician in making this determination.
- Whether there are any prior physical and/or health conditions which may be advise affected by the work and/or exposure to the contaminants. The physician will primarily review the results of the liver enzyme blood tests and pre work serum PCB level.
- Whether any physical or biological systems have been affected by the work. As part of the medical surveillance program, pre and past work serum PCBs will be determined.

6.0 Personal Protective Equipment

The proper wearing of personal protective equipment is an integral component of the worker protection program. An evaluation of the potential for PCBs exposure and the proper ensemble of personal protective equipment has been made. The initial level of protection for workers exposed to PCBs is Level C which includes the wearing of protective clothing to protect against contact and respirators to prevent the inhalation hazard. The personal protective equipment will be continuously evaluated and may be modified depending upon actual work conditions.

7.0 Decontamination Procedures

7.1 PCBs

Building and fixture surfaces may need to be decontaminated upon discovery of a leaking ballast. The worker shall take the following steps to decontaminated affected building or fixture surfaces.

1. Isolate the affected area
2. Don Tyvek or other similar protective coverall
3. Remove the lamp cover or baffle of the light fixture (if present) to expose the fluorescent lamp.
4. If the fluorescent tube is not contaminated with PCBs, it can be reused or recycled as Universal Waste. If the fluorescent tube is contaminated with PCBs, carefully remove it and place it in an approved Department of Transportation (DOT) container.
5. Visually inspect the exposed section of the light fixture for potential PCB leakage or residue from a fire or smoking condition. If the light fixture shows signs of PCB leakage, clean up according to step 2 of Cleanup and Disposal then return to this step.
6. Remove the ballast enclosure cover (tray) within the light fixture to expose the ballast. Inspect the ballast for NO PCBs sticker. If no sticker or marking is present it must be treated as a PCB containing ballast.
7. If leaking or staining is identified on the ballast or light fixture, carefully remove them and place the items directly in an approved DOT container.
8. Clean up spills from PCB-contaminated light fixtures and leaking FLBs outside the light fixture (e.g., floors, desks, walls, etc.).
9. Place PCB remediation waste into a plastic bag and place inside drum with other PCB contaminated building material.
10. Remove PPE and place inside PCB contaminated drum.
11. Wash hands and face upon leaving the work area.

8.0 Disposal

Segregated or non-segregated PCB-ballasts and lamps shall be deposed in accordance with section 02120.

PERIMETER AIR MONITORING PLAN

FOR

Syncon Resins Operable Unit 2 (OU 2) Superfund Site
Remedial Activities
South Kearny, New Jersey
CONTRACT No.
W912DQ-15-D-3002, TO 0002

Prepared by:
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Revision No. 2

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1.0 Introduction

Sevenson Environmental Services, Inc. is under contract to the U.S. Army Corps of Engineers (USACE), to perform remedial action at the Syncon Resins OU2 Superfund Site.

The work effort will focus on the following definable features of work:

1. Site mobilization
2. Building demolition
3. Sheet pile installation and removal
4. Excavation contaminated soils
5. Loading and transportation of building debris and soils
6. Wastewater treatment
7. Site demobilization

1.1 Plan Objective

The objective of this Perimeter Air Monitoring Plan (PAMP) is to define the requirements and designate the air monitoring protocols to be followed during the intrusive work at the Site.

1.2 Acceptance and Modification

This plan will be submitted to the Contracting Officer for review and approval. Any deficiencies in this plan will be corrected and the plan resubmitted for acceptance.

Sevenson will keep a copy of the PAMP on site for review by the USACE and its representatives. As the work proceeds, the PAMP will be adapted to new situations and conditions. Changes and modifications to the PAMP will be made with the knowledge and concurrence of the Air Quality Specialist (AQS), the Site Superintendent, and the Contracting Officer. The requested modification will not be implemented until authorized in writing by the Contracting Officer. Should the Contracting Officer require a modification of any portion or provision of this Plan, the Contracting Officer will notify Sevenson in writing of such modifications.

1.3 Contents

This plan contains the following provisions:

- Organizational structure indicating personnel responsibilities of the AQS and Air Monitoring Technician (AMT).
- Air quality monitoring and sampling procedures.
- Action levels.
- Control of airborne contaminant emissions if and when action levels have been exceeded.

- Collection of meteorological data.
- Description of air monitoring and meteorological equipment, operation and maintenance procedures, and calibration schedules.
- Sampling and Monitoring Results Reporting.

2.0 Air Monitoring Personnel

2.1 Air Quality Specialist (AQS)

Paul Jung, CIH, CSP will be the AQS for the project.

His responsibilities include:

- Preparation of the air monitoring and sampling protocols for the site work.
- Equipment selection.
- Determining the times, durations, and locations of air measurements and samples.
- Develop protocols to determine upwind location and to adjust monitoring and sample results for ambient background.
- Approving the qualifications of the air-monitoring technician.
- Interpreting the results of the air-monitoring program.
- Approving and signing the air quality reports submitted to the Contracting Officer.
- Periodically evaluating if the equipment and protocols are adequately representing perimeter conditions.
- Auditing the PAMP and initiating corrective action, when necessary.

2.2 Air Monitoring and Sampling Technician (AMT)

Ron Scarborough, CHST will be the AMT for the project.

Their responsibilities include:

- Calibration and operation of the air monitoring instrumentation.
- Performing the noise and air monitoring activities as specified in the PAMP.
- Sample submission to the approved laboratory.
- Discussions with the AQS and Contracting Officer on the implementation of the air-monitoring program.
- Submit daily monitoring reports and weekly monitoring logs.

Qualifications for the AQS and AMT are located in Appendix A of this plan.

3.0 Monitoring and Sampling Procedures

The monitoring and sampling program will detect and quantify noise, respirable particulate (PM_{10}), lead, polychlorinated biphenyls (PCBs), and BTX compounds. BTX compounds consist of benzene, toluene, and xylenes during the excavation of contaminated soils.

Respirable particulate, lead, and asbestos sampling shall be conducted during building demolition.

The monitoring during excavation of contaminated soils and building demolition will be accomplished by implementing both real time and EPA sampling protocols.

Real time monitoring instruments will be deployed to the field for at least two days prior to the start of intrusive work to ensure the equipment is functioning properly. Data for the real time instruments will be equipped with telemetry where data can be reviewed in real time.

Meteorological monitoring will be conducted at the Site with a real time weather station.

3.1 Real Time Monitoring

Real time monitoring for fugitive dust will be conducted using the TSI Dust Trak II. Real time VOC vapor monitoring will be conducted using a Rae Systems Mini Rae 3000 (or similar) equipped with a 10.6 eV lamp. Noise levels monitoring will be conducted with an ANSI Type 1 or 2 sound level meter. Specification sheets for these instruments are included in Appendix B of this plan.

Four monitoring stations will be placed at the site perimeter. One of these will be in upwind position. The upwind position shall be designated by the wind direction for that day or monitoring period. The purpose of this monitoring location is to determine the background level of respirable dust or VOCs that may come across the site throughout the day by neighboring businesses or road traffic. The other three will be considered in the downwind position. Locations of the monitoring locations shall be recommended by the AQS or AMT and be approved by the COR. Real time instruments will be calibrated and maintained as required by manufacture's recommendations by the AMT.

This monitoring is to be conducted during building demolition, excavation, material loading, and grading. The locations of the air monitoring equipment will be documented on a site map and will become a part of the daily air monitoring report.

Air monitoring equipment will be placed inside an environmental enclosure to protect it from the elements. Air monitors will be placed between the work area and the public in an area without putting the instruments in danger of being hit by equipment or vehicles.

See Appendix C for an example Air Monitoring Log and Sound Level Monitoring Log and summary page.

3.2 EPA PM_{10} Sampling

Samples will be collected using a low volume sample pump and 37-milimeter collection port on the ADR1500. Samples will be collected daily at each instrument. Filters shall be submitted to a qualified laboratory as indicated in Table 1. The filters submitted for analysis will all be from the same collection period. The once per week and once month samples shall be the collection period with the highest downwind real time result unless determined otherwise by the AQS. The AQS, AMT, COR may elect to have additional samples analyzed. This may include elevated levels of real time fugitive dust emissions recorded on the monitor. This method uses a pre-weighted 37-mm 5.0 micron PVC filter to collect the fugitive dust being drawn into the E-Sampler. The sample will be collected for 24-hour period during work days and a single over the weekend filter will be collected. These filters will be archived and a minimum of one filter from each sampler will be sent to a lab for analysis monthly (a total of four samples will be analyzed). The laboratory will place the sample in a drying or desiccant chamber to remove any moisture from the filter and weight it. The lab will subtract the pre-weight from the post-weight and divide the tare weight by the total air volume (cubic meters) to determine the dust in air concentration. The results of the laboratory analysis will be compared to the project action limits as well as the real time reading to validate the accuracy of the real time instruments.

Figure 1 provides the anticipated air monitoring locations.

3.3 Lead Sampling

Lead will be sampled using low volume sample collection pumps equipped with a 37-mm Mixed Cellulose Estrous filter and analyzed via EPA Method IO-3.4 via ICP/MS. The samples must be analyzed via ICP/MS to ensure the level of detection is less than the site action level. Sampling locations will be the same locations as the real time dust and VOC instruments.

3.4 PCB Sampling

PCBs samples will be collected onto polyurethane foam (PUF) cartridges using a TISCH high volume PUF air sampler. The PUF cartridges will be analyzed for PCBs utilizing USEPA Method TO-4A. Sampling locations will be the same location as the real time dust and VOC instruments. PCB sampling will only be conducted during excavation activities at the frequencies established in Table 1 (Minimum Acceptable Action Levels).

3.5 VOC Sampling

Air samples for VOCs will be collected with an evacuated cylinder set up with an 8-hour regulator. The evacuated cylinder will be analyzed for benzene, toluene, and xylene via USEPA TO-15 analysis. Sampling locations will be the same location as the real time dust and VOC instruments. VOC sampling will only be conducted during excavation activities at the frequencies established in Table 1 (Minimum Acceptable Action Levels).

3.6 Asbestos Monitoring

Air monitoring for asbestos shall be conducted as described in the Asbestos Abatement and Disposal Plan. Asbestos sampling will be conducted by an independent third party that is licensed by the State of New Jersey to perform asbestos air monitoring during asbestos abatement activities.

3.7 Odor Monitoring

Odor monitoring shall be performed once every two hours at the fence line down wind of the work. Odor monitoring is very subjective in nature so any odor different than the typical odor experienced at the site shall be reported to the Contracting Officer's Representative. Current odor controls (if applicable) shall be evaluated. Additional odor controls may need to be utilized to control odors.

4.0 Action Levels

Action levels for all constituents of concern has been prescribed in Table 1 (Minimum Acceptable Action Levels).

5.0 Control of Airborne Emissions

The AMT will compare the highest of the direct reading measurements for fugitive dust downwind of the site (minus the upwind value) to the action levels in Table 1. If the wind is blowing from a direction for which there is no monitor, the upwind value will be assumed to be the lowest of the values collected by any of the monitors.

When the ambient air monitoring system reveals that the 15 minute or work shift action level has been exceeded, Sevenson will inform the Contracting Officer's Representative and evaluate its engineering controls and implement emission controls. Sevenson will document the action level exceedence in its daily air monitoring summary report.

When the work shift action level has been exceeded for an hour or more, Sevenson will temporarily suspend intrusive activities, notify the Contracting Officer's Representative, and implement corrective action(s) to reduce site related emissions to below required action levels. The adequacy of these controls is subject to acceptance by the Contracting Officer Representative prior to restarting intrusive activities. All exceedences will be documented in the daily air monitoring summary report.

The following are emission control measures which may be used to reduce emissions below the action level:

- Adding moisture to the source.
- Covering soil or soil piles with a polyethylene cover.
- Using a misting system with an odor neutralizing additive.
- Reducing the speed of equipment which disturbs the soil.
- Reducing the number of pieces of equipment which disturb the soil.

- Installing barriers to reduce wind speed.
- Limiting the rate of excavation or stabilization.
- Remove accumulated dirt and soil from problem areas, and/or cover, enclose, or isolate dust generating areas/surfaces to shield them from wind and sunlight.
- Increase level of worker awareness and instruct them on implementation of any new or modified operating procedures.
- Perform routine audits of dust suppression methods and work areas for dust sources.

Note: Should corrective measures not be effective enough to reduce off site emissions, Sevenson will notify the affected local emergency management authorities. Table 2 lists local authorities and their contact information. Sevenson will consult with the local emergency management and response authorities on a plan of action should an uncontrollable exceedences occur. This planning will take place prior to intrusive activities being performed at the site.

Note: Sevenson will submit the results of the planning meeting with local emergency management and a written response plan to uncontrollable exceedences prior to the start of intrusive activities.

6.0 Air Monitoring and Meteorological Equipment – Operation, Maintenance, and Calibration

The equipment to be used in the air monitoring program includes:

- ThermoADR1500 – determines respirable dust via real time and gravimetrical sampling.
- ppbRAE 3000 – determines total VOCs in the air via real time measurement.
- Low volume sample pump and 37 mm MCE filter – determines the amount of lead in the air through filter collection and laboratory analysis.
- Tisch high volume PUF air sampler – determines the level of PCBs in the air through filter collection and laboratory analysis.
- Evacuated cylinder – determines the amount of benzene, toluene, and xylene in the air through air collection and laboratory analysis.

6.1 ADR1500 Dust Sampler

The ADR1500 provides direct and continuously updated readouts of concentration of airborne dust, smoke, and mist.

The ADR1500 monitors in real time the concentrations of fine particulates in ambient air light scatter technology.

The following are the specifications of the ADR1500:

- Sensitivity – 1 ug/m^3

- Sample Period – 1 second
- Particle Size Range – 0.05 – 10 um
- Data Storage Capacity – 12,000 records
- Temperature Range – -20° to 50°C

A copy of the operating manual will be kept onsite.

6.2 ppbRae 3000

The ppbRae 3000 provides direct and continuously updated readouts of concentrations of airborne VOCs with an ionization potential of 10.6eV or less.

The following are the specifications of the ADR1500:

- Sensitivity – 1 ppb
- Sample Period – 1 minute
- Photoionization lamp – 10.6eV
- Data Storage Capacity – standard 6 months at one-minute intervals
- Temperature Range – -10° to 50°C

6.3 3M SoundPro Sound Level Meter SP-DL-2-1/3

The 3M™ SoundPro™ SE/DL Series Sound Level Meter SP-DL-2-1/3 provides Class 2 sound level monitoring and comprehensive data analysis. With real-time frequency analysis displayed on its large screen display and data storing capabilities it's easy to use to post-process and evaluate workplace noise levels.

The following are the specifications of the 3M™ SoundPro™ SE/DL Series Sound Level Meter SP-DL-2-1/3:

- Parameters - SPL, LMax, LMin, LPk (peak), LEQ/LAVG, SEL, LN (selectable L1 to L99), TWA, Taktm, Taktmx, Dose, PDose, Exposure (Pa2H/Pa2S), LDN, CNEL, PTWA, L C-A
- Ranges - 120 dB+ (A-weighted) total dynamic measurement range over 8 individual ranges of 90 dB (A-weighted) each (with filters - 80 dB ranges); overall measurement range 0 dB to 140 dB
- Peak Range - Up to 143 dB using standard BK4936 microphone; higher with optional microphones and preamps
- Frequency Weighting - A, C, Z and F (Flat)
- Data Logging - may be logged at 11 selectable intervals from one second to 60 minutes to the included SD (secure digital) memory card. Use 3M™ QuestSuite™ Professional II or 3M™ Detection Management Software DMS to interpret data files.

6.3 Meteorological Station

Meteorological monitoring station will be established in the office compound area. The monitoring stations will have the following parameters:

- Capability of providing a 24 hour average for each parameter measured.
- Provide a continuous readout temperature and rain gauge.
- Determination of wind speed – range of 0-100 miles per hour (mph) with the starting threshold at 0.9 mph.
- Determination of wind direction – range of 0-356 degrees, accuracy +/- 4 degrees.
- Determination of temperature range of - 30°C to 70°C.
- Determination of relative humidity – range 0-100%.

A copy of the instrument manual will be kept on site for operating instructions and maintenance schedule reference.

7.0 Reporting

The AMT shall immediately notify all onsite USACE personnel in the event of an action level event or an exceedance at the perimeter when identified. The initial notification may be verbal or via text message followed up by an email in a timely manner.

Sevenson will maintain a daily air monitoring report. A copy of this report will be submitted part of the Site's daily report. This report will contain:

- Calibration information.
- Meteorological conditions.
- A map identifying sample locations.
- Identification of the upwind instrument.
- Summary for each air sampling location to include maximum, minimum, and daily time weighted average.
- A graph of the air monitoring results for each instrument.
- Comparison of the results corrected for background.
- Action level events and corrective actions taken.

An air sampling log will also be maintained. The log will outline the day's sampling activities, calibration information, monitor location, and daily time weighted average, or analytical result. The log will be maintained and updated as results become available for on-site inspection. This log will be submitted weekly (at the progress meeting) to the Contracting Officer.

Air sample analysis for EPA PM_{10}, lead, PCBs, and VOC samples will be submitted to the Contracting Officer within one week of receipt.

Weather data will be tabulated and submitted to the Contracting Officer weekly.

A Community Air Quality Phase-Out Report will be prepared and submitted as part of the Health and Safety Phase-Out Report. The following information will be provided at a minimum:

- Summary of the overall impact that the project had on air quality in the nearby community.
- Summary of exposure monitoring and air sampling conducted during the project.
- The report will be signed by the Air Quality Specialist and the Project Manager.

Figure 1 –Air Monitoring Locations

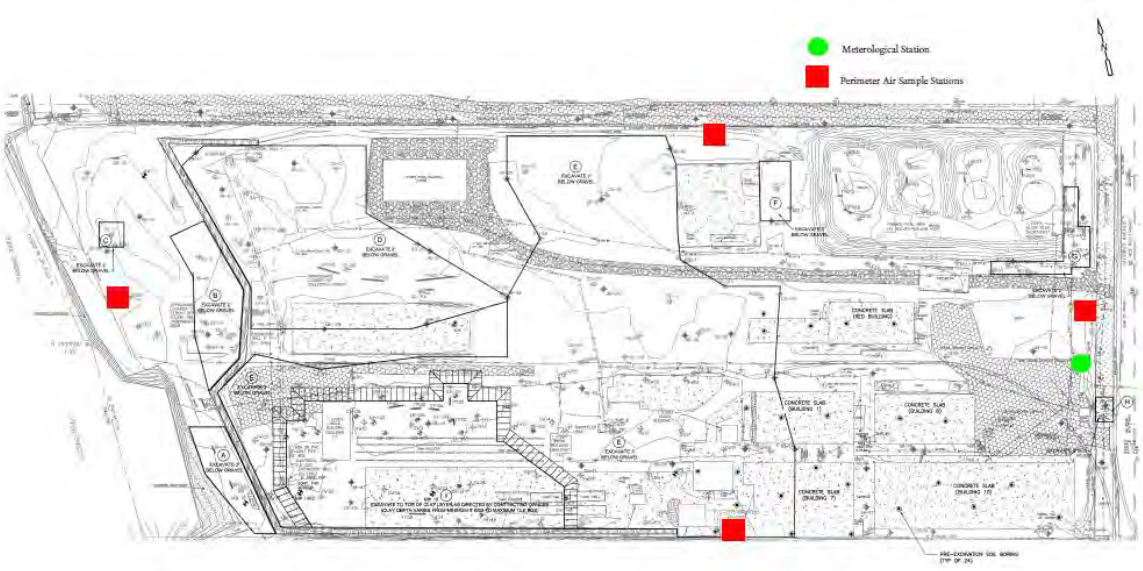

Table 1 –Real Time Air Monitoring Program

Analyte	Action Level[1]	Frequency per location	Analytical Method	Action Required
Real Time Respirable Dust (PM10)	150 µg/m^3 (15 minute) 100 µg/m^3 (work shift)	Continuously during the work day, and for 1 hour before and after. Log 15-minute averages.	Direct-reading dust meter with data logger, e.g. MIE-DR-4	15 minutes: Evaluate engineering controls, implement dust control. 60 minutes: Stop vapor-generating activities and notify Contracting Officer. Increase vapor control measures.
Real Time Vapor Monitoring[3]	2 ppm$_v$[2] (15 minute) 0.5 ppm$_v$[2] (work shift)	Continuously during the work day, and for 1 hour before and after. Log 15-minute averages.	Direct-reading photoionization meter with data logger, e.g. AreaRAE	15 minutes: Evaluate engineering controls, implement dust control. 60 minutes: Stop vapor-generating activities and notify Contracting Officer. Increase vapor control measures.
Noise (7:00 AM to 6:00 PM)	80 dB$_A$ on impact	At least once an hour at the fence line closest to the work	ANSI Type 1 or 2 sound level meter. e.g. Extech 407732	15 minutes: Evaluate engineering controls, implement noise controls. 60 minutes: Stop noise-generating activities and notify Contracting Officer.
Noise (6:00 PM to 7:00 AM and all time on weekends)	75 dB$_A$			
Odors[3]	Objectionable	At least once every two hours at the fence line downwind of the work	Sensory	Evaluate odor controls. Notify Contracting Officer.
Air Sampling - Excavation				
Particulate (PM 10)	150 µg/m^3	Once on each of the first two days of contaminated material excavation in a new area, then once a week for four weeks. Once a month thereafter.	EPA IO-2.1 (PM 10)	Investigate and recommend corrective action. As deemed necessary, modify real-time air monitoring action levels to achieve contaminant compliance.
Lead	0.15 µg/m^3		EPA IO-3.4 (ICP)	
PCBs	1.2 µg/m^3		EPA TO4A	
Benzene Toluene Xylenes	3 ppb$_v$ 300 ppb$_v$ 600 ppb$_v$		EPA – TO15 (Volatiles)	
Air Sampling - Demolition				
Particulate (PM 10)	150 µg/m^3		EPA IO-2.1 (PM 10)	
Lead	1.2 µg/m^3		EPA IO-3.4 (ICP)	

1 Total and compound-specific action levels are evaluated using data corrected for background values.

2 Downwind concentrations at fence line, over background.

3 To be performed during excavation activities only.

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Table 2 – Telephone Contact List	
USEPA RPM – Pamela Baxter	212-637-4416
USACE COR – Michael Johnson	201-909-0019
USACE Project Engineer – Matt Creamer	201-909-0087
Sevenson Project Manager – Steve Gillespie	716-609-1416
Sevenson AQS – Paul Jung CIH, CSP	716-609-1767
Sevenson AMT – Ron Scarborough, CHST	856-873-3614

Appendix A

Qualifications for Air Quality Specialist and Air Monitoring Technician

Years of Experience:

21

Education:

- B.S. Degree – Occupational Safety, SUNY – Empire State College
- A.S. Degree - Radiation Protection Technology, Central Florida Community College, Ocala, Florida

Certifications:

- Certified Industrial Hygienist Certification #10527CP
- Certified Safety Professional Certification #22748
- National Registry of Radiation Protection Technologist-2002
- 40-Hour and 8-Hour OSHA HAZWOPER Training
- 8 Hour OSHA HAZWOPER Supervisor Training
- 40 Hour ORISE Course "Implementing the MARSSIM Approach for Design and Conduct of Radiological Surveys"

Role and Responsibility:

- Oversees the health and safety aspects of all Sevenson's projects.
- Responsible for development, implementation, reviews, and evaluation of the project-specific worker health and safety plans related to occupational safety, industrial hygiene, and health physics.
- Responsible for reviewing air monitoring and exposure data to ensure appropriate controls are instituted and maintained.
- Manages a staff of 30 Site Health and Safety Officers and health physics personnel.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving: excavation and earthwork; innovative and traditional steel sheeting systems; sediment remediation; temporary and mobile water treatment systems; sludge solidification and soils stabilization; slurry wall and trench construction.

Paul Jung-CIH, CSP, RRPT

Director of Health and Safety

Mr. Jung has 21 years of practical, hands on field experience in a variety of health and safety capacities, each with increased responsibility throughout his career.

Mr. Jung is a Certified Industrial Hygienist through the American Board of Industrial Hygiene, a Certified Safety Professional through the Board of Certified Safety Professionals, and a Registered Radiation Protection Technologist through the National Registry of Radiation Protection Technologist.

Mr. Jung is Sevenson's Director of Health and Safety. He responsible for all aspects of occupational safety, marine safety, industrial hygiene, and health physics for Sevenson. The services Sevenon performs require a comprehensive safety program that involves OSHA or Agreement State regulations from the general industry, construction, and maritime standard, EPA TSCA, RCRA, and CERCLA regulations as well as Nuclear Regulatory Commission/Agreement State and United States Coast Guard regulations.

In addition to maintaining Sevenson's Corporate Health and Safety Program, he develops site specific health and safety plans for every Sevenson project. Since his time as Sevenson's Associate Director of Health and Safety and the Director of Health and Safety, he has prepared over 100 site specific health and safety plans.

Mr. Jung is responsible for the supervision and professional development for a staff of 25-40 safety, industrial hygiene, and radiological personnel. He provides safety oversight, technical support, and guidance for his safety staff as well as other project supervision.

Mr. Jung conducts Sevenson's training specific to HAZWOPER, radiation safety (health physics technician and general employee training), industrial hygiene (air monitoring protocols, data review, and method selection, job safety analysis, etc.) and occupational safety (fall protection, confined space, HAZCOM, Control of Hazardous Energy, PPE, etc.).

Mr. Jung also conducts job site inspections and audits as well as reviews all air monitoring and exposure data to evaluate and recommend controls to reduce or abate risk and exposure. He also works in conjunction with project estimators and design teams to ensure as many know physical hazards are eliminated through engineering or administrative controls as possible prior to executing the project in the field.

Mr. Jung is an active member in the Niagara Frontier Chapter of the American Society of Safety Engineers and is on the Board of Directors with the Western New York Safety Conference. As a member of the these two organizations, he has developed an extensive network of colleagues to discuss a variety of health and safety related issues to improve not only Sevenson's overall health and safety program but that of other companies and organizations as well.

ABIH®

american board of industrial hygiene®

organized to improve the practice of industrial hygiene
proclaims that

Paul J. Jung

having met all requirements of
education, experience and examination,
is hereby certified in the

COMPREHENSIVE PRACTICE
of
INDUSTRIAL HYGIENE

and has the right to use the designations

CERTIFIED INDUSTRIAL HYGIENIST

CIH

Certificate Number	**10527 CP**
Awarded:	**May 14, 2014**
Expiration Date:	**December 1, 2019**

Mark B Ferri
Chair ABIH

Lynn C. O'Donnell
Executive Director ABIH

Years of Experience:
21

Education:

- AS, Radiation Protection Technology, Central Florida Community College

Certifications:

- Board Certificated CHST (Number C2739)
- 40 hour Industrial Hygiene Cross Training
- OSHA 30 Hour Construction Outreach Training
- OSHA 40 Hour Training/OSHA 8 Hour Refresher
- NFPA 70E Training
- Supervisor Drug and Alcohol Awareness Training
- First Aid Training/CPR-AED
- USACE CQM for Contractors Course

Role and Responsibility:

- Responsible for implementation of the project-specific worker health and safety plans.
- Responsible for overseeing the medical monitoring of project-specific field employees.
- Performs audits and safety inspections at the sites.
- Oversees the health and safety aspects on assigned project.
- Assists in training all field personnel
- Conducts informational meetings.
- Repairs and maintains field instruments.
- Manages air monitoring and sampling programs.
- Evaluates analytical data.

Experience and Expertise:

- Implemented and enforced site-specific plans on a variety of remedial action projects involving: demolition; excavation and earthwork; innovative and traditional steel sheeting systems; sediment remediation; temporary and mobile water treatment systems; slurry wall and trench construction; construction and operation of collection, recovery and treatment systems and facilities.

Ronald P. Scarborough, CHST

Onsite Health and Safety Officer

Past Project Experience:

USACE Atlantic Wood Industries Superfund Site, Portsmouth, VA (6/2015-4/2016): Health and Safety Officer. Contaminated sediments were mechanically dredged, amended with Portland cement, and consolidated in two on-site designated containment areas. Other activities associated with this project include approximately 425,000 vertical linear feet of prefabricated vertical drains installation, geotechnical engineering instrumentation installation, underwater debris removal, and site grading.

USACE Vineland Chemical Company Superfund Site, Vineland, NJ (9/2014-3/2015): Health and Safety Officer. Demolition and off site disposal of an arsenic contaminated 144' x 90' x 42' tall pre-engineered metal building.

DuPont Pond Dredging and Pressure Filtration Project, New Johnsonville, TN (5/2014 – 9/2014): Health and Safety Officer. Hydraulic dredging and mechanical dewatering of two settling ponds at an active manufacturing plant. O+M requires bank of six (6) 220 cubic feet filter presses.

Shpack Landfill Superfund Site Remedial Action, Attleboro/Norton, MA (6/2013-11/2013): Health and Safety Officer. Excavation of chemically and radiologically contaminated soils and sediments from former landfill areas and adjacent wetland. Excavated material from several areas of the site required characterization, transport and offsite disposal. Dewatering/stabilization and water management was also required. Excavation near high voltage (115 kV and 345 kV) public utility power transmission lines. Construct and create new wetlands, place topsoil, install plants and restore the site

Amenia Town Landfill, Amenia, New York (4/2013 – 6/2013):
Health and Safety Officer. The remediating (remove and dispose of on-site) PCB and heavy metals contaminated sediments. Close and cap the approximately 8.43 acre Amenia Town Landfill. Installation of a low permeability cap/cover system. Install additional intermediate grading material to meet slope requirements; restoration of wetland following sediment remediation; entrance and access roads; temporary and permanent fencing; and site restoration.

USACE Vineland Chemical Company Superfund Site, Vineland, NJ (1/2006-2/2013): Health and Safety Officer. Start-up, optimization, and operation for an innovative soil washing treatment technology to remove arsenic from soils at a rate of 70 tons per hour. Installation of approximately 2,000 LF of steel sheet piling for construciton of a diversion channel. Provided on-site Safety Supervison during excavation and processing of more than 420,000 tons of contaminated soil through the

Soil Washing Plant. Oversaw four phases of flood plain remediation; ~8000 LF of stream diversion (using a combination of sheet piling and soil berms); and three stream by-pass pumping operations. Oversaw more than 99 acres of clearing and grubbing; shipment of approximately 320,000 tons (14,976 truck loads) of contaminated soil for disposal; construction of almost 9,000 LF of restored stream bed. Oversaw field activities to restore 99 acres of flood plain and upland areas. Multiple field crews of up to 18 persons performed micrograding, plant procurment and planting, installation of slash pile habitat as well as long term monitoring. Provided direct safety supervision of seven major subcontractors and a dozen smaller ones in addition to field staff consisting of 25 to 30 union electricians, laborers, dock workers, operators, and teamsters. Job-site logged over 1,000,000 safe man-hours with zero lost work time accidents or injuries while working in Level B, Level C, and Level D (modified) PPE. Received USACE, Philadelphia District, Million Safe Man-Hours Award.

USACE Welsbach/GGM Superfund Site, Camden, NJ (10/2004-1/2006): Health and Safety Officer. This project required the excavation, characterize, transport and dispose off-site, soils contaminated with thorium and radium. Completed demolition of various building structures. Installation of a steel sheet pile wall along the roadways to protect utilities and homes in this residential neighborhood during excavation operations. Existing utilities (gas, electric and sewer) were capped, removed and relocated. Waste water treatment from excavation operations was required.

USACE Montclair/Glen Ridge/West Orange Radium Superfund Sites, NJ (8/1997-10/2004): Health Physics Technician and Health and Safety Officer. Low-level radiological remediation of 400 residential and commercial properties and 14 streets resulting in the excavation and shipment of 125,000 cubic yards of low-level radiological waste materials to a permitted facility via rail. Remedial actions ranged from selective to extensive demolition; excavation and removal of contaminated materials; reconstruction and site restoration. Use of sophisticated shoring and underpinning systems stabilized homes. Successful community relations plan focused on an “open door” policy. Established support zones including medical facilities, administrative offices, safety equipment storage, and decontamination facilities. Oversaw bypass pumping operations for storm and sanitary sewers throughout the remediation activities. Prepared inventories (including photo-documentation) of properties on a house-by-house basis, including landscaping and condition of structures. These inventories proved invaluable in controlling homeowner-requested property improvements. Job-site logged over 1,250,000 safe man-hours with zero lost work time accidents or injuries while working in Level B, Level C, and Level D (modified) PPE. Received USACE, New York District, CENAN’s Million Safe Man-Hours Award

RCRA Lagoon Closure, Perth Amboy, NJ (11/1998-1/1999): Assistant Health and Safety Officer. Provided IH coverage (air monitoring, personal protective equipment selection/decon, and analyzed air samples) during dredging approximately 60,000 cy of oil refinery sludge from two impoundments. Pumped sludge to treatment area for processing. Treatment included centrifugation and separation of sludges and waste

water treatment. Contaminated underlying soils not meeting closure guidelines were removed and placed in stockpiles for treatment or disposal.

Past Project Experience – Other Firms

Shepherd-Miller, Fort Collins, CO (4/1997-8/1997): Lead Radiation Control Technician. Responsible for the sampling, excavation, transport, and on-site disposal of radiological contaminated soils during final verification of a former uranium mill.

Safety and Ecology Corporation, Knoxville, TN (10/1996-4/1997): DOE Radiation Control Technician/Industrial Hygiene Technician. Responsible for all aspects of radiological and hazardous material safety at vicinity property. Provided personnel, area, and confined space monitoring. Collected and shipped radiological, mixed waste, and PCB samples. Calibrated air monitoring, alpha, and beta-gamma count instruments. Provided Health and Safety support for removal of asbestos roofing materials.

Thermo NU Tech, Oak Ridge, TN (5/1995-10/1996): DOE Radiation Control Technician/Industrial Hygiene Technician. Responsible for personnel air and area and industrial hazard monitoring during uranium rafinate solidification operation. Collected, monitored, and shipped radiological and mixed waste samples. Calibrated air monitoring, alpha, and beta-gamma count instruments. Performed radiological surveys for remedial action and post-remedial action activities. Analyzed alpha and beta-gamma samples.

Appendix B
Specification Sheets for air monitoring instruments

Thermo Scientific ADR-1500 Area Dust Monitor

Real-time ambient dust monitor designed for continuous monitoring

The Thermo Scientific™ ADR-1500 Area Dust Monitor utilizes highly sensitive light-scattering photometer (nephelometer) technology, as used in the Thermo Scientific pDR Series monitors.

- Volumetric flow control
- Modular optics and long-life primary HEPA filter for simple servicing
- Multiple power and communications capabilities
- Durable weather-proof IP65 enclosure
- Designed for ease of transport and installation

Thermo Scientific ADR-1500 Area Dust Monitor

The intensity of light scattered by airborne particles passing through the sensing chamber is linearly proportional to their concentration. This optical configuration produces optimal response to particles providing continuous measurements of the concentrations of airborne particles for total particulate and cut-points ranging from PM-10 down to PM-1.

The ADR-1500 monitor incorporates a temperature and relative humidity (RH) sensor coupled with an internal heater to mitigate the positive bias with elevated ambient RH. Additionally, the flow control is truly volumetric and is maintained through digital feedback of the onboard barometric pressure sensor, temperature sensor, and calibrated differential pressure across a precision orifice. The principles of true volumetric flow, as incorporated by the ADR-1500 monitor, result in an accurate sample volume and precise particle cut-point.

The measured concentration of particulate matter is displayed in real-time on the two-line LCD readout display. Additional values can be displayed, such as run start time and date, time averaged concentrations, elapsed run time and many more.

The flexible power capabilities allow the ADR-1500 monitor to operate on AC,external DC,or an internal battery. Communications options are available for USB, RS-232, analog and wireless capability.

The ADR-1500 monitor is housed in a weather-proof IP65 enclosure producing a compact and durable instrument that is ready for rapid deployment and unattended operation.

Thermo SCIENTIFIC

Thermo Scientific ADR-1500 Area Dust Monitor

Concentration Measurement Range	0.001 to 400 mg/m^3 (auto-ranging)
Scattering Coefficient Range	1.1 x 10-6 to 0.6m-1 (approximately) @ λ = 880nm
Precision / Repeatability	+/- 2% of reading or +/- 0.005 mg/m^3, whichever is larger, for 1-second averaging time
2-sigma[2] with heater off and	+/-0.5% of reading or +/- 0.0015 mg/m^3, whichever is larger, for 10-second averaging time
RH correction disabled (over 30 days)	+/-0.2% or reading or +/- 0.0005 mg/m^3, whichever is larger, for 60-second averaging time
Accuracy	+/- 5% of reading (+/- precision) traceable to SAE Fine test dust
Resolution	0.1 µg/m^3
Particle Size Range of maximum response	0.1 to 10 µm
Flow Rate Range	1.0 to 3.5 liters/min.
Aerodynamic Particle Cut-Point Range	1.0 to 10 µm, with optional cyclone accessories
Alarm Averaging Time	Real-time (1 - 60 seconds) or STEL (15 minutes)
Data Logging Averaging Periods	1 second to 1hour
Logged Data	Averaged concentrations, temperature, RH, barometric pressure, time/date, and data point number
Run Summary	Site number, average and max. concentrations, time/date of maximum, number of logged points, start time/date, elapsed time (run duration), averaging (logging) period, calibration factor and tag number

Ordering Information

ADR-1500 Area Dust Monitor
Choose from the following configurations/
options to customize your own ADR-1500 monitor

1. Power cords:
A = 110v power cord
B = 220v power cord

2. Relay kit:
A = Relay kit
N = No relay kit

3. Pole mounting:
A = Pole mount kit, 2" DIA
B = Pole mount kit, 3" DIA
C = Pole mount kit, 4" DIA
N = None

4. External cables:
A = Analog external cable assembly
B = 12/24 Vdc external cable assembly
C = Both cables
N = None

5. 37mm Cassette filter holder assembly
A = 37mm Cassette filter holder assembly with filter support & holder
N = None

6. Cyclone and the cyclone adapter
A = Blue cyclone assembly (PM 1 - 2.5 Micrometer CP)
with cyclone adapter
B = Red cyclone assembly (PM 4 - 10 Micrometer CP)
with cyclone adapter
C = Both cyclones with cyclone adapter
N = None

Your Order Code: ADR1500- __ __ __ __ __

To maintain optimal product performance, you need immediate access to experts worldwide, as well as priority status when your air quality equipment needs repair or replacement. We offer comprehensive, flexible support solutions for all phases of the product life cycle. Through predictable, fixed-cost pricing, our services help protect the return on investment and total cost of ownership of your Thermo Scientific products.

For more information, visit our website at thermoscientific.com

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This product is manufactured in a plant whose quality management system is ISO 9001 certified.

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Thermo SCIENTIFIC
Part of Thermo Fisher Scientific

Lit_ADR1500EPM_0912

RAE SYSTEMS by Honeywell

ppbRAE 3000

Portable Handheld VOC Monitor

The compact ppbRAE 3000 is a comprehensive VOC gas monitor and datalogger for hazardous environments. The ppbRAE 3000 is the most advanced handheld VOC monitor available for parts-per-billion detection. This third-generation patented PID device monitors VOCs using a photoionization detector with a 9.8 eV, 10.6 eV UV-discharge lamp.

The built-in wireless modem allows real-time data connectivity with the ProRAE Guardian command center located up to two miles/3 km away (with optional RAELink3 portable modem) from the ppbRAE 3000 detector.

- **Accurate VOC measurement in all operating conditions**
- **Easy access to lamp and sensor in seconds without tools**
- **Patented sensor and lamp auto-cleaning reduces maintenance**
- **Monitors real-time readings and location of people**
- **Low Cost of Ownership: 3-year 10.6 eV lamp Warranty**

KEY FEATURES

Proven PID Technology

- 3-second response time
- Extended range from 1 ppb to 10,000 ppm with best in class linearity
- Humidity compensation with integral humidity and temperature sensors

Integrated

- Real-time wireless built-in – Bluetooth (and optional RAELink3 portable modem) or Mesh Network support
- Integrated Correction Factors list of 220 compounds—more than any other PID
- Includes flashlight for dark conditions
- Large graphic display presents gas type, Correction Factor and concentration

Durable

- Easy access to battery, lamp and sensor in seconds without tools
- Rugged housing withstands use in harsh environments
- IP-67 waterproof design for easy cleaning and decontamination

APPLICATIONS

- Oil & Gas
- HazMat
- Industrial Safety
- Civil Defense
- Environmental & Indoor Air Quality

Workers can easily measure VOCs and wirelessly transmit readings up to two miles/3 km away.

Wireless AutoRAE 2 Compatible ISO 9001 CERTIFIED ATEX IECEx

ppbRAE 3000

Portable Handheld VOC Monitor

Specifications

Detector Specifications

Size	10" L x 3.0" W x 2.5" H (25.5 cm x 7.6 cm x 6.4 cm)
Weight	26 oz (738 g)
Sensors	Photoionization sensor with standard 10.6 eV or optional 9.8 eV lamp
Battery	• Rechargeable, external field-replaceable Lithium-Ion battery pack • Alkaline battery adapter
Operating Hours	16 hours of operation (12 hours with alkaline battery)
Display Graphic	4 lines, 28 x 43 mm, with LED backlight for enhanced display readability
Keypad	1 operation and 2 programming keys, 1 flashlight on/off
Direct Readout	Instantaneous reading • VOCs as ppm by volume or mg/m^3 (3 in upper case for cubic) • STEL, TWA and PEAK • Battery and shutdown voltage • Date, time, temperature
Alarms	95 dB (at 12"/30 cm) buzzer and flashing red LED to indicate exceeded preset limits • High: 3 beeps and flashes per second • Low: 2 beeps and flashes per second • STEL and TWA: 1 beep and flash per second • Alarms latching with manual override or automatic reset • Additional alarm for low battery and pump stall
EMI/RFI	Highly resistant to EMI/RFI Compliant with EMC Directive 89/336/EEC
IP Rating	• IP-67 unit off and without flexible probe • IP-65 unit running
Datalogging	Standard 6 months at one-minute intervals
Calibration	Two-point or three-point calibration for zero and span Calibration memory for 8 calibration gases
Sampling Pump	• Internal, integrated flow rate at 500 cc/mn • Sample from 100' (30m) horizontally and vertically
Low Flow Alarm	• Auto pump shutoff at low-flow condition
Communication & Data Download	• Download data and upload instrument set-up from PC through charging cradle or optional Bluetooth™ • Wireless data transmission through built-in RF modem
Wireless Network	Mesh RAE Systems Dedicated Wireless Network
Wireless Range (Typical)	EchoView Host: LOS > 660 ft (200 m) ProRAE Guardian & RAEMesh Reader: LOS > 660 ft (200 m) ProRAE Guardian & RAELink3 Mesh: LOS > 330 ft (100 m)
Safety Certifications	• US and Canada: UL, cUL, Classified as Intrinsically Safe for use in Class I, Division 1 Groups A, B, C, D • Europe: ATEX Ex II 2GEx ia IIC/IIB T4 • IECEx: Ex ia IIC/IIB T4
Temperature	-4° to 113° F (-20° to 50° C)
Humidity	0% to 95% relative humidity (non-condensing)
Attachments	Durable black rubber boot with straps
Warranty	3-year warranty for 10.6 eV lamp, 1 year for pump, battery, and instrument
Wireless Frequency	ISM license-free band. IEEE 802.15.4 Sub 1GHz
Wireless Approvals	FCC Part 15, CE R&TTE, Others[1]
Radio Module	Supports Bluetooth or RM900

[1] Contact RAE Systems for country-specific wireless approvals and certificates. Specifications are subject to change.

Sensor Specifications

Gas Monitor	Range	Resolution	Response Time T90
VOCs	0 to 9999 ppb	1 ppb	< 3 s
	10 to 99 ppm	0.01 ppm	< 3 s
	100 to 999 ppm	0.1 ppm	< 3 s
	1000 to 9999 ppm	1 ppm	< 3 s

Monitor only includes:

- ppbRAE 3000 Monitor, with RAE Systems UV lamp, as specified
- Datalogging with ProRAE Studio II
- Charging/download adapter
- VOC Zeroing Tubes (1 box)
- Tube adapter
- Tedlar® bag for calibration
- Flex-I-Probe™
- External filter
- Rubber boot with straps
- Alkaline battery adapter
- Lamp-cleaning and tool kit
- Operation CDROM
- Operation & Maintenance manual
- Soft leather case

Monitor with accessories kit adds:

- Hard transport case with pre-cut foam padding
- Charging/download cradle
- 5 Porous metal filters and O-rings
- Organic vapor zeroing kit
- Gas outlet port adapter and tubing

Optional calibration kit adds:

- 10 ppm isobutylene calibration gas, 34L
- Calibration regulator and flow controller

Optional Guaranteed Cost of Ownership Program:

- 4-year repair and replacement guarantee
- Annual maintenance service

CORPORATE HEADQUARTERS

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Specifications for the SoundPro

GENERAL:	
DISPLAY LANGUAGES	English, French, Spanish, German, Italian and Portuguese
USER INTERFACE	10 pushbuttons and 4 soft keys, menu driven
DISPLAY TYPE	Transflective 128 X 64 Dot Matrix LCD with additional fiber optic backlighting
CONFORMANCE TO STANDARDS:	
EMC REQUIREMENTS	EN/IEC 61326-1(2005) Group 1, Class B Emissions / Industrial Location Immunity. CFR:47 (2008) Part 15 - Meets FCC Class B Emissions
PERFORMANCE REQUIREMENTS	EN/IEC 61672-1(2002), ANSI S1.4 (R2006), ANSI S1.43(R2007), EN/IEC 61260 (2001), ANSI S1.11 (R2009), (also meets requirements of former standards IEC 60651 and 60804)
	IEC60268-16 (2003) with Speech Intelligibility option
SAFETY REQUIREMENTS	IEC61010-1 (2010)
CERTIFICATIONS	CE Mark, WEEE, RoHS
MEASUREMENTS:	
PARAMETERS	SPL, L_{Max}, L_{Min}, L_{Pk}(peak), L_{EQ}/L_{AVG}, SEL, LN (selectable L1 to L99), TWA, Taktm, Taktmx, Dose, PDose, Exposure (Pa2H/Pa2S), LDN, CNEL, PTWA, L_{C-A}
RANGES	120 dB+ (A-weighted) total dynamic measurement range over 8 individual ranges of 90 dB (A-weighted) each (with filters - 80 dB ranges); overall measurement range 0 dB to 140 dB
PEAK RANGE	Up to 143 dB using standard BK4936 microphone; higher with optional microphones and preamps
FREQUENCY WEIGHTING	A, C, Z and F (Flat)
RESPONSE TIME	Fast, Slow, IEC Impulse
EXCHANGE RATES	3, 4, 5, and 6 dB
CRITERION LEVEL	40 to 100 dB
UPPER LIMIT TIME LOGGING	10 to 140 dB selectable
RUN MODES	Level triggered run/pause, clock/date triggered power on and run for programmed duration, external logic input run/pause, and keypad initiated run/pause for programmed duration
MEASUREMENT REFERENCES	SPL: 114 dB Frequency: 1 kHz Direction: 0 degrees using free-field response microphone
OCTAVE AND THIRD OCTAVE FILTERS (OPTIONAL):	(base-10 bands, as recommended by IEC61260 [2001])
FULL OCTAVE FILTERS	11 bands with center frequencies from 16 Hz to 16 kHz
THIRD OCTAVE FILTERS	33 bands with center frequencies from 12.5 Hz to 20 kHz
CALIBRATION:	
HISTORY	Complete calibration history with post study verification logged with calibration history
LOGGING AND STORAGE:	
LOGGING	DL Models only. L_{Max}, L_{Min}, L_{Pk}(peak), LN, L_{EQ}/L_{AVG} may be logged at 11 selectable intervals from one second to 60 minutes to the included SD (secure digital) memory card. Use 3M™ QuestSuite™ Professional II or 3M™ Detection Management Software DMS to interpret data files
SUMMARY DATA	All session/study data is stored to the SD card. Summary data may be interpreted with 3M™ QuestSuite™ Professional II or 3M™ Detection Management Software DMS, or exported to spreadsheet or XML file with an available utility
MEMORY	Accepts 32 MB to 32 GB SD memory cards. Card included with all models and stores multiple summary sessions/studies and for setup storage (Contact factory for preferred SD card manufacturers)
SPECIAL FUNCTIONS:	
BACK ERASE	Selectable 1 to 20 seconds removal of measurement data (data removed by back erasing and retained in session file)
SECURITY	4 digit code protection for Runs and Setups available
OPTIONAL ACOUSTIC SPECTRAL CURVES	Noise Criterion (NC) Curves, Preferred Noise Criterion (PNC) Curves, Room Criterion (RC) Curves, Balanced Noise Criterion (NCB) Curves, Noise Rating (NR) Curves, Audiometric Room Curves (per ANSI S3.1, per OSHA Hearing Conservation Amendment, and per ISO Hearing Screen for Audiology Booths)
OPTIONAL SPEECH INTELLIGIBILITY FUNCTION	Firmware can be installed in the SoundPro™ series to allow the testing and evaluation of intelligibility of human speech through public address (PA), fire alarm and mass notification systems (MNS), the STI-PA method in accordance with IEC 60268-16 and NFPA 72 National Fire Alarm Code. Results are in STI or CIS. On meter post-processing available
OPTIONAL REVERBERATION TIME (RT-60)	Used to measure decay time or acoustic decay performance of a room or closed space

All Specifications Subject to Change

SoundPro Specifications (cont.)

PORTS AND CONNECTIONS:	
POWER JACK	External power supply 9-16 VDC
AC/DC OUTPUT	3.5 mm stereo (tip-AC, Ring-DC, Ring2-Ground)
10 PIN AUXILIARY CONNECTOR	RS-232, 3 digital outputs, 1 digital input
USB	Conforms to USB 2.0, mini-USB connector
ELECTRICAL CHARACTERISTICS:	
BATTERIES	4 disposable AA alkaline cells, typically >10 hours continuous use without backlight (SLM only without filters activated); optional nickel metal hydride (NiMH) cells, typically 10+ hours (SLM only)
EXTERNAL DC POWER INPUT	100 – 240 VAC, 47-63 Hz transformed to 9 VDC
STANDARD MICROPHONES	Class/Type 1 Precision – BK4936; Class/Type 2 General Purpose – QE7052; other optional types and sizes available from ¼" to 1" prepolarized or standard condenser types
MICROPHONE POLARIZATION	Selectable 0 volts or 200 volts (Class/Type 1 models only)
MICROPHONE SENSITIVITY	Selectable nominal values in decibels relevant to 1 Volt/Pa
METER INPUT IMPEDANCE	20 kΩ in series with 11 µF capacitance, with 100 pF capacitance to ground
REMOTE CABLE	Will drive up to 15 meters of cable with negligible signal loss
PREAMPLIFIER	Removable preamp directly accepts ½" (0.52" or 13.2 mm) microphone; other sizes require adapter
PREAMPLIFIER INPUT IMPEDANCE	Greater than 1 GΩ; less than 2pF
PHYSICAL CHARACTERISTICS:	
SIZE	3.1"W X 11.1"H X 1.6" thick (with preamp & microphone); 7.9 cm X 28.2 cm X 4.1 cm
WEIGHT	0.54 kg or 1.2 lbs. (including batteries)
HOUSING	Stainless fiber filled ABS polycarbonate with additional internal EM/RFI shielding
TRIPOD MOUNT	Standard photographic mount on rear accepts ¼"- 20 screw threads
ENVIRONMENTAL:	
TEMPERATURE	Operating -10 ºC to +50 ºC (<± 0.5 dB effect); Storage -25 ºC to +70 ºC
HUMIDITY	10% to 90% RH, non-condensing
EXTERNAL FIELDS	Electric – 10 V/meter, 1 kHz modulated, 30 MHz – 1 GHz, <55 dBC; magnetic - 80 A/m, 50/60 Hz, no significant effect

All Specifications Subject to Change

DMS Software: Data Management Made Easy

New 3M™ Detection Management Software DMS makes it easy to record, report, chart and analyze data collected for assessment of select occupational health hazards in the workplace.

- Retrieve, download, share and save instrument data
- Generate charts and reports
- Export and share recorded data
- Perform advanced calculations
- The software integrates with 3M Quest instruments, and will help improve both efficiency and reporting of environmental data.

Occupational Health & Environmental Safety Division
Quest Technologies, a 3M Company
ISO 9001 Registered Company
ISO 17025 Accredited Calibration Lab
1060 Corporate Center Drive
Oconomowoc, WI 53066

Customer Service: 262-567-9157
Toll Free: 800-245-0779
www.3M.com/detection

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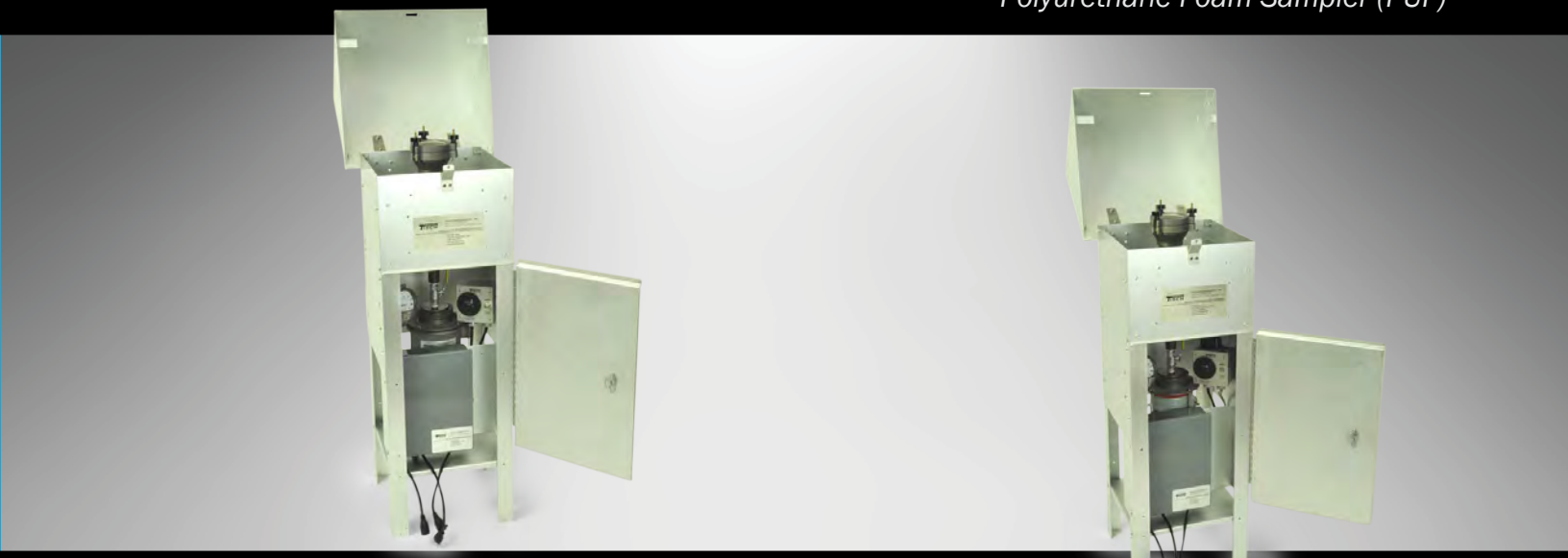
70-0715-7498-5

PUF Sampler

Polyurethane Foam Sampler (PUF)



PUF

Ambient Air Sampler

The PUF sampler is a polyurethane foam sampler used for the collection of volatile organic compounds and particulates. The PUF sampler utilizes a dual sampling module to collect air borne particulate as well as ambient semi volatile organic compounds. The VOC'S are trapped in the polyurethane foam substrates which are collect and sent to a laboratory for further analysis. Tisch Environmental PUF samplers are well suited for all applications that require the use of a high volume VOC sampler.

- **Meets EPA CFR, for TO-4A, TO-9A, TO-13A**
- **Polyurethane Foam Sampler**
- **Brush or Brushless Motor**
- **Manual Motor Control**
- **Elapsed Time Indicators**
- **7 Day Mechanical Timer or Digital Timer**
- **Flow Venturi**
- **Robust Aluminum Shelter**
- **125-250 Liters per Minute**
- **Made in USA**

ABOUT US: Tisch Environmental Inc. Tisch Environmental is the benchmark for high volume air sampling, particulate, metals, volatiles, and specialty monitoring equipment. Since the company's inception in 1953 as General Metal Works, our product line has expanded from the first high volume air sampler to include high-tech and custom samplers. Our clients are professionals from every sector of the regulatory and industrial markets.

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www.tischinternational.com

www.tisch-env.com

Tisch Environmental
145 S. Miami Ave
Cleves, OH 45002
513-467-9000
sales@tisch-env.com

PUF PLUS

VOC Sampler

General System Specifications

Particulate Size: Volatile Organic Compounds
EPA Designation: TO-4A, TO-9A, TO-13A
Flow Controller: Manual Flow Speed Control
Motor Style: Brush or Brushless Style Motor Assembly
Timer: 7 Day Mechanical or Digital Timer
Elapsed Time Indicator: Hours and Tenths **Flow**
Range: 125-250 Lpm
Housing: Anodized Aluminum
Filter Holder: Dual Sampling Module

Applications

US EPA Reference Method Sampling,
Regulatory Compliance
Institutional Studies
Construction Sites
Bridge and Water Tower Painting Sites
Fence Line Monitoring
Industrial Monitoring
Landfill Monitoring
Public Health Applications

Available Models

Brush Style
TE-1000PUF, *110 Volt 60 Hertz, 8 Amps*
TE-1000PUFX, *220 Volt 50 Hertz 4 Amps*
TE-1000PUFXZ, *220 Volts 60 Hertz, 4 Amps*
Brushless Style
TE-1000PUF-BL, 110 Volt 60 Hertz, 8 Amps
TE-1000PUFP-BLX, 220 Volt 50/60 Hertz 4 Amps
TE-1000PUF-BLXZ, 220 Volts 60 Hertz, 4 Amps
Brush Style with Digital Timer
TE-1000DPUF, 110 Volt 60 Hertz, 8 Amps
TE-1000DPUFX, 220 Volt 50 Hertz 4 Amps
TE-1000DPUFXZ, 220 Volts 60 Hertz, 4 Amps
Brushless Style with Digital Timer
TE-1000DPUF-BL, 110 Volt 60 Hertz, 8 Amps
TE-1000DPUFP-BLX, 220 Volt 50/60 Hertz 4 Amps
TE-1000DPUF-BLXZ, 220 Volts 60 Hertz, 4 Amps

Optional Equipment

TE-1010 3" Foam Plugs
TE-1011 2" Foam Plugs
TE-1012 1" Foam Plugs
TE-QMA4 4" Round Quartz Filters
TE-33384 Motor Brush Set (110volt)
TE-33378 Motor Brush Set (220volt)
TE-116336 Replacement Brush Motor (110volt)
TE-116125 Replacement Brush Motor (220volt)
TE-117415 Replacement Brushless Motor (220volt)
TE-117417 Replacement Brushless Motor (110volt)

Calibration Equipment

TE-5040PP -PUF PLUS Calibration Kit

Physical Specifications

Weight: 75lbs, Shelter
Shipping Dimensions: 48"W x 20"L x 20" H, Shelter
19"W x 19"L x 20"H, Lid

Assembled Dimensions: 28"W x 28"L x 61"H

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Appendix C

Example Air Monitoring Log and Sound Level Monitoring Log

Sevenson Environmental Services, Inc.
Syncon Resins Superfund Site

Perimeter Sound Level Monitoring Log

DATE:

INSTRUMENT MODEL NUMBER:

SERIAL NUMBER:

CALIBRATION DUE DATE:

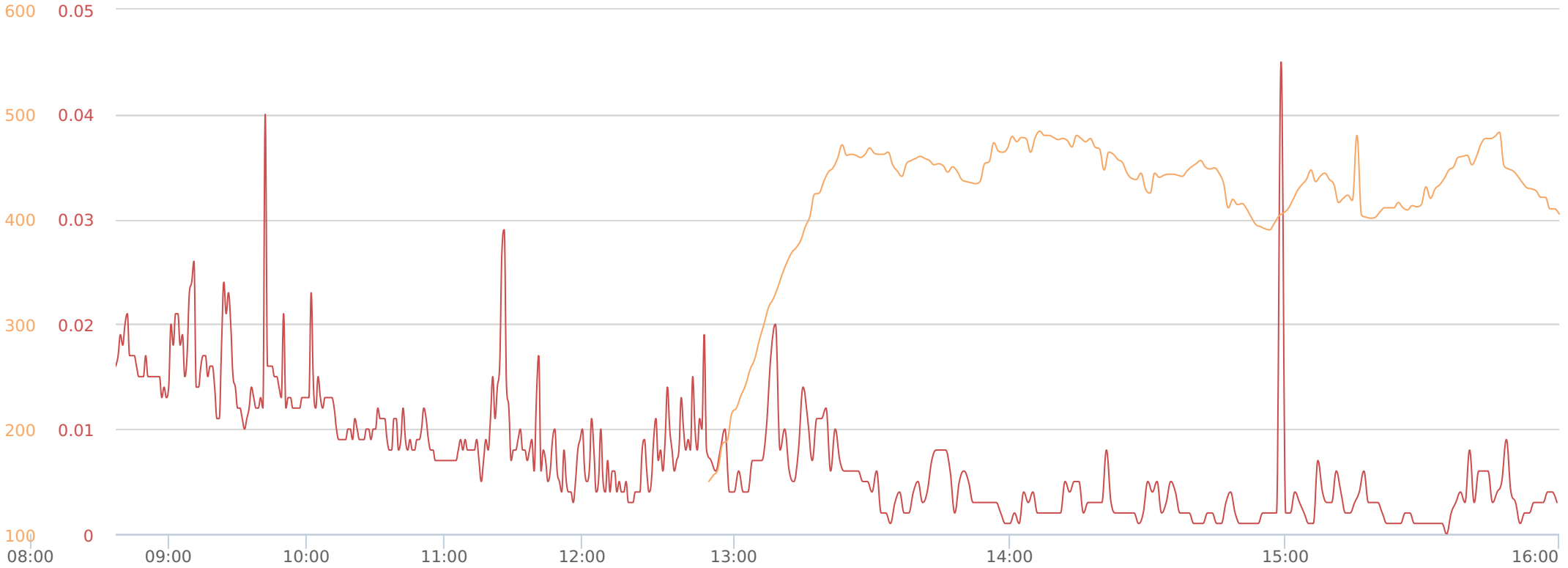
TIME	PERIMETER LOCATION/DESCRIPTION OF WORK	RESULTS

AIR MONITOR NAME	AIR MONITOR SIGNATURE:

enviro net

Mon, 24th of Oct 2016, 7:00:00 – 16:00:00

(GMT-05:00) Eastern Time (US & Canada)



Mass Conc. Total mg/m³		
DustTrak-8530 RS232(C)		
MIN	AVG	MAX
0	0.008	0.045

VOC ppb		
ppbRAE 3000 RS232(A)		
MIN	AVG	MAX
150	423	484

Name	#1 Camden (FA02951)
S/N	0B122182
Description	DUST & VOC #1

Produced By © Netronix 2016

Appendix D
RFI-0021, PAMP Adjustments

US Army Corps of Engineers	REQUEST FOR INFORMATION REPORT (RFI)	RFI NO. RFI-0021	PAGE NO. Page 1 of 1

CONTRACT NO.	CONTRACT TITLE	PRIME CONTRACTOR
W912DQ-15-D-3002 0002	Syncon Resins Superfund Site OU2	Sevenson Environmental Services, Inc.

Contractor's Request for Information

REQUESTED BY:	DATE REQUESTED:		Potential Cost Impact [Yes]
Sevenson Environmental Services	September 07, 2017		Potential Schedule Impact [Yes]

RFI SUBJECT:	PAMP Adjustments
FEATURE OF WORK:	Contaminated Excavation
SPECIFICATION SECTIONS:	01362
DRAWINGS:	N/A

INFORMATION REQUESTED:

Sevenson is recording higher than expected VOC readings during excavation activities onsite. Sevenson has confirmed that the VOC vapors causing the elevated readings are generated by both onsite and offsite sources. The Perimeter Air Monitoring Program (PAMP) is strictly enforced; following a VOC action level of 2 ppm and 0.5 ppm VOC TWA. Sevenson held a meeting onsite on 29 August 2017 with Ray Lo, CENAN Chief of Safety, USACE staff and Sevenson's safety team to review safety and perimeter air monitoring onsite. Per Sevenson's request, CDM has reviewed the project PAMP background data and does not recommend changing the 15-minute average VOC action level of 2 ppm or the 0.5 ppm VOC TWA.

CONTRACTOR RECOMMENDATION:

Sevenson is proposing the following changes to the PAMP:

- Change the telemetry logging data system from a one-minute interval to a fifteen-minute interval. When the VOC reading is under 2.0 ppm at the end of the fifteen-minute interval, no further action is needed.
- In the event that the 2.0 ppm value is exceeded, a hand held PID (MiniRAE 3000) will be used to verify and document the perimeter unit reading, note the wind direction, the work occurring at the time of the measurements, and whether there are odors/VOCs coming from off-site. An evaluation of engineering controls will be conducted. The field crew will increase the foaming/Bio-Solving the work areas and slow the pace of intrusive work. The hand held PID will continue to monitor and determine whether the VOC readings are decreasing. In the event that the readings for the next 15-minute drop below 2.0 ppm, no further action is necessary.
- In the event the reading stays or increases during the next 15-minutes, the pace of intrusive work may slow further, increase foam/Bio-Solv application and document any changes to the readings. If the readings stay at 2.0 ppm after a fourth continuous 15-minute periods, USACE COR will be notified and presented with the documentation. The COR will direct SES to continue to perform work based on the documentation (offsite source, upwind monitor has high reading that can be subtracted, or other factor (weather).) It may be necessary to stop intrusive work temporarily (Stop vapor generating activities) to allow VOC readings to drop.
- The VOC TWA will be monitored and evaluated during this period as well. The VOC TWA follows the same "logic" as the 2-ppm, 15-minute monitoring based on the plan with a big difference. The PID calculates the TWA based on the time that the meter has been on and uses maximums or peaks in the calculation (RAE Systems TN119.) If the instrument runs two hours it calculates the TWA on the entire one-minute intervals.
- SES needs to calculate the shift TWA based on 40 intervals of 15-minute periods.
- A TWA calculation occurs when there is a 2-ppm reading at the end of a 15-minute data-logging period. The readings prior to the 2-ppm reading are taken into account. Readings that have not occurred are given a value of zero (0.)
- Example: TWA= 0 + 0.5+1.0+2.0 +0+.... +0/40=0.0875
- At the end of sixty- (60) minutes, all the information can be presented to USACE. If during that hour and the VOCs continue to climb and emission control continues to be performed, excavation/odor generating work will stop and perimeter monitoring will continue to be monitor VOCs with hand held PID.

Government Response

ANSWERED BY: Matthew Creamer	DATE RECEIVED:	DATE ANSWERED:
TITLE: Project Engineer	September 07, 2017	September 11, 2017

GOVERNMENT RESPONSE TO CONTRACTOR:

The government, including Ray Lo, Chief of NY District Safety, has reviewed these recommendations and concurs with Sevenson. Sevenson shall implement these changes immediately.

NOTE: THE RFI SYSTEM IS INTENDED TO PROVIDE AN EFFICIENT MECHANISM FOR RESPONDING TO CONTRACTOR'S REQUESTS FOR INFORMATION. IT DOES NOT PROVIDE AUTHORITY TO PROCEED WITH ADDITIONAL WORK. IF THE CONTRACTOR CONSIDERS THE RFI RESPONSE A CHANGED CONDITION, PROVIDE WRITTEN NOTICE TO THE CONTRACTING OFFICER'S REPRESENTATIVE IN ACCORDANCE WITH CONTRACT PROVISIONS.	QA REVIEWER'S SIGNATURE	DATE

Memorandum

To: *Matthew Creamer, USACE-NY*

From: *Thomas Mathew*

Date: *November 15, 2017*

Subject: *Comments on OU2 Transmittal No. 01450-19.5*
Syncon Resins Superfund Site

cc: *Nanci Higginbotham, USACE-KC* *Ali Rahmani, CDM Smith*
Phil Rosewisz, USACE-KC *Chris Whitton, CDM Smith*
Michael C. Johnson, USACE-NY

CDM Smith has reviewed Transmittal No. 01450-19.5 for Syncon Resins site, and the review comments are as follows:

Transmittal No. 01450-19.5, Item No. 3 – QAPP, Rev 5

Approval Code "C", Approved, except as noted below.

1. WS #15: Analytes are missing from the full TCL VOC and TCL SVOC lists. It is assumed the full TCL lists will be analyzed. Response: Tables updated to include full lists.
2. WS #18: Nomenclature not provided for different informational sample locations. Therefore, it is assumed specific location information will be provided when this data is reported. Response: WS is updated to include typical nomenclature for info. samples. The more common samples were listed. Also, WS #27 updated for consistency.
3. WS #20: Per RTC to CDM Comment #3, eight informational samples will be collected in total. How is this possible, when:
    a. per WS #17-8, informational samples will be collected once per month after the 1st month
    b. per WS #14, samples are collected from 3 locations (or more, if issues warrant)
    c. the WWTP will operate for several more months.

    Response: WS #20 updated to include 21 info samples. This includes 3 info samples per month, for 5 months of O&M, plus two extra sets, if needed. The QC sample count did not need to be changed to meet the criteria of 5%.

UNIFORM FEDERAL POLICY - QUALITY ASSURANCE PROJECT PLAN

SYNCON RESINS SUPERFUND SITE (OU2)
REMEDIAL ACTION QAPP

SOUTH KEARNY, NEW JERSEY

CONTRACT #: W912DQ-15-D-3002
TASK ORDER: 0002

Prepared by:
Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

December 2017 Revision 6

Based on the Intergovernmental Data Quality Task Force Uniform Federal Policy for Quality Assurance Project Plans (Final Version 1, March 2005)

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Appendix 3 ADR Libraries and eQAPP
Appendix 4 Sampling Standard Operating Procedures (SOP)
Appendix 5 Standard Sample Tracking and Documentation Forms, Review Forms and Checklists
Appendix 6 Sample Maps C2 and C4
Appendix 7 Tables 01450-1, 01450-2 and 01450-4
Appendix 8 WWTP P&ID

LIST OF ABBREVIATIONS AND ACRONYMS

ADR	Automated Data Review
ACM	Asbestos Contaminated Material
AIHA	American Industrial Hygiene Association
AST	Aboveground Storage Tank
CA	Corrective Action
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
CDFR	Chemical Data Final Report
CDIR	Chemical data Interim Report
CHMM	Certified Hazardous Materials Manager
CIH	Certified Industrial Hygienist
COC	Chain of Custody
COR	Contracting Officer's Representative
CQCSM	Contractor Quality Control Systems Manager
CVAA	Cold Vapor Atomic Absorption
D	Difference
DFTPP	Decafluorotriphenylphosphine
DOD	Department of Defense
DQI	Data Quality Indicator
DQO	Data Quality Objective
DRO	Diesel Range Organics
EDD	Electronic Data Deliverables
EDMS	Environmental Data Management System
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency
EPH	Extractable Petroleum Hydrocarbons
E-QAPP	Electronic QAPP
FedEx	Federal Express
GC-ECD	Gas Chromatography with Electron Capture Detector
GC/MS	Gas Chromatography/Mass Spectroscopy
GFF	Glass Fiber Filters
GRO	Gas Range Organics
ICP-AES	Inductively Coupled Plasma – Atomic Emission Spectroscopy
ICP-MS	Inductively Coupled Plasma – Mass Spectroscopy
ICS	Interference Check Sample
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
IS	Internal Standard
LBP	Lead Based Paint
LCS	Laboratory Control Sample
LIMS	Laboratory Information Management System
LOQ	Limit of Quantitation
MDL	Method Detection Limit
MPC	Measurement Performance Criteria
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NELAC	National Environmental Laboratory Accreditation

NELAP	National Environmental Laboratory Accreditation Program
NJDEP	New Jersey Department of Environmental Protection
NRDCSRS	Non-Residential Direct Contact Soil Remediation Standards
OSHA	Occupational Safety and Health Administration
OU-2	Operable Unit 2
PCB	Polychlorinated Biphenyl
PFT	Paint Filter Test
PM	Project Manager
QA	Quality Assurance
QC	Quality Control
QL	Quantitation Limit
QSM	Quality Systems Manual for Environmental Laboratories
RCRA	Resource Conservation and Recovery Act
RDCRCS	Residential Direct Contact Remediation Cleanup Standards
RL	Reporting Limit
ROD	Record of Decision
RPD	Relative Percent Difference
RRF	Relative Response Factor
RSD	Relative Standard Deviation
RT	Retention Time
Sevenson	Sevenson Environmental Services, Inc.
Site	Syncon Resins Superfund Site
SOP	Standard Operating Procedure
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
TOC	Total Organic Carbon
TSS	Total Suspended Solids
UFP-QAPP	Uniform Federal Policy – Quality Assurance Project Plan
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound
YD^3	Cubic Yard

Introduction

This Uniform Federal Policy – Quality Assurance Project Plan (UFP-QAPP) is intended to integrate the technical and quality control aspects of the Syncon Resins Site, OU-2 (Site), sampling and analysis program to be implemented during the remediation phase of the former resins and varnish-related products facility contract phase of Site work. The UFP-QAPP details the process for collecting data and describes the quality assurance (QA) and quality control (QC) activities developed for the remedial action sampling. The purpose of this UFP-QAPP is to generate project data that are technically valid and legally defensible. The UFP-QAPP consists of five main components:

Project management.
Measurement and data acquisition.
Assessment and oversight.
Data validation and usability.
Data management.

Site Location and Overview

The project Site consists of approximately 15 acres of land located at 77 Jacobus Avenue, Kearny (Hudson County), New Jersey. Although the Site is currently inactive, it is boarded to the west by the Passaic River, to the south by Spectraserv, Inc., to the east by Jacobus Avenue and to the north by Clean Earth, Inc.

Former Site manufacturing and warehousing operations are located on the southern portion of the site, including several dilapidated buildings and foundations. An active groundwater treatment building constructed during the OU1 phase of the project is located in the northwestern corner of the site.

Site History

The peninsula on which the site is located was drained in the late 1800's, and development was begun in the 1900s. By the 1930s, aerial photographs of the peninsula indicate it was heavily developed by industrial operations.

Earliest evidence of the Syncon Resins Site is found in aerial photographs of the area from 1951. The owners of the site filed for bankruptcy protection in 1977. In 1981, the New Jersey Department of Environmental Protection (NJDEP) issued orders for the owners to control and contain site hazards. In 1982, the company ceased all operations at the site and in 1983 the site was added to the National Priorities List (NPL).

Until plant production ceased in 1982, resins and varnish-related products were reclaimed from off-specification products, wastes and solvents at the site. The site consisted of as many as 144 above-ground storage tanks, 6 underground storage tanks, 2 former unlined leaching ponds/lagoons and storage for approximately 13,000 55-gallon drums.

Current contract requirements include the delineation and evaluation of soils underneath and proximate to former building's 1, 7, 8, 10 and the Red Building. In addition, site debris and soils will be managed, above-ground storage tanks and contents will be addressed, underground storage tank contents, if any,

will be addressed, limits of excavation will be verified and any waters generated through the onsite water treatment plant will be monitored and controlled.

The Remedial Design, included in the Record of Decision (ROD) for OU-2, approved by the US EPA in October 2012, addresses contamination at the site, as well as demolition and disposal.

Contaminants of concern for this OU-2 phase of remediation include Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), Pesticides/PCB, and Metals.

Cleanup Approach

Cleanup activities to be completed under this current contract will include clearing and grubbing of the site, preparation of staging and containment areas, the treatment and discharge of water, and the removal and offsite transport and disposal of site wastes.

UFP-QAPP Worksheet #1 A1
Title and Approval Page

Site Name/Project Name: Syncon Resins Superfund Site (OU2)

Site Location: South Kearny, New Jersey

Document Title: UFP-QAPP for the Syncon Resins Superfund Site (OU2) - Contract#: W912DQ-11-D-003

Lead Organizations: United States Army Corps of Engineers (USACE) – New York District, USACE - Kansas City District and United States Environmental Protection Agency (USEPA) Region 2

Preparer's Name and Organizational Affiliation: Kenneth Paisley, Sevenson Environmental Services, Inc. (Sevenson)

Preparer's Address, Telephone Number, and E-mail Address: 2749 Lockport Road, Niagara Falls, New York 14305; (716) 284-0431; kpaisley@sevenson.com

Preparation Date: Revision 0: June 2016; Revision 1: October 2106; Revision 2: January 2017; Revision 3: February 9, 2017; Revision 4: June 2017; Revision 5: October 2017; Revision 6: December 2017

Remedial Contractor's Corporate Project Manager: _____
Signature, Date
Al LaGreca, Sevenson Environmental Services, Inc.

Remedial Project Manager (RPM) Project Manager: _____
Signature, Date
Pamela Baxter – US EPA

Contracting Officers Representative (COR): _____
Signature, Date
Michael Johnson - USACE

Other Approval Signatures: Steven J. Gillespie 6 December 2017
Signature, Date

_____
Printed Name/Title/Organization

_____
Signature, Date

_____
Printed Name/Title/Organization

UFP-QAPP Worksheet #2
UFP-QAPP Identifying Information

Site Name/Project Name: Syncon Resins Superfund Site (OU2)

Site Location: South Kearny, New Jersey

Site Number/Code: EPA ID# NJD064263817

Operable Unit: 2

Contractor Name: Sevenson Environmental Services, Inc.

Contractor Number: W912DQ-11-D-3002, Task Order 0002

Contract Title: Syncon Resins Superfund Site, South Kearny, New Jersey

Work Assignment Number: 0001

1. Guidance used to prepare UFP-QAPP: Uniform Federal Policy for Quality Assurance Project Plans, Final Version 1, March 2005/Guidance on Systematic Planning Using the Data Quality Objective Process, EPA QA/G-4, February 2006

2. Regulatory program:
USEPA Region 2, Superfund

3. Approval entity:
USEPA Region 2, USACE – New York District, USACE - Kansas City District

4. The UFP-QAPP is (select one): □ Generic ■ Project Specific

5. Dates of scoping sessions that were held: Initial Project Construction Meeting – August 4, 2016; Project Safety/Mutual Understanding/Pre-work Meeting – August 15, 2016.

6. Dates and titles of UFP-QAPP documents written for previous site work, if applicable: Not applicable

7. Organizational partners (stakeholders) and connection with lead organization:
The project organizational partners include representatives from USEPA Region 2, USACE – New York District, USACE – Kansas City District and Sevenson. The USEPA and USACE will provide project and contract management guidance to Sevenson. Sevenson will be the primary contractor and will be responsible for developing and implementing the remedial action and will provide project management to other subcontractors.

8. Data users:
USEPA Region 2, USACE – New York District, USACE - Kansas City District, New Jersey Department of Environmental Protection (NJDEP), CDM-Smith, Sevenson

9. If any required UFP-QAPP elements and required information are not applicable to the project, then circle the omitted UFP-QAPP elements and required information on the attached table. Provide an explanation for their exclusion below:

No required UFP-QAPP elements are omitted from the document.

Required UFP-QAPP Element(s) and Corresponding UFP-QAPP Section(s)	UFP-QAPP Worksheet # in UFP-QAPP Workbook	Required Information
Project Management and Objectives		
2.1 Title and Approval Page	1	- Title and Approval Page
2.2 Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control Numbering System 2.2.3 Table of Contents 2.2.4 UFP-QAPP Identifying Information	2	- Table of Contents - UFP-QAPP Identifying Information
2.3 Distribution List and Project Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	3 4	- Distribution List - Project Personnel Sign-Off Sheet
2.4 Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certification	5 6 7 8	- Project Organizational Chart - Communication Pathways - Personnel Responsibilities and Qualifications Table - Special Personnel Training Requirements Table
2.5 Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, and Background	9 10 Appendix 1	- Project Planning Session Documentation (including Data Needs tables) - Project Scoping Session Participants Sheet - Problem Definition, Site History, and Background - Site Map
2.6 Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	11 12 Appendix 3	- Site-Specific PQOs - Measurement Performance Criteria Table - ADR libraries and eQAPP
2.7 Secondary Data Evaluation	13	- Sources of Secondary Data and Information - Secondary Data Criteria and Limitations Table

Required UFP-QAPP Element(s) and Corresponding UFP-QAPP Section(s)	UFP-QAPP Worksheet # in UFP-QAPP Workbook	Required Information
2.8 Project Overview and Schedule 2.8.1 Project Overview 2.8.2 Project Schedule	14 15 16	- Summary of Project Tasks - Reference Limits and Evaluation Table - Project Schedule/Timeline Table
Measurement/Data Acquisition		
3.1 Sampling Tasks 3.1.1 Sampling Process Design and Rationale 3.1.2 Sampling Procedures and Requirements 3.1.2.1 Sampling Collection Procedures 3.1.2.2 Sample Containers, Volume, and Preservation 3.1.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures 3.1.2.4 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures 3.1.2.5 Supply Inspection and Acceptance Procedures 3.1.2.6 Field Documentation Procedures	17 18 19 20 21 22 Appendix 2 Appendix 4	- Sampling Design and Rationale - Sample Location Map - Sampling Locations and Methods/ SOP Requirements Table - Analytical Methods/SOP Requirements Table - Field Quality Control Sample Summary Table - Sampling SOPs - Project Sampling SOP References Table - Field Equipment Calibration, Maintenance, Testing, and Inspection Table - NJPDES/DSW Permit Equivalency - Sampling Standard operating Procedures (SOP's)
3.2 Analytical Tasks 3.2.1 Analytical SOPs 3.2.2 Analytical Instrument Calibration Procedures 3.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures 3.2.4 Analytical Supply Inspection and Acceptance Procedures	23 24 25	- Analytical SOPs - Analytical SOP References Table - Analytical Instrument Calibration Table - Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table
3.3 Sample Collection Documentation, Handling, Tracking, and Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	26, 27 Appendix 5	- Sample Collection Documentation Handling, Tracking, and Custody SOPs - Sample Container Identification - Sample Handling Flow Diagram - Example Chain-of-Custody Form and Seal - Standard Sample Tracking and Documentation Forms

Required UFP-QAPP Element(s) and Corresponding UFP-QAPP Section(s)	UFP-QAPP Worksheet # in UFP-QAPP Workbook	Required Information
3.4 Quality Control Samples 3.4.1 Sampling Quality Control Samples 3.4.2 Analytical Quality Control Samples	28	- QC Samples Table - Screening/Confirmatory Analysis Decision Tree
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	29 30	- Project Documents and Records Table - Analytical Services Table - Data Management SOPs
Assessment/Oversight		
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	 31 32	- Assessments and Response Actions - Planned Project Assessments Table - Audit Checklists - Assessment Findings and Corrective Action Responses Table
4.2 QA Management Reports	33	- QA Management Reports Table
4.3 Final Project Report		
Data Review		
5.1 Overview		
5.2 Data Review Steps 5.2.1 Step I: Verification 5.2.2 Step II: Validation 5.2.2.1 Step IIa Validation Activities 5.2.2.2 Step IIb Validation Activities 5.2.3 Step III: Usability Assessment 5.2.3.1 Data Limitations and Actions from Usability Assessment 5.2.3.2 Activities	34 35 36 37	- Verification (Step I) Process Table - Validation (Steps IIa and IIb) Process Table - Validation (Steps IIa and IIb) Summary Table - Usability Assessment

Required UFP-QAPP Element(s) and Corresponding UFP-QAPP Section(s)	UFP-QAPP Worksheet # in UFP-QAPP Workbook	Required Information
5.3 Streamlining Data Review 5.3.1 Data Review Steps To Be Streamlined 5.3.2 Criteria for Streamlining Data Review 5.3.3 Amounts and Types of Data Appropriate for Streamlining	35	

UFP-QAPP Worksheet #3
Distribution List

UFP-QAPP Recipients	Title	Organization	Telephone Number	Fax Number	E-mail Address
Pamela Baxter	Remedial Project Manager (RPM)	USEPA	212-637-4416	N/A	Baxter.Pamela@epa.gov
Michael Johnson	Contracting Officer's Representative (COR)	USACE - NY	201-909-0019	N/A	Michael.C.Johnson@usace.army.mil
Matthew Creamer	Contracting Officer's Representative	USACE - NY	201-909-0087	N/A	Matthew.T.Creamer@usace.army.com
Amy Darpinian	Project Chemist	USACE - KC	816-389-3897	N/A	Amy.f.darpinian@usace.army.com
Steve Gillespie	Project Manager (PM)	Sevenson	716-609-1416 (mobile)	N/A	sgillespie@sevenson.com
Eric DeLellis	Contractor Quality Control Systems Manager (CQCSM)	Sevenson	610-416-8432 (mobile)	N/A	edelellis@sevenson.com
Ron Scarborough	Site Safety and Health Officer (SSHO)	Sevenson	856-873-3614 (mobile)	N/A	rscarborough@sevenson.com
William Zambrana	Field Sampling Manager	Sevenson	973-518-0257 (mobile)	N/A	wzambrana@sevenson.com
James Hyzy	Data Quality Control Review Chemist	Sevenson	716-284-0431	716-285-4201	jhyzy@sevenson.com
Agnes Huntley	Offsite Environmental Laboratory PM	Eurofins	401-732-3400	401-732-3499	agneshuntley@eurofinsus.com

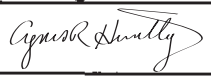
UFP-QAPP Worksheet #4-1
Project Personnel Sign-Off Sheet

Organization: Sevenson/EPA/USACE

Project Personnel	Title	Telephone Number	Signature	Date
Al LaGreca	Corporate PM	716-284-0431		2/9/17
Steve Gillespie	Site Project Manager	716-609-1416 (mobile)	Steven J. Gillespie	14 February 2017
James Hyzy	Data Quality Control Review Chemist	716-284-0431		2/9/17
Ron Scarborough	SSHO	856-873-3614 (mobile)	Ron Scarborough	2/14/2017
William Zambrana	Field Sampling Manager	973-518-0257 (mobile)		2/14/17
Pamela Baxter	US EPA RPM	212-637-4416		
Michael Johnson	USACE COR	201-909-0019		

UFP-QAPP Worksheet #4-2
Project Personnel Sign-Off Sheet[1]

Organizations: Eurofins Analytical

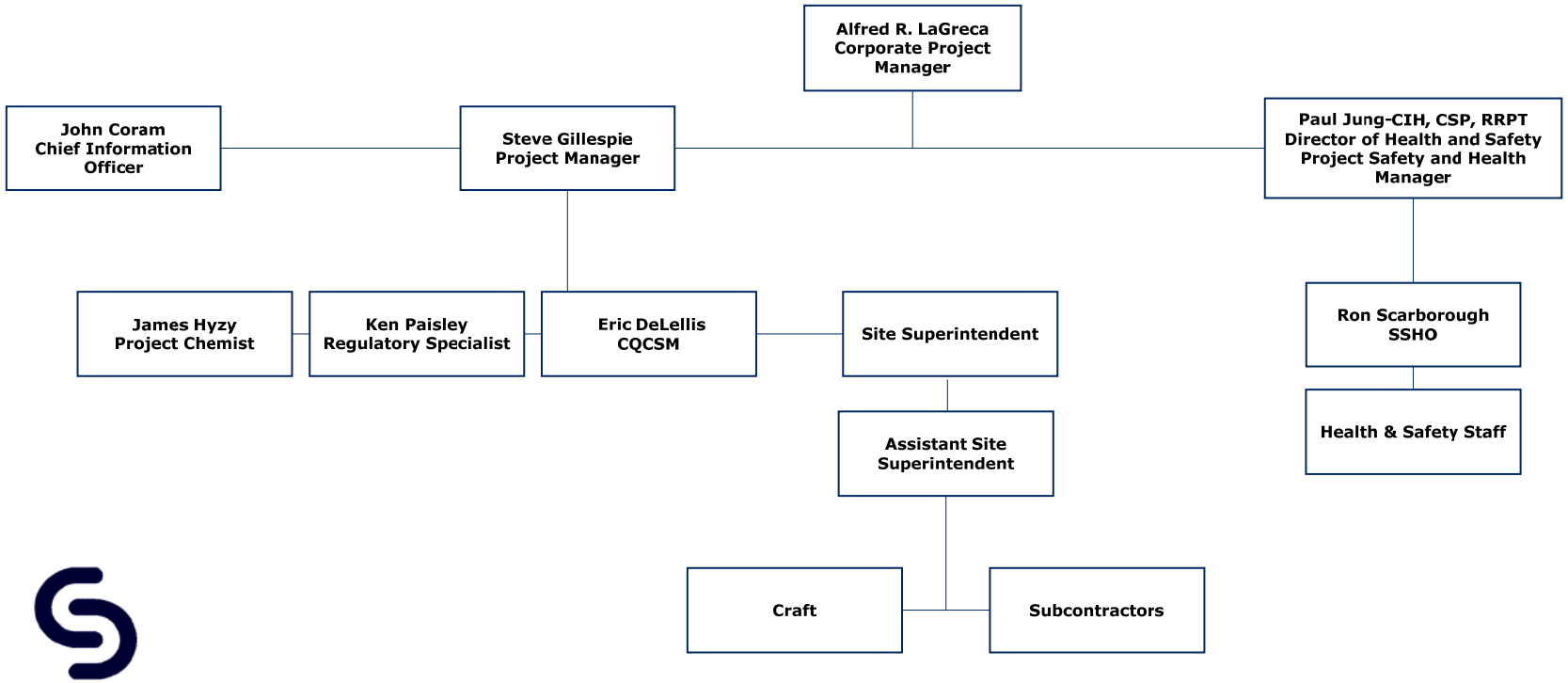
Project Personnel	Title	Telephone Number	Signature	Date
Agnes Huntley	Offsite Environmental Laboratory PM	401-732-3400		02/14/17

[1] All key project personnel are required to sign this Worksheet.

UFP-QAPP Worksheet #5
Project Organizational Chart

The organizational chart and the description of project organization and the roles of the team members are summarized below:

Sevenson Environmental Services, Inc.
SYNCON RESINS SUPERFUND SITE
Project Organizational Chart



Project/Task Organization Overview

The project management team will consist of representatives from USEPA Region 2, USACE – New York District, USACE – Kansas City District, NJDEP, CDM Smith and Sevenson. USEPA and USACE will provide technical oversight to the project and contract management guidance to Sevenson. NJDEP will provide the USEPA with State approval as required. CDM Smith will provide oversight engineering to USACE. Sevenson will be the primary contractor and will be responsible for developing and implementing the remedial action and will provide project management to other subcontractors.

Syncon Site Team Members

This section contains a description of the project organizational structure. Pamela Baxter is the USEPA RPM with responsibility for the site. Michael Johnson is the USACE COR/NY. Sevenson will be the primary contractor and will provide project management to other subcontractors.

Sevenson Home Office Personnel

Paul Jung, CIH – Corporate Health and Safety Manager – Responsible for Site Health and Safety issues and reporting.

Al LaGreca – Corporate PM – Overall responsibility for Sevenson project performance and compliance.

James Hyzy, PhD – Data Quality Control Review – Responsible for review and oversight of all site data collected via sampling.

Sevenson Field Personnel

Steve Gillespie – Onsite PM – Responsible for all issues regarding site contract. Reports directly to Mr. LaGreca with respect to project performance,

Eric DeLellis– CQCSM – Responsible for chemical quality control and reporting onsite. Reports directly to the Onsite Project Manager.

Ron Scarborough, CHST – SSHO – Responsible for Site Health and Safety issues for all site personnel. Reports to Sevenson Health and Safety Director and Site Project Manager.

William Zambrana – Field Sampling Manager – Responsible for field sampling activities at the site. Reports to Mr. Hyzy and Project Manager.

Eurofins Laboratory Personnel

Edward Lawler – Offsite Laboratory Environmental Sampling Project Manager – Responsible for tracking and reporting of all data for samples obtained at the site. He will coordinate with Sevenson's Data Quality Review Officer and Site CQCSM.

UFP-QAPP Worksheet #6
Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
UFP-QAPP Amendments	Sevenson	Kenneth Paisley – Regulatory Specialist	716-284-0431	Sevenson PM and CQCSM will initiate proposed changes in the UFP-QAPP. Kenneth Paisley will be responsible for revisions to the document. USACE and USEPA must approve all changes prior to implementation. Copies of amendments will be forwarded to all parties.
Change to Field Work	Sevenson	Perry Novak – Field Superintendent	973-462-1155 (mobile)	Field supervision and/or personnel will notify PM and CQCSM of any field variations. PM will in turn notify USACE within 24 hours. Telephone and e-mail notifications are acceptable. An FCR form must be approved and signed by USACE. An FCR form will be submitted within 24 hours of notification even if verbal approval was given by USACE. All field changes will be documented as detailed in Worksheet #32.
Analytical Data Reporting	Sevenson	James Hyzy – Project Chemist	716-284-0431	James Hyzy will review all analytical data. Any deficiencies will be reported to the QCQSM and laboratory QA Officer.
Initiation of Corrective Action	Sevenson	Steve Gillespie – Site PM James Hyzy – Project Chemist	716-609-1416 (mobile) 716-284-0431	Sevenson PM and/or Data Quality Control Review Chemist will notify CQCSM (or his alternate) of any issues and/or deficiencies who will in turn determine whether the need for corrective action is warranted.
Health and Safety	Sevenson	Ron Scarborough - SSHO	856-873-3614 (mobile)	The SSHO will be responsible for ensuring the protocols specified in the SSHP are carried out during field activities. All safety matters will be reported to the SSHO who will in turn inform the PM. If any issues arise during the field activities that the SSHO cannot address, the Corporate Health and Safety Manager will be immediately contacted.
Daily Field Sampling Paperwork	Sevenson	William Zambrana - Field Sampling Manager	973-518-0257 (mobile)	The Field Sampling manager will e-mail or fax daily field sampling paperwork to the PM and Data Quality Control Review Chemist within two calendar days.
Release of Analytical Data	Sevenson	James Hyzy – Project Chemist Steve Gillespie – Site PM	716-284-0431 716-609-1416 (mobile)	Analytical data shall typically be released after James Hyzy has completed the data review and Steve Gillespie has approved the release. US EPA/USACE may request data release at any point of the review process.
Reporting Laboratory Data Quality Issues	Project Laboratory	Edward Lawler – Eurofins PM	973-204-0902	The laboratory will report all QA/QC issues with project field samples to the CQCSM and Data Quality Control Review Chemist within two calendar days.

UFP-QAPP Worksheet #7
Personnel Responsibilities and Qualifications Table[1]

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Al LaGreca	Corporate PM	Sevenson	Oversees project and responds to USEPA and USACE.	B/S Engineering
Paul Jung	Corporate Health and Safety Manager	Sevenson	Develop and evaluate the project specific worker health and safety plan, oversees medical monitoring of all field employees	A/S – Radiation Protection Technology Nationally Registered Radiation Protection Technologist CIT
Steve Gillespie	Onsite PM	Sevenson	Manages project – coordinates between lead agency and subcontractors; QC oversight	B/S Mechanical Engineering N4/C1 Licensed Project Management Professional (PMP)
James Hyzy	Data Quality Control Review Chemist	Sevenson	Performs data review	B/A Biology/BA Psychology MA Microbiology/Immunology PhD Microbiology/Psychology Electronic Data Deliverables, Automated data Review and Electronic Data Management System certified; 15 years' experience in data review and assessment.
Eric DeLellis	CQCSM	Sevenson	QC oversight	B/S Environmental Science USACE CQCM - 2013
William Zambrana	Field Sampling Manager	Sevenson	Execute field sampling program	A/S Radiation Health Physics Construction Quality Management for Contractors
Ron Scarborough	SSHO	Sevenson	Oversees health and safety for field activities and dredging operations	Construction Health and Safety Technician Certificate – Number C9243
Kenneth Paisley	UFP-QAPP Preparer	Sevenson	Prepares UFP-QAPP	B/S Biology Certified Hazardous Materials Manager (CHMM) 24 years' plan preparation, sampling, analytical and waste disposal experience

[1] Resumes of Sevenson project team members can be obtained by contacting the Sevenson PM or his designee.

UFP-QAPP Worksheet #8
Special Personnel Training Requirements Table[1]

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/Organizational Affiliation	Location of Training Records/Certificates
All Field Activities[2]	40 hour/8 hour Occupational Safety and Health Administration (OSHA) HAZWOPER	Sevenson	Various and updated	All field team members	Sevenson staff, subcontractors	Sevenson database and onsite
Sample Collection	Competency in USEPA and USACE standard sampling methods	Sevenson	Various and updated	All environmental samplers and treatment system operators	Sevenson staff, subcontractors	Resumes
Sample Analysis	Trained in Department of Defense (DOD) *Quality Systems Manual for Environmental Laboratories* (QSM), USEPA SW-846, and any other applicable analytical methods	Project Laboratories	Various and updated	Project laboratory	All personnel	Laboratory
Data Review and Assessment	None – review performed by an experienced project chemist	Sevenson	Various	James Hyzy	Sevenson Data Quality Control Review Chemist	Sevenson database

[1] Other tasks requiring specialized skills and training will be performed by appropriately qualified subcontractors. Training, certification, and permit requirements will be outlined in separate scopes of work for each task.
[2] All field personnel entering an exclusion zone will be required to be OSHA trained.

UFP-QAPP Worksheet #9
Project Scoping Session Participants Sheet

Sevenson conducted internal discussion/e-mail correspondence regarding the scope of the project. Additional sessions will be scheduled as needed and Worksheet will be updated.

Project Name: Syncon Resins Project **Projected Date(s) of Sampling:** Ongoing in 2016/2017 **Project Manager:** Steve Gillespie	**Site Name:** Syncon Resins Superfund Site (OU2) **Site Location:** South Kearny, New Jersey
Date of Session: June, 2016 **Scoping Session Purpose:** Discussion of project requirements for preparation of the UFP-QAPP	

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Al LaGreca	Corporate PM	Sevenson	716-284-0431	alagreca@sevenson.com	Corporate Project Manager
James Hyzy	Data Quality Control Review Chemist	Sevenson	716-284-0431	jhyzy@sevenson.com	Data review and management
Kenneth Paisley	Regulatory Specialist	Sevenson	716-284-0431	kpaisley@sevenson.com	Preparation of UFP-QAPP

Project Name: Syncon Resins Project **Projected Date(s) of Meeting:** August 4, 2016 **Project Manager:** Steve Gillespie	**Site Name:** Syncon Resins Superfund Site (OU2) **Site Location:** South Kearny, New Jersey
Date of Session: August 4th, 2016 **Scoping Session Purpose: Initial Construction Meeting (see Meeting Attendance Sheet)**	

Project Name: Syncon Resins Project **Projected Date(s) of Meeting:** August 15, 2016 **Project Manager:** Steve Gillespie	**Site Name:** Syncon Resins Superfund Site (OU2) **Site Location:** South Kearny, New Jersey
Date of Session: August 15th, 2016 **Scoping Session Purpose: Project Safety/Mutual Understanding/Pre-work Meeting(see Meeting Attendance Sheet)**	

UFP-QAPP Worksheet #10 A1
Problem Definition

PROBLEM DEFINITION

Poor waste handling practices related to past resin and varnish-related product manufacturing operations at the Syncon site resulted in site-wide soil contamination. Contaminants to be managed under this phase of remediation at the site include heavy metals (arsenic and cadmium), VOCs (benzene, ethylbenzene, toluene and xylene), SVOCs (naphthalene), and pesticides/PCB (Aldrin, dieldrin, 4,4'- DDD, 4,4'-DDT, heptachlor and total PCB)

The objective of this remediation is to remove, dewater (as necessary) and transport for offsite disposal contaminated soils at the site. Remedial activities are being conducted to restore the site such that there will be no impact to human health and the environment, to minimize the migration of contaminants through surface water runoff or flooding and to reduce risks to ecological receptors. The Site was added to the Superfund National Priorities List in 1983. The USEPA issued a Record of Decision (ROD, September, 1986). Site data and cleanup alternatives have been issued and updated through Five Year Review Reports.

PROJECT DESCRIPTION

The major components of the current Remedial Action Objectives are:

Reduce or eliminate the direct contact risks associated with contaminated soil to levels protective of a commercial/industrial use;
Improve the effectiveness and efficiency of the existing OU1 remedy that is currently in place;
Remove or treat continuing sources of contamination (i.e. Principal Threat Waste) when technically feasible or practicable;
Address potential future exposure through inhalation of vapors that may migrate from contaminated soils; and
Provide for restricted (industrial) use of the property.

Constituents to be sampled include the following:

Waste Disposal Characterization samples of site soils;
Subsurface and Surface Pre-excavation samples to determine building slab and subsurface building demolition and soil excavation requirements see Section 01450, Table 01450-1 (see Appendix 7) for performance values based on the OU2 Record of Decision (2000) and/or New Jersey Department of Environmental Protection Non-Residential Soil Cleanup Criteria (NJDEPNRSCC);
Demolition samples of concrete debris for recycling;
Disposal Characterization samples of Above Storage Tanks (AST) and their contents (by layer);
Confirmatory samples of soils for Underground Storage Tanks (UST) for closure;
Post-excavation soil samples (as specified by area, see Section 01450, Table 01450-1 for performance values based on the OU2 Record of Decision (2000) and/or New Jersey Department of Environmental Protection NJDEPNRSCC;
Topsoil and Backfill samples from each offsite borrow source prior ro use onsite;
Process Water samples from onsite treatment water system to monitor compliance with the New Jersey Pollution Discharge Elimination System/Discharge to Surface Water (NJPDES/DSW) critera.

PROJECT DECISION CONDITIONS

The requirements for the offsite disposal of any waste materials generated during completion of the project will be determined through the collection of waste characterization samples. The results of these sampling activities will be compared to the 40 CFR261 Resource Conservation and Recovery Act (RCRA) regulatory limits, the 40CFR761 PCB Manufacturing, Processing, Distribution in Commerce and Use Prohibitions and any specific requirements of the offsite disposal facility. If the TCLP results are greater than the RCRA regulatory limits, the waste will be disposed of as RCRA hazardous; if PCB concentrations are greater than 50 ppm, the materials will be disposed of as TSCA regulated waste. If the results are less than the RCRA regulatory limits, and PCB are < 50 ppm, the materials will be disposed of as non-hazardous waste. Waste characterization samples will be obtained to meet the offsite disposal facility requirements for one (1) sample per 500 cubic yards (yd3) or approximately every 750 tons.

Subsurface and Surface Pre-excavation samples shall be obtained per Section 02410, Demolition, and as shown on the Contract Drawings. Surface soil samples shall be analyzed for EPA Target Analyte (TAL) metals and EPA Target Compound List (TCL) compounds. Subsurface samples shall be analyzed for total PCB, only. Results of this sampling and analysis shall be used to determine additional demolition and excavation requirements with respect to Site cleanup criteria. The goals for samples are as stated in Table 01450.

Demolition Debris (concrete) samples will be obtained from demolished concrete and other construction materials. Concrete samples shall be analyzed for EPA TAL metals, EPA TCL compounds and Extractable Petroleum Hydrocarbons (EPH). All concrete debris designated for recycling shall be below NJDEP Residential Direct Contact Soil Remedial Standards (RDCSRS).

AST tank samples shall be collected and analyzed from any AST tanks found to contain materials for disposal and to determine waste characteristics, handling and disposal requirements. One sample shall be obtained from each layer of AST contents (water/fuel and/or liquid/solid) present determined to have any product present. AST samples will be run for Gasoline Range Organics (GRO), Diesel Range Organics (DRO), EPH and Oil and Grease. In addition, as required for offsite disposal facility approval, each sample may be run for corrosivity, ignitability, reactive cyanide, reactive sulfide, TCLP VOCs, TCLP SVOCs, TCLP pesticides, TCLP herbicides, TCLP metals, and PCBs.

Confirmatory soil samples for UST closures onsite will be made by collection of a sidewall and bottom sample. Each sample will be analyzed for EPA TCL VOC, SVOC, and PCB.

Post Excavation samples from sidewalls and from the bottom of excavations shall be collected per Section 02111, Excavation and Handling of Contaminated Material and as shown on Contract Drawings. Samples shall be analyzed to verify that excavations have proceeded to the point that site soils that exceed Table 01450-1 criteria have been removed.

Samples of backfill materials (common fill and topsoil) from each offsite source will be collected and analyzed to verify that these materials do not contain contaminant levels that are hazardous to human health and the environment. Written approval from the USACE COR will be received prior to bringing backfill to the site. Backfill/fill materials shall be analyzed for EPA TAL metals (plus cyanide and mercury), EPA TCL compounds (plus Acrolein, Acrylonitrile, Benzidine, 1,2-diphenylhydrazine, N-Nitrosodimethlyamine and Tertiary Butyl Alcohol), Ra-226, Gamma radiation exposure rate and pH. The NRDCSRS screening level will be used to determine that borrow sources are free from contamination. The requirements of N.J.A.C. 7:28-12 (Ra-226 < 3 pCi/g, assuming background at 1 pCi/g, and < 30

mR/Hr Gamma exposure rate) will be used to determine if borrow materials contain a minimal amount of naturally occurring radioactive material (NORM). Samples will be analyzed at a frequency of one per 5000 yd3 or one per source, minimum.

Determination of the onsite wastewater treatment plant (WWTP) discharge water quality will be achieved through the collection effluent samples. The results of the effluent sampling activities will be compared to values specified in the NJDES/DSW permit equivalency as included in Appendix 2 of this QAPP. If the results of the sampling activities indicate that water has been discharged with concentrations exceeding the NJPDES/DSW permit limits, the following steps will occur in accordance with contract specifications: (1) immediately cease the discharge; (2) notify the COR of this condition and (3) implement approved protocols as included in the Site Treatment Works Authorization, submitted and approved under separate cover, for water effluent management.

In addition, informational samples will be taken from the influent to the settling tank, settling tank effluent, green sand effluent. However, in the event of treatment issues, other sample points may be sampled, such as bag filter influent/effluent and GAC effluent. Samples will be analyzed for TAL Metals, full TCL VOC, full TCL SVOC, TCL Pesticides, TSS, and TOC. Samples will be obtained every 2 weeks for the first month, and then 1 per month thereafter.

UFP-QAPP Worksheet #11
Project Quality Objectives/Systematic Planning Process Statements

WHO WILL USE THE DATA?

USEPA, USACE, NJDEP, CDM Smith and Sevenson, and the offsite disposal facility (if necessary) will use the project data.

WHAT WILL THE DATA BE USED FOR?

Data collected per this plan will be used to address and evaluate the following:

Data will be used to make decisions as to waste classification under federal law.
Data will be used to assist in determining if contamination has migrated to beneath/outside of the known areas of contamination area.
Data will be used to ascertain the reusability of construction items such as concrete and metal.
Data will be used to verify post-excavation samples meet the ROD criteria.
Data will be used to confirm that offsite borrow source materials such as backfill and topsoil are free from chemical and radiological contamination and do not pose a threat to the environment or health.
Data will be used to verify that the concentrations of contaminants in the WWTP effluent do not exceed the NJPDES/DSW permit equivalent limit.

WHAT TYPES OF DATA ARE NEEDED?

The sampling program will include the following elements:

Representative sampling locations will be as specified for each sample matrix/type.
Standard protocols for sample collection, handling, preparation, and analysis will be followed.

HOW "GOOD" DO DATA NEED TO BE?

The data must be technically defensible and of sufficient quality as to support the project data quality objectives (DQO). The data must meet the requirements of the offsite disposal facility(ies) for RCRA and/or TSCA waste, requirements of the offsite disposal facility(ies) for solid wastes, the contract-specified contaminant levels, or contract-specified WWTP effluent discharge limits. Worksheet #15 summarizes the analytes with the associated project action levels and project quantitation levels.

Specified analytical methods are planned to be of definitive data quality. Definitive data is defined as data that are suitable for final decision making. They are generated using rigorous analytical methods such as approved by USEPA SW-846 reference methods. Definitive data are not restricted in their use unless quality problems require data qualification resulting in unusable data.

WHEN WILL THE DATA BE COLLECTED?

Samples will be collected per the project schedule, which is provided in more detail in Worksheet #16.

As directed by the project specifications, waste characterization samples will be collected as waste is generated and prepared for shipment and disposal offsite. Site soil and debris samples will be collected as the project schedule progresses. WWTP discharge samples will be collected at frequencies specified in NJPDES/DSW permit equivalent. Post-excavation samples will be collected as areas are completed.

Offsite borrow source samples will be collected prior to importing materials such as backfill and topsoil to the site.

WHO WILL COLLECT AND GENERATE THE DATA?

The Sevenson sampling team will collect all the samples. The solid and liquid samples will be analyzed for chemical parameters by Eurofins/Spectrum Analytical (Spectrum) of Kingston, RI. Spectrum holds current DOD Environmental Laboratory Accreditation Program (ELAP), National Environmental Laboratory Accreditation Certification (NELAC) and state of New Jersey certifications, and has related experience and qualifications. Copies of the laboratory DOD ELAP and New Jersey state certifications are on file and can be made available upon request. Spectrum will perform laboratory activities in accordance with the requirements of the DOD QSM (Version 5.0), July, 2013). Sevenson is responsible for the collection and shipment of samples to the laboratory. Analytical data from Spectrum will be managed by Sevenson and forwarded to the COR. Site data will be validated by Sevenson's Project Chemist in accordance with EPA Region 2 SOPs as appropriate. If SOPs are not available, then EPA Contract Laboratory Program National Functional Guidelines for inorganics (EPA-540-R-2016-001), for organics (EPA-540-R-2016-002) and for radiological parameters in accordance with MARLAP Chapter 8, Section 5 (EPA/402/B-04/001A) will be used. Data validation will be performed on 100% of the site environmental samples as a way of confirming the data quality.

HOW WILL THE DATA BE REPORTED?

Samples analyzed by the offsite laboratory will be reported in a hardcopy deliverable format consistent with the requirements of a definitive data package as described in EM200-1-6 (October 1997). Hardcopy data packages, to the extent possible, will include the following:

A cover sheet should be included which specifies the name and address of the laboratory, project name, site location, statement of authenticity, and official signature of release.
A case narrative should also be included which outlines any problems encountered during sample analysis. The case narrative should also list all methods used and contain a table correlating field sample numbers and laboratory sample numbers. Samples that were received but not analyzed should also be identified. Extractions or analyses performed outside of holding time should also be noted. The case narrative should identify all data qualifiers or flags. Deviations of QC sample results from laboratory acceptance criteria should be noted and associated corrective actions taken by the laboratory should be addressed. Any other factors that could affect the sample results should be discussed.
The results for each sample should contain the following information at a minimum:

Project name and unique ID number.
Field sample ID number as written on custody form.
Laboratory name and location.
Laboratory sample number.
Date sample collected.
Date sample received.
Date sample extracted or prepared.
Data sample analyzed.
Analysis procedure including method number.
Analyte or parameter.
Reporting limit.

Analytical results with the correct number of significant figures.
Concentration units.
Dilution factor.
Matrix.
Original chain of custody record, shipping documents, and sample cooler receipt forms.

The minimum data package must include internal laboratory quality control data with their respective acceptance criteria. Method quality control data include all measures of precision and all control limits for accuracy and precision. This would include laboratory performance information such as results for method blanks, recoveries for laboratory control samples, matrix spike and matrix spike duplicate recoveries, and relative percent difference. Any deviations from the control limits should be noted.

Definitions of laboratory qualifiers.

Data will also be reported by the subcontracted laboratory electronically in USACE Automated Data Review (ADR) format using the project-specific library (i.e., electronic QAPP (e-QAPP)), copies of which are included in Appendix 3. The e-QAPP will be prepared using the ADR tools by Sevenson and will include methods; target compound lists; QC recoveries for laboratory control samples (LCS), matrix spike (MS), surrogates, laboratory duplicates, and field duplicates; and required reporting limits. Sevenson and the contract laboratory will be responsible for updates, as necessary, of the project library. Following review of the data using the ADR software, the data will be maintained in the EDMS database. The EDMS database provides for a central storage location of all analytical data generated for the project in a consistent format. The database will be maintained by the Sevenson Data Quality Control Review Chemist and will be made available to Sevenson field personnel and the USACE Project Chemist upon request. EDMS allows for quick retrieval of project analytical results and allows for the generation of summary tables. The EDMS database will be utilized to create the USEPA Region 2 EDD format as documented in the *Electronic Data Deliverable Comprehensive Specification Manual 2.0 (February 2012)*, and current updates. EDD will be uploaded to the Region 2 database in the required Region 2 format for samples of site related media that remain on site after the project is finished (e.g., post-excavation sample).

The EDD shall also include final post-excavation sample information as follows: a site basemap (in AutoCAD drawing exchange (DXF) format showing site features), sample locations (horizontal coordinates, top of inside casing elevations and surface elevation) lithographic data, well data, well construction data, final well development water quality parameter readings and water level data.

Data validation will be conducted the Sevenson Project Chemist on all environmental data. Data validation reports will be submitted to the USACE COR. A monthly ANSET report for all samples obtained at the site sent to the offsite laboratory will also be submitted to EPA Region 2.

Following receipt of reviewed data, Sevenson will generate a Chemical Data Interim Report (CDIR) on a quarterly basis. The CDIR will include a summary of all chemical sampling activities performed during the quarter and will include an evaluation of the achievement of project DQOs. A number of the summary tables included in the CDIR will be generated directly from the EDMS database, ensuring that all reported results are consistent and ultimately eliminating the human error element of data entry.

HOW WILL THE DATA BE ARCHIVED?

Original hard copies of laboratory reports will be kept in Sevenson project files at the site; electronic copies will be maintained at Sevenson's corporate office.

As discussed above, Sevenson maintains an electronic project database in EDMS format. The EDMS database includes all results generated by the subcontracted laboratories. The project EDMS database, reviewed ADR files, and e-QAPPs are stored on Sevenson's corporate file server, which is backed-up daily on tape. In addition, the project EDMS database is copied to compact disc on a monthly basis and the reviewed ADR files and e-QAPPs are copied to compact disc on an annual basis.

Hard copies of the laboratory data and the final project database will be transferred to USACE upon completion of the project. Retrieval of data by others will be at the discretion of USACE and USEPA. The length of time that records will be archived will be at the discretion of USACE and USEPA.

All data will be summarized quarterly in a Chemical Data Interim Report (CDIR). At project completion, all site data will be included in a Chemical Data Final Report (CDFR).

UFP-QAPP Worksheet #12
Measurement Performance Criteria Table

To measure and control the quality of analyses, certain QA parameters are defined and utilized in data analysis activities. These parameters are defined below.

Precision. Precision measures the reproducibility of data or measurements under specific conditions. Precision is a quantitative measure of the variability of a group of data compared to their average value. Measurement of precision is dependent upon sampling technique and analytical method and may be affected by the natural variation of the sample matrix or contamination within the matrix, as well as by errors made in the field and/or laboratory handling procedures. Matrix Spike (MS) and matrix spike duplicate (MSD) pairs and laboratory duplicate samples are used to assess analytical precision. Field precision is assessed by analysis of field duplicate samples.

For chemical determinations, laboratory and field duplicate precision is stated in terms of relative percent difference (RPD) of absolute difference between two measurements. For a pair of measurements, RPD (or absolute difference) will be used, as presented below:

$$RPD = \left(\frac{|X_1 - X_2|}{\frac{(X_1 + X_2)}{2}} \right) x100$$

Where: X_1 and X_2 = the two replicate values

If the RPD acceptance criteria for field or laboratory duplicate samples are not achieved, field-sampling procedures will be reviewed with sampling personnel. In addition, the laboratory will be made aware of the discrepancy such that they may review internal sample preparation and analysis procedures.

Accuracy. Accuracy measures the bias in a measurement system. Sources of error include the sampling process, field contamination, preservation, handling, shipping, sample matrix, sample preparation, and analysis technique. Analytical accuracy will be assessed through calibration checks, surrogate spikes, tracers, MS, LCS, and other method-specific checks. Accuracy is measured in terms of percent recovery:

$$\%R = \left(\frac{|SSR - SR|}{SA} \right) x100$$

Where: SSR = measured value of the spiked sample
SR = measured value of the unspiked sample
SA = known amount of the spike in the sample

Representativeness. Representativeness expresses the degree to which data accurately and precisely reflects a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is a qualitative parameter that is dependent upon the proper design and implementation of the sampling program and proper laboratory protocol. The sampling design created for this project was designed to provide data representative of site conditions. During development of the sampling designs, consideration was give to the past history of contamination at the

site, existing analytical data, physical setting, and process. Representativeness will be satisfied by determining that the UFP-QAPP is followed; proper sampling techniques, preservation, and handling are used; proper analytical procedures are followed; and holding times for the samples are not exceeded in the laboratory. If during data evaluation results indicate that a sample is not representative; Sevenson will notify USACE and provide recommendations for an alternate sample location or sample collection method.

Completeness. Completeness is a measure of the amount of usable data obtained from a measurement system compared to the amount that was expected under normal conditions. To be considered complete and valid, the reported data set must meet all acceptance criteria, including precision and accuracy in accordance with the specified analytical method being used.

The following completeness criteria shall be met:

Completeness for sample collection. Completeness for sample collection is defined as the percentage of samples listed in the UFP-QAPP that were actually collected. The completeness acceptance criterion for samples collected in the field will be 90% of the quantity of samples planned for collection in the UFP-QAPP. Corrective action may be implemented to recollect samples where necessary and possible (e.g., modifying a planned sample location, sample jars broken during shipment). Laboratory notification of sample receipt conditions will be used to determine as soon as possible whether any problems during sample shipment would necessitate recollection of samples. The percent completeness for sample collection will be calculated using the following equation:

$$\%C = \left(\frac{V}{N}\right) x\,100$$

Where: V = number of samples collected
N = total number of samples planned

Completeness for acceptable data. Completeness for acceptable data is defined as the percentage of acceptable data out of the total number of data generated. This completeness will be 90% for each analytical method. Acceptable data is defined as data that passes all applicable quality control systems defined in the UFP-QAPP. The percent completeness will be calculated using the following equation:

$$\%C = \left(\frac{V}{N}\right) x\,100$$

Where: V = number of measurements judged acceptable
N = total number of sample results

The data review process will be used to determine the quality and quantity of usable analytical data generated. For the purpose of calculating completeness, results that are assigned "J" qualifiers during data review will be considered to be acceptable, while results that are assigned "R" qualifiers during data review will be considered unacceptable.

Comparability. Comparability expresses the confidence with which one data set can be compared to another. The extent to which existing and planned analytical data will be comparable depends on the

similarity of sampling and analytical methods. The procedures used to obtain the planned analytical data are expected to provide comparable data. The procedures used will be USEPA promulgated methods, well recognized and commonly used for environmental investigations.

Desired Method Sensitivity. Sensitivity is a measure of a method's detection limit and ability to distinguish between two values. The method detection limit (MDL) is defined as the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte. The method quantitation limit (MQL) is the minimum concentration of a target analyte that can be reported with a specified degree of confidence. The MQL is the lowest concentration that produces a quantitative result within the specific limits of precision and bias, and is set at or above the concentration of the lowest initial calibration standard.

UFP-QAPP Worksheet #12-1
Measurement Performance Criteria Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Toxicity Characteristic Leachate Procedure (TCLP) Metals
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria (MPC)	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-1 and SOP M-120.45-01 (Appendix 4)	SW846 1311/3010A/6010C/ 7471B 110.0062/100.0111/100.0012	Accuracy, Bias	Recovery within 80-120% (if sample is <4x spike value)	MS	S&A
		Precision	RPD ≤20%	Laboratory Duplicate	S&A
		Accuracy	Recovery within 80-120%	LCS	A
		Sensitivity, Accuracy	All target compounds ≤ reporting limit (RL)	Method Blank	A
		Accuracy	4±2ºC	Temperature Blank	S
		Completeness	≥90%	Data Assessment	S&A

MS analyses are required per the analytical method. The analyses may or may not be performed using site samples; i.e., they may be performed using samples from another laboratory project prepared and analyzed in the same analytical batch.

UFP-QAPP Worksheet #12-2
Measurement Performance Criteria Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	TCLP Volatile Organic Compounds (VOCs)
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-1 and SOP M-120.45-01 (Appendix 4)	SW846 1311/5030B/8260B 100.0062/90.0012	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (see Appendix 3)	MS	S&A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	Surrogate Spikes	S&A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Accuracy	4±2ºC	Temperature Blank	S
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS analysis is required per the analytical method. The analysis may or may not be performed using site samples; i.e., it may be performed using a sample from another laboratory project prepared and analyzed in the same analytical batch.

UFP-QAPP Worksheet #12-3
Measurement Performance Criteria Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	TCLP Semi-Volatile Organic Compounds (SVOCs)
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-1 and SOP M-120.45-01 (Appendix 4)	SW846 1311/3510C/3520C/8270D 100.0062/70.0011	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS	S&A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	Surrogate Spikes	S&A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Accuracy	4±2ºC	Temperature Blank	S
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS analysis is required per the analytical method. The analysis may or may not be performed using site samples; i.e., it may be performed using a sample from another laboratory project prepared and analyzed in the same analytical batch.

UFP-QAPP Worksheet #12-4
Measurement Performance Criteria Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	TCLP Pesticides
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-1 and SOP M-120.45-01 (Appendix 4)	SW846 1311/3510C/3520C/8081B 100.0062/60.0006	Accuracy, Bias	Must meet the laboratory control limit criteria (see Appendix 3)	LCS	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (see Appendix 3)	MS	S&A
		Accuracy, Bias	Must meet the laboratory control limit criteria (see Appendix 3)	Surrogate Spikes	S&A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Accuracy	4±2ºC	Temperature Blank	S
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS analysis is required per the analytical method. The analysis may or may not be performed using site samples; i.e., it may be performed using a sample from another laboratory project prepared and analyzed in the same analytical batch.

UFP-QAPP Worksheet #12-5
Measurement Performance Criteria Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	TCLP Herbicides
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-1 and SOP M-120.45-01 (Appendix 4)	SW846 1311/8151A 100.0062/60.0034	Accuracy, Bias	Must meet the laboratory control limit criteria (see Appendix 3)	LCS	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (see Appendix 3)	MS	S&A
		Accuracy, Bias	Must meet the laboratory control limit criteria (see Appendix 3)	Surrogate Spikes	S&A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Accuracy	4±2ºC	Temperature Blank	S
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS analysis is required per the analytical method. The analysis may or may not be performed using site samples; i.e., it may be performed using a sample from another laboratory project prepared and analyzed in the same analytical batch.

UFP-QAPP Worksheet #12-6
Measurement Performance Criteria Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Polychlorinated Biphenyls (PCBs)
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-1 and SOP M-120.45-01 (Appendix 4)	SW846 3540C/3541/8082A 60.0003	Accuracy, Bias	Must meet the laboratory control limit criteria (see Appendix 3)	LCS	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (see Appendix 3)	MS/MSD	S&A
		Accuracy, Bias	Must meet the laboratory control limit criteria (see Appendix 3)	Surrogate Spikes	S&A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Accuracy	4±2ºC	Temperature Blank	S
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analysis is required per the analytical method. The analysis may or may not be performed using site samples; i.e., it may be performed using a sample from another laboratory project prepared and analyzed in the same analytical batch.

UFP-QAPP Worksheet #12-7
Measurement Performance Criteria Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Reactivity (Sulfide and Cyanide)
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-1 and SOP M-120.45-01 (Appendix 4)	SW846 9012B/9034 100.0015	Accuracy, Bias	Sulfide: recovery within 22.6-114% Cyanide: recovery within 0-12.4%	LCS	A
		Accuracy	RPD ≤20%	Laboratory Duplicate	A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Accuracy	4±2ºC	Temperature Blank	S
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

Laboratory duplicate analysis is required per the analytical method. The analysis may or may not be performed using site samples; i.e., it may be performed using a sample from another laboratory project prepared and analyzed in the same analytical batch.

UFP-QAPP Worksheet #12-8
Measurement Performance Criteria Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	pH
Concentration Level	NA

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-1 and SOP M-120.45-01 (Appendix 4)	SW846 1110A/9040C 100.0112	Precision	RPD ≤20%	Laboratory Duplicate	A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

Laboratory duplicate analysis is required per the analytical method. The analysis may or may not be performed using site samples; i.e., it may be performed using a sample from another laboratory project prepared and analyzed in the same analytical batch.

UFP-QAPP Worksheet #12-9
Measurement Performance Criteria Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Ignitability
Concentration Level	NA

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-1 and SOP M-120.45-01 (Appendix 4)	SW846 1010A SOP for Flashpoint by SW846-1010A, 9-26-13 Rev.9	Accuracy	RPD ≤20%	Laboratory Duplicate	A
		Accuracy	4±2ºC	Temperature Blank	S
		Accuracy	81ºF(+/-1.5ºF)	QC Check (P-xylene)	A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

Laboratory duplicate analysis is required per the analytical method. The analysis may or may not be performed using site samples; i.e., it may be performed using a sample from another laboratory project prepared and analyzed in the same analytical batch.

UFP-QAPP Worksheet #12-10
Measurement Performance Criteria Table

Matrix	Solid (Pre-excavation Surface Samples)
Analytical Group	TAL Metals[1]
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-2 and SOP M-120.13-01 (Appendix 4)	SW846 3010A/6010C/7471B 100.0111/100.0012 SW846 9012B 100.0004	Accuracy, Bias	Recovery within 80-120%	MS	S&A
		Precision	RPD ≤20%	Laboratory Duplicate	S&A
		Accuracy, Bias	Recovery within 80-120%	LCS	A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

[1] Total metals to include TAL List metals and Cyanide.
MS analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-11
Measurement Performance Criteria Table

Matrix	Solid (Pre-excavation Surface Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-2 and SOP M-120.13-01 (Appendix 4)	5030B/5035/8260B 90.0012	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analysis is required per the analytical method. The analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-12
Measurement Performance Criteria Table

Matrix	Solid (Pre-excavation Surface Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-2 and SOP M-120.13-01 (Appendix 4)	3540C/8270D 70.0011	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analysis is required per the analytical method. The analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-13
Measurement Performance Criteria Table

Matrix	Solid (Pre-excavation Surface Samples)
Analytical Group	TCL Pesticide/PCB
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-2 and SOP M-120.13-01 (Appendix 4)	Pesticide: 3540C/3541/8081B 60.0006 PCB: 3540C/3541/8082A 60.0003	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-14
Measurement Performance Criteria Table

Matrix	Solid (Pre-excavation Subsurface Samples)
Analytical Group	PCB
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-2 and SOP M-120.13-01 (Appendix 4)	PCB: 3540C/3541/8082A 60.0003	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-15
Measurement Performance Criteria Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TAL Metals[1]
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-3 and SOP M-120.54-00 (Appendix 4)	SW846 3050A/6010C/7471B 100.0111/100.0012 SW846 9012B 100.0004	Accuracy, Bias	Recovery within 80-120%	MS	S&A
		Precision	RPD ≤20%	Laboratory Duplicate	S&A
		Accuracy, Bias	Recovery within 80-120%	LCS	A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

[1] Total metals to include TAL List metals and Cyanide.
MS analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-16
Measurement Performance Criteria Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-3 and SOP M-120.54-00 (Appendix 4)	5030B/5035/8260B 90.0012	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analysis is required per the analytical method. The analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-17
Measurement Performance Criteria Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-3 and SOP M-120.54-00 (Appendix 4)	3540C/8270D 70.0011	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analysis is required per the analytical method. The analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-18
Measurement Performance Criteria Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TCL Pesticide/PCB
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-3 and SOP M-120.54-00 (Appendix 4)	Pesticide: 3540C/3541/8081B 60.0006 PCB: 3540C/3541/8082A 60.0003	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-19
Measurement Performance Criteria Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	Extractable Petroleum Hydrocarbons (EPH)
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-3 and SOP M-120.54-00 (Appendix 4)	NJ EPH SOP for NJEPH, 1-23-14 Rev.6	Accuracy, Bias	Recovery within 40%-140% (C9 must be greater than 25%)	LCS	A
		Precision	RPD ≤ 50%	Laboratory Duplicate	A
		Sensitivity	Result ≤ RL	Method Blank	A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

Laboratory duplicate analysis is required per the analytical method. The field duplicate analysis will be performed using site samples at a frequency of 1 per 20 samples

UFP-QAPP Worksheet #12-20
Measurement Performance Criteria Table

Matrix	Liquid/Solid (AST Samples)
Analytical Group	Gasoline (GRO)/Diesel (DRO) Range Organics
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-4 and SOP M-120.45-01 (Appendix 4)	8015M SOP No. 60.00050	Accuracy, Bias	Recovery within 70%-130%, RPD ≤25%	LCS/LCSD	A
		Accuracy, Bias	Recovery within 70%-130%, RPD ≤25%	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 30%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A

MS analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-21
Measurement Performance Criteria Table

Matrix	Liquid/Solid (AST Samples)
Analytical Group	EPH
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-4 and SOP M-120.45-01 (Appendix 4)	NJ EPH SOP for NJEPH, 1-23-14 Rev.6	Accuracy, Bias	Recovery within 40%-140% (C9 must be greater than 25%)	LCS	A
		Precision	RPD ≤ 50%	Laboratory Duplicate	A
		Sensitivity	Result ≤ RL	Method Blank	A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

Laboratory duplicate analysis is required per the analytical method. The field duplicate analysis will be performed using site samples at a frequency of 1 per 20 samples

UFP-QAPP Worksheet #12-22
Measurement Performance Criteria Table

Matrix	Liquid/Solid (AST Samples)
Analytical Group	Oil and Grease
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-4 and SOP M-120.45-01 (Appendix 4)	1664A SOP for EPA 1664B, 11-14-13 Rev11	Accuracy, Bias	Recovery within 83%-101%, RPD ≤11%	LCS/LCSD	A
		Accuracy, Bias	Recovery within 78%-114%, RPD ≤18%	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Completeness	≥90%	Data Assessment	S&A

MS analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-23
Measurement Performance Criteria Table

Matrix	Solid (Post Excavation Samples)
Analytical Group	TAL Metals
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-5 and SOP M-120.13-01 (Appendix 4)	SW846 3050B/6010C/7471B 100.0111/100.0012	Accuracy, Bias	Recovery within 80-120%	MS	S&A
		Precision	RPD ≤20%	Laboratory Duplicate	S&A
		Accuracy, Bias	Recovery within 80-120%	LCS	A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

Metals to include – Arsenic and Cadmium
MS analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-24
Measurement Performance Criteria Table

Matrix	Solid (Post Excavation Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-5 and SOP M-120.13-01 (Appendix 4)	5030B/5035/8260B 90.0012	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

VOC compounds of interest include – Benzene, Ethylbenzene, Toluene and Xylenes (total).
MS/MSD analysis is required per the analytical method. The analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-25
Measurement Performance Criteria Table

Matrix	Solid (Post Excavation Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-5 and SOP M-120.13-01 (Appendix 4)	3540C/8270D 70.0011	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

SVOC compounds of interest include – Naphthalene only.
MS/MSD analysis is required per the analytical method. The analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-26
Measurement Performance Criteria Table

Matrix	Solid (Post Excavation Samples)
Analytical Group	TCL Pesticide/PCB
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-5 and SOP M-120.13-01 (Appendix 4)	Pesticide: 3540C/3541/8081B 60.0006 PCB: 3540C/3541/8082A 60.0003	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

Pesticide compounds of interest include – Aldrin, Dieldrin, 4,4'-DDD, 4,4'DDT and Heptachlor. All aroclors are reported for PCB analysis. MS/MSD analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-27
Measurement Performance Criteria Table

Matrix	Solid (Backfill/Topsoil Samples)
Analytical Group	TCL VOC[1]
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-7 and SOP M-120.45-01 (Appendix 4)	5030B/5035/8260B 90.0012	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

[1] TCL VOC's + Acrolein, Acrylonitrile and Tert-butyl Alcohol
MS/MSD analysis is required per the analytical method. The analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-28
Measurement Performance Criteria Table

Matrix	Solid (Backfill/Topsoil Samples)
Analytical Group	TCL SVOC [2]
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-7 and SOP M-120.45-01 (Appendix 4)	3540C/8270D 70.0011	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

[2] TCL SVOC's and Benzidine, 1,2-Diphenylhydrazine, and N-Nitrosodimethylamine.
MS/MSD analysis is required per the analytical method. The analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-29
Measurement Performance Criteria Table

Matrix	Solid (Backfill/Topsoil Samples)
Analytical Group	TCL Pesticide/PCB
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-7 and SOP M-120.45-01 (Appendix 4)	Pesticide: 3540C/3541/8081B 60.0006 PCB: 3540C/3541/8082A 60.0003	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-30
Measurement Performance Criteria Table

Matrix	Solid (Backfill/Topsoil Samples)
Analytical Group	TAL Metals and Cyanide
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-7 and SOP M-120.45-01 (Appendix 4)	Metals: 3050B/6010C/7471B 100.0111/100.0012 Cyanide: 9012B 100.0004	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS	A
		Precision	RPD ≤ 25%	Laboratory Duplicate	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-31
Measurement Performance Criteria Table

Matrix	Solid (Backfill/Topsoil Samples)
Analytical Group	Radium-226
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-7 and SOP M-120.45-01 (Appendix 4)	DOE Ga-01-R* GL-RAD-A-013	Precision	NAD≤1.96	Laboratory Duplicate	S&A
		Accuracy	Recoveries must meet the control limit criteria recovery 80-120%	Laboratory Control Standard	A
		Sensitivity, Accuracy	±3 standard deviations	Method Blank	A
		Precision, Representativeness	Results within a factor of 4 of each other	Field Duplicate	S&A
		Completeness	≥90% for acceptable laboratory data	Percent Completeness	A
		Completeness	≥90% for sample collection	Percent Completeness	S

Laboratory duplicate analysis is required per the analytical method. The field duplicate analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-32
Measurement Performance Criteria Table

Matrix	Solid (UST Closure Confirmation Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-6 and SOP M-120.45-01 (Appendix 4)	5030B/5035/8260B 90.0012	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

VOC compounds of interest include – Benzene, Ethylbenzene, Toluene and Xylenes (total).
MS/MSD analysis is required per the analytical method. The analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-33
Measurement Performance Criteria Table

Matrix	Solid (UST Closure Confirmation Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-6 and SOP M-120.45-01 (Appendix 4)	3540C/8270D 70.0011	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

SVOC compounds of interest include – Naphthalene only.
MS/MSD analysis is required per the analytical method. The analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-34
Measurement Performance Criteria Table

Matrix	Solid (UST Closure Confirmation Samples)
Analytical Group	TCL PCB
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-6 and SOP M-120.45-01 (Appendix 4)	PCB: 3540C/3541/8082A 60.0003	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS/MSD analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP- QAPP Worksheet #12-35
Measurement Performance Criteria Table

Matrix	Liquid (WWTP Effluent Samples)
Analytical Group	Metals[1]
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-8 and SOP M-120.42-00 (Appendix 4)	SW846 3010A/6010C 100.0111	Accuracy, Bias	Recovery within 80-120%	MS	S&A
		Precision	RPD ≤20%	Laboratory Duplicate	S&A
		Accuracy, Bias	Recovery within 80-120%	LCS	A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

[1] Total metals to include: Arsenic and Iron.
MS analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-36
Measurement Performance Criteria Table

Matrix	Liquid (WWTP Effluent Samples)
Analytical Group	Total Suspended Solids (TSS)
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-8 and SOP M-120.42-00 (Appendix 4)	SM 2540D 100.0021	Accuracy, Bias	NA	NA	A
		Sensitivity	NA	NA	A
		Precision, Representativeness	RPD ≤ 30%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

UFP-QAPP Worksheet #12-37
Measurement Performance Criteria Table

Matrix	Liquid (WWTP Effluent Samples)
Analytical Group	Total Organic Carbon (TOC)
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-8 and SOP M-120.42-00 (Appendix 4)	SW846 9060A 100.0025	Accuracy, Bias	NA	NA	A
		Precision	RPD ≤ 10%	Laboratory Duplicate	A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 30%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

Laboratory duplicate analysis is required per the analytical method. The field duplicate analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP- QAPP Worksheet #12-38 A1
Measurement Performance Criteria Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TAL Metals
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-8 and SOP M-120.42-00 (Appendix 4)	SW846 3010A/6010C 100.0111	Accuracy, Bias	Recovery within 80-120%	MS	S&A
		Precision	RPD ≤20%	Laboratory Duplicate	S&A
		Accuracy, Bias	Recovery within 80-120%	LCS	A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-39 A1
Measurement Performance Criteria Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-8 and SOP M-120.42-00 (Appendix 4)	SW846 5030/8260C 90.0012	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A

UFP-QAPP Worksheet #12-40 A1
Measurement Performance Criteria Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-8 and SOP M-120.42-00 (Appendix 4)	SW846 3510/8270D 70.0011	Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A
		Accuracy, Bias	Must meet the laboratory control limit criteria (See Appendix 3)	LCS/LCSD	A

UFP-QAPP Worksheet #12-41 A1
Measurement Performance Criteria Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TCL Pesticides
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-8 and SOP M-120.42-00 (Appendix 4)	SW846 3510/8081B 60.0006	Accuracy, Bias	Recovery within 80-120%	MS	S&A
		Precision	RPD ≤20%	Laboratory Duplicate	S&A
		Accuracy, Bias	Recovery within 80-120%	LCS	A
		Sensitivity, Accuracy	All target compounds ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

UFP-QAPP Worksheet #12-42 A1
Measurement Performance Criteria Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	Total Suspended Solids (TSS)
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-8 and SOP M-120.42-00 (Appendix 4)	SM 2540D 100.0021	Accuracy, Bias	NA	NA	A
		Sensitivity	NA	NA	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

UFP-QAPP Worksheet #12-43 A1
Measurement Performance Criteria Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	Total Organic Carbon (TOC)
Concentration Level	Low to Medium

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheets #17-8 and SOP M-120.42-00 (Appendix 4)	SW846 9060A 100.0025	Accuracy, Bias	NA	NA	A
		Precision	RPD ≤ 10%	Laboratory Duplicate	A
		Sensitivity	Result ≤ RL	Method Blank	A
		Precision, Representativeness	RPD ≤ 35%	Field Duplicate	S&A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

Laboratory duplicate analysis is required per the analytical method. The field duplicate analysis will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #12-44 A1
Measurement Performance Criteria Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	Oil and Grease
Concentration Level	NA

Sampling Procedure	Analytical Method/SOP	DQIs	MPC	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Worksheet #17-8 and SOP M-120.42-00 (Appendix 4)	1664A EPA 1664B, 11-14-13 Rev11	Accuracy, Bias	Recovery within 83%-101%, RPD ≤11%	LCS/LCSD	A
		Accuracy, Bias	Recovery within 78%-114%, RPD ≤18%	MS/MSD	S&A
		Sensitivity	Result ≤ RL	Method Blank	A
		Completeness	≥90%	Data Assessment	S&A
		Comparability	Similar units and methods	Data results review	S&A

MS analyses are required per the analytical method. The analyses will be performed using site samples at a frequency of 1 per 20 samples.

UFP-QAPP Worksheet #13
Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Organization, Data Types, Data Generation/Collection Dates)	How Data Will Be Used	Limitations on Data Use
OU2 Record of Decision Soil Remediation Goals	Syncon Resin Superfund Sites – OU2 Contract Specification Section – Table 01010-2	USEPA	Point of reference for determining Surface/Subsurface Soil Remediation Goals	None
Soil Standard Remediation Standards (mg/kg) NJAC 7:26D	Syncon Resin Superfund Sites – OU2 Contract Specification Section – Table 01450-2 (see Appendix 7)	NJDEP	Point of reference for determining clean backfill/topsoil	None
OU2 Analytical Methods for Chemical Parameters	Syncon Resin Superfund Sites – OU2 Contract Specification Section – Table 01450-4 (see Appendix 7)	USEPA	Point of reference for determining site analytical methods	None
NJPDEP/DSW Permit Equivalency Requirements	Syncon Resin Superfund Sites – OU2 Contract Specification Section – Table 13300-1	USEPA	Point of reference for determining water treatment options	None

UFP-QAPP Worksheet #14 A1
Summary of Project Tasks

Sampling Tasks: Samples will be collected for analytical parameters from the locations described in Worksheets #17 and #18. Note that the number of samples included in Worksheet #17 and #18 are estimated and may change based on conditions encountered in the field. The following list represents the types of samples to be collected during the course of field activities:

Solid Waste Characterization Sampling. Samples will be collected as needed from wastes generated during site operations using appropriate standard methods for waste characterization and disposal facility approval.

Pre-excavation Surface/Subsurface Sampling. Pre-excavation samples shall be obtained with regard to building slab and subsurface demolition requirements and soil excavation limits in site areas. Buildings 1A, 6A, 7A, 9, 11, 12, the Northeast Building, and the Shed are located within the excavation area and shall be fully demolished, including slabs and footings. Buildings 1, 7, 8, 10 and the Red Building area located outside of the excavation area and demolition shall be to the top of slab present, with samples obtained underneath. Samples shall be obtained from buildings after each has been assessed for structural integrity, asbestos-containing material (ACM), lead-based paint (LBP) and any other hazardous material. No building shall be entered until it is deemed structurally safe. At a minimum, it is assumed that Buildings 1, 7, 8, 9, 10 and 11 will require at least partial demolition with asbestos in place. Contract Drawing C-2 (see Appendix 6) includes details of pre-excavation sample collection

Demolition Debris. Samples of concrete debris and other construction materials (i.e., metal) shall be analyzed per requirements of NJDEP Solid and Hazardous Waste Management Program "Guidance for Characterization of Concrete and Clean Fill Material for Recycling". All data will be compared against and less than criteria established in NJDEP Residential Direct Soil Remediation Standards (RDCSRS).

AST Content Disposal. Any site AST's found to contain product shall be sampled and analyzed per the contract requirements and to meet offsite disposal facility requirements.

Confirmatory Soil for UST Closure. Soils surrounding any UST on-site shall be analyzed the removal of any contamination which may have resulted from leaks above EPA Cleanup Criteria. A sample from below and at a midway point (or point of obvious leakage) for each UST shall be obtained from surrounding soils and compared to Table 01450-1 and NJDEPNRSCC.

Post-excavation Sidewall and Bottoms. Samples shall be analyzed for Table 01450-1 and NJDEPNRSCC parameters to verify final limits of excavation have been met.

Offsite Backfill and Topsoil Samples. Material brought in from offsite sources will be analyzed to verify that the soil is clean for the intended use (i.e., all concentrations are less than the project action limits presented in Worksheets #15-12 to 15-17).

WWTP Effluent Sampling. The temporary site WWTP effluent samples will be collected prior to final discharge from the process train using appropriate standard methods in order to monitor treatment plant performance and compliance with contract discharge criteria.

In addition, informational water treatment samples may be taken from several locations in the WWTP as specified in the Water Treatment Plan and WS #10.

Analysis Tasks: Analytical methodologies are described in Worksheets #19 and #23. The following list represents the analyses required for each sample type to be collected during the course of field activities:

Solid Waste Characterization Sampling. Laboratory analyses will be performed to meet the requirements of the offsite disposal facility. On an as needed basis, laboratory analysis will be performed on these samples for corrosivity, ignitability, reactive cyanide, reactive sulfide, TCLP VOCs, TCLP SVOCs, TCLP pesticides, TCLP herbicides, TCLP metals, and PCBs. A Paint Filter Liquid Test (PFT) and Moisture Content shall also be performed on each sample. Additional analyses may be performed at the direction of the offsite disposal facility. Sevenson's Waste Disposal Coordinator should be contacted prior to sample collection in order to verify the list of required laboratory analyses.

Pre-excavation Surface/Subsurface Sampling. Sample shall be collected as detailed in this plan and at sample locations designated in Contract Drawing C-2. Surface Soils (0-2') and Subsurface Soils samples (2-4', 5-7', and 9-11') shall be collected from 24 pre-excavation borings and analyzed per Contract Drawing C-2. Surface Soils shall be analyzed for EPA TAL metals and EPA TCL compounds. Sub-surface soils shall be analyzed for PCBs.

Demolition Debris. Demotion debris samples (concrete, metal, etc.) shall be collected and analyzed for EPA TAL metals, EPA TCL organics and Extractable Petroleum Hydrocarbons (EPH) and compared to NJDEP Residential Direct Contact Soil Remedial Standards (RDCSRS).

AST Content Disposal – All contents of ASTs found at the site (if any), will be sampled and analyzed to meet characterization and offsite disposal facility requirements. At a minimum, each ASTs contents (by layer) shall be analyzed for gasoline range organics (GRO), diesel range organics (DRO), EPH and oil and grease per Table 01450-4, at a minimum. As required by the disposal facility, AST samples may also be run for corrosivity, ignitability, reactive cyanide, reactive sulfide, TCLP VOCs, TCLP SVOCs, TCLP pesticides, TCLP herbicides, TCLP metals, and PCBs.

Confirmatory Soil for UST Closure. Samples of soils surrounding any of any USTs encountered shall be analyzed for EPA TCL VOC, EPA TCL SVOCs and EPA TCL PCBs. Samples results to verify clean closure shall be compared to the EPA Cleanup Criteria listed in Table 01450-1 and NJDEPNRSCC. .

Post-excavation Sidewalls and Bottoms. Samples of sidewall and bottom soils will be analyzed for and be below Table 02111-1 values for VOC, SVOC, Pesticides/PCB (surface soils), metals and PCB (subsurface soils). One sidewall sample shall be taken for every 30' of sidewall, with a minimum of one per sidewall. All excavation sidewalls, and interior sidewalls between adjoining excavations with a change in final excavation of greater than two feet, shall be sampled. One bottom sample shall be obtained from every 30' by 30'of final grid excavation, or every 900 square feet of excavation floor.

Offsite Backfill and Topsoil Samples. Laboratory analysis will be performed on these samples for EPA TAL metals (including mercury and cyanide), EPA TCL inorganics (including Acrolein, Acrylonitrile, Benzidine, 1,2-Diphenylhydrazine, and N-Nitrosodimethylamine and Tertiary Butyl Alcohol) and gamma spectroscopy (Ra-226) at a frequency of 1 sample per 5000 cubic yards and no less than 1 per borrow source. All backfill/topsoil shall meet NJAC RDCSRS criterial as confirmed by USACE before placement.

WWTP Effluent Sampling. Laboratory analysis will be performed on the treated effluent on a periodic basis as established in the discharge permit. Effluent criteria shall be analyzed for each analyte included

in the waste water discharge testing program. These parameters include pH, TAL metals (arsenic and iron), Total Suspended Solids (TSS) and Total Organic Carbon (TOC).

In addition, informational samples will be taken from the influent to the settling tank, settling tank effluent, green sand effluent. However, in the event of treatment issues, other sample points may be sampled, such as bag filter influent/effluent and GAC effluent. Samples will be analyzed for TAL Metals, full TCL VOC, full TCL SVOC, TCL Pesticides, TSS, and TOC.

Quality Control Tasks: The analytical laboratory will be required to analyze QC samples listed in the documents and procedures listed in Worksheet #23. Laboratory analytical data will undergo internal reviews and validation prior to sending the final reports to Sevenson. Data generated by the subcontracted laboratory will be reviewed by Sevenson using ADR software and the project-specific e-QAPP.

Sampling and analysis performed under this QAPP will be subject to the overall Contractor Quality Control Plan, approved for the site and submitted under separate cover. All sampling performed will be part of the Daily Contractor Quality Control Report. All sampling tasks will be subject to the Three Phase Inspection System; Preparatory Phase, Initial Phase and Follow-up Phase. Any deficiencies encountered will be subject to reporting and correction requirements.

Secondary Data: Reports and analytical data associated with prior investigations are defined in Worksheet #13.

Data Management Tasks: Both hardcopy and electronic data deliverables will be tracked, stored, handled, and managed. Original hard copies of laboratory reports will be kept in Sevenson project files at the site; electronic copies will be maintained at Sevenson's corporate office. All laboratory analytical results will be placed in an electronic database and will be maintained in the Sevenson corporate office. The electronic database will be maintained using the EDMS program.

Hard copies of the laboratory data and the final project database will be transferred to USACE with all project records upon completion of the project. Retrieval of data by others will be at the discretion of USACE and USEPA. The length of time that records will be archived will be at the discretion of USACE and USEPA.

Documentation and Records: All hardcopy data completion files (e.g., field notebooks, photographs, hardcopies of chain of custody forms, airbills, etc.) will be taken to the Sevenson corporate office and kept in the project files. All files may be reviewed at the request of USEPA or USACE.

Assessment/Audit Tasks: Planned project assessments are defined in Worksheet #31. Audits of field staff compliance with project standard operating procedures (SOPs) and the UFP-QAPP will be performed periodically as determined by the CQCSM. Checklists used during field audits, including task-specific quality control checklists, are included in Appendix 5. Audits of laboratory compliance with the SOPs will be performed on a periodic basis as determined by the laboratory QA manager. In addition, laboratory data will be audited as part of the data validation process are defined in this UFP-QAPP. The laboratory may be audited onsite by Sevenson at any time based on need determined by the Sevenson data quality control review chemist.

Subcontracted laboratories will maintain current requirements for certification required by NJDEP, NELAP, and DOD ELAP. The DOD ELAP provides a means for laboratories to demonstrate conformance to the DOD QSM.

Data Review Tasks: Chemical data that is generated by subcontracted laboratories will be reviewed and validated by Sevenson in accordance USEPA validation guidance and this UFP-QAPP. See also Worksheets #23, #28, #35, and #36.

Data review by Sevenson will include, but may not be limited to, the following parameters:

Data completeness.
Method blank.
Holding time.
Surrogate compound recovery.
MS recovery.
Laboratory and field duplicate results.
LCS recovery.

A CDIR will be provided on a quarterly basis to summarize the results of the data review findings and to present conclusions regarding the usability of the data for project objectives. The report will assess the accuracy, precision, representativeness, comparability, and completeness of the data generated. The report will focus on out of control data results and present a table of non-compliant results that exceeded some QC requirement.

A CDFR including all prepared CDIR's and summarizing all site sample results will be prepared at the completion of the project.

QAPP Worksheet #15-1

Reference Limits and Evaluation Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Toxicity Characteristic Leachate Procedure (TCLP) Metals
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (µg/L)	Project Quantitation Limit Goal (µg/L)	SW846 6010C/7470A			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (µg/L)	QLs (µg/L)
Arsenic	7440-38-2	5000	100	NA	NA	25	100
Barium	7440-39-3	100000	500	NA	NA	40	500
Cadmium	7440-43-9	1000	30	NA	NA	5	30
Chromium	7440-47-3	5000	50	NA	NA	11	50
Lead	7439-92-1	5000	60	NA	NA	15	60
Mercury	7439-97-6	200	2.0	NA	NA	1.0	2.0
Selenium	7782-49-2	1000	100	NA	NA	48	100
Silver	7440-22-4	5000	50	NA	NA	12.5	50

[1] Project action limits are based upon TCLP regulatory levels

QAPP Worksheet #15-2

Reference Limits and Evaluation Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Toxicity Characteristic Leachate Procedure (TCLP) VOC
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (µg/L)	Project Quantitation Limit Goal (µg/L)	SW846 8260B			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (µg/L)	QLs (µg/L)
1,1-Dichloroethene	75-35-4	700	25	NA	NA	2.4	25
1,2-Dichloroethane	107-06-2	500	25	NA	NA	2.4	25
Benzene	71-43-2	500	25	NA	NA	1.6	25
Carbon Tetrachloride	56-23-5	500	25	NA	NA	1.0	25
Chlorobenzene	108-90-7	100000	25	NA	NA	2.5	25
Chloroform	67-66-3	6000	25	NA	NA	1.7	25
Tetrachloroethene	127-18-4	700	25	NA	NA	1.4	25
Trichloroethene	79-01-6	500	25	NA	NA	1.4	25
Vinyl Chloride	75-01-4	200	25	NA	NA	1.7	25

[1] Project action limits are based upon TCLP regulatory levels

.

QAPP Worksheet #15-3

Reference Limits and Evaluation Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Toxicity Characteristic Leachate Procedure (TCLP) SVOC
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (µg/L)	Project Quantitation Limit Goal (µg/L)	SW846 8270D			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (µg/L)	QLs (µg/L)
1,4-Dichlorobenzene	106-46-7	7500	100	NA	NA	2.0	100
2,4,5-Trichlorophenol	95-95-4	400000	100	NA	NA	4.0	100
2,4,6-Trichlorophenol	88-06-2	2000	100	NA	NA	5.6	100
2,4-Dinitrotoluene	121-14-2	130	100	NA	NA	10	100
2-Methylphenol	95-48-7	200000	100	NA	NA	2.4	100
3+4-Methylphenol	65794-96-9	400000	100	NA	NA	3.8	100
Hexachlorobenzene	118-74-1	130	100	NA	NA	1.8	100
Hexachlorobutadiene	87-68-3	500	100	NA	NA	2.5	100
Hexachloroethane	67-72-1	3000	100	NA	NA	2.5	100
Nitrobenzene	98-95-3	2000	100	NA	NA	6.8	100
Pentachlorophenol	87-86-5	100000	100	NA	NA	10	100
Pyridine	110-86-1	5000	100	NA	NA	10	100

[1] Project action limits are based upon TCLP regulatory levels

QAPP Worksheet #15-4

Reference Limits and Evaluation Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Toxicity Characteristic Leachate Procedure (TCLP) Pesticides
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (µg/L)	Project Quantitation Limit Goal (µg/L)	SW846 8081B			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (µg/L)	QLs (µg/L)
Chlordane	57-74-9	30	5.0	NA	NA	1.0	5.0
Endrin	72-20-8	20	0.5	NA	NA	0.058	0.5
Heptachlor	76-44-8	8	0.5	NA	NA	0.069	0.5
Heptachlor Epoxide	1024-57-3	8	0.5	NA	NA	0.067	0.5
Lindane (g-BHC)	58-89-9	400	0.5	NA	NA	0.055	0.5
Methoxychlor	72-43-5	10000	0.5	NA	NA	0.05	0.5
Toxaphene	8001-35-2	500	5.0	NA	NA	1.0	5.0

[1] Project action limits are based upon TCLP regulatory levels

QAPP Worksheet #15-5

Reference Limits and Evaluation Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Toxicity Characteristic Leachate Procedure (TCLP) Herbicides
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (µg/L)	Project Quantitation Limit Goal (µg/L)	SW846 8151A			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (µg/L)	QLs (µg/L)
2,4,5-TP	93-72-1	1000	20	NA	NA	1.5	20
2,4-D	94-75-7	10000	20	NA	NA	3.5	20

[1] Project action limits are based upon TCLP regulatory levels

QAPP Worksheet #15-6
Reference Limits and Evaluation Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Total PCBs
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (mg/Kg)	Project Quantitation Limit Goal (mg/Kg)	SW846 8082A			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (mg/Kg)	QLs (mg/Kg)
Aroclor 1016	12674-11-2	50	0.037	NA	NA	0.0073	0.037
Aroclor 1221	11104-28-2	50	0.037	NA	NA	0.0073	0.037
Aroclor 1232	11141-16-5	50	0.037	NA	NA	0.0073	0.037
Aroclor 1242	53469-21-9	50	0.037	NA	NA	0.0073	0.037
Aroclor 1254	11097-69-1	50	0.037	NA	NA	0.0073	0.037
Aroclor 1260	11096-82-5	50	0.037	NA	NA	0.0073	0.037
Aroclor 1262	37324-23-5	50	0.037	NA	NA	0.0073	0.037
Aroclor 1268	11100-14-4	50	0.037	NA	NA	0.0073	0.037

[1] Project action limits are based upon RCRA regulatory levels

QAPP Worksheet #15-7
Reference Limits and Evaluation Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Reactivity (Sulfide and Cyanide)
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1]	Project Quantitation Limit Goal	SW846 9012B/9034			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs	QLs
Reactive Cyanide	12674-11-2	100mg/Kg	0.05mg/Kg	NA	NA	0.05mg/Kg	0.05mg/Kg
Reactive Sulfide	11104-28-2	500mg/Kg	10mg/Kg	NA	NA	10mg/Kg	10mg/Kg

[1] Project action limits are based upon RCRA regulatory levels

QAPP Worksheet #15-8
Reference Limits and Evaluation Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	pH
Concentration Level	NA

Analyte	**CAS Number**	**Project Action Limit[1]**	**Project Quantitation Limit Goal**	**SW846 9040C**			
				Analytical Method	**Achievable Laboratory Limits**		
				MDLs	**Method QLs**	**MDLs**	**QLs**
pH	NA	2-12.5	1 pH Unit	NA	NA	1 pH Unit	1 pH Unit

[1] Project action limits are based upon RCRA regulatory levels

QAPP Worksheet #15-9
Reference Limits and Evaluation Table

Matrix	Solid (Waste Characterization Samples)
Analytical Group	Ignitability
Concentration Level	NA

Analyte	CAS Number	Project Action Limit[1]	Project Quantitation Limit Goal	SW846 1010A			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs	QLs
Ignitability	10-36-6	Flashpoint <140°C	NA	NA	NA	NA	NA

[1] Project action limits are based upon RCRA regulatory levels

QAPP Worksheet #15-10

Reference Limits and Evaluation Table

Matrix	Soil (Pre-Excavation-Surface)
Analytical Group	Metals
Concentration Level	Low

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3050B/6010C/7471B/9012B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Aluminum	7429-90-5	NA	NA	NA	NA	1.2	10
Antimony	7440-36-0	NA	NA	NA	NA	0.38	1.0
Arsenic	7440-38-2	38.86	1.0	NA	NA	0.41	1.0
Barium	7440-39-3	NA	NA	NA	NA	0.031	10
Beryllium	7440-41-7	NA	NA	NA	NA	0.0015	0.25
Cadmium	7440-43-9	78	0.25	NA	NA	0.015	0.25
Calcium	7440-70-2	NA	NA	NA	NA	6.1	40
Chromium	7440-47-3	NA	NA	NA	NA	0.019	1.0
Cobalt	7440-48-4	NA	NA	NA	NA	0.044	2.5
Copper	7440-50-8	NA	NA	NA	NA	0.11	1.5
Cyanide	57-12-5	NA	NA	NA	NA	0.45	1.0
Iron	7439-89-6	NA	NA	NA	NA	1.5	10
Lead	7439-92-1	NA	NA	NA	NA	0.17	0.50
Magnesium	7439-95-4	NA	NA	NA	NA	0.63	25
Manganese	7439-96-5	NA	NA	NA	NA	0.13	2.5
Mercury	7439-97-6	NA	NA	NA	NA	0.0020	0.033
Nickel	7440-02-0	NA	NA	NA	NA	0.043	2.5
Potassium	7440-09-7	NA	NA	NA	NA	3.4	50
Selenium	7782-49-2	NA	NA	NA	NA	0.64	1.5
Silver	7440-22-4	NA	NA	NA	NA	0.064	1.5
Sodium	7440-23-5	NA	NA	NA	NA	1.1	50
Thallium	7440-28-0	NA	NA	NA	NA	0.22	1.0
Vanadium	7440-62-2	NA	NA	NA	NA	0.060	2.5
Zinc	7440-66-6	NA	NA	NA	NA	0.18	2.5

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.
"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-11
Reference Limits and Evaluation Table

Matrix	Soil (Pre-Excavation-Surface)
Analytical Group	VOCs
Concentration Level	Low

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)[2]	SW846 5030B/5035/8260B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
1,1,1-Trichloroethane	71-55-6	NA	NA	NA	NA	0.0013	0.005
1,1,2,2-Tetrachloroethane	79-34-5	NA	NA	NA	NA	0.0042	0.005
1,1,2-Trichloroethane	79-00-5	NA	NA	NA	NA	0.0036	0.005
1,1-Dichloroethane	75-34-3	NA	NA	NA	NA	0.0032	0.005
1,1-Dichloroethene	75-35-4	NA	NA	NA	NA	0.0038	0.005
1,2-Dibromo-3-chloropropane	96-12-8	NA	NA	NA	NA	0.0072	0.010
1,2-Dibromoethane[4]	106-93-4	NA	NA	NA	NA	0.0034	0.005
1,2-Dichloroethane	107-06-2	NA	NA	NA	NA	0.0012	0.005
1,2-Dichloropropane	78-87-5	NA	NA	NA	NA	0.0027	0.005
2-Butanone	78-93-3	NA	NA	NA	NA	0.0059	0.050
Acetone	67-64-1	NA	NA	NA	NA	0.033	0.057
Acrolein	107-02-8	NA	NA	NA	NA	0.025	0.050
Acrylonitrile	107-13-1	NA	NA	NA	NA	0.0048	0.005
Benzene	71-43-2	5	0.005	NA	NA	0.00092	0.005
Bromodichloromethane	75-27-4	NA	NA	NA	NA	0.0034	0.005
Bromoform	75-25-2	NA	NA	NA	NA	0.0048	0.005
Bromomethane	74-83-9	NA	NA	NA	NA	0.0029	0.005
Carbon Disulfide	75-15-0	NA	NA	NA	NA	0.0031	0.010
Carbon Tetrachloride	56-23-5	NA	NA	NA	NA	0.0041	0.010
Chlorobenzene	108-90-7	NA	NA	NA	NA	0.00082	0.005
Chloroethane	75-00-3	NA	NA	NA	NA	0.0028	0.010
Chloroform	67-66-3	NA	NA	NA	NA	0.0016	0.005
Chloromethane	74-87-3	NA	NA	NA	NA	0.0020	0.010

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 5030B/5035/8260B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
cis-1,2-Dichloroethene	156-59-2	NA	NA	NA	NA	0.0018	0.005
Cis-1,3-dichloropropene	10061-01-5	NA	NA	NA	NA	0.0030	0.005
Dibromochloromethane	124-48-1	NA	NA	NA	NA	0.0034	0.005
Dichlorodifluoromethane	75-71-8	NA	NA	NA	NA	0.0017	0.010
Ethylbenzene	100-41-4	29	0.005	NA	NA	0.00092	0.005
Methyl Acetate	79-20-9	NA	NA	NA	NA	0.0047	0.025
Methyl tert-butyl ether	1634-04-4	NA	NA	NA	NA	0.0019	0.005
Methylene Chloride	75-09-2	NA	NA	NA	NA	0.0014	0.010
m,p-Xylene	1330-20-7	2600	0.010	NA	NA	0.0010	0.010
Styrene	100-42-5	NA	NA	NA	NA	0.00082	0.005
tert-Butyl Alcohol	75-65-0	NA	NA	NA	NA	0.0291	0.050
Tetrachloroethene	127-18-4	NA	NA	NA	NA	0.0019	0.005
Toluene	108-88-3	46000	0.005	NA	NA	0.0011	0.005
Trans-1,2-Dichloroethene	156-60-5	NA	NA	NA	NA	0.0027	0.005
Trans-1,3-Dichloropropene	542-75-6	NA	NA	NA	NA	0.0027	0.005
Trichloroethene	79-01-6	NA	NA	NA	NA	0.00082	0.005
Trichlorofluoromethane	75-69-4	NA	NA	NA	NA	0.0027	0.005
Vinyl Chloride	75-01-4	NA	NA	NA	NA	0.0018	0.005

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-12

Reference Limits and Evaluation Table

Matrix	Soil (Pre-Excavation-Surface)
Analytical Group	SVOCs
Concentration Level	Low

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
1,1'-Biphenyl	92-52-4	NA	NA	NA	NA	0.042	0.33
1,2,4-Trichlorobenzene	120-82-1	NA	NA	NA	NA	0.046	0.33
1,2-Dichlorobenzene	95-50-1	NA	NA	NA	NA	0.042	0.33
1,2-Diphenylhydrazine	122-66-7	NA	NA	NA	NA	0.032	0.33
1,3-Dichlorobenzene	541-73-1	NA	NA	NA	NA	0.040	0.33
1,4-Dichlorobenzene	106-46-7	NA	NA	NA	NA	0.036	0.33
2,4,5-Trichlorophenol	95-95-4	NA	NA	NA	NA	0.037	0.67
2,4,6-Trichlorophenol	88-06-2	NA	NA	NA	NA	0.039	0.33
2,4-Dichlorophenol	120-83-2	NA	NA	NA	NA	0.038	0.33
2,4-Dimethylphenol	105-67-9	NA	NA	NA	NA	0.036	0.33
2,4-Dinitrophenol	51-28-5	NA	NA	NA	NA	0.180	0.67
2,4-Dinitrotoluene	121-14-2	NA	NA	NA	NA	0.023	0.33
2,6-Dinitrotoluene	606-20-2	NA	NA	NA	NA	0.028	0.33
2-Chlorophenol	95-57-8	NA	NA	NA	NA	0.041	0.33
4,6-Dinitro-2-methylphenol	534-52-1	NA	NA	NA	NA	0.025	0.67
2-Methylnaphthalene	91-57-6	NA	NA	NA	NA	0.042	0.33
2-Methylphenol	95-48-7	NA	NA	NA	NA	0.038	0.33
2-Nitroaniline	88-74-4	NA	NA	NA	NA	0.021	0.67
3&4-Methylphenol	106-44-5	NA	NA	NA	NA	0.035	0.33
3,3'-Dichlorobenzidine	91-94-1	NA	NA	NA	NA	0.035	0.33

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Acenaphthene	83-32-9	NA	NA	NA	NA	0.039	0.33
Acenaphthylene	208-96-8	NA	NA	NA	NA	0.037	0.33
Acetophenone	98-86-2	NA	NA	NA	NA	0.031	0.33
Anthracene	120-12-7	NA	NA	NA	NA	0.027	0.33
Atrazine	1912-24-9	NA	NA	NA	NA	0.047	0.33
Benzaldehyde	100-52-7	NA	NA	NA	NA	0.044	0.33
Benzidine	92-87-5	NA	NA	NA	NA	0.13	0.33
Benzo(a)anthracene	56-55-3	NA	NA	NA	NA	0.033	0.33
Benzo(a)pyrene[3]	50-32-8	NA	NA	NA	NA	0.031	0.33
Benzo(b)fluoranthene	205-99-2	NA	NA	NA	NA	0.040	0.33
Benzo(g,h,i)perylene	191-24-2	NA	NA	NA	NA	0.038	0.33
Benzo(k)fluoranthene	207-08-9	NA	NA	NA	NA	0.043	0.33
Bis(2-chloroethyl)ether	111-44-4	NA	NA	NA	NA	0.042	0.33
Bis(2-chloroisoproyl)ether	108-60-1	NA	NA	NA	NA	0.033	0.33
Bis(2-ethylhexyl)phthalate	117-81-7	NA	NA	NA	NA	0.029	0.33
Butyl benzyl phthalate	85-68-7	NA	NA	NA	NA	0.026	0.33
Caprolactam	105-60-2	NA	NA	NA	NA	0.021	0.33
Carbazole	86-74-8	NA	NA	NA	NA	0.028	0.33
Chrysene	218-01-9	NA	NA	NA	NA	0.029	0.33
Dibenzo(a,h)anthracene	53-70-3	NA	NA	NA	NA	0.035	0.33
Diethyl phthalate	84-66-2	NA	NA	NA	NA	0.024	0.33
di-n-Butyl phthalate	84-74-2	NA	NA	NA	NA	0.028	0.33

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
di-n-Octylphthalate	117-84-0	NA	NA	NA	NA	0.028	0.33
Fluoranthene	206-44-0	NA	NA	NA	NA	0.029	0.33
Fluorene	86-73-7	NA	NA	NA	NA	0.033	0.33
Hexachlorobenzene	118-74-1	NA	NA	NA	NA	0.032	0.33
Hexachlorobutadiene	87-68-3	NA	NA	NA	NA	0.045	0.33
Hexachlorocyclopentadiene	77-47-4	NA	NA	NA	NA	0.096	0.33
Hexachloroethane	67-72-1	NA	NA	NA	NA	0.035	0.33
Indeno(1,2,3-cd)pyrene	193-39-5	NA	NA	NA	NA	0.037	0.33
Isophorone	78-59-1	NA	NA	NA	NA	0.034	0.33
Naphthalene	91-20-3	17	0.33	NA	NA	0.041	0.33
Nitrobenzene	98-95-3	NA	NA	NA	NA	0.038	0.33
N-Nitrosodimethylamine	62-75-9	NA	NA	NA	NA	0.034	0.33
N-Nitroso-di-n-propylamine	621-64-7	NA	NA	NA	NA	0.032	0.33
N-Nitrosodiphenylamine	86-30-6	NA	NA	NA	NA	0.029	0.33
Pentachlorophenol	87-86-5	NA	NA	NA	NA	0.14	0.67
Phenanthrene	85-01-8	NA	NA	NA	NA	0.026	0.33
Phenol	108-95-2	NA	NA	NA	NA	0.037	0.33
Pyrene	129-00-0	NA	NA	NA	NA	0.032	0.33

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-13

Reference Limits and Evaluation Table – Offsite Backfill and Topsoil Pesticides

Matrix	Soil (Pre-Excavation-Surface)
Analytical Group	Pesticides / PCBs
Concentration Level	Low

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/3541/8081B/8082A			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
4,4'-DDD	72-54-8	7.2	0.0033	NA	NA	0.00022	0.0033
4,4'-DDE	72-55-9	NA	NA	NA	NA	0.00025	0.0033
4,4'-DDT	50-29-3	7	0.0033	NA	NA	0.00033	0.0033
Aldrin	309-00-2	0.1	0.0017	NA	NA	0.00011	0.0017
Alpha-BHC	319-84-6	NA	NA	NA	NA	0.000056	0.0017
Beta-BHC	319-85-7	NA	NA	NA	NA	0.000063	0.0017
Chlordane	57-74-9	NA	NA	NA	NA	0.000087	0.0017
Dieldrin	60-57-1	0.11	0.0033	NA	NA	0.00012	0.0033
Endosulfan I and II	115-29-7	NA	NA	NA	NA	0.00015	0.0033
Endosulfan sulfate	1031-07-8	NA	NA	NA	NA	0.00013	0.0033
Endrin	72-20-8	NA	NA	NA	NA	0.00014	0.0033
Gamma-BHC	58-89-9	NA	NA	NA	NA	0.000055	0.0017
Heptachlor	76-44-8	0.38	0.0017	NA	NA	0.000072	0.0017
Heptachlor epoxide	1024-57-3	NA	NA	NA	NA	0.00016	0.0017
Methoxychlor	72-43-5	NA	NA	NA	NA	0.00088	0.017
Toxaphene	8001-35-2	NA	NA	NA	NA	0.0088	0.170
Aroclor 1016	12674-11-2	10	0.033	NA	NA	0.0025	0.033
Aroclor 1221	11104-28-2			NA	NA	0.0044	0.033
Aroclor 1232	11141-16-5			NA	NA	0.0024	0.033
Aroclor 1242	53469-1-9			NA	NA	0.0025	0.033
Aroclor 1248	12672-29-6			NA	NA	0.0038	0.033
Aroclor 1254	11097-69-1			NA	NA	0.0044	0.033
Aroclor 1260	11096-82-5			NA	NA	0.0018	0.033

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-14
Reference Limits and Evaluation Table

Matrix	Solid (Pre-Excavation-Subsurface)
Analytical Group	PCBs
Concentration Level	Low

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/3541/8082A			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Aroclor 1016	12674-11-2	10	0.033	NA	NA	0.0025	0.033
Aroclor 1221	11104-28-2			NA	NA	0.0044	0.033
Aroclor 1232	11141-16-5			NA	NA	0.0024	0.033
Aroclor 1242	53469-1-9			NA	NA	0.0025	0.033
Aroclor 1248	12672-29-6			NA	NA	0.0038	0.033
Aroclor 1254	11097-69-1			NA	NA	0.0044	0.033
Aroclor 1260	11096-82-5			NA	NA	0.0018	0.033

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-15

Reference Limits and Evaluation Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TAL Metals
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3050B/6010C/7471B/9012B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Aluminum	7429-90-5	NA	NA	NA	NA	1.2	10
Antimony	7440-36-0	450	1.0	NA	NA	0.38	1.0
Arsenic	7440-38-2	19	1.0	NA	NA	0.41	1.0
Barium	7440-39-3	59000	10	NA	NA	0.031	10
Beryllium	7440-41-7	140	0.25	NA	NA	0.0015	0.25
Cadmium	7440-43-9	78	0.25	NA	NA	0.015	0.25
Calcium	7440-70-2	NA	NA	NA	NA	6.1	40
Chromium	7440-47-3	NA	NA	NA	NA	0.019	1.0
Cobalt	7440-48-4	590	2.5	NA	NA	0.044	2.5
Copper	7440-50-8	45000	1.5	NA	NA	0.11	1.5
Cyanide	57-12-5	23000	1.0	NA	NA	0.45	1.0
Iron	7439-89-6	NA	NA	NA	NA	1.5	10
Lead	7439-92-1	800	0.50	NA	NA	0.17	0.50
Magnesium	7439-95-4	NA	NA	NA	NA	0.63	25
Manganese	7439-96-5	5900	2.5	NA	NA	0.13	2.5
Mercury	7439-97-6	65	0.033	NA	NA	0.0020	0.033
Nickel	7440-02-0	23000	2.5	NA	NA	0.043	2.5
Potassium	7440-09-7	NA	NA	NA	NA	3.4	50
Selenium	7782-49-2	5700	1.5	NA	NA	0.64	1.5
Silver	7440-22-4	5700	1.5	NA	NA	0.064	1.5
Sodium	7440-23-5	NA	NA	NA	NA	1.1	50
Thallium	7440-28-0	79	1.0	NA	NA	0.22	1.0
Vanadium	7440-62-2	1100	2.5	NA	NA	0.060	2.5
Zinc	7440-66-6	110000	2.5	NA	NA	0.18	2.5

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-2, Non-Residential Direct Contact Soil Remediation Standards.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.
"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-16

Reference Limits and Evaluation Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TCL VOCs
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)[2]	SW846 5030B/5035/8260B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
1,1,1-Trichloroethane	71-55-6	4200	0.005	NA	NA	0.0013	0.005
1,1,2,2-Tetrachloroethane	79-34-5	3	0.005	NA	NA	0.0042	0.005
1,1,2-Trichloroethane	79-00-5	6	0.005	NA	NA	0.0036	0.005
1,1-Dichloroethane	75-34-3	24	0.005	NA	NA	0.0032	0.005
1,1-Dichloroethene	75-35-4	150	0.005	NA	NA	0.0038	0.005
1,2-Dibromo-3-chloropropane	96-12-8	0.20	0.010	NA	NA	0.0072	0.010
1,2-Dibromoethane	106-93-4	0.04	0.005	NA	NA	0.0034	0.005
1,2-Dichloroethane	107-06-2	3	0.005	NA	NA	0.0012	0.005
1,2-Dichloropropane	78-87-5	5	0.005	NA	NA	0.0027	0.005
2-Butanone	78-93-3	44000	0.050	NA	NA	0.0059	0.050
Acetone	67-64-1	NA	NA	NA	NA	0.033	0.057
Acrolein	107-02-8	1	0.050	NA	NA	0.025	0.050
Acrylonitrile	107-13-1	3	0.005	NA	NA	0.0048	0.005
Benzene	71-43-2	5	0.005	NA	NA	0.00092	0.005
Bromodichloromethane	75-27-4	3	0.005	NA	NA	0.0034	0.005
Bromoform	75-25-2	280	0.005	NA	NA	0.0048	0.005
Bromomethane	74-83-9	59	0.005	NA	NA	0.0029	0.005
Carbon Disulfide	75-15-0	110000	0.010	NA	NA	0.0031	0.010
Carbon Tetrachloride	56-23-5	2	0.010	NA	NA	0.0041	0.010
Chlorobenzene	108-90-7	7400	0.005	NA	NA	0.00082	0.005
Chloroethane	75-00-3	1100	0.010	NA	NA	0.0028	0.010
Chloroform	67-66-3	2	0.005	NA	NA	0.0016	0.005
Chloromethane	74-87-3	12	0.010	NA	NA	0.0020	0.010

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 5030B/5035/8260B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
cis-1,2-Dichloroethene	156-59-2	560	0.005	NA	NA	0.0018	0.005
Cis-1,3-dichloropropene	10061-01-5	7	0.005	NA	NA	0.0030	0.005
Dibromochloromethane	124-48-1	NA	NA	NA	NA	0.0034	0.005
Dichlorodifluoromethane	75-71-8	230000	0.010	NA	NA	0.0017	0.010
Ethylbenzene	100-41-4	110000	0.005	NA	NA	0.00092	0.005
Methyl Acetate	79-20-9	NA	NA	NA	NA	0.0047	0.025
Methyl tert-butyl ether	1634-04-4	320	0.005	NA	NA	0.0019	0.005
Methylene Chloride	75-09-2	97	0.010	NA	NA	0.0014	0.010
m,p-Xylene	1330-20-7	170000	0.010	NA	NA	0.0010	0.010
Styrene	100-42-5	260	0.005	NA	NA	0.00082	0.005
tert-Butyl Alcohol	75-65-0	11000	0.050	NA	NA	0.0291	0.050
Tetrachloroethene	127-18-4	5	0.005	NA	NA	0.0019	0.005
Toluene	108-88-3	91000	0.005	NA	NA	0.0011	0.005
Trans-1,2-Dichloroethene	156-60-5	720	0.005	NA	NA	0.0027	0.005
Trans-1,3-Dichloropropene	542-75-6	7	0.005	NA	NA	0.0027	0.005
Trichloroethene	79-01-6	20	0.005	NA	NA	0.00082	0.005
Trichlorofluoromethane	75-69-4	340000	0.005	NA	NA	0.0027	0.005
Vinyl Chloride	75-01-4	2	0.005	NA	NA	0.0018	0.005

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-2, Non-Residential Direct Contact Soil Remediation Standards.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-17

Reference Limits and Evaluation Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TCL SVOCs
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
1,1'-Biphenyl	92-52-4	34000	0.17	NA	NA	0.042	0.17
1,2,4-Trichlorobenzene	120-82-1	820	0.17	NA	NA	0.046	0.17
1,2-Dichlorobenzene	95-50-1	59000	0.17	NA	NA	0.042	0.17
1,2-Diphenylhydrazine	122-66-7	2	0.17	NA	NA	0.032	0.17
1,3-Dichlorobenzene	541-73-1	59000	0.17	NA	NA	0.040	0.17
1,4-Dichlorobenzene	106-46-7	13	0.17	NA	NA	0.036	0.17
2,4,5-Trichlorophenol	95-95-4	68000	0.33	NA	NA	0.037	0.33
2,4,6-Trichlorophenol	88-06-2	74	0.17	NA	NA	0.039	0.17
2,4-Dichlorophenol	120-83-2	2100	0.17	NA	NA	0.038	0.17
2,4-Dimethylphenol	105-67-9	14000	0.17	NA	NA	0.036	0.17
2,4-Dinitrophenol	51-28-5	1400	0.33	NA	NA	0.180	0.33
2,4-Dinitrotoluene	121-14-2	3	0.17	NA	NA	0.023	0.17
2,6-Dinitrotoluene	606-20-2	3	0.17	NA	NA	0.028	0.17
2-Chlorophenol	95-57-8	2200	0.17	NA	NA	0.041	0.17
4,6-Dinitro-2-methylphenol	534-52-1	68	0.33	NA	NA	0.025	0.33
2-Methylnaphthalene	91-57-6	2400	0.17	NA	NA	0.042	0.17
2-Methylphenol	95-48-7	3400	0.17	NA	NA	0.038	0.17
2-Nitroaniline	88-74-4	23000	0.33	NA	NA	0.021	0.33
3&4-Methylphenol	106-44-5	340	0.17	NA	NA	0.035	0.17
3,3'-Dichlorobenzidine	91-94-1	4	0.17	NA	NA	0.035	0.17

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Acenaphthene	83-32-9	37000	0.17	NA	NA	0.039	0.17
Acenaphthylene	208-96-8	300000	0.17	NA	NA	0.037	0.17
Acetophenone	98-86-2	5	0.17	NA	NA	0.031	0.17
Anthracene	120-12-7	30000	0.17	NA	NA	0.027	0.17
Atrazine	1912-24-9	2400	0.17	NA	NA	0.047	0.17
Benzaldehyde	100-52-7	68000	0.17	NA	NA	0.044	0.17
Benzidine	92-87-5	0.7	0.17	NA	NA	0.13	0.17
Benzo(a)anthracene	56-55-3	2	0.17	NA	NA	0.033	0.17
Benzo(a)pyrene[3]	50-32-8	0.2	0.17	NA	NA	0.031	0.17
Benzo(b)fluoranthene	205-99-2	2	0.17	NA	NA	0.040	0.17
Benzo(g,h,i)perylene	191-24-2	30000	0.17	NA	NA	0.038	0.17
Benzo(k)fluoranthene	207-08-9	23	0.17	NA	NA	0.043	0.17
Bis(2-chloroethyl)ether	111-44-4	2	0.17	NA	NA	0.042	0.17
Bis(2-chloroisoproyl)ether	108-60-1	67	0.17	NA	NA	0.033	0.17
Bis(2-ethylhexyl)phthalate	117-81-7	140	0.17	NA	NA	0.029	0.17
Butyl benzyl phthalate	85-68-7	14000	0.17	NA	NA	0.026	0.17
Caprolactam	105-60-2	340000	0.17	NA	NA	0.021	0.17
Carbazole	86-74-8	96	0.17	NA	NA	0.028	0.17
Chrysene	218-01-9	230	0.17	NA	NA	0.029	0.17
Dibenzo(a,h)anthracene	53-70-3	0.2	0.17	NA	NA	0.035	0.17
Diethyl phthalate	84-66-2	550000	0.17	NA	NA	0.024	0.17
di-n-Butyl phthalate	84-74-2	68000	0.17	NA	NA	0.028	0.17

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
di-n-Octylphthalate	117-84-0	27000	0.17	NA	NA	0.028	0.17
Fluoranthene	206-44-0	24000	0.17	NA	NA	0.029	0.17
Fluorene	86-73-7	24000	0.17	NA	NA	0.033	0.17
Hexachlorobenzene	118-74-1	1	0.17	NA	NA	0.032	0.17
Hexachlorobutadiene	87-68-3	25	0.17	NA	NA	0.045	0.17
Hexachlorocyclopentadiene	77-47-4	110	0.17	NA	NA	0.096	0.17
Hexachloroethane	67-72-1	140	0.17	NA	NA	0.035	0.17
Indeno(1,2,3-cd)pyrene	193-39-5	2	0.17	NA	NA	0.037	0.17
Isophorone	78-59-1	2000	0.17	NA	NA	0.034	0.17
Naphthalene	91-20-3	17	0.17	NA	NA	0.041	0.17
Nitrobenzene	98-95-3	340	0.17	NA	NA	0.038	0.17
N-Nitrosodimethylamine	62-75-9	0.7	0.17	NA	NA	0.034	0.17
N-Nitroso-di-n-propylamine	621-64-7	0.3	0.17	NA	NA	0.032	0.17
N-Nitrosodiphenylamine	86-30-6	390	0.17	NA	NA	0.029	0.17
Pentachlorophenol	87-86-5	10	0.33	NA	NA	0.14	0.33
Phenanthrene	85-01-8	300000	0.17	NA	NA	0.026	0.17
Phenol	108-95-2	210000	0.17	NA	NA	0.037	0.17
Pyrene	129-00-0	18000	0.17	NA	NA	0.032	0.17

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-2, Non-Residential Direct Contact Soil Remediation Standards.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

A Low-Level standard at one half the normal low standard is to be analyzed with these samples in order to achieve the needed PAL for N-Nitroso-di-N-propyl amine, Dibenzo(a,h)anthracene and Benzo(a) anthracene.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-18a

Reference Limits and Evaluation Table – Offsite Backfill and Topsoil Pesticides

Matrix	Soil (Demolition Debris Samples)
Analytical Group	TCL Pesticides / PCBs
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/3541/8081B/8082A			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
4,4'-DDD	72-54-8	13	0.0033	NA	NA	0.00022	0.0033
4,4'-DDE	72-55-9	9	0.0033	NA	NA	0.00025	0.0033
4,4'-DDT	50-29-3	8	0.0033	NA	NA	0.00033	0.0033
Aldrin	309-00-2	0.2	0.0017	NA	NA	0.00011	0.0017
Alpha-BHC	319-84-6	0.5	0.0017	NA	NA	0.000056	0.0017
Beta-BHC	319-85-7	2	0.0017	NA	NA	0.000063	0.0017
Chlordane	57-74-9	1	0.0017	NA	NA	0.000087	0.0017
Dieldrin	60-57-1	0.2	0.0033	NA	NA	0.00012	0.0033
Endosulfan I and II	115-29-7	6800	0.0033	NA	NA	0.00015	0.0033
Endosulfan sulfate	1031-07-8	6800	0.0033	NA	NA	0.00013	0.0033
Endrin	72-20-8	340	0.0033	NA	NA	0.00014	0.0033
Gamma-BHC	58-89-9	2	0.0017	NA	NA	0.000055	0.0017
Heptachlor	76-44-8	0.7	0.0017	NA	NA	0.000072	0.0017
Heptachlor epoxide	1024-57-3	0.3	0.0017	NA	NA	0.00016	0.0017
Methoxychlor	72-43-5	5700	0.017	NA	NA	0.00088	0.017
Toxaphene	8001-35-2	3	0.170	NA	NA	0.0088	0.170
Aroclor 1016	12674-11-2	1	0.033	NA	NA	0.0025	0.033
Aroclor 1221	11104-28-2			NA	NA	0.0044	0.033
Aroclor 1232	11141-16-5			NA	NA	0.0024	0.033
Aroclor 1242	53469-1-9			NA	NA	0.0025	0.033
Aroclor 1248	12672-29-6			NA	NA	0.0038	0.033
Aroclor 1254	11097-69-1			NA	NA	0.0044	0.033
Aroclor 1260	11096-82-5			NA	NA	0.0018	0.033

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-2, Non-Residential Direct Contact Soil Remediation Standards.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

UFP-QAPP Worksheet #15-19
Reference Limits and Evaluation Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	Extractable Petroleum Hydrocarbons (EPH)
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	NJ EPH			
				Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
1,2,3-Trimethylbenzene	526-73-8	1700 Total EPH	0.4	NA	NA	0.217	0.4
2-Methylnaphthalene	91.57-6			NA	NA	0.198	0.4
Acenaphthene	83-32-9			NA	NA	0.249	0.4
Acenaphthylene	208-96-8			NA	NA	0.211	0.4
Anthracene	120-12-7			NA	NA	0.280	0.4
Benzo(a)anthracene	56-55-3			NA	NA	0.257	0.4
Benzo(a)pyrene	50-32-8			NA	NA	0.223	0.4
Benzo(b)fluoranthene	205-99-2			NA	NA	0.322	0.4
Benzo(g,h,i)perylene	191-24-2			NA	NA	0.291	0.4
Benzo(k)fluoranthene	207-08-9			NA	NA	0.304	0.4
Chrysene	218-01-9			NA	NA	0.254	0.4
Dibenzo(a,h)anthracene	53-70-3			NA	NA	0.285	0.4
Fluoranthene	206-44-0			NA	NA	0.232	0.4
Fluorene	86-73-7			NA	NA	0.214	0.4
Indeno(1,2,3-cd)pyrene	193-39-5			NA	NA	0.279	0.4
Naphthalene	91-20-3			NA	NA	0.206	0.4
Phenanthrene	85-01-8			NA	NA	0.261	0.4
Pyrene	129-00-0			NA	NA	0.230	0.4
n-Decane	124-18-5			NA	NA	0.135	0.4
n-Docosane	629-97-0			NA	NA	0.145	0.4
n-Dodecane	112-40-3			NA	NA	0.133	0.4
n-Dotriacontane	544-85-4			NA	NA	0.126	0.4
n-Eicosane	112-95-8			NA	NA	0.138	0.4

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	NJ EPH			
				Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
n-Heneicosane	629-94-7	1700 Total EPH	0.4	NA	NA	0.198	0.4
n-Hexacosane	630-01-3			NA	NA	0.142	0.4
n-Hexadecane	544-76-3			NA	NA	0.130	0.4
n-Hexatriacontane	630-06-8			NA	NA	0.124	0.4
n-Nonane	111-84-2			NA	NA	0.0817	0.4
n-Octacosane	630-02-4			NA	NA	0.132	0.4
n-Octadecane	593-45-3			NA	NA	0.141	0.4
n-Octatriacontane	7194-85-6			NA	NA	0.123	0.4
n-Tetracontane	4181-95-7			NA	NA	0.118	0.4
n-Tetracosane	646-31-1			NA	NA	0.158	0.4
n-Tetradecane	629-59-4			NA	NA	0.130	0.4
n-Tetratriacontane	14157-59-0			NA	NA	0.141	0.4
n-Triacontane	638-68-6			NA	NA	0.127	0.4

[1] Project action limits are based upon New Jersey Department of Environmental Protection Site Remediation Program, Protocol for Addressing Extractable Petroleum Hydrocarbons. (Version 5.0, August9, 2010)

QAPP Worksheet #15-20

Reference Limits and Evaluation Table

Matrix	Liquid/Solid (AST Samples)
Analytical Group	Gasoline (GRO)/Diesel (DRO) Range Organics
Concentration Level	Low to Medium

Analyte - Liquid	**CAS Number**	**Project Action Limit[1] (mg/L)**	**Project Quantitation Limit Goal (mg/L)**	**SW846 8015M**			
				Analytical Method		**Achievable Laboratory Limits**	
				MDLs	**Method QLs**	**MDLs (mg/L)**	**QLs (mg/L)**
Gasoline Range Organics (C5-C12)	8006-61-9	NA	NA	NA	NA	0.01805	0.375
Diesel Range Organics	68334-30-5	NA	NA	NA	NA	0.01800	0.200
Analyte - Solid	**CAS Number**	**Project Action Limit[1] (mg/Kg)**	**Project Quantitation Limit Goal (mg/Kg)**	**MDLs**	**Method QLs**	**MDLs (mg/Kg)**	**QLs (mg/Kg)**
Gasoline Range Organics (C5-C12)	8006-61-9	NA	NA	NA	NA	0.0815	3.75
Diesel Range Organics	68334-30-5	NA	NA	NA	NA	1.3	7

[1] No project action limits are listed in the bid document.
NA" indicates that there is no criterion listed for the analyte.

UFP-QAPP Worksheet #15-21a
Reference Limits and Evaluation Table

Matrix	Liquid (AST Samples)
Analytical Group	EPH
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/L)[1]	Project Quantitation Limit Goal (mg/L)	NJ EPH			
				Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	Method QLs (mg/L)	MDLs (mg/L)	QLs (mg/L)
1,2,3-Trimethylbenzene	526-73-8	1700 Total EPH	0.005	NA	NA	0.0026	0.005
2-Methylnaphthalene	91.57-6			NA	NA	0.0025	0.005
Acenaphthene	83-32-9			NA	NA	0.0025	0.005
Acenaphthylene	208-96-8			NA	NA	0.0024	0.005
Anthracene	120-12-7			NA	NA	0.0024	0.005
Benzo(a)anthracene	56-55-3			NA	NA	0.0028	0.005
Benzo(a)pyrene	50-32-8			NA	NA	0.0028	0.005
Benzo(b)fluoranthene	205-99-2			NA	NA	0.0032	0.005
Benzo(g,h,i)perylene	191-24-2			NA	NA	0.0033	0.005
Benzo(k)fluoranthene	207-08-9			NA	NA	0.0034	0.005
Chrysene	218-01-9			NA	NA	0.0033	0.005
Dibenzo(a,h)anthracene	53-70-3			NA	NA	0.0034	0.005
Fluoranthene	206-44-0			NA	NA	0.0026	0.005
Fluorene	86-73-7			NA	NA	0.0025	0.005
Indeno(1,2,3-cd)pyrene	193-39-5			NA	NA	0.0032	0.005
Naphthalene	91-20-3			NA	NA	0.0029	0.005
Phenanthrene	85-01-8			NA	NA	0.0026	0.005
Pyrene	129-00-0			NA	NA	0.0029	0.005
n-Decane	124-18-5			NA	NA	0.0021	0.005
n-Docosane	629-97-0			NA	NA	0.0019	0.005
n-Dodecane	112-40-3			NA	NA	0.00207	0.005
n-Dotriacontane	544-85-4			NA	NA	0.0019	0.005
n-Eicosane	112-95-8			NA	NA	0.0019	0.005

Analyte	CAS Number	Project Action Limit (mg/L)[1]	Project Quantitation Limit Goal (mg/L)	NJ EPH			
				Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/Kg)	Method QLs (mg/L)	MDLs (mg/Kg)	QLs (mg/L)
n-Heneicosane	629-94-7	1700 Total EPH	0.005	NA	NA	0.0026	0.005
n-Hexacosane	630-01-3			NA	NA	0.0019	0.005
n-Hexadecane	544-76-3			NA	NA	0.00206	0.005
n-Hexatriacontane	630-06-8			NA	NA	0.0016	0.005
n-Nonane	111-84-2			NA	NA	0.0033	0.005
n-Octacosane	630-02-4			NA	NA	0.0018	0.005
n-Octadecane	593-45-3			NA	NA	0.00209	0.005
n-Octatriacontane	7194-85-6			NA	NA	0.0018	0.005
n-Tetracontane	4181-95-7			NA	NA	0.0018	0.005
n-Tetracosane	646-31-1			NA	NA	0.0019	0.005
n-Tetradecane	629-59-4			NA	NA	0.002	0.005
n-Tetratriacontane	14157-59-0			NA	NA	0.00202	0.005
n-Triacontane	638-68-6			NA	NA	0.0019	0.005

[1] Project action limits are based upon New Jersey Department of Environmental Protection Site Remediation Program, Protocol for Addressing Extractable Petroleum Hydrocarbons. (Version 5.0, August9, 2010)

UFP-QAPP Worksheet #15-21b
Reference Limits and Evaluation Table

Matrix	Solid (AST Samples)
Analytical Group	EPH
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	NJ EPH			
				Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	Method QLs (mg/L)	MDLs (mg/Kg)	QLs (mg/Kg)
1,2,3-Trimethylbenzene	526-73-8	1700 Total EPH	0.005	NA	NA	0.217	0.4
2-Methylnaphthalene	91.57-6			NA	NA	0.198	0.4
Acenaphthene	83-32-9			NA	NA	0.249	0.4
Acenaphthylene	208-96-8			NA	NA	0.211	0.4
Anthracene	120-12-7			NA	NA	0.280	0.4
Benzo(a)anthracene	56-55-3			NA	NA	0.257	0.4
Benzo(a)pyrene	50-32-8			NA	NA	0.223	0.4
Benzo(b)fluoranthene	205-99-2			NA	NA	0.322	0.4
Benzo(g,h,i)perylene	191-24-2			NA	NA	0.291	0.4
Benzo(k)fluoranthene	207-08-9			NA	NA	0.304	0.4
Chrysene	218-01-9			NA	NA	0.254	0.4
Dibenzo(a,h)anthracene	53-70-3			NA	NA	0.285	0.4
Fluoranthene	206-44-0			NA	NA	0.232	0.4
Fluorene	86-73-7			NA	NA	0.214	0.4
Indeno(1,2,3-cd)pyrene	193-39-5			NA	NA	0.279	0.4
Naphthalene	91-20-3			NA	NA	0.206	0.4
Phenanthrene	85-01-8			NA	NA	0.261	0.4
Pyrene	129-00-0			NA	NA	0.230	0.4
n-Decane	124-18-5			NA	NA	0.135	0.4
n-Docosane	629-97-0			NA	NA	0.145	0.4
n-Dodecane	112-40-3			NA	NA	0.133	0.4
n-Dotriacontane	544-85-4			NA	NA	0.126	0.4
n-Eicosane	112-95-8			NA	NA	0.138	0.4

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	NJ EPH			
				Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
n-Heneicosane	629-94-7	1700 Total EPH	0.005	NA	NA	0.198	0.4
n-Hexacosane	630-01-3			NA	NA	0.142	0.4
n-Hexadecane	544-76-3			NA	NA	0.130	0.4
n-Hexatriacontane	630-06-8			NA	NA	0.124	0.4
n-Nonane	111-84-2			NA	NA	0.0817	0.4
n-Octacosane	630-02-4			NA	NA	0.132	0.4
n-Octadecane	593-45-3			NA	NA	0.141	0.4
n-Octatriacontane	7194-85-6			NA	NA	0.123	0.4
n-Tetracontane	4181-95-7			NA	NA	0.118	0.4
n-Tetracosane	646-31-1			NA	NA	0.158	0.4
n-Tetradecane	629-59-4			NA	NA	0.130	0.4
n-Tetratriacontane	14157-59-0			NA	NA	0.141	0.4
n-Triacontane	638-68-6			NA	NA	0.127	0.4

[1] Project action limits are based upon New Jersey Department of Environmental Protection Site Remediation Program, Protocol for Addressing Extractable Petroleum Hydrocarbons. (Version 5.0, August9, 2010)

QAPP Worksheet #15-22

Reference Limits and Evaluation Table

Matrix	Liquid/Solid (AST Samples)
Analytical Group	Oil and Grease
Concentration Level	Low to Medium

Analyte - Liquid	**CAS Number**	**Project Action Limit[1] (mg/L)**	**Project Quantitation Limit Goal (mg/L)**	**SW846 1664A**			
				Analytical Method		**Achievable Laboratory Limits**	
				MDLs	**Method QLs**	**MDLs (mg/L)**	**QLs (mg/L)**
Oil & Grease	None	NA	NA	NA	NA	0.237	1
Analyte - Solid	**CAS Number**	**Project Action Limit[1] (mg/Kg)**	**Project Quantitation Limit Goal (mg/Kg)**	**MDLs**	**Method QLs**	**MDLs (mg/Kg)**	**QLs (mg/Kg)**
Oil & Grease	None	NA	NA	NA	NA	0.237	1

[1] No project action limits are listed in the bid document.
NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-23

Reference Limits and Evaluation Table

Matrix	Solid (Post-Excavation Samples)
Analytical Group	TAL Metals
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3050B/6010C/7471B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Arsenic	7440-38-2	38.86	1.0	NA	NA	0.41	1.0
Cadmium	7440-43-9	78	0.25	NA	NA	0.015	0.25

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.
"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-24
Reference Limits and Evaluation Table

Matrix	Solid (Post-Excavation Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)[2]	SW846 5030B/5035/8260B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Benzene	71-43-2	5	0.005	NA	NA	0.00092	0.005
Ethylbenzene	100-41-4	29	0.005	NA	NA	0.00092	0.005
Xylenes (total)	1330-20-7	2600	0.010	NA	NA	0.0010	0.010
Toluene	108-88-3	46000	0.005	NA	NA	0.0011	0.005

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-25

Reference Limits and Evaluation Table

Matrix	Solid (Post Excavation Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Naphthalene	91-20-3	17	0.33	NA	NA	0.041	0.33

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-26

Reference Limits and Evaluation Table

Matrix	Solid (Post Excavation Samples)
Analytical Group	TCL Pesticide/PCB
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/3541/8081B/8082A			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
4,4'-DDD	72-54-8	7.2	0.0033	NA	NA	0.00022	0.0033
4,4'-DDT	50-29-3	7	0.0033	NA	NA	0.00033	0.0033
Aldrin	309-00-2	0.1	0.0017	NA	NA	0.00011	0.0017
Dieldrin	60-57-1	0.11	0.0033	NA	NA	0.00012	0.0033
Heptachlor	76-44-8	0.38	0.0017	NA	NA	0.000072	0.0017
Aroclor 1016	12674-11-2	10	0.033	NA	NA	0.0025	0.033
Aroclor 1221	11104-28-2			NA	NA	0.0044	0.033
Aroclor 1232	11141-16-5			NA	NA	0.0024	0.033
Aroclor 1242	53469-1-9			NA	NA	0.0025	0.033
Aroclor 1248	12672-29-6			NA	NA	0.0038	0.033
Aroclor 1254	11097-69-1			NA	NA	0.0044	0.033
Aroclor 1260	11096-82-5			NA	NA	0.0018	0.033

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-27
Reference Limits and Evaluation Table

Matrix	Solid (Backfill/ Topsoil Samples)
Analytical Group	TCL VOCs
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)[2]	SW846 5030B/5035/8260B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
1,1,1-Trichloroethane	71-55-6	4200	0.005	NA	NA	0.0013	0.005
1,1,2,2-Tetrachloroethane	79-34-5	3	0.005	NA	NA	0.0042	0.005
1,1,2-Trichloroethane	79-00-5	6	0.005	NA	NA	0.0036	0.005
1,1-Dichloroethane	75-34-3	24	0.005	NA	NA	0.0032	0.005
1,1-Dichloroethene	75-35-4	150	0.005	NA	NA	0.0038	0.005
1,2-Dibromo-3-chloropropane	96-12-8	NA	0.010			0.0072	0.010
1,2-Dibromoethane	106-93-4	0.04	0.005	NA	NA	0.0034	0.005
1,2-Dichloroethane	107-06-2	3	0.005	NA	NA	0.0012	0.005
1,2-Dichloropropane	78-87-5	5	0.005	NA	NA	0.0027	0.005
2-Butanone	78-93-3	44,000	0.050	NA	NA	0.0059	0.050
Acetone	67-64-1	NA	0.057	NA	NA	0.033	0.057
Acrolein	107-02-8	1	0.050	NA	NA	0.025	0.050
Acrylonitrile	107-13-1	3	0.005	NA	NA	0.0048	0.005
Benzene	71-43-2	5	0.005	NA	NA	0.00092	0.005
Bromodichloromethane	75-27-4	3	0.005	NA	NA	0.0034	0.005
Bromoform	75-25-2	280	0.005	NA	NA	0.0048	0.005
Bromomethane	74-83-9	59	0.005	NA	NA	0.0029	0.005
Carbon Disulfide	75-15-0	110,000	0.010	NA	NA	0.0031	0.010
Carbon Tetrachloride	56-23-5	2	0.010	NA	NA	0.0041	0.010
Chlorobenzene	108-90-7	7400	0.005	NA	NA	0.00082	0.005
Chloroethane	75-00-3	1100	0.010	NA	NA	0.0028	0.010
Chloroform	67-66-3	2	0.005	NA	NA	0.0016	0.005
Chloromethane	74-87-3	12	0.010	NA	NA	0.0020	0.010

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 5030B/5035/8260B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
cis-1,2-Dichloroethene	156-59-2	560	0.005	NA	NA	0.0018	0.005
Cis-1,3-dichloropropene	10061-01-5	NA	0.005	NA	NA	0.0030	0.005
Dibromochloromethane	124-48-1	8	0.005	NA	NA	0.0034	0.005
Dichlorodifluoromethane	75-71-8	230,000	0.010	NA	NA	0.0017	0.010
Ethylbenzene	100-41-4	110,000	0.005	NA	NA	0.00092	0.005
Methyl Acetate	79-20-9	NA	0.025	NA	NA	0.0047	0.025
Methyl tert-butyl ether	1634-04-4	320	0.005	NA	NA	0.0019	0.005
Methylene Chloride	75-09-2	97	0.010	NA	NA	0.0014	0.010
m,p-Xylene	1330-20-7	170,000	0.010	NA	NA	0.0010	0.010
Styrene	100-42-5	260	0.005	NA	NA	0.00082	0.005
tert-Butyl Alcohol	75-65-0	11,000	0.050	NA	NA	0.0291	0.050
Tetrachloroethene	127-18-4	5	0.005	NA	NA	0.0019	0.005
Toluene	108-88-3	91,000	0.005	NA	NA	0.0011	0.005
Trans-1,2-Dichloroethene	156-60-5	720	0.005	NA	NA	0.0027	0.005
Trans-1,3-Dichloropropene	542-75-6	7	0.005	NA	NA	0.0027	0.005
Trichloroethene	79-01-6	20	0.005	NA	NA	0.00082	0.005
Trichlorofluoromethane	75-69-4	3400000	0.005	NA	NA	0.0027	0.005
Vinyl Chloride	75-01-4	2	0.005	NA	NA	0.0018	0.005

[1] Project action limits are based upon NJDEP Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) and Table 01450-2.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-28

Reference Limits and Evaluation Table

Matrix	Solid (Backfill/ Topsoil Samples)
Analytical Group	TCL SVOCs
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
1,1'-Biphenyl	92-52-4	34,000	0.17	NA	NA	0.042	0.17
1,2,4-Trichlorobenzene	120-82-1	820	0.17	NA	NA	0.046	0.17
1,2-Dichlorobenzene	95-50-1	59,000	0.17	NA	NA	0.042	0.17
1,2-Diphenylhydrazine	122-66-7	2	0.17	NA	NA	0.032	0.17
1,3-Dichlorobenzene	541-73-1	59,000	0.17	NA	NA	0.040	0.17
1,4-Dichlorobenzene	106-46-7	13	0.17	NA	NA	0.036	0.17
2,4,5-Trichlorophenol	95-95-4	68,000	0.33	NA	NA	0.037	0.33
2,4,6-Trichlorophenol	88-06-2	74	0.17	NA	NA	0.039	0.17
2,4-Dichlorophenol	120-83-2	2100	0.17	NA	NA	0.038	0.17
2,4-Dimethylphenol	105-67-9	14,000	0.17	NA	NA	0.036	0.17
2,4-Dinitrophenol	51-28-5	1400	0.33	NA	NA	0.180	0.33
2,4-Dinitrotoluene	121-14-2	3	0.17	NA	NA	0.023	0.17
2,6-Dinitrotoluene	606-20-2	3	0.17	NA	NA	0.028	0.17
2-Chlorophenol	95-57-8	2200	0.17	NA	NA	0.041	0.17
4,6-Dinitro-2-methylphenol	534-52-1	68	0.33	NA	NA	0.025	0.33
2-Methylnaphthalene	91-57-6	2400	0.17	NA	NA	0.042	0.17
2-Methylphenol	95-48-7	3400	0.17	NA	NA	0.038	0.17
2-Nitroaniline	88-74-4	23,000	0.33	NA	NA	0.021	0.33
3&4-Methylphenol	106-44-5	340	0.17	NA	NA	0.035	0.17
3,3'-Dichlorobenzidine	91-94-1	4	0.17	NA	NA	0.035	0.17

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Acenaphthene	83-32-9	37,000	0.17	NA	NA	0.039	0.17
Acenaphthylene	208-96-8	300,000	0.17	NA	NA	0.037	0.17
Acetophenone	98-86-2	5	0.17	NA	NA	0.031	0.17
Anthracene	120-12-7	30,000	0.17	NA	NA	0.027	0.17
Atrazine	1912-24-9	2400	0.17	NA	NA	0.047	0.17
Benzaldehyde	100-52-7	68,000	0.17	NA	NA	0.044	0.17
Benzidine	92-87-5	0.7	0.17	NA	NA	0.13	0.17
Benzo(a)anthracene	56-55-3	2	0.17	NA	NA	0.033	0.17
Benzo(a)pyrene	50-32-8	0.2	0.17	NA	NA	0.031	0.17
Benzo(b)fluoranthene	205-99-2	2	0.17	NA	NA	0.040	0.17
Benzo(g,h,i)perylene	191-24-2	30,000	0.17	NA	NA	0.038	0.17
Benzo(k)fluoranthene	207-08-9	23	0.17	NA	NA	0.043	0.17
Bis(2-chloroethyl)ether	111-44-4	2	0.17	NA	NA	0.042	0.17
Bis(2-chloroisoproyl)ether	108-60-1	67	0.17	NA	NA	0.033	0.17
Bis(2-ethylhexyl)phthalate	117-81-7	140	0.17	NA	NA	0.029	0.17
Butyl benzyl phthalate	85-68-7	14,000	0.17	NA	NA	0.026	0.17
Caprolactam	105-60-2	340,000	0.17	NA	NA	0.021	0.17
Carbazole	86-74-8	96	0.17	NA	NA	0.028	0.17
Chrysene	218-01-9	230	0.17	NA	NA	0.029	0.17
Dibenzo(a,h)anthracene	53-70-3	0.2	0.17	NA	NA	0.035	0.17
Diethyl phthalate	84-66-2	550,000	0.17	NA	NA	0.024	0.17
di-n-Butyl phthalate	84-74-2	68,000	0.17	NA	NA	0.028	0.17

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
di-n-Octylphthalate	117-84-0	27,000	0.17	NA	NA	0.028	0.17
Fluoranthene	206-44-0	24,000	0.17	NA	NA	0.029	0.17
Fluorene	86-73-7	24,000	0.17	NA	NA	0.033	0.17
Hexachlorobenzene	118-74-1	1	0.17	NA	NA	0.032	0.17
Hexachlorobutadiene	87-68-3	25	0.17	NA	NA	0.045	0.17
Hexachlorocyclopentadiene	77-47-4	110	0.17	NA	NA	0.096	0.17
Hexachloroethane	67-72-1	140	0.17	NA	NA	0.035	0.17
Indeno(1,2,3-cd)pyrene	193-39-5	2	0.17	NA	NA	0.037	0.17
Isophorone	78-59-1	2000	0.17	NA	NA	0.034	0.17
Naphthalene	91-20-3	17	0.17	NA	NA	0.041	0.17
Nitrobenzene	98-95-3	340	0.17	NA	NA	0.038	0.17
N-Nitrosodimethylamine	62-75-9	0.7	0.17	NA	NA	0.034	0.17
N-Nitroso-di-n-propylamine	621-64-7	0.3	0.17	NA	NA	0.032	0.17
N-Nitrosodiphenylamine	86-30-6	390	0.17	NA	NA	0.029	0.17
Pentachlorophenol	87-86-5	10	0.33	NA	NA	0.14	0.33
Phenanthrene	85-01-8	300,000	0.17	NA	NA	0.026	0.17
Phenol	108-95-2	210,000	0.17	NA	NA	0.037	0.17
Pyrene	129-00-0	18,000	0.17	NA	NA	0.032	0.17

[1] Project action limits are based upon NJDEP Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) and Table 01450-2.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

A Low-Level standard at one half the normal low standard is to be analyzed with these samples in order to achieve the needed PAL for N-Nitroso-di-N-propyl amine, Dibenzo(a,h)anthracene and Benzo(a) anthracene.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-29
Reference Limits and Evaluation Table

Matrix	Solid (Backfill/ Topsoil Samples)
Analytical Group	TCL Pesticide/PCB
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/3541/8081B/8082A			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
4,4'-DDD	72-54-8	13	0.0033	NA	NA	0.00022	0.0033
4,4'-DDE	72-55-9	9	0.0033	NA	NA	0.00025	0.0033
4,4'-DDT	50-29-3	8	0.0033	NA	NA	0.00033	0.0033
Aldrin	309-00-2	0.2	0.0017	NA	NA	0.00011	0.0017
Alpha-BHC	319-84-6	0.5	0.0017	NA	NA	0.000056	0.0017
Beta-BHC	319-85-7	2	0.0017	NA	NA	0.000063	0.0017
Chlordane	57-74-9	1	0.0017	NA	NA	0.000087	0.0017
Dieldrin	60-57-1	0.2	0.0033	NA	NA	0.00012	0.0033
Endosulfan I and II	115-29-7	6800	0.0033	NA	NA	0.00015	0.0033
Endosulfan sulfate	1031-07-8	6800	0.0033	NA	NA	0.00013	0.0033
Endrin	72-20-8	340	0.0033	NA	NA	0.00014	0.0033
Gamma-BHC	58-89-9	2	0.0017	NA	NA	0.000055	0.0017
Heptachlor	76-44-8	0.7	0.0017	NA	NA	0.000072	0.0017
Heptachlor epoxide	1024-57-3	0.3	0.0017	NA	NA	0.00016	0.0017
Methoxychlor	72-43-5	5700	0.017	NA	NA	0.00088	0.017
Toxaphene	8001-35-2	3	0.170	NA	NA	0.0088	0.170
Aroclor 1016	12674-11-2	1	0.033	NA	NA	0.0025	0.033
Aroclor 1221	11104-28-2			NA	NA	0.0044	0.033
Aroclor 1232	11141-16-5			NA	NA	0.0024	0.033
Aroclor 1242	53469-1-9			NA	NA	0.0025	0.033
Aroclor 1248	12672-29-6			NA	NA	0.0038	0.033
Aroclor 1254	11097-69-1			NA	NA	0.0044	0.033
Aroclor 1260	11096-82-5			NA	NA	0.0018	0.033

[1] Project action limits are based upon NJDEP NRDCSRS and Table 01450-2.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

QAPP Worksheet #15-30
Reference Limits and Evaluation Table

Matrix	Solid (Backfill/ Topsoil Samples)
Analytical Group	Metals
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3050B/6010C/7471B/9012B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Aluminum	7429-90-5	NA	NA	NA	NA	1.2	10
Antimony	7440-36-0	450	1.0	NA	NA	0.38	1.0
Arsenic	7440-38-2	19	1.0	NA	NA	0.41	1.0
Barium	7440-39-3	59,000	10	NA	NA	0.031	10
Beryllium	7440-41-7	140	0.25	NA	NA	0.0015	0.25
Cadmium	7440-43-9	78	0.25	NA	NA	0.015	0.25
Calcium	7440-70-2	NA	NA	NA	NA	6.1	40
Chromium	7440-47-3	NA	NA	NA	NA	0.019	1.0
Cobalt	7440-48-4	590	2.5	NA	NA	0.044	2.5
Copper	7440-50-8	45,000	1.5	NA	NA	0.11	1.5
Cyanide	57-12-5	23,000	1.0	NA	NA	0.45	1.0
Iron	7439-89-6	NA	NA	NA	NA	1.5	10
Lead	7439-92-1	800	0.50	NA	NA	0.17	0.50
Magnesium	7439-95-4	NA	NA	NA	NA	0.63	25
Manganese	7439-96-5	5900	2.5	NA	NA	0.13	2.5
Mercury	7439-97-6	65	0.033	NA	NA	0.0020	0.033
Nickel	7440-02-0	23,000	2.5	NA	NA	0.043	2.5
Potassium	7440-09-7	NA	NA	NA	NA	3.4	50
Selenium	7782-49-2	5700	1.5	NA	NA	0.64	1.5
Silver	7440-22-4	5700	1.5	NA	NA	0.064	1.5
Sodium	7440-23-5	NA	NA	NA	NA	1.1	50
Thallium	7440-28-0	79	1.0	NA	NA	0.22	1.0
Vanadium	7440-62-2	1100	2.5	NA	NA	0.060	2.5
Zinc	7440-66-6	110,000	2.5	NA	NA	0.18	2.5

[1] Project action limits are based upon NJDEP NRDCSRS and Table 01450-2.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.
"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-31

Reference Limits and Evaluation Table

Matrix	Solid (Backfill/ Topsoil Samples)
Analytical Group	Radium-226
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (pCi/g)[1]	Project Quantitation Limit Goal (pCi/g)	DOE Ga-01-R			
				Analytical Method		Achievable Laboratory Limits	
				MDLs (pCi/g)	Method QLs (pCi/g)	MDLs (pCi/g)	QLs (pCi/g)[2]
Ra-226	13982-63-3	3	0.10	NA	NA	0.10	0.10

[1] Project action limits obtained from Contract Specification 01450, 1.5.3.6.3.
[2] The achievable laboratory limit is based on the highest expected minimum detectable activity (MDA). MDAs are calculated by the laboratory for each sample analyzed.

QAPP Worksheet #15-32
Reference Limits and Evaluation Table

Matrix	Solid (UST Closure Confirmation Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)[2]	SW846 5030B/5035/8260B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
1,1,1-Trichloroethane	71-55-6	NA	NA	NA	NA	0.0013	0.005
1,1,2,2-Tetrachloroethane	79-34-5	NA	NA	NA	NA	0.0042	0.005
1,1,2-Trichloroethane	79-00-5	NA	NA	NA	NA	0.0036	0.005
1,1-Dichloroethane	75-34-3	NA	NA	NA	NA	0.0032	0.005
1,1-Dichloroethene	75-35-4	NA	NA	NA	NA	0.0038	0.005
1,2-Dibromo-3-chloropropane	96-12-8	NA	NA	NA	NA	0.0072	0.010
1,2-Dibromoethane[4]	106-93-4	NA	NA	NA	NA	0.0034	0.005
1,2-Dichloroethane	107-06-2	NA	NA	NA	NA	0.0012	0.005
1,2-Dichloropropane	78-87-5	NA	NA	NA	NA	0.0027	0.005
2-Butanone	78-93-3	NA	NA	NA	NA	0.0059	0.050
Acetone	67-64-1	NA	NA	NA	NA	0.033	0.057
Acrolein	107-02-8	NA	NA	NA	NA	0.025	0.050
Acrylonitrile	107-13-1	NA	NA	NA	NA	0.0048	0.005
Benzene	71-43-2	5	0.005	NA	NA	0.00092	0.005
Bromodichloromethane	75-27-4	NA	NA	NA	NA	0.0034	0.005
Bromoform	75-25-2	NA	NA	NA	NA	0.0048	0.005
Bromomethane	74-83-9	NA	NA	NA	NA	0.0029	0.005
Carbon Disulfide	75-15-0	NA	NA	NA	NA	0.0031	0.010
Carbon Tetrachloride	56-23-5	NA	NA	NA	NA	0.0041	0.010
Chlorobenzene	108-90-7	NA	NA	NA	NA	0.00082	0.005
Chloroethane	75-00-3	NA	NA	NA	NA	0.0028	0.010
Chloroform	67-66-3	NA	NA	NA	NA	0.0016	0.005
Chloromethane	74-87-3	NA	NA	NA	NA	0.0020	0.010

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 5030B/5035/8260B			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
cis-1,2-Dichloroethene	156-59-2	NA	NA	NA	NA	0.0018	0.005
Cis-1,3-dichloropropene	10061-01-5	NA	NA	NA	NA	0.0030	0.005
Dibromochloromethane	124-48-1	NA	NA	NA	NA	0.0034	0.005
Dichlorodifluoromethane	75-71-8	NA	NA	NA	NA	0.0017	0.010
Ethylbenzene	100-41-4	29	0.005	NA	NA	0.00092	0.005
Methyl Acetate	79-20-9	NA	NA	NA	NA	0.0047	0.025
Methyl tert-butyl ether	1634-04-4	NA	NA	NA	NA	0.0019	0.005
Methylene Chloride	75-09-2	NA	NA	NA	NA	0.0014	0.010
Xylene- total	1330-20-7	2600	0.010	NA	NA	0.0010	0.010
Styrene	100-42-5	NA	NA	NA	NA	0.00082	0.005
tert-Butyl Alcohol	75-65-0	NA	NA	NA	NA	0.0291	0.050
Tetrachloroethene	127-18-4	NA	NA	NA	NA	0.0019	0.005
Toluene	108-88-3	46000	0.005	NA	NA	0.0011	0.005
Trans-1,2-Dichloroethene	156-60-5	NA	NA	NA	NA	0.0027	0.005
Trans-1,3-Dichloropropene	542-75-6	NA	NA	NA	NA	0.0027	0.005
Trichloroethene	79-01-6	NA	NA	NA	NA	0.00082	0.005
Trichlorofluoromethane	75-69-4	NA	NA	NA	NA	0.0027	0.005
Vinyl Chloride	75-01-4	NA	NA	NA	NA	0.0018	0.005

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-33

Reference Limits and Evaluation Table

Matrix	Solid (UST Closure Confirmation Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
1,1'-Biphenyl	92-52-4	NA	NA	NA	NA	0.042	0.33
1,2,4-Trichlorobenzene	120-82-1	NA	NA	NA	NA	0.046	0.33
1,2-Dichlorobenzene	95-50-1	NA	NA	NA	NA	0.042	0.33
1,2-Diphenylhydrazine	122-66-7	NA	NA	NA	NA	0.032	0.33
1,3-Dichlorobenzene	541-73-1	NA	NA	NA	NA	0.040	0.33
1,4-Dichlorobenzene	106-46-7	NA	NA	NA	NA	0.036	0.33
2,4,5-Trichlorophenol	95-95-4	NA	NA	NA	NA	0.037	0.67
2,4,6-Trichlorophenol	88-06-2	NA	NA	NA	NA	0.039	0.33
2,4-Dichlorophenol	120-83-2	NA	NA	NA	NA	0.038	0.33
2,4-Dimethylphenol	105-67-9	NA	NA	NA	NA	0.036	0.33
2,4-Dinitrophenol	51-28-5	NA	NA	NA	NA	0.180	0.67
2,4-Dinitrotoluene	121-14-2	NA	NA	NA	NA	0.023	0.33
2,6-Dinitrotoluene	606-20-2	NA	NA	NA	NA	0.028	0.33
2-Chlorophenol	95-57-8	NA	NA	NA	NA	0.041	0.33
4,6-Dinitro-2-methylphenol	534-52-1	NA	NA	NA	NA	0.025	0.67
2-Methylnaphthalene	91-57-6	NA	NA	NA	NA	0.042	0.33
2-Methylphenol	95-48-7	NA	NA	NA	NA	0.038	0.33
2-Nitroaniline	88-74-4	NA	NA	NA	NA	0.021	0.67
3&4-Methylphenol	106-44-5	NA	NA	NA	NA	0.035	0.33
3,3'-Dichlorobenzidine	91-94-1	NA	NA	NA	NA	0.035	0.33

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Acenaphthene	83-32-9	NA	NA	NA	NA	0.039	0.33
Acenaphthylene	208-96-8	NA	NA	NA	NA	0.037	0.33
Acetophenone	98-86-2	NA	NA	NA	NA	0.031	0.33
Anthracene	120-12-7	NA	NA	NA	NA	0.027	0.33
Atrazine	1912-24-9	NA	NA	NA	NA	0.047	0.33
Benzaldehyde	100-52-7	NA	NA	NA	NA	0.044	0.33
Benzidine	92-87-5	NA	NA	NA	NA	0.13	0.33
Benzo(a)anthracene	56-55-3	NA	NA	NA	NA	0.033	0.33
Benzo(a)pyrene[3]	50-32-8	NA	NA	NA	NA	0.031	0.33
Benzo(b)fluoranthene	205-99-2	NA	NA	NA	NA	0.040	0.33
Benzo(g,h,i)perylene	191-24-2	NA	NA	NA	NA	0.038	0.33
Benzo(k)fluoranthene	207-08-9	NA	NA	NA	NA	0.043	0.33
Bis(2-chloroethyl)ether	111-44-4	NA	NA	NA	NA	0.042	0.33
Bis(2-chloroisoproyl)ether	108-60-1	NA	NA	NA	NA	0.033	0.33
Bis(2-ethylhexyl)phthalate	117-81-7	NA	NA	NA	NA	0.029	0.33
Butyl benzyl phthalate	85-68-7	NA	NA	NA	NA	0.026	0.33
Caprolactam	105-60-2	NA	NA	NA	NA	0.021	0.33
Carbazole	86-74-8	NA	NA	NA	NA	0.028	0.33
Chrysene	218-01-9	NA	NA	NA	NA	0.029	0.33
Dibenzo(a,h)anthracene	53-70-3	NA	NA	NA	NA	0.035	0.33
Diethyl phthalate	84-66-2	NA	NA	NA	NA	0.024	0.33
di-n-Butyl phthalate	84-74-2	NA	NA	NA	NA	0.028	0.33

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/8270D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
di-n-Octylphthalate	117-84-0	NA	NA	NA	NA	0.028	0.33
Fluoranthene	206-44-0	NA	NA	NA	NA	0.029	0.33
Fluorene	86-73-7	NA	NA	NA	NA	0.033	0.33
Hexachlorobenzene	118-74-1	NA	NA	NA	NA	0.032	0.33
Hexachlorobutadiene	87-68-3	NA	NA	NA	NA	0.045	0.33
Hexachlorocyclopentadiene	77-47-4	NA	NA	NA	NA	0.096	0.33
Hexachloroethane	67-72-1	NA	NA	NA	NA	0.035	0.33
Indeno(1,2,3-cd)pyrene	193-39-5	NA	NA	NA	NA	0.037	0.33
Isophorone	78-59-1	NA	NA	NA	NA	0.034	0.33
Naphthalene	91-20-3	17	0.33	NA	NA	0.041	0.33
Nitrobenzene	98-95-3	NA	NA	NA	NA	0.038	0.33
N-Nitrosodimethylamine	62-75-9	NA	NA	NA	NA	0.034	0.33
N-Nitroso-di-n-propylamine	621-64-7	NA	NA	NA	NA	0.032	0.33
N-Nitrosodiphenylamine	86-30-6	NA	NA	NA	NA	0.029	0.33
Pentachlorophenol	87-86-5	NA	NA	NA	NA	0.14	0.67
Phenanthrene	85-01-8	NA	NA	NA	NA	0.026	0.33
Phenol	108-95-2	NA	NA	NA	NA	0.037	0.33
Pyrene	129-00-0	NA	NA	NA	NA	0.032	0.33

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-34
Reference Limits and Evaluation Table

Matrix	Solid (UST Closure Confirmation Samples)
Analytical Group	TCL PCBs
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit (mg/Kg)[1]	Project Quantitation Limit Goal (mg/Kg)	SW846 3540C/3541/8082A			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs (mg/Kg)	Method QLs (mg/Kg)	MDLs (mg/Kg)	QLs (mg/Kg)
Aroclor 1016	12674-11-2	10	0.033	NA	NA	0.0025	0.033
Aroclor 1221	11104-28-2			NA	NA	0.0044	0.033
Aroclor 1232	11141-16-5			NA	NA	0.0024	0.033
Aroclor 1242	53469-1-9			NA	NA	0.0025	0.033
Aroclor 1248	12672-29-6			NA	NA	0.0038	0.033
Aroclor 1254	11097-69-1			NA	NA	0.0044	0.033
Aroclor 1260	11096-82-5			NA	NA	0.0018	0.033

[1] Project action limits are based upon Section 01450 of Remedial Design –Rev2, Table 01450-1 and NJDEPNRSCC criteria.
[2] The DOD QSM requires that the QL support the MDL. The QL must be at least three-times the MDL.

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-35
Reference Limits and Evaluation Table

Matrix	Liquid (WWTP Effluent Samples)
Analytical Group	Metals
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (µg/L)	Project Quantitation Limit Goal (µg/L)	SW846 6010C			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (µg/L)	QLs (µg/L)
Arsenic	7440-38-2	100	20	NA	NA	4.3	20
Iron	7439-89-6	2000	200	NA	NA	47	200

[1] Project action limits are based upon Site Effluent Permit Values (NJPDES Discharge/DSW Appendix 2)
NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-36
Reference Limits and Evaluation Table

Matrix	Liquid (WWTP Effluent Samples)
Analytical Group	Total Suspended Solids (TSS)
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (mg/L)	Project Quantitation Limit Goal (mg/L)	SM 2540D			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs	Method QLs	MDLs (mg/L)	QLs (mg/L)
Total Suspended Solids (TSS)	57-12-5	40	10	NA	NA	10	10

[1] Project action limits are based upon Site Effluent Permit Values (NJPDES Discharge/DSW Appendix 2)
[2] Analytical MDLs and QLs are those documented in validated methods. NA indicates that the MDLs and QLs are not provided in the most recent version of the SW-846 method for the parameters and matrices of interest.

QAPP Worksheet #15-37
Reference Limits and Evaluation Table

Matrix	Liquid (WWTP Effluent Samples)
Analytical Group	Total Organic Carbon (TOC)
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (mg/L)	Project Quantitation Limit Goal (mg/L)	SW846 9060A			
				Analytical Method		Achievable Laboratory Limits[2]	
				MDLs	Method QLs	MDLs (mg/L)	QLs (mg/L)
Total Organic Carbon (TOC)	61-54-1	45	10	NA	NA	2	10

[1] Project action limits are based upon Site Effluent Permit Values (NJPDES Discharge/DSW Appendix 2)
[2] Analytical MDLs and QLs are those documented in validated methods. NA indicates that the MDLs and QLs are not provided in the most recent version of the SW-846 method for the parameters and matrices of interest.

QAPP Worksheet #15-38 A1
Reference Limits and Evaluation Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TAL Metals
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (mg/L)	Project Quantitation Limit Goal (mg/L)	SW846 6010C			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (mg/L)	QLs (mg/L)
Silver	7440-22-4	NA	NA	NA	NA	0.00124	0.0100
Aluminum	7429-90-5	NA	NA	NA	NA	0.0206	0.0500
Arsenic	7440-38-2	***	***	NA	NA	0.00277	0.00800
Barium	7440-39-3	NA	NA	NA	NA	0.00139	0.0100
Beryllium	7440-41-7	NA	NA	NA	NA	0.000557	0.00400
Calcium	7440-70-2	NA	NA	NA	NA	0.0142	0.200
Cadmium	7440-43-9	NA	NA	NA	NA	0.000706	0.00500
Cobalt	7440-48-4	NA	NA	NA	NA	0.00155	0.0100
Chromium	7440-47-3	NA	NA	NA	NA	0.00185	0.0100
Copper	7440-50-8	NA	NA	NA	NA	0.00461	0.0100
Iron	7439-97-6	***	***	NA	NA	0.00892	0.0300
Mercury	7439-97-6	NA	NA	NA	NA	0.000130	0.000200
Potassium	7440-09-7	NA	NA	NA	NA	0.120	1.00
Magnesium	7439-95-4	NA	NA	NA	NA	0.00885	0.0200
Manganese	7439-96-5	NA	NA	NA	NA	0.00379	0.00400
Sodium	7440-23-5	NA	NA	NA	NA	0.0785	0.500
Nickel	7440-02-0	NA	NA	NA	NA	0.00173	0.0100
Lead	7439-92-1	NA	NA	NA	NA	0.0124	0.0150
Antimony	7440-36-0	NA	NA	NA	NA	0.00321	0.0120
Selenium	7782-49-2	NA	NA	NA	NA	0.00830	0.0300
Thallium	7440-28-0	NA	NA	NA	NA	0.00419	0.0100
Vanadium	7440-62-2	NA	NA	NA	NA	0.00224	0.0100
Zinc	7440-66-6	NA	NA	NA	NA	0.00316	0.0100

[1] Project action limits are based upon Site Effluent Permit Values (NJPDES Discharge/DSW Appendix 2)
NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-39 A1
Reference Limits and Evaluation Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (µg/L)	Project Quantitation Limit Goal (µg/L)	SW846 8260C			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (µg/L)	QLs (µg/L)
Dichlorodifluoromethane	75-71-8	NA	NA	NA	NA	0.584	2.00
Chloromethane	74-87-3	NA	NA	NA	NA	0.368	2.00
Bromomethane	74-83-9	NA	NA	NA	NA	0.896	2.00
Vinyl Chloride	75-01-4	NA	NA	NA	NA	0.472	1.00
Chloroethane	75-00-3	NA	NA	NA	NA	0.588	2.00
Trichlorofluoromethane	75-69-4	NA	NA	NA	NA	0.487	1.00
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	NA	NA	NA	NA	0.532	1.00
Methyl acetate	79-20-9	NA	NA	NA	NA	0.647	5.00
Methylene Chloride	75-09-2	NA	NA	NA	NA	0.661	2.00
Acetone	67-64-1	NA	NA	NA	NA	0.804	10.0
Carbon Disulfide	75-15-0	NA	NA	NA	NA	0.412	2.00
1,1-Dichloroethene	75-35-4	NA	NA	NA	NA	0.693	1.00
1,1-Dichloroethane	75-34-3	NA	NA	NA	NA	0.323	1.00
Cis-1,2-Dichloroethene	156-59-2	NA	NA	NA	NA	0.327	1.00
Trans-1,2-Dichloroethene	156-60-5	NA	NA	NA	NA	0.377	1.00
Bromochloromethane	74-97-5	NA	NA	NA	NA	0.338	1.00
Chloroform	67-66-3	NA	NA	NA	NA	0.326	1.00
1,2-Dichloroethane	107-06-2	NA	NA	NA	NA	0.277	1.00
2-Butanone	78-93-3	NA	NA	NA	NA	1.07	2.00
1,1,1-Trichloroethane	71-55-6	NA	NA	NA	NA	0.509	1.00
Cyclohexane	110-82-7	NA	NA	NA	NA	0.787	5.00
Carbon Tetrachloride	56-23-5	NA	NA	NA	NA	0.437	1.00
Bromodichloromethane	75-27-4	NA	NA	NA	NA	0.417	0.500
Methylcyclohexane	108-87-2	NA	NA	NA	NA	0.742	5.00
1,2-Dichloropropane	78-87-5	NA	NA	NA	NA	0.292	1.00
Cis-1,3-Dichloropropene	10061-01-5	NA	NA	NA	NA	0.359	0.500
1,4-Dioxane	123-91-1	NA	NA	NA	NA	11.4	20.0
Trichloroethene	79-01-6	NA	NA	NA	NA	0.497	1.00
Dibromochloromethane	124-48-1	NA	NA	NA	NA	0.317	0.500
1,1,2-Trichloroethane	79-00-5	NA	NA	NA	NA	0.330	1.00
Benzene	71-43-2	NA	NA	NA	NA	0.284	1.00
Toluene	108-88-3	NA	NA	NA	NA	0.299	1.00
Trans-1,3-Dichloropropene	10061-02-6	NA	NA	NA	NA	0.347	0.500
Bromoform	75-25-2	NA	NA	NA	NA	0.425	1.00
Methyl tertiary-Butyl Ether	1634-04-4	NA	NA	NA	NA	0.237	1.00
4-Methyl-2-Pentanone	108-10-1	NA	NA	NA	NA	0.515	2.00

2-Hexanone	591-78-6	NA	NA	NA	NA	0.528	2.00
Tetrachloroethene	127-18-4	NA	NA	NA	NA	0.570	1.00
1,1,2,2-Tetrachloroethane	79-34-5	NA	NA	NA	NA	0.330	0.500
1,2-Dibromoethane	106-93-4	NA	NA	NA	NA	0.202	0.500
Isopropylbenzene	98-82-8	NA	NA	NA	NA	0.360	1.00
Chlorobenzene	108-90-7	NA	NA	NA	NA	0.249	1.00
Ethylbenzene	100-41-4	NA	NA	NA	NA	0.329	1.00
Styrene	100-42-5	NA	NA	NA	NA	0.405	1.00
Xylenes (Total)	1330-20-7	NA	NA	NA	NA	0.283	1.00
1,3-Dichlorobenzene	541-73-1	NA	NA	NA	NA	0.314	1.00
1,4-Dichlorobenzene	106-46-7	NA	NA	NA	NA	0.272	1.00
1,2-Dichlorobenzene	95-50-1	NA	NA	NA	NA	0.277	1.00
1,2-Dibromo-3-chloropropane	96-12-8	NA	NA	NA	NA	0.863	2.00
1,2,4-Trichlorobenzene	120-82-1	NA	NA	NA	NA	0.378	1.00
1,2,3-Trichlorobenzene	87-61-6	NA	NA	NA	NA	0.377	1.00

[1] Project action limits are based upon Site Effluent Permit Values (NJPDES Discharge/DSW Appendix 2)
"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-40 A1
Reference Limits and Evaluation Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (µg/L)	Project Quantitation Limit Goal (µg/L)	SW846 8270D			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (µg/L)	QLs (µg/L)
Phenol	108-95-2	NA	NA	NA	NA	0.645	5.00
bis(2-Chloroethyl) ether	111-44-4	NA	NA	NA	NA	0.734	5.00
2-Chlorophenol	95-57-8	NA	NA	NA	NA	0.748	5.00
1,2-Dichlorobenzene	95-50-1	NA	NA	NA	NA	0.562	5.00
1,3-Dichlorobenzene	541-73-1	NA	NA	NA	NA	0.647	5.00
1,4-Dichlorobenzene	106-46-7	NA	NA	NA	NA	0.614	5.00
2-Methylphenol	95-48-7	NA	NA	NA	NA	0.665	5.00
2,2'-oxybis (1-chloropropane)	108-60-1	NA	NA	NA	NA	0.778	5.00
3&4-Methylphenol	106-44-5	NA	NA	NA	NA	0.615	10.00
N-Nitroso-di-n-propylamine	621-64-7	NA	NA	NA	NA	0.578	5.00
Hexachloroethane	67-72-1	NA	NA	NA	NA	0.639	5.00
Nitrobenzene	98-95-3	NA	NA	NA	NA	0.690	5.00
Isophorone	78-59-1	NA	NA	NA	NA	0.586	5.00
2-Nitrophenol	88-75-5	NA	NA	NA	NA	0.838	20.0
2,4-Dimethylphenol	105-67-9	NA	NA	NA	NA	0.653	5.00
bis(2-Chloroethoxy) methane	111-91-1	NA	NA	NA	NA	0.666	5.00
2,4-Dichlorophenol	120-83-2	NA	NA	NA	NA	0.530	5.00
1,2,4-Trichlorobenzene	120-82-1	NA	NA	NA	NA	0.687	5.00
Naphthalene	91-20-3	NA	NA	NA	NA	0.685	5.00
4-Chloroaniline	106-47-8	NA	NA	NA	NA	1.12	5.00
Hexachlorobutadiene	87-68-3	NA	NA	NA	NA	0.388	5.00
4-Chloro-3-methylphenol	59-50-7	NA	NA	NA	NA	0.501	5.00
2-Methylnaphthalene	91-57-6	NA	NA	NA	NA	0.574	5.00
Hexachlorocyclopentadiene	77-47-4	NA	NA	NA	NA	1.04	5.00
2,4,6-Trichlorophenol	88-06-2	NA	NA	NA	NA	0.518	5.00
2,4,5-Trichlorophenol	95-96-4	NA	NA	NA	NA	0.520	5.00
2-Chloronaphthalene	91-58-7	NA	NA	NA	NA	0.590	5.00
2-Nitroaniline	88-74-4	NA	NA	NA	NA	0.606	5.00
Dimethylphthalate	131-11-3	NA	NA	NA	NA	0.758	5.00
Acenaphthylene	208-96-8	NA	NA	NA	NA	0.683	5.00
2,6-dinitrotoluene	606-20-2	NA	NA	NA	NA	0.593	5.00
3-Nitroanaline	99-09-2	NA	NA	NA	NA	0.543	5.00
Acenaphthene	83-32-9	NA	NA	NA	NA	0.691	5.00
2,4-Dinitrophenol	51-28-5	NA	NA	NA	NA	0.561	5.00
4-Nitrophenol	100-02-7	NA	NA	NA	NA	0.838	5.00

Dibenzofuran	132-64-9	NA	NA	NA	NA	0.740	5.00
2,4-Dinitrotoluene	121-14-2	NA	NA	NA	NA	0.673	5.00
Diethylphthalate	84-66-2	NA	NA	NA	NA	0.623	5.00
4-Chlorophenyl-phenyl ether	7005-72-3	NA	NA	NA	NA	0.603	5.00
Fluorene	86-73-7	NA	NA	NA	NA	0.612	5.00
4-Nitroaniline	100-01-6	NA	NA	NA	NA	0.374	5.00
4,6-Dinitro-2-methylphenol	534-52-1	NA	NA	NA	NA	0.319	5.00
N-nitrosodiphenylamine	86-30-6	NA	NA	NA	NA	0.651	5.00
4-Bromophenyl-phenyl ether	101-55-3	NA	NA	NA	NA	0.602	5.00
Hexachlorobenzene	118-74-1	NA	NA	NA	NA	0.571	5.00
Pentachlorophenol	87-86-5	NA	NA	NA	NA		5.00
Phenanthrene	85-01-8	NA	NA	NA	NA	0.586	5.00
Anthracene	120-12-7	NA	NA	NA	NA		5.00
Carbazole	86-74-8	NA	NA	NA	NA	1.56	5.00
Di-n-butylphthalate	84-74-2	NA	NA	NA	NA	0.457	5.00
Fluoranthene	206-44-0	NA	NA	NA	NA	0.638	5.00
Pyrene	129-00-0	NA	NA	NA	NA	0.610	5.00
Butylbenzylphthalate	85-68-7	NA	NA	NA	NA	0.438	5.00
3,3'-Dichlorobenzidine	91-94-1	NA	NA	NA	NA	1.99	5.00
Benzo(a)anthracene	56-55-3	NA	NA	NA	NA	0.536	5.00
Chrysene	218-01-9	NA	NA	NA	NA	0.532	5.00
bis(2-Ethylhexyl)phthalate	117-81-7	NA	NA	NA	NA	0.638	5.00
Di-n-octylphthalate	117-84-0	NA	NA	NA	NA	0.406	5.00
Benzo(b)fluoranthene	205-99-2	NA	NA	NA	NA	0.437	5.00
Benzo(k)fluoranthene	207-08-9	NA	NA	NA	NA	0.480	5.00
Benzo(a)pyrene	50-32-8	NA	NA	NA	NA	0.562	5.00
Indeno(1,2,3-cd)pyrene	193-39-5	NA	NA	NA	NA	0.580	5.00
Dibenz(a,h)anthracene	53-70-3	NA	NA	NA	NA	0.450	5.00
Benzo(g,h,i)perylene	191-24-2	NA	NA	NA	NA	0.530	5.00
Benzaldehyde	100-52-7	NA	NA	NA	NA	1.14	5.00
Acetophenone	98-86-2	NA	NA	NA	NA	0.305	5.00
Caprolactam	105-60-2	NA	NA	NA	NA	0.639	5.00
1,1'-Biphenyl	92-52-4	NA	NA	NA	NA	0.473	5.00
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	NA	NA	NA	0.725	5.00
Atrazine	1912-24-9	NA	NA	NA	NA	0.563	5.00
2,3,4,6-Tetrachlorophenol	58-90-2	NA	NA	NA	NA	0.490	5.00

[1] Project action limits are based upon Site Effluent Permit Values (NJPDES Discharge/DSW Appendix 2)
"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-41 A1
Reference Limits and Evaluation Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TCL Pesticides
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (µg/L)	Project Quantitation Limit Goal (µg/L)	SW846 8081B			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (µg/L)	QLs (µg/L)
Alpha-BHC	319-84-6	NA	NA	NA	NA	0.0115	0.0200
Beta-BHC	319-85-7	NA	NA	NA	NA	0.0146	0.0200
delta-BHC	319-86-8	NA	NA	NA	NA	0.0154	0.0200
gamma-BHC	58-89-9	NA	NA	NA	NA	0.0173	0.0200
Heptachlor	76-44-8	NA	NA	NA	NA	0.0196	0.0200
Aldrin	309-00-2	NA	NA	NA	NA	0.0157	0.0200
Heptachlor epoxide	1024-57-3	NA	NA	NA	NA	0.0152	0.0200
Endosulfan I	959-98-8	NA	NA	NA	NA	0.0163	0.0200
Dieldrin	60-57-1	NA	NA	NA	NA	0.0170	0.0200
4,4'-DDE	72-55-9	NA	NA	NA	NA	0.0178	0.0200
Endrin	72-20-8	NA	NA	NA	NA	0.0192	0.0400
Endosulfan II	33213-65-9	NA	NA	NA	NA	0.0199	0.0400
4,4'-DDD	72-54-8	NA	NA	NA	NA	0.0186	0.0400
Endosulfan sulfate	1031-07-8	NA	NA	NA	NA	0.0198	0.0400
4,4'-DDT	5029-3	NA	NA	NA	NA	0.0177	0.0400
Methoxychlor	72-43-5	NA	NA	NA	NA	0.0183	0.0400
Endrin ketone	53494-70-5	NA	NA	NA	NA	0.0173	0.0400
Endrin aldehyde	7421-93-4	NA	NA	NA	NA	0.0192	0.0400
alpha-Chlordane	5103-71-9	NA	NA	NA	NA	0.0154	0.0400
gamma-Chlordane	5566-34-7	NA	NA	NA	NA	0.0141	0.0400
Toxaphene	8001-35-2	NA	NA	NA	NA	0.328	0.500

[1] Project action limits are based upon Site Effluent Permit Values (NJPDES Discharge/DSW Appendix 2)

"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-42 A1
Reference Limits and Evaluation Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	Total Suspended Solids (TSS)
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (mg/L)	Project Quantitation Limit Goal (mg/L)	SM 2540D			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (mg/L)	QLs (mg/L)
Total Suspended Solids (TSS)	57-12-5	40	10	NA	NA	2.2	5.0

[1] Project action limits are based upon Site Effluent Permit Values (NJPDES Discharge/DSW Appendix 2)
"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-43 A1
Reference Limits and Evaluation Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	Total Organic Carbon (TOC)
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (mg/L)	Project Quantitation Limit Goal (mg/L)	SW846 9060A			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (mg/L)	QLs (mg/L)
Total Organic Carbon (TOC)	61-54-1	20	10	NA	NA	2	10

[1] Project action limits are based upon Site Effluent Permit Values (NJPDES Discharge/DSW Appendix 2)
"NA" indicates that there is no criterion listed for the analyte.

QAPP Worksheet #15-44 A1
Reference Limits and Evaluation Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	Oil and Grease (offsite lab)
Concentration Level	Low to Medium

Analyte	CAS Number	Project Action Limit[1] (mg/L)	Project Quantitation Limit Goal (mg/L)	1664A			
				Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs (mg/L)	QLs (mg/L)
Oil and Grease	7440-66-6	NA	NA	NA	NA	0.237	1.0

[1] Project action limits are based upon Site Effluent Permit Values (NJPDES Discharge/DSW Appendix 2)
"NA" indicates that there is no criterion listed for the analyte.

UFP-QAPP Worksheet #16
Project Schedule/Timeline Table[1]

Activities	Organization	Dates		Deliverable	Deliverable Due Date
		Anticipated Date of Initiation	Anticipated Date of Completion		
Development of the sampling rationale	Sevenson	Completed	July 2016	UFP-QAPP	July 2016
Preparation of the UFP-QAPP	Sevenson	Completed	July/August 2016	UFP-QAPP	Ongoing
Waste Disposal Characterization samples	Sevenson	December 2016	May 2017	Sample Results	Each sampling event
Surface/Subsurface Pre-excavation samples	Sevenson	November 2016	January 2017	Sample Results	Each sampling event
Post-excavation samples	Sevenson	March 2017	May 2017	Sample Results	Each sampling event
Demolition Debris samples	Sevenson	December 2016	January 2017	Sample Results	Each sampling event
AST Content Disposal samples	Sevenson	November 2016	December 2016	Sample Results	Each sampling event
Confirmatory Soils for UST Closure samples	Sevenson	December 2016	January 2017	Sample Results	Each sampling event
Offsite Backfill/Topsoil samples	Sevenson	December 2016	July 2017	Sample Results	Each sampling event
WWTP Effluent samples	Sevenson	March 2017	December 2017	Sample Results	Each sampling event
Laboratory data analyses review and verification of data	Sevenson	December 2016 (project is ongoing)	September 2017	CDIR/CDFR	Quarterly – within 60 days of the end of the quarter/At completion of project.

[1] The project schedule is continually updated and submitted to USACE; please refer to the individual submittals of the project schedule for the up-to-date timetable. For the purpose of this document, 11 month long-term response action (November 2016 – September 2017).

UFP-QAPP Worksheet #17-1
Sampling Design and Rationale – Solid Waste Characterization Sampling

As part of the site remediation, solid waste materials generated during site activities require disposal at an offsite disposal facility. Samples will be collected for waste characterization to meet disposal facility requirements of one sample per 500 yd^3. It is estimated that a total of 99 waste characterization samples will be analyzed by the contract laboratory and the results will be sent to the offsite disposal facility prior to waste shipment for approval. Where field conditions or unforeseen events necessitate a departure from the standard procedures, all necessary actions will be discussed with, and approved by, the USACE COR.

Samples will be collected according to procedures in SOP M-120.45-01 included in Appendix 4 of this QAPP.

Solid waste characterization samples will be collected from either stockpiles or in situ sampling grids. In order to prevent excess volatilization, TCLP VOC samples will be collected as grab samples from a minimum depth of one foot within the stockpile or sampling grid. The samples for all other parameters will be collected as five-point composites. The compositing procedure is designed to provide a representative sample of a waste material by combining five discrete samples from the stockpile or sample grid. Discrete samples should be spread evenly within the stockpile or sample grid so that they are spatially representative both horizontally and vertically. Prior to sampling, a visual inspection of the material will be performed to locate areas suitable for sampling.

After samples have been collected and labeled, they will immediately be placed on ice in a cooler for shipment to the laboratory as discussed in Worksheet #27.

UFP-QAPP Worksheet #17-2
Sampling Design and Rationale – Surface/Subsurface Pre-excavation Samples

Following building demolition, 24 pre-excavation soil borings shall be installed at locations determined in the Contract Drawings. Borehole locations associated with Buildings 1A, 6A, 7A, 9, 11, 12, the Northeast Building and the Shed are within the excavation area and shall be fully demolished (including slab). Buildings 1, 7, 8, 10 and the Red Building are located outside of the excavation area and shall be demolished to top of slab and sampled with removal of slab and excavation contaminated soils beneath in areas were analytical results are above remediation goals. All sample results will be compared to either surface or subsurface remediation goals. Those soils above remediation goals (and any slab removal, if necessary) will be further excavated to a depth as directed by the USACE Contracting Officer.

Per specification section 01450 (Section 1.5.3.1), surface pre-excavation samples (0-2') will be sampled for EPA TAL metals and EPA TCL organics. Subsurface (2-4', 5-7 and 9-11') will be analyzed for total PCB. Samples will be collected at sample points as per Appendix 6.

Samples will be collected according to procedures in SOP M-120.13-01 (surface soil samples) and SOP M-120.15-01 (subsurface soil samples) included in Appendix 4 of this QAPP.

After samples have been collected and labeled, they will immediately be placed on ice in a cooler for shipment to the laboratory as discussed in Worksheet #27.

No sampling equipment decontamination will be required as disposable media will be utilized.

UFP-QAPP Worksheet #17-3
Sampling Design and Rationale – Demolition Debris Samples

Demolition debris samples, whether concrete, metal or other construction materials, from solids designated for recycling will be collected as necessary. Results of analysis shall be compared to NJDEP RDCSRS criteria for determination of recycling options. Decontaminated metal may be determined to be reusable offsite at either a Class A recycling center or for direct unrestricted reuse onsite. Concrete, if below RDCSRS, may be reused offsite at a Class B recycling center or onsite if it meets site criteria. Determination for reuse is subject to approval by the USACE Contracting Officer.

Demolition Debris samples will be analyzed for EPA TAL metals, EPA TCL compounds and EPH.

Samples will be collected according to procedures in SOP M-120.17-01 (demolition stockpile samples) included in Appendix 4 of this QAPP.

After samples have been collected and labeled, they will immediately be placed on ice in a cooler for shipment to the laboratory as discussed in Worksheet #27.

No sampling equipment decontamination will be required as disposable media will be utilized.

UFP-QAPP Worksheet #17-4
Sampling Design and Rationale – AST Contents

Waste characterization samples of all AST contents shall be obtained as necessary. At a minimum, each tank shall be analyzed for GRO/DRO, EPH and oil and grease. As necessary for disposal, additional analysis for RCRA ignitability, corrosivity, reactivity, full TCLP parameters and total PCB may be completed.

Grab samples will be collected according to procedures in SOP M-120.28-02 included in Appendix 4 of this QAPP.

After samples have been collected and labeled, they will immediately be placed on ice in a cooler for shipment to the laboratory as discussed in Worksheet #27.

No sampling equipment decontamination will be required as disposable media will be utilized.

UFP-QAPP Worksheet #17-5
Sampling Design and Rationale – Post-excavation Samples

All excavations at the site shall require confirmation in accordance with NJDEP post-remedial action requirements as defined in NJAC 7:26E, Subchapter 5. Excavation confirmation sampling shall be completed based on whether the excavation is considered a sidewall or bottom (excavation floor). Sidewalls shall be sampled every 30 linear feet, with a minimum of one sample per sidewall. Overall perimeter sidewalls, and interior sidewalls between excavations with a change in elevation of greater than two feet shall be sampled. Bottom samples shall be obtained for every 30 foot by 30 foot (900 square feet) area. Both excavation sidewall and bottom samples will be collected as surface soil (0-6") samples. Post-excavation samples results shall be compared to remediation goals as included in Table 01450-1.

It is estimated that a total of 159 sidewall post-excavation samples will be obtained and analyzed for EPA TAL metals, and EPA TCL inorganics. An estimated total of 333 samples will be obtained as post-excavation bottom samples will be obtained and analyzed for total PCB.

Samples will be collected according to procedures in SOP M-120.13-01 (surface soil samples) included in Appendix 4 of this QAPP.

After samples have been collected and labeled, they will immediately be placed on ice in a cooler for shipment to the laboratory as discussed in Worksheet #27.

No sampling equipment decontamination will be required as disposable media will be utilized.

UFP-QAPP Worksheet #17-6
Sampling Design and Rationale – UST Confirmation Soil Samples

Soils surrounding an estimated two USTs at the Site shall be sampled to confirm the removal of any contamination above site criteria. This contamination may have resulted from leakage of UST contents prior to removal.

It is estimated that a total 2 UST soil samples will be obtained and analyzed EPA TCL VOC, SVOC and PCB. Sample results shall be compared against Site Cleanup criteria as included in Table 01450-1.

Samples will be collected according to procedures in SOP M-120.15-01 (subsurface soil samples) included in Appendix 4 of this QAPP.

After samples have been collected and labeled, they will immediately be placed on ice in a cooler for shipment to the laboratory as discussed in Worksheet #27.

No sampling equipment decontamination will be required as disposable media will be utilized.

UFP-QAPP Worksheet #17-7
Sampling Design and Rationale –Backfill/Topsoil Sampling

As necessary, backfill material and standard topsoil will be obtained from local approved offsite sources. Samples of backfill materials will be analyzed to confirm that they are free from chemical contamination as defined in N.J.A.C. 7:26D as included in Table 01450-2 of the contract specifications.

A minimum of one sample per every 5,000yd^3 will be collected for chemical and radiological analysis. No less than one sample per borrow area will be collected. Additional samples may be collected and analyzed as requested by the USACE.

Backfill/Topsoil material samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, metals, cyanide, and Ra-226. The results of these analyses will be compared to the NJDEP Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) NJAC 7:26D, per Contract Specification 01450, 1.5.2.2.7. Sample results exceeding criteria will be considered unacceptable as topsoil or backfill.

Samples will be collected according to procedures in SOP M-120.45-01 included in Appendix 4 of this QAPP.

After samples have been collected and labeled, they will immediately be placed on ice in a cooler for shipment to the laboratory as discussed in Worksheet #27.

UFP-QAPP Worksheet #17-8 A1
Sampling Design and Rationale – WWTP Effluent Sampling, Influent Sampling and Informational Samples

Samples will be collected from the WWTP effluent in order to verify that the treatment plant is operating in compliance with the Site NJPDES/DSW permit, Contract Specifications, Section 13300, and the Site Wastewater Treatment Plant O&M Manual, submitted under separate cover. This analysis will include real-time monitoring for pH and offsite laboratory analysis for EPA TAL metals (Arsenic and Iron), TSS and TOC. The samples will be collected directly from the system discharge pipe sample port. Where field conditions or unforeseen events necessitate a departure from the standard procedures, all necessary actions will be discussed with, and approved by, the USACE Contracting Officer.

Grab samples will be collected according to procedures in SOP M-120.42-00 included in Appendix 4 of this QAPP.

After samples have been collected and labeled, they will immediately be placed on ice in a cooler for shipment to the laboratory as discussed in Worksheet #27.

Effluent samples will be collected daily as a grab samples during start-up period and then every other week thereafter. More frequent sampling may be required during treatment process changes or when potential higher contamination areas of the site are conducted. Specific details regarding water treatment and discharge may be found in Appendix 2.

In addition, Informational samples will be obtained from within the WWTP (influent and other informational samples). This analysis will include TAL metals, TCL VOC, TCL SVOC, TCL Pesticides, TSS, TOC and Oil and Grease. These informational samples will be obtained from within the treatment system. Informational samples will be obtained once every 2 weeks for the first month, and then 1 per month thereafter.

Grab samples will be collected according to procedures in SOP M-120.42-00 included in Appendix 4 of this QAPP.

After samples have been collected and labeled, they will immediately be placed on ice in a cooler for shipment to the laboratory as discussed in Worksheet #27.

UFP-QAPP Worksheet #18
Sampling Locations and Methods/SOP Requirements Table

Sampling Location/Sample Designation	Matrix	Depth	Analytical Group	Concentration Level	Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
Waste Characterization Sample ID: WC-WW-XXYYZZ	Solid/Liquid	NA	TCLP analytes (VOCs, SVOCs, pesticides, herbicides, metals) PCBs RCRA waste characteristics (corrosivity, ignitability, reactive cyanide, reactive sulfide) Paint Filter Test Moisture Content[1]	Low to Medium	Total number determined by offsite disposal facility requirements; estimated 99 based on 1/500 tons; no field duplicate or QA split samples required	Worksheet #17-1 and SOP M-120.45-01	Characterize waste for proper disposal
Pre-excavation Surface/Subsurface Soils Sample ID: PRE-WW-XXYYZZ	Solid	0-2’ 2-4’; 5-7’; and 9-11’	Surface Soils - EPA TAL Metals EPA TCL Organics Subsurface Soils – PCB	Low to Medium	Estimated 24 surface samples; 1 per 20 field duplicate and MS/MSD Estimated 72 subsurface samples; 1 per 20 field duplicates and MS/MSD	Worksheet #17-2 and SOP M-120.13-01 and 120.15-01 (locations in Appendix 6)	To determine building slab and subsurface excavation limits
Demolition Debris (concrete, metal, etc.) Sample ID: DD-WW-XXYYZZ	Solid	NA	EPA TAL Metals EPA TCL Organics EPH	Low to Medium	Estimated 25 debris samples;	Worksheet #17-3 and SOP 120.17-01	For comparison to RDCSRS requirements for offsite management for recycling

Sampling Location/Sample Designation	Matrix	Depth	Analytical Group	Concentration Level	Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
AST Content Disposal Sample ID: AS-WW-XXYYZZ	Liquid	NA	GRO/DRO EPH Oil and Grease TCLP analytes (VOCs, SVOCs, pesticides, herbicides, metals) PCBs RCRA waste characteristics (corrosivity, ignitability, reactive cyanide, reactive sulfide) Paint Filter Test Moisture Content[1]	Low to Medium	Estimated 17 samples; no field duplicate or QA split samples required	Worksheet #17-4 and SOP M-120.28-02	For oil-based recycling criteria; may run TCLP waste characterization for facility disposal
Confirmatory Soils for UST Closure Sample ID: UT-WW-XXYYZZ	Solid	0-6”	EPA TAL Metals EPA TCL VOC; SVOC; PCB	Low to Medium	Estimated 2 samples; 1 per 20 field duplicates and MS/MSD	Worksheet 17-6 and SOP M-120.15-01	To ascertain whether UST leakage has occurred.
Post-Excavation/Confirmation Sample ID: PE-WW-XXYYZZ	Solid	Sidewall Bottoms	EPA TAL Metals EPA TCL PCB	Low to High	Estimated 159 samples; 1 per 20 field duplicates and MS/MSD Estimated 333 samples; 1 per 20 field duplicates and MS/MSD	Worksheet #17-5 and SOP M-120.13-01 (locations in Appendix 6)	To confirm final limits of excavation
Backfill/Topsoil Sample ID: BF-WW-XXYYZZ	Solid	NA	TCL Analytes (VOC, SVOC, Pesticides and PCB) TAL Analytes (metals and cyanide) Radium-226	Low	Total number determined by volume required; estimated 10 based on 1/5000 yards per source; no field duplicate or QA split samples required	Worksheet 17-7 and SOP M-120.45-001	Confirm imported materials are below NJAC 7:26D criteria

Sampling Location/Sample Designation	Matrix	Depth	Analytical Group	Concentration Level	Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
WWTP Effluent Sample ID: EFF-WW-XXYYZZ	Aqueous	NA	Total Metals[2] TSS TOC pH	Low to High	Startup-Daily Operation – 1 sample every 2 weeks; 1 per 20 samples field duplicate	Worksheet #17-8 and SOP M-120.42-00	Assess and evaluate WWTP performance in meeting discharge criteria
WWTP Informational Samples Example Designations: INF-WW-XXYYZZ (Influent to the WWTP) GS1-WW-XXYYZZ (Greensand Filter No. 1 effluent) WEIR-WW-XXYYZZ (Weir tank effluent) OG-WW-XXYYZZ (Organoclay effluent) GAC1-WW-XXYYZZ (GAC No.1 effluent)	Aqueous	NA	TAL Metals TCL VOC TCL SVOC TCL Pesticides TSS TOC Oil and Grease	Low to High	Startup – Bi-weekly Operation – 1 sample every month; 1 per 20 samples field duplicate	Worksheet #17-8 and SOP M-120.42-00	Asses and evaluate WWTP in meeting operational goals.

[1] Additional analytes may be required by the offsite disposal facility. The Waste Disposal Coordinator should be contacted prior to sample collection in order to verify the analytical requirements.
[2] Arsenic and Iron

UFP-QAPP Worksheet #19 A1
Analytical SOP Requirements Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)[1]	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)
Waste Characterization	TCLP VOCs, SVOCs, pesticides, herbicides, and metals PCBs RCRA Characteristics (corrosivity, ignitability, reactive cyanide, reactive sulfide)	Low to Medium	SW846 1311 / 110.0062 SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8151A / 60.0034 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 8082A / 60.0003 SW846 1110A/9045C / 100.0112 SW846 1010A / SOP for Flashpoint by SW846-1010A, 9-26-13 Rev.9 SW846 9012B / 100.0015 SW846 9034 / 100.0015	200 grams for extractable organics and metals; 25 grams for VOCs; 100 grams for RCRA characteristics	32 oz. glass container for extractable organics and metals; 4oz. glass container for VOCs; 32 oz. glass container for RCRA characteristics	4ºC±2ºC; minimize headspace	**TCLP extraction** within 14 days for organics and within 180 days for metals (except mercury within 28 days); **Analysis of TCLP extracts:** *VOCs:* analysis within 14 days; *Extractable Organics (SVOCs, pesticides, herbicides):* extraction of leachate within 7 days and analysis within 40 days of extraction; *Metals:* analysis within 180 days (except mercury within 28 days) **PCBs:** 14 days from date of collection to extraction and 40 days from extraction to analysis **pH, Ignitability, Reactive Sulfide:** 7 days from date of collection to analysis **Reactive Cyanide:** 14 days from date of collection to analysis

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)[1]	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)
Pre-excavation Surface/Subsurface	Surface Soils: TAL Metals TCL Organics Subsurface Soils: PCB	Low to Medium	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 9012B / 100.0004 SW846 8082A / 60.0003	500 grams for extractable organics and metals; 2 different 2oz jars with minimum headspace for VOCs 50 grams for extractable organics	32oz glass container for extractable organics and metals; 2x2oz glass with minimum headspace for VOCs; 8 oz. glass container for extractable organics.	4ºC±2ºC; minimize headspace	**TAL Metals -** digest within 180 days from date of collection for metals (except mercury within 28 days); **TCL Organics** - *VOCs:* analysis within 14 days from date of collection; *Extractable Organics (SVOCs, pesticides, PCB's)* extraction within 7 days from date of collection and analysis within 40 days of extraction. **Cyanide:** 14 days from date of collection to analysis
Demolition Debris	TAL Metals TCL Organics NJ EPH	Low to Medium	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 9012B / 100.0004 NJ EPH / SOP for NJEPH, 1-23-14 Rev.6	500 grams for extractable organics and metals; 2 different 2oz jars with minimum headspace for VOCs 50 grams for extractable organics	32oz glass container for extractable organics and metals; 2x2oz glass with minimum headspace for VOCs;	4ºC±2ºC; minimize headspace	**TAL Metals -** digest within 180 days from date of collection for metals (except mercury within 28 days); **TCL Organics** - *VOCs:* analysis within 14 days from date of collection; *Extractable Organics (SVOCs, pesticides, PCB's, NJEPH)* extraction within 7 days from date of collection and analysis within 40 days of extraction. **Cyanide:** 14 days from date of collection to analysis

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)[1]	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)
AST Samples	GRO/DRO NJEPH Oil and Grease	Low to Medium	SW846 8015M / 60.00050 NJ EPH / SOP for NJEPH, 1-23-14 Rev.6 1664A / SOP for EPA 1664A, 11-14-13 Rev.11	**Liquid Samples – Organic:** 8oz for all analyses **Liquid Samples – Aqueous:** 8oz for all analyses **Solid Samples:** 500 grams for extractable organics and metals; 2 different 2oz jars with minimum headspace for VOCs	8oz Glass for all analyses with minimum headspace. 3 x 1L amber glass for DRO, NJEPH and 1664A. 2 x 40mL VOC for GRO. **Solid Samples:** 32oz glass container for extractable organics and metals; 2x2oz glass with minimum headspace for VOCs;	4ºC±2ºC; minimize headspace	*GRO:* analysis within 14 days from date of collection; *Extractable Organics (NJEPH, DRO)* extraction within 7 days from date of collection and analysis within 40 days of extraction. Oil and Grease analysis within 28 days from date of collection.. *GRO:* analysis within 14 days from date of collection; *Extractable Organics (NJEPH, DRO)* extraction within 7 days from date of collection and analysis within 40 days of extraction. Oil and Grease analysis within 28 days from date of collection.

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)[1]	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)
Post-Excavation	TAL Metals TCL Organics	Low to Medium	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012	500 grams for extractable organics and metals; 2 different 2oz jars with minimum headspace for VOCs	32oz glass container for extractable organics and metals; 2x2oz glass with minimum headspace for VOCs	4ºC±2ºC; minimize headspace	**TAL Metals -** digest within 180 days from date of collection for metals (except mercury within 28 days); **TCL Organics** - *VOCs:* analysis within 14 days from date of collection; *Extractable Organics (SVOCs, pesticides, PCB's,)* extraction within 7 days from date of collection and analysis within 40 days of extraction.
Backfill/Topsoil	TAL Metals TCL Organics (+ Acrolein, Acrylonitrile, Benzidine, 1,2-Diphenylhydrazine *as Azobenzene*, N-Nitrosodimethylamine and Tert Butyl Alcohol) Radium-226 Soil pH	Low to Medium	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 9012B / 100.0004 DOE Ga-01-R* SW846 1110A/9045C / 100.0112	500 grams for extractable organics and metals; 2 different 2oz jars with minimum headspace for VOCs Radium-226: fill Marinelli container (sample weight will vary based on density of material)	32oz glass container for extractable organics and metals; 2x2oz glass with minimum headspace for VOCs; 12x15 ziplock style plastic bag for Radium-226	4ºC±2ºC; minimize headspace; none required for radiological.	**TAL Metals -** digest within 180 days from date of collection for metals (except mercury within 28 days); **TCL Organics** - *VOCs:* analysis within 14 days from date of collection; *Extractable Organics (SVOCs, pesticides, PCB's)* extraction within 7 days from date of collection and analysis within 40 days of extraction. **Cyanide:** 14 days from date of collection to analysis **Radium-226:** 6 Months **Soil pH**: As soon as practical.

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)[1]	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)
UST Closure Confirmation	TCL Organics (VOC, SVOC and PCB only)	Low to Medium	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8082A / 60.0003	500 grams for extractable organics and metals; 2 different 2oz jars with minimum headspace for VOCs.	32oz glass container for extractable organics and metals; 2x2oz glass with minimum headspace for VOCs.	4±2°C; minimize headspace for VOC sample.	**TCL Organics** - *VOCs:* analysis within 14 days from date of collection; *Extractable Organics (SVOCs, PCB's)* extraction within 7 days from date of collection and analysis within 40 days of extraction.
WWTP Effluent	Total Metals TSS TOC pH (onsite)	Low to Medium	SW846 6010C / 100.0111 SM 2540D / 100.0021 SW846 9060A / 100.0025	500mL 1L	500mL plastic 1L amber glass	*4±2℃ for all.*	**Metals -** digest within 180 days from date of collection. **TSS:** 7 days from date of collection. **TOC and Oil and Grease:** 28 days from date of collection.

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)[1]	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)
WWTP Informational Samples	TAL Metals TCL VOC TCL SVOC TCL Pesticides TSS TOC Oil and Grease	Low to Medium	SW846 6010C / 100.0111 SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SM 2540D / 100.0021 SW846 9060A / 100.0025 1664A / SOP for EPA 1664A, 11-14-13 Rev 11.	500mL 2 x 40mL VOA vial. 1L 1L 1L 100mL 1L	500mL plastic Glass VOA Vial 1L amber glass 1L amber glass 1L amber glass 100mL plastic 1L amber glass	4±2°C for all. HNO_3 to pH2 for Metals. HCL to pH 2, no Headspace for VOC. H_2SO_4 to pH<2 for TOC and Oil and Grease.	Metals - digest within 180 days from date of collection. Organics - VOCs: analysis within 14 days from date of collection; Extractable Organics (SVOCs, pesticide), extraction within 7 days from date of collection and analysis within 40 days of extraction. TSS: 7 days from date of collection. TOC and Oil and Grease: 28 days from date of collection.

[1] In some cases multiple analyses can be taken from the same jar. Consult the laboratory for further instructions.
[2] Additional analytes may be required by the disposal facility. The Waste Disposal Coordinator should be contacted prior to sample collection in order to verify the analytical requirements.

UFP-QAPP Worksheet #20 A1
Field Quality Control Sample Summary Table

Matrix	Analytical Group[1]	Conc. Level	Analytical and Preparation SOP Reference	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of MS/ MSD	No. of Trip Blanks	No. of Field Blanks	No. of Equip. Blanks	No. of PT Samples	Total No. of Samples to Lab[2]
Waste Characterization	TCLP VOCs, SVOCs, pesticides, herbicides, and metals PCBs RCRA Characteristics (corrosivity, ignitability, reactive cyanide, reactive sulfide)[3]	Low to Medium	SW846 1311 / 110.0062 SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8151A / 60.0034 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 8082A / 60.0003 SW846 1110A/9045C / 100.0112 SW846 1010A / SOP for Flashpoint by SW846-1010A, 9-26-13 Rev.9 SW846 9012B / 100.0015 SW846 9034 / 100.0015	Estimate 99	0	0	0	0	0	0	99
Pre-excavation		Low to Medium	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 9012B / 100.0004	Estimate 24	1	1	1	0	0	0	27
			SW846 8082A / 60.0003	Estimate 72	3	1	1	0	0	0	77

Matrix	Analytical Group[1]	Conc. Level	Analytical and Preparation SOP Reference	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of MS/ MSD	No. of Trip Blanks	No. of Field Blanks	No. of Equip. Blanks	No. of PT Samples	Total No. of Samples to Lab[2]
Demolition Debris	TAL Metals TCL Organics NJ EPH	Low to Medium	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 9012B / 100.0004 NJ EPH / SOP for NJEPH, 1-23-14 Rev.6	Estimate 25	1	1	1	0	0	0	28
AST Samples	GRO/DRO NJEPH Oil and Grease	Low to Medium	SW846 8015M / 60.00050 NJ EPH / SOP for NJEPH, 1-23-14 Rev.6 1664A / SOP for EPA 1664A, 11-14-13 Rev.11	Estimate 17	1	1	1	0	0	0	20
Post-excavation	Sidewalls: TAL Metals TCL Organics Bottoms: PCB	Low to Medium	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 8082A / 60.0003	Estimate 159 Estimate 333	7 16	7 16	7 16	0 0	0 0	0 0	180 381
UST Closure Confirmation	TCL Organics (VOC, SVOC and PCB only)	Low to Medium	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8082A / 60.0003	Estimate 2	0	0	0	0	0	0	2

Matrix	Analytical Group[1]	Conc. Level	Analytical and Preparation SOP Reference	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of MS/ MSD	No. of Trip Blanks	No. of Field Blanks	No. of Equip. Blanks	No. of PT Samples	Total No. of Samples to Lab[2]
Backfill/Topsoil	VOCs SVOCs Pesticides PCBs Metals Cyanide Radium-226 Soil pH	Low	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 9012B / 100.0004 DOE Ga-01-R* SW846 1110A/9045C / 100.0112	Estimate 5	1	1	1	0	0	0	8
WWTP Effluent[4]	Total Metals TSS TOC pH (onsite)	Low to Medium	SW846 6010C / 100.0111 SM 2540D / 100.0021 SW846 9060A / 100.0025 .	10	1	1	1	0	0	0	13
WWTP Information	TAL Metals TCL VOC TCL SVOC TCL Pesticides TSS TOC Oil and Grease	Low to Medium	SW846 6010C / 100.0111 SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SM 2540D / 100.0021 SW846 9060A / 100.0025 1664A / SOP for EPA 1664A, 11-14-13 Rev 11.	21	1	1	1	0	0	0	24

[1] See Sampling Summary in Worksheet #16 for the required analytical groups for each sampling event/frequency.
[2] The total number of samples represents the estimated total number of each type of sample which will be collected during the project.
[3] Additional analytes may be required by the disposal facility. The Waste Disposal Coordinator should be contacted prior to sample collection in order to verify the analytical requirements.
[4] After initial discharge data is reviewed, and with USACE approval, sampling for parameters shall be twice per month.

UFP-QAPP Worksheet #21
Project Sampling SOP References Table

Reference Number	Title, Revision Date, and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
EPA 530/SW-846	Test Methods for Evaluating Solid Waste: Physical/Chemical Methods 3rd edition - 4 vols. November 1986	USEPA	Sample collection and processing equipment	No	To be used by the field team as a guide to collecting samples; sampling methodology based on the procedures included in this manual
NA	New Jersey Department of Environmental Protection, Field Sampling Procedures, August 2005	NJDEP	Sample collection and processing equipment	No	To be used by the field team as a guide to collecting samples; sampling methodology based on the procedures included in this manual
NA	New Jersey Department of Environmental Protection Alternative and Clean Fill Guidance for SRP Sites, Version 2.0	NJDEP	Sample collection guidance	No	To be used for the acceptance of backfill that are below NRDCSRS
M-120.45-01	Sevenson SOP Stockpile and Off-site Source Soil Sampling.	Sevenson	Sample collection and processing equipment	No	To be used by the field team as a guide to collecting samples of off-site borrow material, stockpiles and site soils
M-120.42-00	Sevenson SOP for Wastewater Treatment Plant Grab Sampling	Sevenson	Sample collection and processing equipment	No	To be used by the field team as a guide to collecting samples of WWTP discharge water
M-120.13-01	Sevenson SOP for Surface Soil Sampling	Sevenson	Sample collection and processing equipment	No	To be used by the field team as a guide to collecting samples of Removal Area soils
M-120.15-01	Sevenson SOP for Subsurface Soil Sampling	Sevenson	Sample collection and processing equipment	No	To be used by the field team as a guide to collecting samples of subsurface soils
M-120.17-01	Sevenson SOP for Debris Stockpile Sampling	Sevenson	Sample collection and processing equipment	No	To be used by the field team as a guide to collecting samples of debris stockpiles

UFP-QAPP Worksheet #22
Field Equipment Calibration, Maintenance, Testing, and Inspection Table

None anticipated.

UFP-QAPP Worksheet #23
Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
90.0012	Determination of Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) Analysis by SW846 Method 8260B, Revision 13, 09/14/12	Definitive	VOCs	Gas Chromatography/Mass Spectroscopy (GC/MS)	Eurofins Analytical	No
70.0011	Determination of Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry(GC/MS) Analysis by SW846 Method 8270D Revision 11, 07/27/11	Definitive	SVOCs	GC/MS	Eurofins Analytical	No
60.0006	Determination of Pesticides by Gas Chromatography/Electron Capture Detector Analysis by SW846 Method 8081B, Revision 10, 04/19/11	Definitive	Pesticides	Gas Chromatography with Electron Capture Detector (GC-ECD)	Eurofins Analytical	No
60.0034	Determination of Chlorinated Herbicides by Gas Chromatography/Electron Capture Device Analysis by SW846 8151A, Revision 8, 04/12/11	Definitive	Herbicides	GC-ECD	Eurofins Analytical	No
60.0003	Determination of Polychlorinated Biphenyls by Gas Chromatography/Electron Capture Detector Analysis using SW846 Method 8082A, Revision 10, 04/19/11	Definitive	PCBs	GC-ECD	Eurofins Analytical	No
100.0111	Determination of Metals in Water and Soil by Inductively Coupled Argon Plasma Atomic Emission Spectroscopy using Method SW846- 6010C, Revision 14, 02/04/15	Definitive	Metals	Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES)	Eurofins Analytical	No
100.0012	Preparation and Analysis of Mercury in Aqueous and Soil Samples by Manual Cold Vapor Atomic Absorption Methods SW846 Method 7470A/7471B, Revision 11, 02/17/15	Definitive	Metals	Cold Vapor Atomic Absorption (CVAA)	Eurofins Analytical	No

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
SOP for Flashpoint by SW846 1010A, 9-26-13 Rev.9	Flashpoint/Ignitability by Pensky-Martens Closed-Cup Method SW846 1010A, Revision 9, 09/26/13	Definitive	Ignitability	Pensky-Martens	Eurofins Analytical	No
100.0112	pH in Soil Samples by SW846 9040C and USEPA SOM01.2, Revision 8, 08/09/11	Definitive	pH	pH Meter	Eurofins Analytical	No
100.0015	The Preparation of Waste Samples for Reactive Cyanide and Sulfide; Determination of Reactive Cyanide by Automated Colorimetric Method and Reactive Sulfide by Spectrophotometric Method SW846 Methods 7.3.3.2 and 7.3.4.2, Revision 6, 11/18/11	Definitive	Reactive Cyanide/Sulfide	Distillation, Redox	Eurofins Analytical	No
100.0004	Total Cyanides by Automated Colorimetric with Midi-Distillation SW846 9012B, Revision 9, 05/03/13	Definitive	Reactive Cyanide	Distillation, Colorimetric	Eurofins Analytical	No
100.0021	Total Suspended Solids (TSS) Dried at 103 – 105 Degrees F, Revision 8, 05/08/13	Definitive	TSS	Analytical Balance	Eurofins Analytical	No
100.0025	Total Organic Carbon (TOC) by Methods SW846 9060A and SM53, Revision 10, 05/30/14	Definitive	TOC	TOC Analyzer	Eurofins Analytical	No
110.0062	Toxicity Characteristic Leachate Procedure and Synthetic Precipitation Leachate Procedure by SW846 EPA Methods 1311/1312, Revision 0, 12/04/14	NA	TCLP	NA	Eurofins Analytical	No
NJ EPH	New Jersey department of Environmental Protection Extractable Petroleum Hydrocarbons (EPH), Revision 6, 01/23/14	Definitive	TPH	Gas Chromatography/Flame Ionization Detector	Eurofins Analytical	No
GL-RAD-A-013	DOE HASL 300 4.5.2.3/Ga-01-R	Definitive	Ra-226	Gamma Spectroscopy	GEL Labs	No
60.00050	DRO/GRO by GC/FID, SW 846 8015M	Definitive	DRO/GRO	Gas Chromatography/Flame Ionization Detector	Eurofins Analytical	No
EPA 1664A , 11-14-13, Rev.11	Total Oil & Grease by EPA Method 1664A	Definitive	O & G	Analytical Balance	Eurofins Analytical	No

UFP-QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS (VOC)	Bromofluorobenzene (BFB) tuning	Prior to initial calibration and calibration verification	Refer to criteria listed in the SOP	Retune instrument and verify	Laboratory analyst	See Worksheet #23
	Initial calibration (minimum five points)	Prior to sample analysis or when calibration verification fails	% relative standard deviation (RSD) must be ≤15% for each compound. If %RSD >15%, determine best-fit curve: Linear regression correlation coefficient ≥0.995 or quadratic regression coefficient of determination ≥0.99	Correct the problem and repeat the initial calibration.	Laboratory analyst	
	System performance check	Once after each initial calibration and calibration verification	Response factor ≥0.10 for chloromethane, 1,1-dichloroethane, and bromoform; ≥0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane	Correct the problem and repeat initial calibration.	Laboratory analyst	
	Continuing calibration verification	At the start of each analytical sequence and every 12 hours thereafter	Response factor ≥0.10 for chloromethane, 1,1-dichloroethane, and bromoform; ≥0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane. All other analytes within ±20% of expected value.	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable continuing calibration verification	Laboratory analyst	
GC/MS (SVOC)	Decafluorotriphenylphosphine (DFTPP) tuning	Prior to initial calibration and calibration verification (every 12 hours)	Refer to criteria listed in the SOP	Retune instrument and verify	Laboratory analyst	See Worksheet #23

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
	Initial calibration (minimum five points)	Prior to sample analysis or when calibration verification fails	%RSD must be ≤15% for each compound. If %RSD >15%, determine best-fit curve: Linear regression correlation coefficient ≥0.995 or quadratic regression coefficient of determination ≥0.99	Correct the problem and repeat the initial calibration.	Laboratory analyst	
	System performance check	Once after each initial calibration and calibration verification	Response factor ≥0.05 for N-nitroso-di-n-propylamine; hexachlorocyclopentadiene; 2,4-dinitrophenol; 4-nitrophenol	Correct the problem and repeat initial calibration.	Laboratory analyst	
	Continuing calibration verification	At the start of each analytical sequence and every 12 hours thereafter	Response factor ≥0.05 for N-nitroso-di-n-propylamine; hexachlorocyclopentadiene; 2,4-dinitrophenol; 4-nitrophenol. All other analytes within ±20% of expected value.	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable continuing calibration verification	Laboratory analyst	
GC-ECD (pesticides, PCBs, and herbicides)	Multipoint initial calibration for single response pesticides and herbicides; multipoint calibration for multi-peak pesticides; multipoint calibration for aroclors 1016 and 1260 only	Whenever major instrument maintenance or modification is performed, or when calibration verification fails	To use average Relative Response Factor (RRF) for quantitation of any analyte, %RSD must be ≤15%; otherwise use first order linear regression curve with correlation coefficient ≥0.995 or quadratic regression with coefficient of determination ≥0.99	Correct the problem and repeat the initial calibration.	Laboratory analyst	See Worksheet #23
	Initial calibration verification	Once for each multipoint initial calibration	All analytes within ±20% of expected value	Correct the problem, then repeat initial calibration and reanalyze all samples	Laboratory analyst	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
	Continuing calibration verification	At the start of each analytical sequence, after 12 hours or 10 samples whichever is more frequent, and at the end of the sequence	All analytes within ±20% of expected value; either column may be used to meet the calibration criteria, however, the analytes must be quantified from the column that met the criteria	Correct the problem, then repeat initial calibration and reanalyze all samples	Laboratory analyst	
ICP (metals)	Initial calibration	Before sample analysis, every 24 hours, whenever modifications are made to the system, or when continuing calibration verification fails	Correlation coefficient must be ≥0.997	Correct problem and repeat initial calibration.	Laboratory analyst	See Worksheet #23
	Initial calibration verification (ICV)	Once after each initial calibration, prior to sample analysis	Recovery must be 95-105%	Reanalyze; if problem persists, terminate analysis, correct problem, recalibrate, and re-verify the calibration	Laboratory analyst	
	QC check standard	Once after each initial calibration, prior to sample analysis	Recovery must be 90-110%	Terminate analysis, correct problem, recalibrate, and re-verify the calibration	Laboratory analyst	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
	Initial calibration blank	Immediately after analysis of ICV	Absolute value of blank result <3-sigma the mean calibration blank	Terminate analysis, correct the problem, recalibrate, and re-verify the calibration.	Laboratory analyst	
	Continuing calibration verification (CCV)	After every 10 samples and at the end of the analysis sequence	Recovery must be 90-110%	Terminate analysis, correct the problem, recalibrate, and re-verify the calibration; reanalyze all samples and QC checks run since last acceptable CCV.	Laboratory analyst	
	Continuing calibration blank (CCB)	Immediately after analysis of CCV	Absolute value of blank must be <RL	Terminate analysis, correct problem, recalibrate, and re-verify the calibration; reanalyze all samples and QC checks run since the last acceptable CCB.	Laboratory analyst	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
CVAA (mercury)	Initial calibration	Before sample analysis, every 24 hours, whenever modifications are made to the system, or when continuing calibration verification fails	Correlation coefficient must be ≥0.995	Correct problem and repeat initial calibration	Laboratory analyst	See Worksheet #23
	QC Check Standard	Immediately following each initial calibration	All analytes within ±10% of expected value	Check QC solution; recalibrate and reanalyze; of results still are not acceptable, re-digest and reanalyze samples	Laboratory analyst	
	Continuing calibration verification	After every 10 samples and at the end of the analysis sequence	All analytes within ±20% of expected value	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification	Laboratory analyst	
Cyanide Sulfide	Initial multipoint calibration (minimum eight standards and a calibration blank)	Annually or if analysis of continuing calibration or QC check standards do not meet criteria	Correlation coefficient ≥0.995 for linear regression	Correct problem then repeat initial calibration	Laboratory analyst	See Worksheet #23

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
	Distilled standards (one high and one low)	Once per initial calibration	Value within ±10% of true value	Correct problem then repeat distilled standard	Laboratory analyst	
	Continuing calibration verification	Daily prior to sample analysis	Value within ±15% of true value	Prepare new calibration verification standard; recalibrate if problem cannot be located	Laboratory analyst	
Pensky-Martens	Determine flashpoint of xylenes	Once per 10 samples analyzed	Value of 81ºF (±2ºF)	Check apparatus for proper operation before analyzing samples	Laboratory analyst	See Worksheet #23
pH Meter	Initial calibration (minimum 2 points)	Daily	Slope of curve must be 100±5%	Correct problem and repeat calibration	Laboratory analyst	See Worksheet #23
	Calibration verification	After initial calibration, after every 10 samples analyzed, and at the end of sample measurement	pH 7 buffer solution must exhibit pH of 7.00±0.05	Repeat initial calibration and reanalyze all associated samples	Laboratory analyst	
TSS	Method is gravimetric; no calibration required	NA	NA	NA	NA	See Worksheet #23
ICP-AES	Initial Calibration	Daily	No acceptance criteria is listed in the SOP, but the curve must be checked with an ICV (see below).	If the ICV/ICB is outside control limits, the instrument must be recalibrated.	Laboratory analyst	See Worksheet #23

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
	Initial Calibration Verification (ICV)	Analyzed after Calibration.	Results must be within 10% of the true value. Each replicate must be within 12.5% of the true value and the replicates must be similar.	If the ICV/ICB is outside control limits, the instrument must be recalibrated and the samples analyzed since the last passing CCV/CCB must be reanalyzed.	Laboratory analyst	See Worksheet #23
	Initial Calibration Blank (ICB)	Analyzed after Calibration.	Must be less than 5 times the instrument detection limit(IDL) or the LOQ (level of quantitation), whichever is lower	If the ICV/ICB is outside control limits, the instrument must be recalibrated and the samples analyzed since the last passing CCV/CCB must be reanalyzed.	Laboratory analyst	See Worksheet #23
	Detection Limit Standard (DLS)	Must be run with each batch of samples.	Must be within 20% of the true value. Each replicate must be within 25% of the true value and replicates must be similar.		Laboratory analyst	See Worksheet #23
	Interference Check Standards (ICS)	At the beginning of the analytical sequence and every 20 sample injections (not including associated quality control checks).	The elements that are affected by the interferents must be within 20% of their true value.		Laboratory analyst	See Worksheet #23

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
	Continuing Calibration Verification / Continuing Calibration Blank (CCV/CCB)	Must be analyzed after every 10 analyses of sample and/or quality control check.	The CCV result must be within 10% of the true value. The CCB must be less than 5 times the IDL or the LOQ, whichever is lower.	If the CCV/CCB is outside control limits, the instrument must be recalibrated and the samples analyzed since the last passing CCV/CCB must be reanalyzed.	Laboratory analyst	See Worksheet #23

UFP-QAPP Worksheet #25
Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

All laboratory analytical equipment will undergo maintenance and testing procedures in accordance with the laboratory SOPs. Laboratory SOPs must be compliant with minimum method requirements. Some typical maintenance and testing activities are included in the following table.

Instrument/Equipment	Frequency	Maintenance, Testing, or Inspection Activity	Responsible Person	SOP Reference
GC/MS; GC-ECD	Daily	Purge traps are baked out; changes of the traps are logged.	Laboratory analyst	See Worksheet #23
		Columns are baked out.		
		Volume of gas cylinders is checked.		
	As Required	Teflon ferrules are replaced.		
		Injection port liners are cleaned or replaced.		
		GC septa are changed after 50 injections.		
		Detectors are baked out.		
	Quarterly	Instrument electronics are visually inspected and cleaned.		
		Detectors are cleaned as recommended by the manufacturer or more frequently as needed.		
	Annually	Electron capture detectors are wipe tested.		
		Preventative maintenance performed by manufacturer as per service contract terms.	Manufacturer representative	
ICP	Daily	Verify room temperature and humidity maintained to manufacturer's specifications.	Laboratory analyst	See Worksheet #23
		Check argon tank pressure and verify that spare tank is available.		
		Inspect pump tubing before operation and every few hours.		
		Check that nebulizer is not clogged and that capillary tubing is clean and in good condition.		
		Inspect torch glassware and aerosol injector tube.		
		Be sure drain tube is firmly attached to spray chamber and drain bottle. Verify that drain bottle is not full and that there is liquid in the loop.		
	As Required	Check tension on peristaltic pump tubing.		

Instrument/Equipment	Frequency	Maintenance, Testing, or Inspection Activity	Responsible Person	SOP Reference
ICP	As Required	Check nebulizer spray pattern with deionized water and clean spray tips if necessary.	Laboratory analyst	See Worksheet #23
		Clean torch components with water or solvents. Replace cracked or work o-rings.		
		Inspect air filter and clean with soap and water if necessary.		
		Check performance by running Manganese Background Equivalent Concentration or Coefficient of Variation tests.		
CVAA	Daily	Clean and rinse all glassware with 20% nitric acid and 10% hydrochloric acid.	Laboratory analyst	See Worksheet #23
		Check tubing for contamination and wear.		
		Regenerate drying tube.		
	As Required	Rinse stannous chloride and pump tubing with 10% 10N sodium hydroxide and deionized water.		
		Wipe pump rollers with isopropyl alcohol.		
		Replace lamp and clean optical cell.		
Pensky-Martens	Daily	Verify room temperature and humidity maintained to manufacturer's specifications.	Laboratory analyst	See Worksheet #23
		Wash flash cup with soap and water after each analysis.		
Cyanide Analysis Distillation System	Daily	Clean glassware prior to reuse	Laboratory analyst	See Worksheet #23
		Rinse tubing connecting distillation heads and dispersion tube assemblies with reagent water		
	As Required	Replace tubing when it appears soiled		
	Semi-Annually	Replace tubing		
		Inspect spectrophotometer	Manufacturer representative	
pH Meter	Daily	Clean glassware prior to reuse	Laboratory analyst	See Worksheet #23
		Store electrode in pH 7 buffer solution or storage solution		
	As Required	Change internal filling solution		
TSS	NA	Check oven certified thermometer	Laboratory analyst	See Worksheet #23

ICP-AES	As Required	Change filters on the front of the chiller (monthly) Clean torch (approximately every two weeks) Clean injector (approximately every two weeks) Clean nebulizer (approximately once per week) Change tubing (approximately every 2-3 days)	Laboratory analyst	See Worksheet #23

UFP-QAPP Worksheet #26
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): William Zambrana/Sevenson field team
Sample Packaging (Personnel/Organization): William Zambrana/Sevenson field team
Coordination of Shipment (Personnel/Organization): William Zambrana/Sevenson field team
Type of Shipment/Carrier: Federal Express (FedEx) for Overnight Delivery or courier to the laboratory
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Eurofins Analytical Sample Custodian
Sample Custody and Storage (Personnel/Organization): Eurofins Analytical Sample Custodian
Sample Preparation (Personnel/Organization): Assigned subcontracted laboratory personnel
Sample Determinative Analysis (Personnel/Organization): Assigned subcontracted laboratory personnel
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples will not be stored in the field, but will be shipped within 24 hours of collection. If in an emergency they are stored in the field, they will be kept in a cooler or transferred to a refrigerator maintained at 4ºC. All samples will be maintained by the laboratory sample custodian will store samples at the laboratory for 30 days after the final report has been submitted to Sevenson.
Sample Extract/Digestate Storage (No. of days from extraction/digestion): Laboratory analytical technicians will store all extracts/digestates for 30 days after the final report has been submitted to Sevenson.
Biological Sample Storage (No. of days from sample collection): Not applicable
SAMPLE DISPOSAL
Personnel/Organization: Assigned subcontracted laboratory personnel
Number of Days from Analysis: Samples may not be disposed of prior to 30 days after final report has been submitted to Sevenson.

UFP-QAPP Worksheet #27 A1
Sample Custody Requirements

Proper sample handling, shipment, and maintenance of chain of custody (COC) are key components of building the documentation and support for data that can be used to make project decisions. It is important that sample handling and sample COC requirements are performed completely, accurately, and consistently. A COC record establishes the documentation necessary to trace sample possession from the time of collection through sample analysis and disposition.

A sample is considered to be in someone's custody if it:

- Is in his/her possession.
- Is in his/her view, after being in his/her possession.
- Is in his/her possession and has been placed in a secure area.
- Is in a designated secure area.

Field Logbooks/Documentation

The field logbook will provide the means of recording data collection activities performed. As such, logbook entries will be described in as much detail as possible so that particular site activities could be reconstructed without reliance on memory.

Field logbooks will be bound logbooks, field survey books, or notebooks. Logbooks will be assigned to field personnel, but will be stored in the document control center when not in use.

A project-specific document number will be used to identify each logbook. The title page of each logbook will contain the following information:

- Person to whom the logbook is assigned.
- Logbook number.
- Project name.
- Project start date.
- Project end date.

Entries into the logbook will contain a variety of information. The beginning of each entry will include the date, start time, weather conditions, names of all sampling team members' present, level of personal protection being used, and the signature of the person making the entry. The names of visitors to the site will also be recorded in the field logbook.

Measurements made and samples collected will be recorded in the field logbook. All entries will be made in ink and no erasures will be made. If an incorrect entry is made, the incorrect information will be crossed out with a single line strikethrough and initialed. No blank spaces will be allowed in the logbook. If a blank line is present, a single line strikethrough with date and initial should be made. If there are multiple lines at the end of a page when the day or event is complete, a diagonal line with date and initials should be marked in the blank spaces.

Whenever a sample is collected or a measurement is made, a detailed description of the location of the station will be recorded in the logbook. The number of photographs taken at the station, if any, will also be noted. The logbook will identify all equipment used to make measurements.

Samples will be collected in accordance with the sampling procedures documented in the Worksheets #17-1 through #17-8. The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth of sample collection, volume, and the number of sample containers. The corresponding sample identification number will be prominently listed.

Field Procedures

The field sampler will be personally responsible for the care and custody of the samples until the samples are transferred and properly dispatched. As few people as possible will handle the samples. The CQCSM will review all field activities to determine whether proper custody procedures were followed during the fieldwork and decide if additional samples are required.

Sample Numbering System

A unique sample numbering scheme will be used to identify each sample designated for laboratory analysis. Sample identification numbers will be used on all sample labels, field data sheets or logbooks, chain of custody records, and all other applicable documentation used during the project. Field samples will be identified using the sample designations below, followed by a sample point ID or sequential sample number and the sample collection date.

Waste Characterization:	WC-WW-XXYYZZ with WW being the sequential sample number and XX, YY and ZZ being the date of collection.
Pre-excavation:	PRE-WW-XXYYZZ with WW being the sequential sample number and XX, YY and ZZ being the date of collection.
Demolition Debris:	DD-WW-XXYYZZ with WW being the sequential sample number and XX, YY and ZZ being the date of collection.
AST Sample:	AS-WW-XXYYZZ with WW being the sequential sample number and XX, YY and ZZ being the date of collection.
Post-X Sample:	PE-WWW-XXYYZZ with WWW being the sequential sample number and XX, YY and ZZ being the date of collection.
UST Sample:	UT-WW-XXYYZZ with WW being the sequential sample number and XX, YY and ZZ being the date of collection.
Backfill/Topsoil:	BF-WW-XXYYZZ with WW being the sequential sample number and XX, YY and ZZ being the date of collection.
WWTP Samples:	EFF-WW-XXYZZ with WW being the sequential sample number and XX, YY and ZZ being the date of collection.
WWTP Info Samples:	GAC1-WW-XXYYZZ (for example) with WW being the sequential sample number and XX, YY and ZZ being the date of collection.

Field duplicate samples will be submitted to the laboratory "blind" and no identifying modifiers will be attached to the sample labels. Duplicate samples will be given separate, discrete numbers and designated as field duplicates, but will not include the sample location. As such, they will be labeled FD-xx-mmddyy, where "FD" identifies field duplicate, "xx" indicates the sequential field duplicate number, and "mmddyy" is the sample collection date. For field samples, the sequential field duplicate number will start with "01". The respective locations of the field duplicate samples will be kept in the field logbook and field record sheets. On the chain of custody form, the field duplicate samples will be listed as the last sample and the collection time will be listed as "00:00". For example:

- A duplicate sample collected in relation to the WWTP effluent on October 10, 2016 will be numbered as "FD-01-101016".

Additional sample volume collected for MS and MSD analyses will receive sample numbers identical to the original with "MS" or "MSD" suffix.

Sample Labeling

Self-adhesive labels will be affixed to each sample container. The sample label will be completed in indelible ink and will include the following information:

- Project name.
- Sample ID number.
- Date and time of sample collection.
- Sampler's initials.
- Sample type (i.e., matrix).
- Preservative used, if any.
- Analyses requested.

Sample labels will be affixed to the sample containers and covered with clear packaging tape.

Chain of Custody Procedures

The COC form serves as an official communication to the laboratory detailing the particular analyses required for each sample. The COC record will accompany the samples from the time of sampling through all transfers of custody. The sample collector will complete a COC record to accompany each delivery container and will be responsible for shipping samples to the laboratory.

The COC form and sample shipment documentation will be faxed or e-mailed to the laboratory project manager and Sevenson data quality control review chemist when samples are shipped. The following information is typically recorded on COC forms:

- Project name and/or project number.
- Signature of field sampler.
- Field sample identification number.
- Date and time of sample collection.
- Grab or composite sample designation.
- Sample matrix.
- Analyses required.
- Preservation technique.

- Signatures and dates for transfer of custody.
- Air express/shipper's bill of lading identification number.

A second member of the field sampling team will review the completed COC record to assure that required information is not omitted. The original signature copy of the COC record will be enclosed in a plastic bag and secured to the inside of the cooler lid. A copy of the COC record will be retained for the project files.

Packaging and Shipping Procedures

As an aid to field personnel and as part of the site QC inspections, Sevenson Checklist Number 130.13, "Task Specific QC Checklist – Packing, Storing, and Shipment of Samples" and Sevenson Checklist Number 130.20, "Task Specific QC Checklist – Sample Cooler Shipment" are included in Appendix 4. All samples will be packaged and labeled for shipment in compliance with current regulations. All samples should be shipped to the project laboratory within 24 hours of sample collection via overnight courier service to ensure timely receipt of the samples by the laboratory. The shipment of samples on Friday is discouraged unless it is absolutely necessary and the laboratory has assured that personnel will be present to receive the shipment on Saturday and implement any necessary processing within the analytical holding times.

For samples that must be stored onsite over a weekend period, a small, dedicated sample refrigerator will be utilized. This sample refrigerator will be located in the Sevenson's Field Sampling trailer office. This office will be lockable and under the control of Sevenson's Field Sampling Manager. The refrigerator will be equipped with a thermometer to monitor that temperature in maintained at 4• C. All samples placed in onsite storage will be tracked in a separate logbook (separate from the field sample logbook) with the date in, time and date out recorded. Refrigerator temperature will be monitored daily and recorded.

Aqueous and solid samples should be prepared for shipment as follows:

- Samples will immediately be placed in a cooler filled with ice for temporary storage prior to shipment to the laboratory. Sample labels are placed on samples immediately after sample collection.
- Secure the lid of the sample jar tightly. Wrap the sample jar with bubble wrap. Place each sample jar in a separate Ziploc-style plastic bag and seal.
- Only metal or plastic ice chests will be used for shipping samples. Tape shut any drain plugs on both the inside and outside of the cooler. Place a new, clean garbage bag inside the cooler as a secondary liner.
- Place bubble wrap or other suitable, waterproof packaging material between each sample bag to take up any void space in the cooler and to prevent the containers from touching. Ice used in coolers for shipping to the laboratories will be placed in doubled Ziploc-style bags with a minimum amount of air. Use an adequate amount of ice bags such that the samples arrive at the laboratory at 4ºC. Secure the secondary cooler liner with a twist-tie or knot.
- The COC record will be placed inside a Ziploc-style bag and taped to the inside of the cooler top.
- The cooler will be closed and taped shut with packing tape or duct tape, and a custody seal will be properly placed across two sides of the cooler lid, preferably one on the front and one on the side.
- The shipping air bill will be securely attached to the exterior of the cooler. Commercial carriers or sample pickup couriers are not required to sign the COC record if it is sealed inside the

shipping cooler and the custody seals remain intact. A copy of the bill of lading must be retained in the project files.

Laboratory Chain of Custody Procedures

The laboratory sample custodian will reconcile the information on the COC records with the sample bottles received and sign and date all appropriate receiving documents. The sample custodian will document any anomalies and report these to the laboratory project manager. Anomalies will be resolved with the Sevenson field sampler, project manager, or data quality control review chemist. The information will be entered into the Laboratory Information Management System (LIMS) along with the analyses being requested. To ensure traceability of samples while in possession of the laboratory, a method for sample identification that has been documented by the laboratory will be used to assign internal sample numbers. The sample custodian is responsible for seeing that all samples are transferred to the proper analyst or stored in the appropriate secure area. Laboratory personnel are responsible for the care and custody of samples form the time they are received, until the sample is exhausted or returned to the custodian using an internal COC record to track sample movement within the laboratory. When sample analyses and necessary QA checks have been completed in the laboratory, the unused portion of the sample will be disposed of properly. All identifying stickers, data sheets, and laboratory records are maintained as part of the documentation. Sample containers and remaining samples are disposed of in compliance with federal, state, and local regulatory requirements.

Final Evidence File Custody Procedures

The evidence files for the project are maintained at the Sevenson corporate office located at 2749 Lockport Road, Niagara Falls, NY, 14305. All files are maintained in a controlled, locked storage for a period of 10 years, unless directed otherwise. The content of the evidence file will include all relevant records, reports, correspondence, logs, field logbooks, laboratory sample preparation and analysis logbooks, data packages, pictures, subcontractor reports, chain of custody records, data review reports, etc. The evidence file will be under custody of the contractor project manager in a locked, secure area. The selected contract laboratory will also retain evidence files of analytical data for a minimum of seven years.

QAPP Worksheet #28-1
QC Samples Table

Matrix	Solid (Waste Characterization)
Analytical Group	TCLP Metals
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-1; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 6010B, 7471B/100.0111, 100.0012
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per preparation batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-digest and reanalyze if level of analyte in sample is <10-times level of blank and above regulatory requirements. Corrective action may not be necessary if samples do not contain analyte found in blank, if samples contain >10-times level of blank, or if level of analyte in sample does not exceed regulatory requirement.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ Reporting Limit (RL)
LCS	One per preparation batch of not more than 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	LCS recoveries must meet the control limit criteria in Appendix 3
MS	One per 20 field samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If not possible (e.g., insufficient sample volume), note in case narrative. If after reanalysis recoveries are again outside limits, note matrix effect. If level of analyte in source sample >4-times the spike added, re-preparation and reanalysis not required.	Laboratory analyst	Accuracy	Spike recoveries must meet the control limit criteria in Appendix 3 (if sample is <4x spike value)
Laboratory Duplicate	One per 20 field samples	RPD ≤ 20%	No further action required; investigate if repeated failures occur	Laboratory analyst	Precision	RPD ≤ 20%

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-2
QC Samples Table

Matrix	Solid (Waste Characterization)
Analytical Group	TCLP VOCs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-1; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8260B/90.0012
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS	One per analytical batch of not more than 20 samples	Per QAPP and laboratory SOP	Reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-3
QC Samples Table

Matrix	Solid (Waste Characterization)
Analytical Group	TCLP SVOCs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-1; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8270C/70.0011
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-4
QC Samples Table

Matrix	Solid (Waste Characterization)
Analytical Group	TCLP Pesticides
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-1; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8081A/60.0006
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain analyte found in blank.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-5
QC Samples Table

Matrix	Solid (Waste Characterization)
Analytical Group	TCLP Herbicides
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-1; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8151A/60.0034
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain analyte found in blank.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-6
QC Samples Table

Matrix	Solid (Waste Characterization)
Analytical Group	PCBs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-1; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8082/60.0003
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain analyte found in blank.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spikes	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per analytical batch	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
MS/MSD	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Precision, Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-7
QC Samples Table

Matrix	Solid (Waste Characterization)
Analytical Group	Reactivity
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-1; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 Sections 9014, 9034/100.0015
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per digestion batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-prepare and reanalyze along with associated samples	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
LCS	One per digestion batch not to exceed 10 samples	Per QAPP and laboratory SOP	Check spiking standard; re-prepare and reanalyze samples	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Laboratory Duplicate	One per SDG	Per QAPP and laboratory SOP	Reanalyze	Laboratory analyst	Precision, Accuracy	RPDs must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-8
QC Samples Table

Matrix	Solid (Waste Characterization)
Analytical Group	pH
Concentration Level	NA
Sampling SOP	Worksheet #17-1; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 1110A/9040C/100.0112
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Initial Calibration Verification	One per batch of 20 samples	±0.10 pH unit of the temperature adjusted pH value	Recalibrate pH meter; reanalyze	Laboratory analyst	Sensitivity	±0.10 pH unit of the temperature adjusted pH value
Continuing Calibration Verification	One per batch of 20 samples	±0.05 pH unit of the temperature adjusted pH value	Recalibrate pH meter; reanalyze	Laboratory analyst	Sensitivity	±0.05 pH unit of the temperature adjusted pH value
Laboratory Duplicate	One per 10 samples	Per QAPP and laboratory SOP	Recalibrate pH meter; reanalyze	Laboratory analyst	Precision	RPDs must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-9
QC Samples Table

Matrix	Solid (Waste Characterization)
Analytical Group	Ignitability
Concentration Level	NA
Sampling SOP	Worksheet #17-1; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 1010A/SW846 1010A, 9-26-13, Rev.9
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Laboratory Duplicate	One per batch of 20 samples	Must agree within ±4ºF	Reanalyze; if reanalysis not possible due to volume constraints, report and flag result	Laboratory analyst	Accuracy	Must agree within ±4ºF
LCS	One per batch of 20 samples	Must flash at 81ºF (±2ºF)	Check apparatus and reanalyze	Laboratory analyst	Precision/Accuracy	Must flash at 81ºF (±2ºF)
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-10
QC Samples Table

Matrix	Soil (Pre-Excavation-Surface)
Analytical Group	TAL Metals (with Mercury and Cyanide)
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-2; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 6010B, 7471B, 9012B/100.0111, 100.0012, 100.0004
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per preparation batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-digest and reanalyze if level of analyte in sample is <10-times level of blank and above regulatory requirements. Corrective action may not be necessary if samples do not contain analyte found in blank, if samples contain >10-times level of blank, or if level of analyte in sample does not exceed regulatory requirement.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ Reporting Limit (RL)
LCS	One per preparation batch of not more than 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	LCS recoveries must meet the control limit criteria in Appendix 3
MS	One per 20 field samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If not possible (e.g., insufficient sample volume), note in case narrative. If after reanalysis recoveries are again outside limits, note matrix effect. If level of analyte in source sample >4-times the spike added, re-preparation and reanalysis not required.	Laboratory analyst	Accuracy	Spike recoveries must meet the control limit criteria in Appendix 3 (if sample is <4x spike value)
Laboratory Duplicate	One per 20 field samples	RPD ≤ 20%	No further action required; investigate if repeated failures occur	Laboratory analyst	Precision	RPD ≤ 20%

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-11
QC Samples Table

Matrix	Soil (Pre-Excavation-Surface)
Analytical Group	TCL VOCs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-2; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8260B/90.0012
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS	One per analytical batch of not more than 20 samples	Per QAPP and laboratory SOP	Reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-12
QC Samples Table

Matrix	Soil (Pre-Excavation-Surface)
Analytical Group	TCL SVOCs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-2; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8270C/70.0011
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-13
QC Samples Table

Matrix	Soil (Pre-Excavation-Surface)
Analytical Group	TCL Pesticides / PCBs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-2; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8081A/60.0006 8082A/60.0003
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain analyte found in blank.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-14
QC Samples Table

Matrix	Soil (Pre-Excavation-Subsurface)
Analytical Group	TCL PCBs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-2; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8082A/60.0003
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain analyte found in blank.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-15
QC Samples Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TAL Metals (with Mercury and Cyanide)
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-3; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 6010B, 7471B, 9012B/100.0111, 100.0012, 100.0004
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per preparation batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-digest and reanalyze if level of analyte in sample is <10-times level of blank and above regulatory requirements. Corrective action may not be necessary if samples do not contain analyte found in blank, if samples contain >10-times level of blank, or if level of analyte in sample does not exceed regulatory requirement.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ Reporting Limit (RL)
LCS	One per preparation batch of not more than 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	LCS recoveries must meet the control limit criteria in Appendix 3
MS	One per 20 field samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If not possible (e.g., insufficient sample volume), note in case narrative. If after reanalysis recoveries are again outside limits, note matrix effect. If level of analyte in source sample >4-times the spike added, re-preparation and reanalysis not required.	Laboratory analyst	Accuracy	Spike recoveries must meet the control limit criteria in Appendix 3 (if sample is <4x spike value)
Laboratory Duplicate	One per 20 field samples	RPD ≤ 20%	No further action required; investigate if repeated failures occur	Laboratory analyst	Precision	RPD ≤ 20%

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-16
QC Samples Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TCL VOCs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-3; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8260B/90.0012
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS	One per analytical batch of not more than 20 samples	Per QAPP and laboratory SOP	Reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-17
QC Samples Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TCL SVOCs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-3; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8270C/70.0011
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-18
QC Samples Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	TCL Pesticides / PCBs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-3; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8081A/60.0006 8082A/60.0003
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain analyte found in blank.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-19
QC Samples Table

Matrix	Solid (Demolition Debris Samples)
Analytical Group	Extractable Petroleum Hydrocarbons (EPH)
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-3; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	NJ EPH; SOP for NJEPH, 1-23-14, Rev 6
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain analyte found in blank.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-20
QC Samples Table

Matrix	Liquid/Solid (AST Samples)
Analytical Group	Gasoline (GRO)/Diesel (DRO) Range Organics
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-4; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8015M / 60.00050
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per digestion batch not to exceed 20 samples	All target compounds ≤ RL	Re-prepare and reanalyze along with associated samples	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
LCS	One per digestion batch not to exceed 10 samples	Per QAPP and laboratory SOP	Check spiking standard; re-prepare and reanalyze samples	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	For QC and field samples, correct problem then re-prepare and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	Laboratory analyst	Accuracy	Recoveries and RPDs must meet the recovery control limit criteria in Appendix 3.

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS/MSD	One per 20 samples of similar matrix and procedure; where the client has not provided sufficient sample aliquots for a MS/MSD to be included in every batch, a duplicate LCS should be performed so analytical precision can be demonstrated	Per QAPP and laboratory SOP	Evaluate problem. If MS and MSD show same effect, it is generally matrix interference. If concentration of spike analyte is significantly (~4-times) greater in unspiked sample, this is matrix interference masking quantitation of spike concentration. If source cannot be determined, reanalyze spike sample.	Laboratory analyst	Accuracy	Recoveries and RPDs must meet the recovery control limit criteria in Appendix 3.
Laboratory Duplicate	One per SDG	Per QAPP and laboratory SOP	Reanalyze	Laboratory analyst	Precision, Accuracy	RPDs must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 30%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 30%

QAPP Worksheet #28-21
QC Samples Table

Matrix	Liquid/Solid (AST Samples)
Analytical Group	EPH
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-4; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	NJ EPH; SOP for NJEPH, 1-23-14, Rev 6
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per digestion batch not to exceed 20 samples	All target compounds ≤ RL	Re-prepare and reanalyze along with associated samples	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
LCS	One per digestion batch not to exceed 10 samples	Per QAPP and laboratory SOP	Check spiking standard; re-prepare and reanalyze samples	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	For QC and field samples, correct problem then re-prepare and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	Laboratory analyst	Accuracy	Recoveries and RPDs must meet the recovery control limit criteria in Appendix 3.

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS/MSD	One per 20 samples of similar matrix and procedure; where the client has not provided sufficient sample aliquots for a MS/MSD to be included in every batch, a duplicate LCS should be performed so analytical precision can be demonstrated	Per QAPP and laboratory SOP	Evaluate problem. If MS and MSD show same effect, it is generally matrix interference. If concentration of spike analyte is significantly (~4-times) greater in unspiked sample, this is matrix interference masking quantitation of spike concentration. If source cannot be determined, reanalyze spike sample.	Laboratory analyst	Accuracy	Recoveries and RPDs must meet the recovery control limit criteria in Appendix 3.
Laboratory Duplicate	One per SDG	Per QAPP and laboratory SOP	Reanalyze	Laboratory analyst	Precision, Accuracy	RPDs must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-22
QC Samples Table

Matrix	Liquid/Solid (AST Samples)
Analytical Group	Oil and Grease
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-4; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	EPA 1664A / EPA 1664A , 11-14-13, Rev.11
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per digestion batch not to exceed 20 samples	All target compounds ≤ RL	Re-prepare and reanalyze along with associated samples	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
LCS	One per digestion batch not to exceed 10 samples	Per QAPP and laboratory SOP	Check spiking standard; re-prepare and reanalyze samples	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
MS	One per 20 samples of similar matrix and procedure; where the client has not provided sufficient sample aliquots for a MS/MSD to be included in every batch, a duplicate LCS should be performed so analytical precision can be demonstrated	Per QAPP and laboratory SOP	Evaluate problem. If MS and MSD show same effect, it is generally matrix interference. If concentration of spike analyte is significantly (~4-times) greater in unspiked sample, this is matrix interference masking quantitation of spike concentration. If source cannot be determined, reanalyze spike sample.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3.
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-23
QC Samples Table

Matrix	Solid (Post-Excavation)
Analytical Group	TAL Metals
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-5; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 6010B / 100.0111
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per preparation batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-digest and reanalyze if level of analyte in sample is <10-times level of blank and above regulatory requirements. Corrective action may not be necessary if samples do not contain analyte found in blank, if samples contain >10-times level of blank, or if level of analyte in sample does not exceed regulatory requirement.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ Reporting Limit (RL)
LCS	One per preparation batch of not more than 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	LCS recoveries must meet the control limit criteria in Appendix 3
MS	One per 20 field samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If not possible (e.g., insufficient sample volume), note in case narrative. If after reanalysis recoveries are again outside limits, note matrix effect. If level of analyte in source sample >4-times the spike added, re-preparation and reanalysis not required.	Laboratory analyst	Accuracy	Spike recoveries must meet the control limit criteria in Appendix 3 (if sample is <4x spike value)
Laboratory Duplicate	One per 20 field samples	RPD ≤ 20%	No further action required; investigate if repeated failures occur	Laboratory analyst	Precision	RPD ≤ 20%

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-24
QC Samples Table

Matrix	Solid (Post Excavation Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-5; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8260B / 90.0012
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS	One per analytical batch of not more than 20 samples	Per QAPP and laboratory SOP	Reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-25
QC Samples Table

Matrix	Solid (Post Excavation Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-5; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8270C / 70.0011
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-26
QC Samples Table

Matrix	Solid (Post Excavation Samples)
Analytical Group	TCL Pesticide/PCB
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-5; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8081A / 60.0006 8082A / 60.0003
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain analyte found in blank.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-27
QC Samples Table

Matrix	Solid (Backfill/Topsoil Samples)
Analytical Group	TCL VOCs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-7; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8260B / 90.0012
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS	One per analytical batch of not more than 20 samples	Per QAPP and laboratory SOP	Reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-28
QC Samples Table

Matrix	Solid (Backfill/Topsoil Samples)
Analytical Group	TCL SVOCs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-7; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8270C / 70.0011
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-29
QC Samples Table

Matrix	Solid (Backfill/Topsoil Samples)
Analytical Group	TCL Pesticides / PCBs
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-7; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8081A / 60.0006 8082A / 60.0003
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain analyte found in blank.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-30
QC Samples Table

Matrix	Solid (Backfill/Topsoil Samples)
Analytical Group	TAL Metals (with Mercury and Cyanide)
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-7; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 6010B, 7471B / 100.0111, 100.0012
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per preparation batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-digest and reanalyze if level of analyte in sample is <10-times level of blank and above regulatory requirements. Corrective action may not be necessary if samples do not contain analyte found in blank, if samples contain >10-times level of blank, or if level of analyte in sample does not exceed regulatory requirement.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ Reporting Limit (RL)
LCS	One per preparation batch of not more than 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	LCS recoveries must meet the control limit criteria in Appendix 3
MS	One per 20 field samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If not possible (e.g., insufficient sample volume), note in case narrative. If after reanalysis recoveries are again outside limits, note matrix effect. If level of analyte in source sample >4-times the spike added, re-preparation and reanalysis not required.	Laboratory analyst	Accuracy	Spike recoveries must meet the control limit criteria in Appendix 3 (if sample is <4x spike value)
Laboratory Duplicate	One per 20 field samples	RPD ≤ 20%	No further action required; investigate if repeated failures occur	Laboratory analyst	Precision	RPD ≤ 20%

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-31
QC Samples Table

Matrix	Solid (Backfill/Topsoil Samples)
Analytical Group	Radium-226
Concentration Level	Trace to Medium
Sampling SOP	Worksheet #17-7; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	DOE Ga-01-R* / GL-RAD-A-013
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Energy and Efficiency Calibration, Energy and Efficiency Check, Background Check	At instrument installation, annually, and following system maintenance that may affect the system; background check performed daily	Per QAPP and laboratory SOP	Recalibrate	Laboratory analyst	Sensitivity	Must meet criteria as outlined in Worksheet #24
Method Blank	One per preparation batch of not more than 20 samples	Result should be ±3 standard deviations	Reanalyze	Laboratory analyst	Sensitivity, Accuracy	Result should be ±3 standard deviations
Laboratory Duplicate	One per preparation batch of not more than 10 samples; two per preparation batch of 11-20 samples.	NAD≤1.96	Reanalyze	Laboratory analyst	Precision	NAD≤1.96

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Laboratory Control Standard	One per preparation batch of not more than 20 samples	Per QAPP and laboratory SOP	Reanalyze	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria
Field duplicate	One per 20 field samples	Results should be within a factor of 4 of each other	Qualify data as necessary. Evaluate if the out of control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible, notify the field team leader to evaluate field procedures.	Sevenson project chemist	Precision, Representativeness	Results should be within a factor of 4 of each other

QAPP Worksheet #28-32
QC Samples Table

Matrix	Solid (UST Closure Confirmation Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-6; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8260B / 90.0012
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per batch of not more than 20 samples	All target compounds ≤ Reporting Limit (RL)	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS	One per analytical batch of not more than 20 samples	Per QAPP and laboratory SOP	Reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-33
QC Samples Table

Matrix	Solid (UST Closure Confirmation Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-6; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8270C / 70.0011
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain compound found in blank, if samples contain >10-times the level of the blank, or if the level in the sample or blank is < regulatory limit.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-34
QC Samples Table

Matrix	Solid (UST Closure Confirmation Samples)
Analytical Group	PCBs
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-6; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8082A / 60.0003
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per extraction batch not to exceed 20 samples	All target compounds ≤ Reporting Limit (RL)	Re-extract and reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. Corrective action may not be necessary if samples do not contain analyte found in blank.	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	Reanalyze samples. If not possible (e.g., limited sample volume, holding time), report data and flag. If recoveries fail again, matrix effect indicated, report original results. If poor recovery due to matrix, reanalysis may not be required.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-35
QC Samples Table

Matrix	Liquid (WWTP Effluent Samples)
Analytical Group	Metals
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-8; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 6010B / 100.0111
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per digestion batch not to exceed 20 samples	All target compounds ≤ RL	Re-prepare and reanalyze along with associated samples	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
LCS	One per digestion batch not to exceed 10 samples	Per QAPP and laboratory SOP	Check spiking standard; re-prepare and reanalyze samples	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Laboratory Duplicate	One per SDG	Per QAPP and laboratory SOP	Reanalyze	Laboratory analyst	Precision, Accuracy	RPDs must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Field Duplicate	One per 20 field samples	RPD ≤ 35%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 35%

QAPP Worksheet #28-36
QC Samples Table

Matrix	Liquid (WWTP Effluent Samples)
Analytical Group	Total Suspended Solids (TSS)
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-8; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SM 2540D / 100.0021
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Method Blank	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Verify concentration and check calculations. Re-prepare and reanalyze method blank and all samples processed with the contaminated blank. If not possible (e.g., limited sample volume, holding time), report data and flag.	Laboratory analyst	Sensitivity, Accuracy	All target compounds < RL.
Laboratory Duplicate	One per SDG	Per QAPP and laboratory SOP	Reanalyze	Laboratory analyst	Precision, Accuracy	RPDs must be ≤5%
LCS/LCSD	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Correct problem, the re-prepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Laboratory analyst	Accuracy	Recoveries must be 80%-120%.

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Field Duplicate	One per 20 field samples	RPD ≤ 30%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 30%

QAPP Worksheet #28-37
QC Samples Table

Matrix	Liquid (WWTP Effluent Samples)
Analytical Group	Total Organic Carbon (TOC)
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-8; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW 846 9060A / 100.0025
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Method Blank	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Verify concentration and check calculations. Re-prepare and reanalyze method blank and all samples processed with the contaminated blank. If not possible (e.g., limited sample volume, holding time), report data and flag.	Laboratory analyst	Sensitivity, Accuracy	All target compounds < RL.
Laboratory Duplicate	One per SDG	Per QAPP and laboratory SOP	Reanalyze	Laboratory analyst	Precision, Accuracy	RPDs must be ≤20%
LCS/LCSD	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Correct problem, the re-prepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Laboratory analyst	Accuracy	Recoveries must be 80%-120%.
Field Duplicate	One per 20 field samples	RPD ≤ 30%	Qualify data as necessary; evaluate if out-of-control condition is likely related to laboratory error. If so, no further action is needed. If laboratory error is not suspected or may not be completely responsible notify field team leader to evaluate field procedures.	Sevenson Project Chemist	Precision, Representativeness	RPD ≤ 30%

QAPP Worksheet #28-38 A1
QC Samples Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TAL Metals
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-8; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 6010B / 100.0111
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per digestion batch not to exceed 20 samples	All target compounds ≤ RL	Re-prepare and reanalyze along with associated samples	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
LCS	One per digestion batch not to exceed 10 samples	Per QAPP and laboratory SOP	Check spiking standard; re-prepare and reanalyze samples	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Laboratory Duplicate	One per SDG	Per QAPP and laboratory SOP	Reanalyze	Laboratory analyst	Precision, Accuracy	RPDs must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

QAPP Worksheet #28-39 A1
QC Samples Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TCL VOC
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-8; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8260C / 90.0012
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per preparatory batch not to exceed 20 samples	Per QAPP and laboratory SOP	Verify concentration and check calculations. Re-prepare and reanalyze method blank and all samples processed with the contaminated blank. If not possible (e.g., limited sample volume, holding time), report data and flag.	Laboratory analyst	Sensitivity, Accuracy	All target compounds < RL
BFB Tune	Prior to initial calibration and calibration verification	Per QAPP and laboratory SOP	Retune instrument and verify	Laboratory analyst	Sensitivity	Refer to criteria included in Worksheet #24
Initial Calibration, Continuing Calibration Verification	At the beginning of the analytical sequence and every 12 hours	Per QAPP and laboratory SOP	Correct the problem, then repeat initial calibration and reanalyze all samples	Laboratory analyst	Sensitivity	Must meet minimum %RSD and %D criteria as outlined in Worksheet #24
System performance check	Once after each initial calibration and calibration verification	Per QAPP and laboratory SOP	Correct the problem and repeat initial calibration.	Laboratory analyst	Sensitivity	Must meet minimum response factor criteria as outlined in Worksheet #24
LCS/LCSD	One per preparatory batch not to exceed 20 samples	Per QAPP and laboratory SOP	Correct problem, the re-prepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3.

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	For QC and field samples, correct problem then re-prepare and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3.
MS/MSD	One per 20 samples of similar matrix and procedure; where the client has not provided sufficient sample aliquots for a MS/MSD to be included in every batch, a duplicate LCS should be performed so analytical precision can be demonstrated	Per QAPP and laboratory SOP	Evaluate problem. If MS and MSD show same effect, it is generally matrix interference. If concentration of spike analyte is significantly (~4-times) greater in unspiked sample, this is matrix interference masking quantitation of spike concentration. If source cannot be determined, reanalyze spike sample.	Laboratory analyst	Accuracy	Recoveries and RPDs must meet the recovery control limit criteria in Appendix 3.

QAPP Worksheet #28-40 A1
QC Samples Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TCL SVOC
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-8; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8270D / 70.0011
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Verify concentration and check calculations. Re-prepare and reanalyze method blank and all samples processed with the contaminated blank. If not possible (e.g., limited sample volume, holding time), report data and flag.	Laboratory analyst	Sensitivity, Accuracy	All target compounds < RL.
DFTPP Tune	Prior to initial calibration and calibration verification	Per QAPP and laboratory SOP	Retune instrument and verify	Laboratory analyst	Sensitivity	Refer to criteria included in Worksheet #24
Initial Calibration, CCV	At the beginning of the analytical sequence and every 12 hours	Per QAPP and laboratory SOP	Correct the problem, then repeat initial calibration and reanalyze all samples	Laboratory analyst	Sensitivity	Must meet minimum %RSD and %D criteria as outlined in Worksheet #24
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	For QC and field samples, correct problem then re-prepare and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3.

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
LCS/LCSD	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Correct problem, the re-prepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3.
MS/MSD	One per 20 samples of similar matrix and procedure; where the client has not provided sufficient sample aliquots for a MS/MSD to be included in every batch, a duplicate LCS should be performed so analytical precision can be demonstrated	Per QAPP and laboratory SOP	Evaluate problem. If MS and MSD show same effect, it is generally matrix interference. If concentration of spike analyte is significantly (~4-times) greater in unspiked sample, this is matrix interference masking quantitation of spike concentration. If source cannot be determined, reanalyze spike sample.	Laboratory analyst	Accuracy	Recoveries and/or RPDs must meet the control limit criteria in Appendix 3.

QAPP Worksheet #28-41 A1
QC Samples Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	TCL Pesticides
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-8; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW846 8081A / 60.0006
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Method Blank	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Verify concentration and check calculations. Re-prepare and reanalyze method blank and all samples processed with the contaminated blank. If not possible (e.g., limited sample volume, holding time), report data and flag.	Laboratory analyst	Sensitivity, Accuracy	All target compounds < RL.
Initial Calibration, ICV, CCV	At the beginning and end of the analytical sequence and every 10 samples	Per QAPP and laboratory SOP	Correct the problem, then repeat initial calibration and reanalyze all samples	Laboratory analyst	Sensitivity	Must meet minimum %RSD and %D criteria as outlined in Worksheet #24
Surrogate Spike	Added to all samples and QC samples per the laboratory SOP	Per QAPP and laboratory SOP	For QC and field samples, correct problem then re-prepare and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3.
LCS/LCSD	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Correct problem, the re-prepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3.

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
MS/MSD	One per 20 samples of similar matrix and procedure; where the client has not provided sufficient sample aliquots for a MS/MSD to be included in every batch, a duplicate LCS should be performed so analytical precision can be demonstrated	Per QAPP and laboratory SOP	Evaluate problem. If MS and MSD show same effect, it is generally matrix interference. If concentration of spike analyte is significantly (~4-times) greater in unspiked sample, this is matrix interference masking quantitation of spike concentration. If source cannot be determined, reanalyze spike sample.	Laboratory analyst	Precision, Accuracy	Recoveries must meet the control limit criteria in Appendix 3.

QAPP Worksheet #28-42 A1
QC Samples Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	Total Suspended Solids (TSS)
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-8; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SM 2540D / 100.0021
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Method Blank	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Verify concentration and check calculations. Re-prepare and reanalyze method blank and all samples processed with the contaminated blank. If not possible (e.g., limited sample volume, holding time), report data and flag.	Laboratory analyst	Sensitivity, Accuracy	All target compounds < RL.
Laboratory Duplicate	One per SDG	Per QAPP and laboratory SOP	Reanalyze	Laboratory analyst	Precision, Accuracy	RPDs must be ≤5%
LCS/LCSD	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Correct problem, the re-prepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Laboratory analyst	Accuracy	Recoveries must be 80%-120%.

QAPP Worksheet #28-43 A1
QC Samples Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	Total Organic Carbon (TOC)
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-8; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW 846 9060A / 100.0025
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Eurofins Analytical
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Method Blank	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Verify concentration and check calculations. Re-prepare and reanalyze method blank and all samples processed with the contaminated blank. If not possible (e.g., limited sample volume, holding time), report data and flag.	Laboratory analyst	Sensitivity, Accuracy	All target compounds < RL.
Laboratory Duplicate	One per SDG	Per QAPP and laboratory SOP	Reanalyze	Laboratory analyst	Precision, Accuracy	RPDs must be ≤20%
LCS/LCSD	One per preparation batch not to exceed 20 samples	Per QAPP and laboratory SOP	Correct problem, the re-prepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	Laboratory analyst	Accuracy	Recoveries must be 80%-120%.

QAPP Worksheet #28-44 A1
QC Samples Table

Matrix	Liquid (WWTP Influent / Informational Samples)
Analytical Group	Oil and Grease
Concentration Level	Low to Medium
Sampling SOP	Worksheet #17-8; Worksheet #27; Appendix 4
Analytical Method/ SOP Reference	SW 846 1664A/SOP for EPA 1664A. 11-14-13, Rev11.doc
Sampler's Name	TBD
Field Sampling Organization	Sevenson
Analytical Organization	Spectrum
No. of Sample Locations	See Worksheet #18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Method Blank	One per digestion batch not to exceed 20 samples	All target compounds ≤ RL	Re-prepare and reanalyze along with associated samples	Laboratory analyst	Sensitivity, Accuracy	All target compounds ≤ RL
LCS/LCSD	One per digestion batch not to exceed 10 samples	Per QAPP and laboratory SOP	Check spiking standard; re-prepare and reanalyze samples	Laboratory analyst	Accuracy	Recovery must be 83%-101%. RPD must be ≤11%
MS/MSD	One per 20 samples of similar matrix and procedure; where the client has not provided sufficient sample aliquots for a MS/MSD to be included in every batch, a duplicate LCS should be performed so analytical precision can be demonstrated	Per QAPP and laboratory SOP	Evaluate problem. If MS and MSD show same effect, it is generally matrix interference. If concentration of spike analyte is significantly (~4-times) greater in unspiked sample, this is matrix interference masking quantitation of spike concentration. If source cannot be determined, reanalyze spike sample.	Laboratory analyst	Accuracy	Recoveries must be 78%-114%. RPD must be ≤18%
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

LCS/LCSD	One per extraction batch not to exceed 20 samples	Per QAPP and laboratory SOP	Re-prepare and reanalyze. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
MS	One per 20 samples. LCS/LCSD analyzed if no appropriate sample can be identified or if insufficient volume available	Per QAPP and laboratory SOP	Reanalyze. If not possible (e.g., limited sample volume, holding time), report data and flag. If recovery is biased high and the analyte is not detected in the sample, corrective action may not be necessary.	Laboratory analyst	Accuracy	Recoveries must meet the control limit criteria in Appendix 3
Temperature Blank	One per sample cooler	4±2ºC	Determine effect on project DQOs; proceed with analysis or recollect samples	Sevenson Project Chemist	Accuracy	4±2ºC

UFP-QAPP Worksheet #29
Project Documents and Records Table

Sample Collection Documents and Records	On-Site Analysis Documents and Records	Off-Site Analysis Documents and Records	Data Assessment Documents and Records	Other
▪ Field logbooks ▪ Chain of custody records ▪ Air bills ▪ Custody seals ▪ Field Change Request forms ▪ Corrective Action forms ▪ Daily Chemical Quality Control Reports ▪ Photo logs ▪ ANSETS Form to EPA	▪ Field logbooks ▪ Equipment calibration logs	▪ Sample receipt, chain of custody forms, and sample tracking records ▪ Equipment calibration logs ▪ Sample preparation logs ▪ Case narrative, data packages ▪ Definition of laboratory qualifiers ▪ Equipment maintenance, testing, and inspection logs ▪ Corrective action forms ▪ Reported field sample results ▪ Electronic data deliverables ▪ Reported results with standards, QC checks, and QC samples ▪ Instrument printouts for field samples, standards, and QC samples ▪ Data package completeness checklists ▪ Technical/QA forms ▪ Data assessment reports ▪ Extraction/cleanup records ▪ Sample disposal records	▪ Field sampling audit checklists ▪ Offsite laboratory audit checklists ▪ Data review reports ▪ Corrective action forms ▪ Telephone logs	▪ Disposal facility waste approval forms ▪ Waste shipping manifests and/or bill-of-lading ▪ Quarterly Chemical Data Interim Reports (CDIR) ▪ Project completion Chemical Data Final Report (CDFR)

UFP-QAPP Worksheet #30 A1
Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Locations/ID Number	Analytical SOP	Data Package Turnaround Time	Laboratory / Organization (name and address, contact person and telephone number)	Backup Laboratory / Organization (name and address, contact person and telephone number)
Waste Characterization	TCLP VOCs, SVOCs, pesticides, herbicides, and metals PCBs RCRA Characteristics (corrosivity, ignitability, reactive cyanide, reactive sulfide)	Low to Medium	Waste Disposal Areas and Stockpiles/Worksheet #24	SW846 1311 / 110.0062 SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8151A / 60.0034 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 8082A / 60.0003 SW846 1110A/9040C / 100.0112 SW846 1010A / SOP for Flashpoint by SW846-1010A, 9-26-13 Rev.9 SW846 9012B / 100.0015 SW846 9034 / 100.0015	Data Results: 10 days Full Deliverable Package: 30 days	Eurofins Analytical 646 Camp Avenue North Kingston, RI 02852 Contact: Ed Lawler Tel: 1 401-732-3400 Fax: 1 401-732-3499	Spectrum's Agawam, Ma lab is designated as a backup

Matrix	Analytical Group	Concentration Level	Sample Locations/ID Number	Analytical SOP	Data Package Turnaround Time	Laboratory / Organization (name and address, contact person and telephone number)	Backup Laboratory / Organization (name and address, contact person and telephone number)
Pre-excavation Surface/Subsurface	Surface Soils: TAL Metals TCL Organics Subsurface Soils: PCB	Low to Medium	Site Drawing C3/Worksheet #24	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 9012B / 100.0004 SW846 8082A / 60.0003	Data Results: 10 days Full Deliverable Package: 30 days	Eurofins Analytical 646 Camp Avenue North Kingston, RI 02852 Contact: Ed Lawler Tel: 1 401-732-3400 Fax: 1 401-732-3499	Spectrum's Agawam, Ma lab is designated as a backup
Demolition Debris	TAL Metals TCL Organics NJ EPH	Low to Medium	Site Drawing C3/Worksheet #24	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 9012B / 100.0004 NJ EPH / SOP for NJEPH, 1-23-14 Rev.6	Data Results: 10 days Full Deliverable Package: 30 days	Eurofins Analytical 646 Camp Avenue North Kingston, RI 02852 Contact: Ed Lawler Tel: 1 401-732-3400 Fax: 1 401-732-3499	Spectrum's Agawam, Ma lab is designated as a backup

Matrix	Analytical Group	Concentration Level	Sample Locations/ID Number	Analytical SOP	Data Package Turnaround Time	Laboratory / Organization (name and address, contact person and telephone number)	Backup Laboratory / Organization (name and address, contact person and telephone number)
AST Samples	GRO/DRO NJEPH Oil and Grease	Low to Medium	Site Contract Drawings/Worksheet #24	SW846 8015M / 60.00050 NJ EPH / SOP for NJEPH, 1-23-14 Rev.6 1664A / SOP for EPA 1664A, 11-14-13 Rev.11	Data Results: 10 days Full Deliverable Package: 30 days	Eurofins Analytical 646 Camp Avenue North Kingston, RI 02852 Contact: Ed Lawler Tel: 1 401-732-3400 Fax: 1 401-732-3499	Spectrum's Agawam, Ma lab is designated as a backup
Post-Excavation	TAL Metals TCL Organics	Low to Medium	Site Drawing C3/Worksheet #24	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012	Data Results: 10 days Full Deliverable Package: 30 days	Eurofins Analytical 646 Camp Avenue North Kingston, RI 02852 Contact: Ed Lawler Tel: 1 401-732-3400 Fax: 1 401-732-3499	Spectrum's Agawam, Ma lab is designated as a backup
Backfill/Topsoil	TAL Metals TCL Organics (+ Acrolein, Acrylonitrile, Benzidine, 1,2-Diphenylhydrazine *as Azobenzene*, N-Nitrosodimethylamine and Tert Butyl Alcohol) Radium-226 Soil pH	Low to Medium	Source Material Location/Worksheet #24	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SW846 8082A / 60.0003 SW846 6010C / 100.0111 SW846 7471B / 100.0012 SW846 9012B / 100.0004 DOE Ga-01-R* SW846 1110A/9040C / 100.0112	Data Results: 10 days Full Deliverable Package: 30 days	Eurofins Analytical 646 Camp Avenue North Kingston, RI 02852 Contact: Ed Lawler Tel: 1 401-732-3400 Fax: 1 401-732-3499	Spectrum's Agawam, Ma lab is designated as a backup

Matrix	Analytical Group	Concentration Level	Sample Locations/ID Number	Analytical SOP	Data Package Turnaround Time	Laboratory / Organization (name and address, contact person and telephone number)	Backup Laboratory / Organization (name and address, contact person and telephone number)
UST Closure Confirmation	TCL Organics (VOC, SVOC and PCB only)	Low to Medium	Site Contract Drawings/Worksheet #24	SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8082A / 60.0003	Data Results: 10 days Full Deliverable Package: 30 days	Eurofins Analytical 646 Camp Avenue North Kingston, RI 02852 Contact: Ed Lawler Tel: 1 401-732-3400 Fax: 1 401-732-3499	Spectrum's Agawam, Ma lab is designated as a backup
WWTP Effluent	Total Metals TSS TOC	Low to Medium	Site WWTP/Worksheet #24	SW846 6010C / 100.0111 SM 2540D / 100.0021 SW846 9060A / 100.0025	Data Results: 10 days Full Deliverable Package: 30 days	Eurofins Analytical 646 Camp Avenue North Kingston, RI 02852 Contact: Ed Lawler Tel: 1 401-732-3400 Fax: 1 401-732-3499	Spectrum's Agawam, Ma lab is designated as a backup
WWTP Information	TAL Metals TCL VOC TCL SVOC TCL Pesticides TSS TOC Oil and Grease	Low to Medium	Site WWTP/Worksheet #24	SW846 6010C / 100.0111 SW846 8260C / 90.0012 SW846 8270D / 70.0011 SW846 8081B / 60.0006 SM 2540D / 100.0021 SW846 9060A / 100.0025 1664A / SOP for EPA 1664A, 11-14-13 Rev 11.	Data Results: 10 days Full Deliverable Package: 30 days	Eurofins Analytical 646 Camp Avenue North Kingston, RI 02852 Contact: Ed Lawler Tel: 1 401-732-3400 Fax: 1 401-732-3499	Spectrum's Agawam, Ma lab is designated as a backup

[1] Additional analytes may be required by the offsite disposal facility. The Waste Disposal Coordinator should be contacted prior to sample collection in order to verify the analytical requirements.

UFP-QAPP Worksheet #31
Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing CA	Person(s) Responsible for Monitoring Effectiveness of CA
Specific field procedure assessment and UFP-QAPP compliance	Quarterly if necessary	Internal	Sevenson	Eric DeLellis, Sevenson CQCSM	William Zambrana Sevenson Field Sampling Team Leader	William Zambrana Sevenson Field Sampling Team Leader	Eric DeLellis, Sevenson CQCSM William Zambrana, Sevenson Field Sampling Team Leader
Field Audit of sample collection procedures	Quarterly	Internal	Sevenson	Eric DeLellis, Sevenson CQCSM	William Zambrana Sevenson Field Sampling Team Leader	William Zambrana Sevenson Field Sampling Team Leader	Eric DeLellis, Sevenson CQCSM William Zambrana, Sevenson Field Sampling Team Leader
Data review	As data becomes available from the laboratory	Internal	Sevenson	James Hyzy, Sevenson Data Quality Control Review Chemist	Laboratory QA Officer	Laboratory QA Officer	James Hyzy, Sevenson Data Quality Control Review Chemist Laboratory QA Officer
Data review to assign regulatory status of materials for offsite disposal	As data becomes available from the laboratory	Internal	Sevenson	Ken Paisley, Sevenson Regulatory Specialist/Waste Disposal Coordinator	James Hyzy, Sevenson Data Quality Control Review Chemist Laboratory QA Officer	James Hyzy, Sevenson Data Quality Control Review Chemist Laboratory QA Officer	Ken Paisley, Sevenson Regulatory Specialist/Waste Disposal Coordinator
Daily field documentation	Daily	Internal	Sevenson	Eric DeLellis, Sevenson CQCSM	William Zambrana,	William Zambrana,	Eric DeLellis, Sevenson CQCSM

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing CA	Person(s) Responsible for Monitoring Effectiveness of CA
review					Sevenson Field Sampling Team Leader	Sevenson Field Sampling Team Leader	William Zambrana, Sevenson Field Sampling Team Leader
Health and safety audit	Quarterly if necessary	Internal	Sevenson	Paul Jung, Sevenson Corporate H&S Director	Steve Gillespie, Sevenson Project Manager	Ron Scarborough, Sevenson SSHO	Paul Jung, Sevenson Corporate H&S Director

UFP-QAPP Worksheet #32
Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings	Timeframe of Notification	Nature of CA Response Documentation	Individual(s) Receiving CA Response	Timeframe for Response
Data validation	Laboratory resubmission	Laboratory QA officer	After arrival of data from the lab and during data validation activities	Corrective action reports and/or updated case narratives and corrected data submissions	James Hyzy, Sevenson Data Quality Control Review Chemist	7 business days
Daily field documentation reviews	Internal letter and any verification documentation	Steve Gillespie, Sevenson Project Manager	1 business day	Plan for correction and verification that correction is complete	Steve Gillespie, Sevenson Project Manager	1 business day
Internal project reporting reviews	Internal report comments	Steve Gillespie, Sevenson Project Manager	7 business days	Response to comment and applicable report correction	Steve Gillespie, Sevenson Project Manager	7 business days
Health and safety audit	Written audit report	Steve Gillespie Sevenson Project Manager	3-5 business days	Letter and any verification documentation	Paul Jung, Sevenson Corporate H&S Director	24 hours after notification
Field activities	Field audit report form	Steve Gillespie, Sevenson Project Manager	1 business day	Verification that field change is warranted or corrective action report to correct item noted during field activity assessment	William Zambrana, Sevenson Field Sampling Team Leader	1 business day

UFP-QAPP Worksheet #33
QA Management Reports Table

Type of Report	Frequency	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation	Report Recipient(s)
Daily Chemical Quality Control Report	Daily during field work	Duration of field activities	William Zambrana, Sevenson Field Sampling Team Leader	Steve Gillespie, Sevenson Project Manager USACE-NY
Field Audit Report	If significant deficiencies are found	Within 5 days of completion of field audit	Field auditor(s)	Steve Gillespie, Sevenson Project Manager
Corrective Action Reports	When corrective action is required	When corrective action is implemented	William Zambrana, Sevenson Field Sampling Team Leader	Steve Gillespie, Sevenson Project Manager
Analytical Data Review Summary Reports	Each laboratory work order generated for project samples	Within 5 days of receipt of the analytical data report from the laboratory	James Hyzy, Sevenson Data Quality Control Review Chemist	Steve Gillespie, Sevenson Project Manager
Chemical Data Interim Report	Quarterly	Within 60 days of the end of the quarter	James Hyzy, Sevenson Data Quality Control Review Chemist	USACE-NY USEPA
Chemical Data Final Report	Once at project completion	Within 60 days of the end of the quarter	James Hyzy, Sevenson Data Quality Control Review Chemist	USACE-NY USEPA
Health and Safety Audit	Once	Submitted with final reports	Paul Jung, Sevenson Corporate H&S Director Other Sevenson health and safety staff	USACE-NY USEPA

UFP-QAPP Worksheet #34
Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification
Chain of custody and shipping forms	Chain of custody forms and shipping documentation will be reviewed internally upon their completion and verified against the packed sample coolers they represent. The shipper's signature on the COC will be initialed by the reviewer, a copy of the COC retained in the site files, and the original and remaining copies taped inside the cooler for shipment. Refer to Worksheet #27 for additional details.	Internal	Steve Gillespie, Sevenson Project Manager
Audit reports	Upon report completion, a copy of all audit reports will be placed in the site file. If corrective actions are required, a copy of the documented corrective action will be attached to the appropriate audit report in the site file.	Internal	Steve Gillespie, Sevenson Project Manager
Field notes	Field notes will be reviewed internally at the end of each working day and placed in the site file.	Internal	Steve Gillespie, Sevenson Project Manager
Laboratory data	All laboratory packages will be verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal. All data packages will be verified internally by the Sevenson data quality control review chemist or designee for samples generated by a subcontracted laboratory according to the data review procedures specified in Worksheet #36.	External Internal	Project laboratory James Hyzy, Sevenson Project Chemist
UFP-QAPP	All planning documents will be available to reviewers to allow reconciliation with planned activities and objectives.	Internal	Steve Gillespie, Sevenson Project Manager James Hyzy, Sevenson Project Chemist

UFP-QAPP Worksheet #35
Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation
IIa	Laboratory data packages	Ensure that all analytical procedures were followed. Corrective actions will be taken and documented when applicable per specific methods. Data will be qualified in accordance with specific methods. Any deviations will be documented.	Laboratory personnel James Hyzy, Sevenson Project Chemist
IIa	Documentation of method QC results	Establish that all method required QC samples were run and met required limits.	Laboratory personnel James Hyzy, Sevenson Project Chemist
IIb	Documentation of UFP-QAPP QC sample results	Establish that all UFP-QAPP required QC samples were run and met required limits.	Laboratory personnel James Hyzy, Sevenson
IIb	Project quantitation limits	All sample results met the project quantitation limit specified in the UFP-QAPP.	Laboratory personnel James Hyzy, Sevenson Project Chemist
IIb	Sampling procedures	Evaluate whether sampling procedures were followed with respect to equipment and proper sampling support.	Steve Gillespie, Sevenson Project Manager James Hyzy, Sevenson Project Chemist
IIb	Deviations (sampling and analysis)	Determine the impacts of any deviations from sampling or analytical methods and SOPs	Steve Gillespie, Sevenson Project Manager James Hyzy, Sevenson Project Chemist USACE USEPA

UFP-QAPP Worksheet #36
Validation (Steps IIa and IIb) Summary Table

Step IIa / IIb	Matrix	Analytical Group	Methods	Concentration Level	Validation Criteria	Data Validator
IIa/IIb	Solid Waste Characterization	TCLP VOCs, SVOCs, pesticides, herbicides, and metals Total PCBs RCRA Characteristics (i.e., corrosivity, ignitability, reactive cyanide, reactive sulfide)[1]	EPA SW846 1311, 8260B, 8270D, 8081B, 8151A, 6010C, 7471B EPA SW846 8082A EPA SW846 9045, 40 CFR §261.21,EPA SW 846 9010, 9030.	Low to Medium	Project-specific e-QAPP, (Specific Quality Control criteria is listed in Appendix 3 of this document) For disposal – no formal validation package required.	James Hyzy, Sevenson Project Chemist
IIa/IIb	Demolition Debris	TAL Metals TCL Organics NJ EPH	EPA SW846 8260B, 8270D, 8081B, 8151A 6010C, 7471B NJ EPH	Low to Medium	Project-specific e-QAPP, (Specific Quality Control criteria is listed in Appendix 3 of this document). Validation will be performed using ADR/EDMS[2] software and evaluated in accordance with EPA Contract Laboratory Program National Functional Guidelines (inorganics – EPA 540-R-013-001; organics – EPA-540-R-014-002).	James Hyzy, Sevenson Project Chemist
IIa/IIb	AST Samples	GRO/DRO NJEPH Oil and Grease	EPA SW846 8015C NJEPH EPA SW846 9071B	Low to Medium	Project-specific e-QAPP, (Specific Quality Control criteria is listed in Appendix 3 of this document) For disposal – no formal validation package required.	James Hyzy, Sevenson Project Chemist
IIa/IIb	Post-Excavation	TAL Metals	EPA SW846 8260B,	Low to Medium	Project-specific e-QAPP,	James Hyzy, Sevenson

Step IIa / IIb	Matrix	Analytical Group	Methods	Concentration Level	Validation Criteria	Data Validator
		TCL Organics	8270D, 6010C, 7471B		(Specific Quality Control criteria is listed in Appendix 3 of this document) Validation will be performed using ADR/EDMS^2 software and evaluated in accordance with EPA Contract Laboratory Program National Functional Guidelines (inorganics – EPA 540-R-013-001; organics – EPA-540-R-014-002).	Project Chemist
IIa/IIb	Backfill/Topsoil	TAL Metals TCL Organics (+ Acrolein, Acrylonitrile, Benzidine, 1,2-Diphenylhydrazine *as Azobenzene*, N-Nitrosodimethylamine and Tert Butyl Alcohol) Radium-226 Soil pH	EPA SW846 8260B, 8270D, 6010C, 7471B EPA SW846 9000 EPA SW846 9045D	Low to Medium	Project-specific e-QAPP, (Specific Quality Control criteria is listed in Appendix 3 of this document) Validation will be performed using ADR/EDMS^2 software and evaluated in accordance with EPA Contract Laboratory Program National Functional Guidelines (inorganics – EPA 540-R-013-001; organics – EPA-540-R-014-002).	James Hyzy, Sevenson Project Chemist
IIa/IIb	UST Closure Confirmation	TCL Organics (VOC, SVOC and PCB only)	EPA SW846 8260B, 8270D, 8082A	Low to Medium	Project-specific e-QAPP, (Specific Quality Control criteria is listed in Appendix 3 of this document). Validation will be performed using ADR/EDMS^2 software and evaluated in accordance	James Hyzy, Sevenson Project Chemist

Step IIa / IIb	Matrix	Analytical Group	Methods	Concentration Level	Validation Criteria	Data Validator
					with EPA Contract Laboratory Program National Functional Guidelines (inorganics – EPA 540-R-013-001; organics – EPA-540-R-014-002).	
IIa/IIb	WWTP Effluent	Total Metals TSS TOC	EPA SW846 6010C, 7471B, 160.2, 415.1	Low to Medium	Project-specific e-QAPP, (Specific Quality Control criteria is listed in Appendix 3 of this document) . Validation will be performed using ADR/EDMS[2] software and evaluated in accordance with site specific discharge parameters.	James Hyzy, Sevenson Project Chemist

[1] Additional analytes may be required by the offsite disposal facility. The Waste Disposal Coordinator should be contacted prior to sample collection in order to verify the analytical requirements.

[2] 100% of the analytical data requiring validation, will be validated and where applicable and reviewed electronically using the USACE ADR.NET (Version 1.9.1.331) and Environmental Data Management System – EDMS (Version 7.1) software and project-specific e-QAPP. For radiological parameters in accordance with MARLAP Chapter 8, Section 5 ((EPA/402/B-04/001A) will be used. Validation reports containing the results of this review will be provided to the site for matrix samples that require a formal validation process. All samples will be validated using ADR / EDMS software; 100% of data will be validated, 10% of calculations will be verified.

UFP-QAPP Worksheet #37
Usability Assessment

Summarize the usability assessment and all procedures, including interim steps and statistics, equations, and computer algorithms that will be used:

It is the responsibility of the Sevenson Data Quality Control Review Chemist and the laboratory to ensure that the data meet the method detection limits, reporting limits, and laboratory QC limits listed in the UFP-QAPP. During the data validation assessment, non-conformances are documented and data are qualified for use in decision making. The data are determined to be usable by the Sevenson Data Quality Control Review Chemist based on the requirements of this UFP-QAPP. Data gaps will be present if a sample is not collected, a sample is not analyzed for the requested parameters, or the data are determined to be unusable. The need for further investigation will be determined on a case-by-case basis, depending on whether data can be extrapolated from adjacent sampling locations, and whether or not the results are unnecessary based on the results from adjacent locations. All data are usable as qualified by the data validator, with the exception of rejected data. Estimated and/or biased results are usable. Final decisions on further sampling, usability of qualified data and usability of estimated/biased data are subject to final review and approval by the COR.

Describe the evaluative procedures used to assess overall measurement error associated with the project:

In depth assessment occurs during the data validation process. The validation will follow approved USEPA Region 2 Guidelines and SOPs to assess conformance with the requirements of the methods, SOPs, and data quality objectives of this UFP-QAPP. The findings of the data validation will generate qualifiers applied to the data considered in context to assess overall usability of the data.

Identify the personnel responsible for performing the usability assessment:

James Hyzy, Sevenson Data Quality Control Review Chemist

Describe the documentation that will be generated using usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

The data validation reports will identify precision and accuracy exceedances with respect to the laboratory performance for each batch of samples, as well as comparability of field and laboratory duplicates. All the results will be assembled and reported for an overall quality assessment provided in the CDIR and final project report. Discussion will cover precision, accuracy/bias, sensitivity, representativeness, comparability, completeness, and reconciliation, defined as follows:

- **Precision.** Results of laboratory duplicates will be assessed during data review and data will be qualified according to the data review procedures cited on Worksheet #36. Precision will be calculated using the equations included in Worksheet #12. A discussion summarizing the results of laboratory precision and any limitations on the use of the data will be described in the CDIR.

- **Accuracy/Bias Contamination.** Results of laboratory blanks will be assessed as part of data review. During the review process the reviewer will qualify the data following the procedures described on Worksheet #36. A discussion summarizing the results of laboratory accuracy and

bias based on contamination will be presented and any limitation on the use of the data will be described in the CDIR.

- **Overall Accuracy/Bias.** The results of MS recoveries will be reviewed and data will be qualified according to the data review procedures cited on Worksheet #36. Accuracy will be calculated using the equations included in Worksheet #12. A discussion summarizing the results of laboratory accuracy and any limitations on the use of the data will be described in the CDIR.

- **Sensitivity.** Data results will be compared to clean-up criteria provided on Worksheet #15. A discussion summarizing any conclusions about the sensitivity of the analyses will be presented and any limitations on the use of the data will be described in the CDIR.

- **Representativeness.** A review of adherence to field procedures and of project quality control audits will be performed in order to assess the representativeness of the sampling program. Data review narratives will also be reviewed and any conclusions about the representativeness of the data set will be discussed.

- **Comparability.** Data will be collected, analyzed, and reported in a manner that is comparable to the existing site data.

- **Completeness.** A completeness check will be done on all data generated by the laboratory. Completeness will be calculated using the equations included in Worksheet #12 for each analyte. For sampling, completeness will be calculated as the number of samples collected and analyzed by the laboratory divided by the number planned for collection. Also for each analyte, completeness will be calculated as the number of data points for each analyte that meets measurement performance criteria divided by the total number of data points for that analyte. A discussion summarizing the results of project completeness and any limitations on the use of the data will be described in the CDIR.

- **Reconciliation.** The project quality objectives presented in Worksheet #12 will be examined to determine if the objective was met. This examination will include a combined overall assessment of the results of each analysis pertinent to an objective. Each analysis will first be evaluated separately in terms of major impacts observed from data review, data quality indicators, and measurement performance criteria assessments. Based on the results of these assessments, the quality of the data will be determined. Based on the quality determined, the usability of the data for each analysis will be determined. Based on the combined usability of the data from all analyses for an objective, it will be determined if the project quality objective was met and whether project goals were achieved. As part of the reconciliation of each objective, conclusions will be drawn and any limitations on the usability of any of the data will be described.

The process that will be used to ensure that the data obtained by this project addresses the DQOs and is of sufficient quantity and quality to fulfill the project goals is a 5-step data usability process described as follows:

Step 1 – Review the project's objectives and sampling design.

Review the sampling design for consistency with stated objectives. This provides the context for interpreting the data in subsequent steps.

Step 2 – Review the data verification and data validation outputs.

Review available QA reports, including the data verification and data validation reports. Look for patterns, trends, and anomalies (i.e., unexpected results). Review deviations from planned activities (e.g., number and locations of samples, holding time exceedances, damaged samples, non-compliant sample results, and SOP deviations) and determine their impacts on the data usability. Evaluate implications of unacceptable QC sample results.

Step 3 – Verify the assumptions of the selected statistical method.

If applicable

Step 4 – Implement the statistical method.

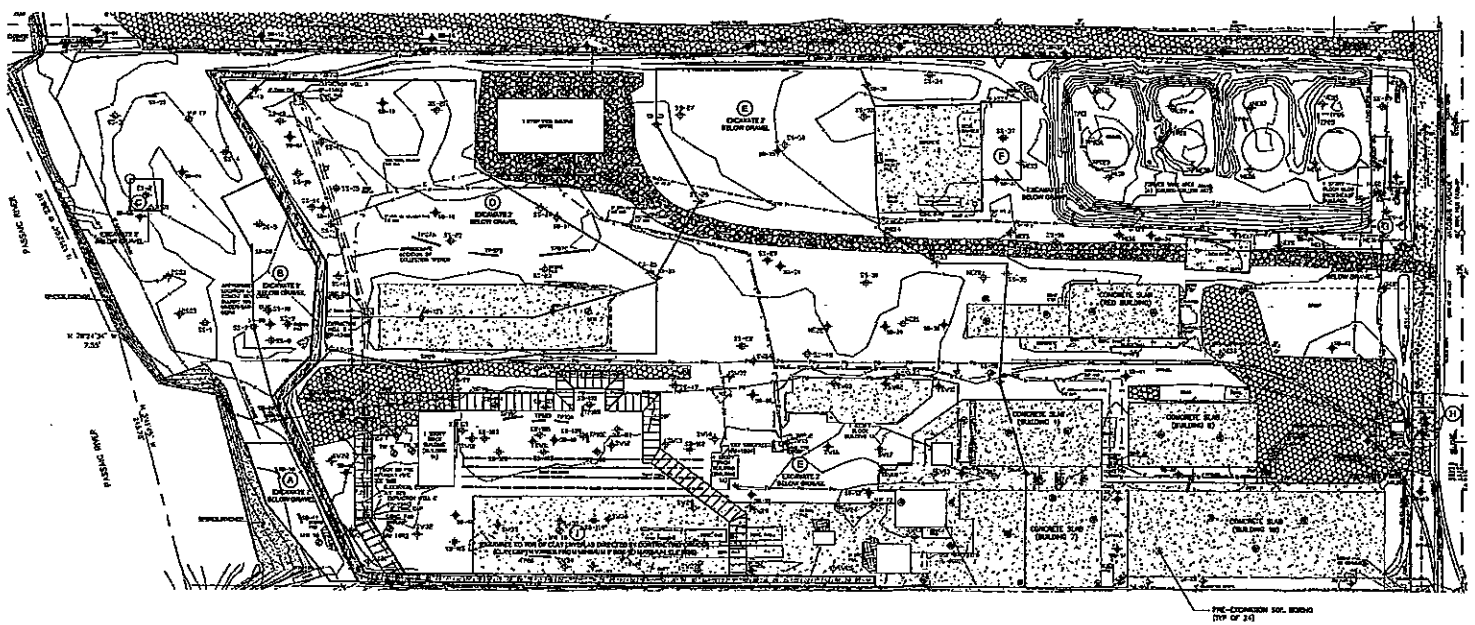
Not applicable

Step 5 – Document data usability and draw conclusions.

Determine if the data can be used as intended, considering implications of deviations and corrective actions. Discuss data quality indicators. Assess the performance of the sampling design and Identify limitations on data use. Update the conceptual site model and document conclusions. Prepare the data usability summary report in the form of text and/or a table.

APPENDIX 1

Site Map



NOTES:

1. FOLLOWING BUILDING DEMOLITION, THE CONTRACTOR SHALL COLLECT PRE-EXCAVATION SOIL SAMPLES FROM 24 SOIL BORINGS AS SHOWN ON THIS PLAN. SURFACE AND SUBSURFACE SOIL SAMPLES SHALL BE COLLECTED IN 2-FOOT INTERVALS APPROXIMATELY AS FOLLOWS OR AS DIRECTED BY THE CONTRACTING OFFICER:

INTERVAL	DEPTH (FEET BGS OR BELOW SLAB)
A	0–2 (SURFACE)
B	3–4
C	5–7
D	8–11

2. ALL SAMPLES SHALL BE COLLECTED AND ANALYZED IN ACCORDANCE WITH SPECIFICATIONS SECTION 01450, AND CONTRACTOR'S APPROVED UNIFORM FIELDING, POLICY QUALITY ASSURANCE PROJECT PLAN. SAMPLES SHALL BE ANALYZED BY AN OFFSITE SUBCONTRACT LABORATORY ON A 14-DAY QUICK TURN AROUND TIME.

3. PRE-EXCAVATION SAMPLES WILL BE COMPARED TO EITHER SURFACE OR SUBSURFACE SITE CLEANUP CRITERIA AS DESCRIBED IN SECTION 02110 AND SUBMITTED TO CONTRACTING OFFICER. UPON RECEIPT OF SAMPLE RESULTS, THE CONTRACTING OFFICER WILL REVISE THE EXCAVATION PLAN, AS NECESSARY.

4. BORING LOCATIONS ARE APPROXIMATE. EXACT LOCATIONS TO BE DETERMINED IN FIELD BY CONTRACTOR IN CONSULTATION WITH THE CONTRACTING OFFICER.

1" = 40'
20 0 40

PRE-EXCAVATION SAMPLING PLAN

SHEET NO. C-2

100% DESIGN – REVISION 2

APPENDIX 2

NJPDES/DSW Permit Equivalency

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Mail Code – 401-02B
Water Pollution Management Element
Bureau of Surface Water Permitting
P.O. Box 420
Trenton, NJ 08625-0420
Phone: (609) 292-4860 / Fax: (609) 984-7938

BOB MARTIN
Commissioner

Via E-mail only

February 1, 2017

Pamela Baxter, Remedial Project Manager
United States Environmental Protection Agency (USEPA)
290 Broadway
New York, New York 10007-1866

Re: Surface Water GPA New
Category: BGR - General Remediation Clean-up (GP)
NJPDES Permit No. NJG0263036
Syncon Resins Superfund Site
77 Jacobus Avenue
Kearny Township, Hudson County

Dear Ms. Baxter:

Enclosed is an Individual NJPDES/DSW General Permit Authorization under the Category BGR Master General Remediation Clean-Up Permit (NJ0155438). This General Permit Authorization is issued in accordance with the New Jersey Pollutant Discharge Elimination System (NJPDES) Regulations (N.J.A.C. 7:14A-1 et seq.).

This general permit authorizes the temporary discharge of treated water from the dewatering and construction operations on site, through the discharge outfall, DSN001A, as specified on your permit authorization page. Approximately 0.12 MGD of dewatering and construction water will be pumped and treated via an oil/water separator, a weir settling tank, three greensand filters, a zeolite absorber unit, and two liquid phase carbon filter units, and will then be discharged to the Passaic River which is classified as SE3 (C2) waters.

The limits and monitoring requirements in Part III of this authorization are included in accordance with the Master BGR NJ0155438. Monitoring for Iron has also been included in this permit due to its known presence in the water being treated. Violation of any condition of this authorization may subject the permittee to significant penalties.

Due to the nature of the treatment process, the method for management of the residuals as well as the minimal amount of residuals that will be generated in the settling tank, an exemption from reporting under the Sludge Quality Assurance Regulations (SQAR, N.J.A.C. 7:14C) is granted. However, records shall be kept of the amount and where all sediment from the settling tank (if necessary) is managed.

The project is scheduled to begin on approximately March 1, 2017 and end on approximately September 31, 2017; therefore, the enclosed Authorization to discharge groundwater under the General Permit is effective on March 1, 2017 and shall expire on December 31, 2017. This should allow sufficient time for the project to be

completed. The permittee shall contact the Department at least 30 days prior to expiration if an extension of the permit date is necessary.

The NJPDES Monitoring Report Form (MRF) Reference Manual can be accessed at www.state.nj.us/dep/dwq/pdf/MRF_Manual.pdf for further information regarding reporting of monitoring data. Please note that if there is a discrepancy between the General Permit Authorization and the MRF Reference Manual, the General Permit Authorization always takes precedence.

On October 22, 2015, the U.S. Environmental Protection Agency (EPA) promulgated the final National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule (see Federal Register 80:204 p. 64064). This rule requires entities regulated under the Clean Water Act NPDES program to report certain information electronically instead of filing paper reports. To view the final rule, please visit www.gpo.gov/fdsys/pkg/FR-2015-10-22/pdf/2015-24954.pdf. Information on how to enroll in electronic reporting may be obtained from the Department's website at www.nj.gov/dep/dwq/mrf.htm.

All monitoring shall be conducted in accordance with the Department's "Field Sampling Procedures Manual" applicable at the time of sampling (N.J.A.C. 7:14A-6.5(b)4). The Field Sampling Procedures Manual can be found on the Department's website at www.nj.gov/dep/srp/guidance/fspm/.

If you have questions or comments regarding the final action, please contact Johnathan Lakhicharran by phone at (609) 292-4860 or by e-mail at Johnathan.Lakhicharran@dep.nj.gov.

Sincerely,

M Christopher

Michele Christopher,
Supervising Environmental Engineer
Bureau of Surface Water Permitting

Enclosures

c: Permit Distribution List

Masterfile #: 48613; PI #: 745007

Table of Contents

This permit package contains the following items:

1. **Cover Letter**
2. **Table of Contents**
3. **NJPDES Permit Authorization Page for NJG0263036**
4. **NJPDES Permit Authorization Page for Master General Permit NJPDES No. NJ0155438**
5. **USGS Map**
6. **Part I – General Requirements: NJPDES**
7. **Part II – General Requirements: Discharge Categories**
8. **Part III – Limits and Monitoring Requirements**
9. **Part IV – Specific Requirements: Narrative**

New Jersey Department of Environmental Protection

Mail Code – 401-02B
Bureau of Surface Water Permitting
Water Pollution Management Element
PO Box 420 – 401 E State St
Trenton, NJ 08625-0420
(609) 292-4860

AUTHORIZATION TO DISCHARGE
BGR -General Remediation Clean-up (GP)

Facility Name: Syncon Resins Superfund Site

PI ID #: 745007

Facility Address:
77 Jacobus Avenue
Kearny, New Jersey 07032

NJPDES #: NJG0263036

Type of Activity: Surface Water GPA New

Owner:
None

Operating Entity:
USEPA
290 Broadway
New York, New York 10007-1866

Outfall Number	Latitude	Longitude	Receiving Stream	Classification
DSN001A	40° 44' 20.3" N	74° 6' 58.6" W	Passaic River	SE3 (C2)

Authorization Covered Under This Approval	Issuance Date:	Effective Date:	Expiration Date:
BGR -General Remediation Clean-up (GP) Surface Water GPA New	2/1/17	3/1/2017	12/31/17

Your Request for Authorization under NJPDES General Permit No. NJ0155438 has been approved by the New Jersey Department of Environmental Protection.

M Christopher

Michele Christopher, Supervising Environmental Engineer
Bureau of Surface Water Permitting
Water Pollution Management Element
Division of Water Quality
New Jersey Department of Environmental Protection

NEW JERSEY POLLUTANT DISCHARGE ELIMINATION SYSTEM

The New Jersey Department of Environmental Protection hereby grants you a NJPDES permit for the facility/activity named in this document. This permit is the regulatory mechanism used by the Department to help ensure your discharge will not harm the environment. By complying with the terms and conditions specified, you are assuming an important role in protecting New Jersey's valuable water resources. Your acceptance of this permit is an agreement to conform with all of its provisions when constructing, installing, modifying, or operating any facility for the collection, treatment, or discharge of pollutants to waters of the state. If you have any questions about this document, please feel free to contact the Department representative listed in the permit cover letter. Your cooperation in helping us protect and safeguard our state's environment is appreciated.

Permit Number: NJ0155438

Final: Surface Water Master General Permit Renewal

Permittee:
NJPDES Master General Permit Program Interest
Per Individual Notice of Authorization

Co-Permittee:

Property Owner:
Per Individual Notice of Authorization
Division of Water Quality
Bureau of Surface Water Permitting
Mail Code 401-02B
Trenton, NJ 08625-0420

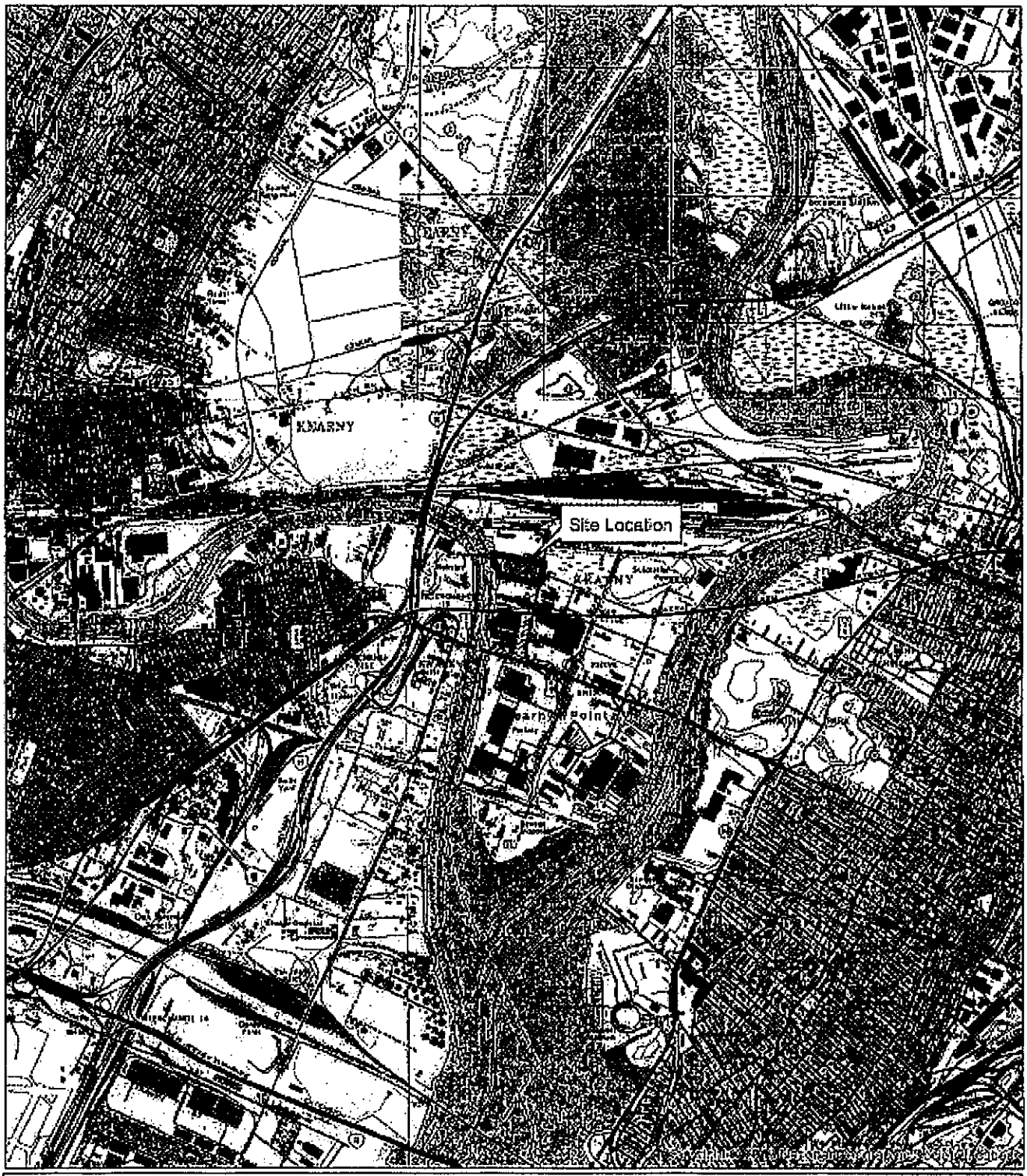
Location Of Activity:
NJPDES Master General Permit Program Interest
Per Individual Notice of Authorization

Authorization(s) Covered Under This Approval	Issuance Date	Effective Date	Expiration Date
BGR -General Remediation Clean-up (GP)	June 3, 2015	July 1, 2015	June 30, 2020

By Authority of:
Commissioner's Office

DEP AUTHORIZATION
Pilar Patterson, Chief
Bureau of Surface Water Permitting
Division of Water Quality

(Terms, conditions and provisions attached hereto)



N
W E
S

0 0.25 0.5 1 Miles

Syncon Resins Superfund Site

South Kearny, Hudson County, New Jersey

Figure 1
Site Location

CDM Smith

PART I
GENERAL REQUIREMENTS:
NJPDES

A. General Requirements of all NJPDES Permits

1. Requirements Incorporated by Reference

a. The permittee shall comply with all conditions set forth in this permit and with all the applicable requirements incorporated into this permit by reference. The permittee is required to comply with the regulations, including those cited in paragraphs b. through e. following, which are in effect as of the effective date of the final permit.

b. General Conditions

Penalties for Violations	N.J.A.C. 7:14-8.1 et seq.
Incorporation by Reference	N.J.A.C. 7:14A-2.3
Toxic Pollutants	N.J.A.C. 7:14A-6.2(a)4i
Duty to Comply	N.J.A.C. 7:14A-6.2(a)1 & 4
Duty to Mitigate	N.J.A.C. 7:14A-6.2(a)5 & 11
Inspection and Entry	N.J.A.C. 7:14A-2.11(e)
Enforcement Action	N.J.A.C. 7:14A-2.9
Duty to Reapply	N.J.A.C. 7:14A-4.2(e)3
Signatory Requirements for Applications and Reports	N.J.A.C. 7:14A-4.9
Effect of Permit/Other Laws	N.J.A.C. 7:14A-6.2(a)6 & 7 & 2.9(c)
Severability	N.J.A.C. 7:14A-2.2
Administrative Continuation of Permits	N.J.A.C. 7:14A-2.8
Permit Actions	N.J.A.C. 7:14A-2.7(c)
Reopener Clause	N.J.A.C. 7:14A-6.2(a)10
Permit Duration and Renewal	N.J.A.C. 7:14A-2.7(a) & (b)
Consolidation of Permit Process	N.J.A.C. 7:14A-15.5
Confidentiality	N.J.A.C. 7:14A-18.2 & 2.11(g)
Fee Schedule	N.J.A.C. 7:14A-3.1
Treatment Works Approval	N.J.A.C. 7:14A-22 & 23

c. Operation And Maintenance

Need to Halt or Reduce not a Defense	N.J.A.C. 7:14A-2.9(b)
Proper Operation and Maintenance	N.J.A.C. 7:14A-6.12

d. Monitoring And Records

Monitoring	N.J.A.C. 7:14A-6.5
Recordkeeping	N.J.A.C. 7:14A-6.6
Signatory Requirements for Monitoring Reports	N.J.A.C. 7:14A-6.9

e. Reporting Requirements

Planned Changes	N.J.A.C. 7:14A-6.7
Reporting of Monitoring Results	N.J.A.C. 7:14A-6.8
Noncompliance Reporting	N.J.A.C. 7:14A-6.10 & 6.8(h)
Hotline/Two Hour & Twenty-four Hour Reporting	N.J.A.C. 7:14A-6.10(c) & (d)
Written Reporting	N.J.A.C. 7:14A-6.10(e) &(f) & 6.8(h)
Duty to Provide Information	N.J.A.C. 7:14A-2.11, 6.2(a)14 & 18.1
Schedules of Compliance	N.J.A.C. 7:14A-6.4
Transfer	N.J.A.C. 7:14A-6.2(a)8 & 16.2

PART II

GENERAL REQUIREMENTS: DISCHARGE CATEGORIES

A. Additional Requirements Incorporated By Reference

1. Requirements for Discharges to Surface Waters

a. In addition to conditions in Part I of this permit, the conditions in this section are applicable to activities at the permitted location and are incorporated by reference. The permittee is required to comply with the regulations which are in effect as of the effective date of the final permit.

i. Surface Water Quality Standards N.J.A.C. 7:9B-1

B. General Conditions

1. Scope

a. The issuance of this permit shall not be considered as a waiver of any applicable federal, state, and local rules, regulations and ordinances.

2. Permit Renewal Requirement

a. Permit conditions remain in effect and enforceable until and unless the permit is modified, renewed or revoked by the Department.

b. Submit a complete permit renewal application: 180 days before the the Expiration Date.

c. For short term discharges (typically 6 months or less), a renewal application is not required. However, written notice of at least 30 days prior to expiration shall be submitted to the Department for a permit modificiation to extend the expiration date.

d. Requests for short term discharge extensions shall be submitted to the following:
Via Email: Brian.Salvo@dep.nj.gov or Kelly.Perez@dep.nj.gov
Or Via Mail: Brian Salvo or Kelly Perez
NJ Department of Environmental Protection
Bureau of Surface Water Permitting
Mail Code 401-02B
PO Box 420
Trenton, NJ 08625-0420
Or via phone at: (609) 292-4860

3. Notification of Non-Compliance

a. The permittee shall notify the Department of all non-compliance when required in accordance with N.J.A.C. 7:14A-6.10 by contacting the DEP HOTLINE at 1-877-WARNDEP (1-877-927-6337).

b. The permittee shall submit a written report as required by N.J.A.C. 7:14A-6.10 within five days.

4. Notification of Changes

a. The permittee shall give written notification to the Department of any planned physical or operational alterations or additions to the permitted facility when the alteration is expected to result in a significant change in the permittee's discharge and/or residuals use or disposal practices including the cessation of discharge in accordance with N.J.A.C. 7:14A-6.7.

b. Prior to any change in ownership, the current permittee shall comply with the requirements of N.J.A.C. 7:14A-16.2, pertaining to the notification of change in ownership.

5. Access to Information

a. The permittee shall allow an authorized representative of the Department, upon the presentation of credentials, to enter upon a person's premises, for purposes of inspection, and to access / copy any records that must be kept under the conditions of this permit.

6. Operator Certification

a. Pursuant to N.J.A.C. 7:10A-1.1 et seq. every wastewater system not exempt pursuant to N.J.A.C. 7:10A-1.1(b) requires a licensed operator. The operator of a system shall meet the Department's requirements pursuant to N.J.A.C. 7:10A-1.1 and any amendments. The name of the proposed operator, where required shall be submitted to the Department at the address below, in order that his/her qualifications may be determined prior to initiating operation of the treatment works.

i. Notifcations shall be submitted to:
NJDEP
Bureau of Licensing and Pesticide Operations
Mail Code 401-04E
PO Box 420
Trenton, New Jersey 08625-0420
(609) 984-6507

b. The permittee shall notify the Department of any changes in licensed operator within two weeks of the change.

7. Operation Restrictions

a. The operation of a waste treatment or disposal facility shall at no time create: (a) a discharge, except as authorized by the Department in the manner and location specified in Part III of this permit; (b) any discharge to the waters of the state or any standing or ponded condition for water or waste, except as specifically authorized by a valid NJPDES permit.

8. Residuals Management

a. The permittee shall comply with land-based sludge management criteria and shall conform with the requirements for the management of residuals and grit and screenings under N.J.A.C. 7:14A-6.15(a), which includes:

i. Standards for the Use or Disposal of Residual, N.J.A.C. 7:14A-20;

ii. Section 405 of the Federal Act governing the disposal of sludge from treatment works treating domestic sewage;

iii. The Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and the Solid Waste Management Rules, N.J.A.C. 7:26;

iv. The Sludge Quality Assurance Regulations, N.J.A.C. 7:14C;

v. The Statewide Sludge Management Plan promulgated pursuant to the Water Quality Planning Act, N.J.S.A. 58:11A-1 et seq., and the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq.; and

vi. The provisions concerning disposal of sewage sludge and septage in sanitary landfills set forth at N.J.S.A. 13:1E-42 and the Statewide Sludge Management Plan.

vii. Residual that is disposed in a municipal solid waste landfill unit shall meet the requirements in 40 CFR Part 258 and/or N.J.A.C. 7:26 concerning the quality of residual disposed in a municipal solid waste landfill unit. (That is, passes the Toxicity Characteristic Leaching Procedure and does not contain "free liquids" as defined at N.J.A.C. 7:14A-1.2.)

b. If any applicable standard for residual use or disposal is promulgated under section 405(d)of the Federal Act and Sections 4 and 6 of the State Act and that standard is more stringent than any limitation on the pollutant or practice in the permit, the Department may modify or revoke and reissue the permit to conform to the standard for residual use or disposal.

c. The permittee shall make provisions for storage, or some other approved alternative management strategy, for anticipated downtimes at a primary residual management alternative. The permittee shall not be permitted to store residual beyond the capacity of the structural treatment and storage components of the treatment works. N.J.A.C. 7:14A-20.8(a) and N.J.A.C. 7:26 provide for the temporary storage of residuals for periods not exceeding six months, provided such storage does not cause pollutants to enter surface or ground waters of the State. The storage of residual for more than six months is not authorized under this permit. However, this prohibition does not apply to residual that remains on the land for longer than six months when the person who prepares the residual demonstrates that the land on which the residual remains is not a surface disposal site or landfill. The demonstration shall explain why residual must remain on the land for longer than six months prior to final use or disposal, discuss the approximate time period during which the residual shall be used or disposed and provide documentation of ultimate residual management arrangements. Said demonstration shall be in writing, be kept on file by the person who prepares residual, and submitted to the Department upon request.

d. The permittee shall comply with the appropriate adopted District Solid Waste or Sludge Management Plan (which by definition in N.J.A.C. 7:14A-1.2 includes Generator Sludge Management Plans), unless otherwise specifically exempted by the Department.

e. The preparer must notify and provide information necessary to comply with the N.J.A.C. 7:14A-20 land application requirements to the person who applies bulk residual to the land. This shall include, but not be limited to, the applicable recordkeeping requirements and certification statements of 40 CFR 503.17 as referenced at N.J.A.C 7:14A-20.7(j).

f. The preparer who provides biosolids to another person who further prepares the biosolids for application to the land must provide this person with notification and information necessary to comply with the N.J.A.C. 7:14A-20 land application requirements.

g. Any person who prepares bulk residual in New Jersey that is applied to land in a State other than New Jersey shall comply with the requirement at N.J.A.C. 7:14A-20.7(b)1.ix to provide written notice to the Department and to the permitting authority for the State in which the bulk residual is proposed to be applied.

9. Standard Reporting Requirements – Monitoring Report Forms (MRFs)

a. As of the effective date identified below, all required monitoring results reported on Monitoring Report Forms (MRFs) shall be electronically submitted to the Department via NJDEP's Electronic Monitoring Report Form (MRF) Submission Service. Prior to this date, monitoring results reported on MRFs may be submitted to the Department using the paper forms provided to the permittee.

   i. December 21, 2016 for Discharge to Surface Water or Discharge of Stormwater Permits

b. Any electronic MRF data submission shall be in accordance with the guidelines and provisions outlined in the Department's Electronic Data Interchange (EDI) agreement with the permittee.

c. Any MRFs in paper format shall be submitted to the addresses identified in Part IV of this permit.

d. MRFs shall be submitted at the frequencies identified in Part III of this permit.

e. All MRFs shall be certified by the highest ranking official having day-to-day managerial and operational responsibilities for the discharging facility.

f. The highest ranking official may delegate responsibility to certify the MRFs in his or her absence. Authorizations for other individuals to certify shall be made in accordance with N.J.A.C. 7:14A-4.9(b).

g. Monitoring results shall be submitted in accordance with the current NJPDES Monitoring Report Form Reference Manual and any updates thereof.

h. If monitoring for a parameter is not required in a monitoring period, the permittee must report "CODE=N" for that parameter.

i. If, for a monitored location, there are no discharge events during an entire monitoring period, the permittee must notify the Department when submitting the monitoring results by checking the "No Discharge this monitoring period" box on the paper or electronic version of the monitoring report submittal form.

10. Standard Reporting Requirements - Electronic Submission of NJPDES Information

a. Effective December 21, 2020, the below identified documents and reports, if required to be submitted by this permit, shall be electronically submitted to the NJDEP via the Department's designated Electronic Submission Service.

   i. General permit authorization requests (i.e. RFAs)

   ii. General permit termination/revocation requests

PART III
LIMITS AND MONITORING REQUIREMENTS

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
001A Surface Water Outfall	Pasaic River	SE3(C2)	BGR - General Remediation Clean-up (GP)

Location Description

Effluent sampling shall be performed after the last treatment step and prior to discharge at latitude 40°44' 20.3" N and longitude 74° 6' 58.6" W.

Contributing Waste Types

Groundwater Remediation

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - A - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 03/01/2017 **PHASE End Date:** 12/31/2017

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	GPD	*****	*****	*****	*****	1/2 Weeks	Grab
January thru December	QL	***	***		***	***	***			
pH	Effluent Gross Value	*****	*****	*****	6.0 Monthly Minimum	*****	9.0 Monthly Maximum	SU	1/2 Weeks	Grab
January thru December	QL	***	***		***	***	***			
Solids, Total Suspended	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	40 Daily Maximum	MG/L	1/2 Weeks	Grab
January thru December	QL	***	***		***	***	***			
Carbon, Tot Organic (TOC)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	20 Daily Maximum	MG/L	1/2 Weeks	Grab
January thru December	QL	***	***		***	***	***			
Iron, Total Recoverable	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Daily Maximum	UG/L	1/2 Weeks	Grab
January thru December	QL	***	***		***	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - A - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 03/01/2017 **PHASE End Date:** 12/31/2017

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Arsenic, Total Recoverable (as As)	Effluent Gross Value	*****	*****	*****	*****	50 Monthly Average	100 Daily Maximum	UG/L	1/2 Weeks	Grab
January thru December	QL	***	***		***	***	***			

PART IV

SPECIFIC REQUIREMENTS: NARRATIVE

General Remediation Clean-up (GP)

A. MONITORING REQUIREMENTS

1. Standard Monitoring Requirements

a. Each analysis required by this permit shall be performed by a New Jersey Certified Laboratory that is certified to perform that analysis.

b. The Permittee shall perform all water/wastewater analyses in accordance with the analytical test procedures specified in 40 CFR 136 unless other test procedures have been approved by the Department in writing or as otherwise specified in the permit. Further information regarding analytical testing methods can be found at http://water.epa.gov/scitech/methods/cwa/index.cfm. If you have further questions or comments regarding analytical methods, please contact NJDEP, Office of Quality Assurance at (609) 292-3950.

c. The permittee shall utilize analytical methods that will ensure compliance with the Quantification Levels (QLs) listed in PART III. If the permittee and/or contract laboratory determines that the QLs achieved for any pollutant(s) generally will not be as sensitive as the QLs specified in PART III, the permittee must submit a justification of such to the Bureau of Surface Water Permitting. For limited parameters with no QL specified, the sample analysis shall use a detection level at least as sensitive as the effluent limit.

d. All sampling shall be conducted in accordance with the Department's Field Sampling Procedures Manual, or an alternate method approved by the Department in writing.

e. All monitoring shall be conducted as specified in Part III.

f. All sample frequencies expressed in Part III are minimum requirements. Any additional samples taken consistent with the monitoring and reporting requirements contained herein shall be reported on the Monitoring Report Forms.

g. If annual and semi-annual wastewater testing is specified, it shall be conducted in a different quarter of each year so that tests are conducted in each of the four permit quarters of the permit cycle. Testing may be conducted during any month of the permit quarters.

h. The permittee shall perform all residual analyses in accordance with the analytical test procedures specified in 40 CFR 503.8 and the Sludge Quality Assurance Regulations (N.J.A.C. 7:14C) unless other test procedures have been approved by the Department in writing or as otherwise specified in the permit.

i. Flow shall be measured using a meter unless specified otherwise in the individual authorization. If the flow monitoring method will be something other than a flow meter, the applicant shall indicate so in its BGR permit application so that Part III can be adjusted accordingly.

B. RECORDKEEPING

1. Standard Recordkeeping Requirements

a. The permittee shall retain records of all monitoring information, including 1) all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation (if applicable), 2) copies of all reports required by this NJPDES permit, 3) all data used to complete the application for a NJPDES permit, and 4) monitoring information required by the permit related to the permittee's residual use and/or disposal practices, for a period of at least 5 years, or longer as required by N.J.A.C. 7:14A-20, from the date of the sample, measurement, report, application or record.

b. Records of monitoring information shall include 1) the date, locations, and time of sampling or measurements, 2) the individual(s) who performed the sampling or measurements, 3) the date(s) the analyses were performed, 4) the individual(s) who performed the analyses, 5) the analytical techniques or methods used, and 6) the results of such analyses.

C. REPORTING

1. Standard Reporting Requirements

a. In accordance with the schedule in Part II of the permit, prior to the December 21, 2016, monitoring results reported on MRFs may be submitted to the Department using paper forms provided to the permittee to the appropriate address below:

i. NJDEP
Division of Water Quality
Bureau of Permit Management
Mailcode 401-02B
P.O. Box 420
Trenton, New Jersey 08625-0420

ii. (if requested by the Water Compliance and Enforcement Bureau)
NJDEP: Northern Bureau of Water Compliance and Enforcement
7 Ridgedale Avenue
Cedar Knolls, New Jersey 07927
(Counties of Bergen, Essex, Hudson, Hunterdon, Morris, Passaic, Somerset, Sussex and Warren)

iii. (if requested by the Water Compliance and Enforcement Bureau)
NJDEP: Central Bureau of Water Compliance and Enforcement
Mail Code: 44-03
401 East State Street
P.O. Box 420
Trenton, NJ 08625-0420
(Counties of Mercer, Middlesex, Monmouth, Ocean and Union)

iv. (if requested by the Water Compliance and Enforcement Bureau)
NJDEP: Southern Bureau of Water Compliance and Enforcement
2 Riverside Drive, Suite 201
Camden, New Jersey 08103
(Counties of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester and Salem)

b. For intermittent discharges, the permittee shall obtain a sample during at least one of the discharge events occurring during a monitoring period.

D. SUBMITTALS

1. **Standard Submittal Requirements**

   a. The permittee shall prepare/update the Operation and Maintenance (O&M) Manual including an emergency plan in accordance with requirements of N.J.A.C. 7:14A-6.12(c).

   b. The permittee shall amend the Operation & Maintenance Manual whenever there is a change in the treatment works design, construction, operations or maintenance which substantially changes the treatment works operations and maintenance procedures.

E. FACILITY MANAGEMENT

1. **Discharge Requirements**

   a. The permittee shall discharge at the location(s) specified in PART III of this permit.

   b. The permittee shall not discharge foam or cause foaming of the receiving water that: 1) Forms objectionable deposits on the receiving water, 2) Forms floating masses producing a nuisance, or 3) Interferes with a designated use of the waterbody.

   c. The permittee's discharge shall not produce objectionable color or odor in the receiving stream.

   d. The discharge shall not exhibit a visible sheen.

   e. When quantification levels (QL) and effluent limits are both specified for a given parameter in Part III, and the QL is less stringent than the effluent limit, effluent compliance will be determined by comparing the reported value against the QL.

2. **Operation, Maintenance and Emergency conditions**

   a. The permittee shall operate and maintain treatment works and facilities which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit as specified in the Operation & Maintenance Manual.

   b. The permittee shall develop emergency procedures to ensure effective operation of the treatment works under emergency conditions in accordance with NJAC 7:14A-6.12(d).

F. CONDITIONS FOR MODIFICATION

1. **Notification requirements**

   a. For new discharges, the permittee shall notify the Department that a tag to mark the location of the outfall pipe has been installed consistent with N.J.A.C. 7:14A-6.2(a)9.

2. **Causes for modification**

   a. The Department may modify or revoke and reissue any permit to incorporate 1) any applicable effluent standard or any effluent limitation, including any effluent standards or effluent limitations to control the discharge of toxic pollutants or pollutant parameters such as acute or chronic whole effluent toxicity and chemical specific toxic parameters, 2) toxicity reduction requirements, or 3) the implementation of a TMDL or watershed management plan adopted in accordance with N.J.A.C. 7:15-7.

   b. The permittee may request a minor modification for a reduction in monitoring frequency for a non-limited parameter when four consecutive test results of "not detected" have occurred using the specified QL.

c. For new dischargers where a chronic whole effluent toxicity requirement is imposed: The Department may issue a minor modification further deferring the effective date of the chronic whole effluent toxicity limitation if a facility is implementing the Toxicity Reduction Implementation Requirements (TRIR) in Part IV of this permit.

d. The Department may modify individual authorizations under this permit through a minor modification in accordance with N.J.A.C. 7:14A-16.5(a)1 to reduce WET monitoring to either semi-annual or annual. The criteria for such reduction is consistent compliance with the WET limit for a minimum of 4 data points with a result of >100. The Department may also consider site-specific characteristics such as discharge volume, location and wastewater constituents.

e. The Department may modify individual authorizations under this permit through a minor modification in accordance with N.J.A.C. 7:14A-16.5(a)1 to reduce toxics and conventionals monitoring to quarterly or an alternate monitoring frequency. The criteria for such reduction is consistent compliance with the applicable limits for at least 12 data points. This change will be incorporated as a minor modification pursuant to N.J.A.C. 7:14A-16.5.

G. OPERATIONAL ISSUES

1. Operational Requirements

a. The treatment works shall operate at the optimal average design flow rate for maximum groundwater clean-up.

b. Filter backwash water must be returned through the treatment system prior to discharge.

c. The permittee shall not attain any effluent limitations by dilution pursuant to N.J.A.C. 7:14A-6.2. Specifically, the permittee shall not pump from a recovery well and divert such waters to the treatment system for the purposes of diluting groundwater from other contaminated recovery wells.

d. Samples taken in compliance with the specified monitoring requirements shall be taken at the discharge outfall(s) specified in Part III of this permit authorization at the nearest accessible point after final treatment but prior to actual discharge.

2. Use of Chemical Addition Agents

a. If a permittee proposes addition of any chemical or biofouling agents in its treatment system in order to enhance treatment effectiveness and system performance, the permittee must obtain permission from the Department in writing prior to use of such compounds.

b. The permittee shall submit a letter to the Department describing the use of such chemical addition agents, including information pertaining to dosage rates and frequency of dosage, and shall also include a material safety data sheet for the product(s).

c. This letter shall be submitted to the Bureau of Surface Water Permitting where the address is included in the cover letter. The Department will then evaluate the submittal and notify the permittee in writing as to whether the compound can be utilized under the conditions of the individual authorization under the permit. Please note that N.J.A.C. 7:14A-22.4(a)7 does not require a treatment works approval (TWA) modification for chemical addition where it is used for purposes of improving treatment system performance.

3. Third Party Storm Sewers

a. If the permittee proposes to discharge or discharges through an off-site public or private storm drainage system, please note that this permit to discharge does not exempt, nor shall be construed to exempt, the permittee from compliance with rules, regulations, policies, and/or laws lodged in any agency or subdivision of the state having legal jurisdiction over the storm sewer system proposed for use as a wastewater conveyance.

4. **Permanent Cessation of Discharge to Surface Waters**

a. If the permittee permanently discontinues its discharge to surface waters the appropriate Regional Bureau of Water and Compliance Enforcement shall be notified:

i. NORTHERN BUREAU (Counties of Bergen, Essex, Hudson, Hunterdon, Morris, Passaic, Somerset, Sussex and Warren) - (973) 656-4099.

ii. CENTRAL BUREAU (Counties of Mercer, Middlesex, Monmouth, Ocean and Union) - (609) 292-3010.

iii. SOUTHERN BUREAU (Counties of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester and Salem) - (856) 614-3655.

5. **Revocation of an Individual Authorization under the Permit.**

a. If the permittee has permanently ceased its discharge to surface water, the permittee can request revocation of its individual authorization under the BGR permit. The permittee can obtain the necessary revocation forms by accessing www.state.nj.us/dep/dwq or by contacting the Department's Office of Permit Management at (609) 984-4428. The permittee can also contact the appropriate Regional Enforcement Office for further guidance on closure proceedings.

b. Upon receipt of an administratively complete revocation request, the Department will verify with the appropriate Regional Enforcement Office that the discharge has ceased and that the treatment works has undergone closure, in conformance with N.J.A.C. 7:14A-23.34. The Department will then revoke such individual authorization by preparing a copy of the individual authorization page showing the revocation date of the individual authorization and sending such to the permittee.

c. For short term discharges, the individual authorization will expire consistent with the permit expiration date without the permit revocation procedure described in b. above.

6. **Correspondence for the BGR Surface Water Permit:**

a. Via Email: Brian.Salvo@dep.nj.gov or Kelly.Perez@dep.nj.gov
Or Via Mail at: NJ Department of Environmental Protection
Bureau of Surface Water Permitting
Mail Code 401-02B
PO Box 420
Trenton, NJ 08625-0420
Or via phone at: (609) 292-4860

APPENDIX 3

Project Specific ADR Libraries and eQAPP

Project Target Analyte Reporting Limit, Blank Contamination, and Lab & Field Duplicate RPD Criteria

eQapp Name: HR_WC_Spectrum(042415)
Description:

Target Analyte Name		Analyte	Quantitatic	Detectio	Units	Blank Contaminati	LabDu	FieldDt
Method: 6010C-TCLP	Matrix: SO							
ARSENIC		7440-38-2	20	4.3	ug/L	5.00	20.00	35.00
BARIUM		7440-39-3	200	1.1	ug/L	5.00	20.00	35.00
CADMIUM		7440-43-9	5	0.89	ug/L	5.00	20.00	35.00
CHROMIUM		7440-47-3	20	0.64	ug/L	5.00	20.00	35.00
LEAD		7439-92-1	10	4.2	ug/L	5.00	20.00	35.00
SELENIUM		7782-49-2	30	12	ug/L	5.00	20.00	35.00
SILVER		7440-22-4	30	6.9	ug/L	5.00	20.00	35.00
Method: 7470A-TCLP	Matrix: SO							
MERCURY		7439-97-6	0.2	0.028	ug/L	5.00	20.00	35.00
Method: 8081B-TCLP	Matrix: SO							
CHLORDANE (TECHNICAL)		57-74-9	2.5	0.064	ug/L	5.00	30.00	35.00
ENDRIN		72-20-8	0.1	0.0035	ug/L	5.00	30.00	35.00
GAMMA-BHC		58-89-9	0.05	0.0039	ug/L	5.00	30.00	35.00
HEPTACHLOR		76-44-8	0.05	0.0019	ug/L	5.00	30.00	35.00
METHOXYCHLOR		72-43-5	0.5	0.031	ug/L	5.00	30.00	35.00
TOXAPHENE		8001-35-2	5.0	0.14	ug/L	5.00	30.00	35.00
Method: 8082	Matrix: SO							
AROCLOR 1016		12674-11-2	33	2.5	ug/Kg	5.00		35.00
AROCLOR 1221		11104-28-2	33	4.4	ug/Kg	5.00		35.00
AROCLOR 1232		11141-16-5	33	2.4	ug/Kg	5.00		35.00
AROCLOR 1242		53469-21-9	33	2.5	ug/Kg	5.00		35.00
AROCLOR 1248		12672-29-6	33	3.6	ug/Kg	5.00		35.00
AROCLOR 1254		11097-69-1	33	4.4	ug/Kg	5.00		35.00
AROCLOR 1260		11096-82-5	33	1.8	ug/Kg	5.00		35.00
Method: 8151A-TCLP	Matrix: SO							
2,4,5-TP		93-72-1	0.1	0.01	ug/L	5.00	30.00	35.00

Target Analyte Name		Analyte	Quantitatic	Detectio	Units	Blank Contaminati	LabDu	FieldDu
Method: 8151A-TCLP	Matrix: SO							
2,4-D		94-75-7	1	0.13	ug/L	5.00	30.00	35.00
Method: 8260C-TCLP	Matrix: SO							
1,1-DICHLOROETHENE		75-35-4	5	0.39	ug/L	5.00	30.00	35.00
1,2-DICHLOROETHANE		107-06-2	5	0.41	ug/L	5.00	30.00	35.00
2-BUTANONE		78-93-3	5	2.1	ug/L	5.00	30.00	35.00
BENZENE		71-43-2	5	0.33	ug/L	5.00	30.00	35.00
CARBON TETRACHLORIDE		56-23-5	5	0.54	ug/L	5.00	30.00	35.00
CHLOROBENZENE		108-90-7	5	0.26	ug/L	5.00	30.00	35.00
CHLOROFORM		67-66-3	5	0.33	ug/L	5.00	30.00	35.00
TETRACHLOROETHENE		127-18-4	5	0.65	ug/L	5.00	30.00	35.00
TRICHLOROETHENE		79-01-6	5	0.36	ug/L	5.00	30.00	35.00
VINYL CHLORIDE		75-01-4	5	0.5	ug/L	5.00	30.00	35.00
Method: 8270D-TCLP	Matrix: SO							
1,4-DICHLOROBENZENE		106-46-7	10	1.1	ug/L	5.00	30.00	35.00
2,4,5-TRICHLOROPHENOL		95-95-4	20	0.26	ug/L	5.00	30.00	35.00
2,4,6-TRICHLOROPHENOL		88-06-2	10	0.53	ug/L	5.00	30.00	35.00
2,4-DINITROTOLUENE		121-14-2	10	0.41	ug/L	5.00	30.00	35.00
2-METHYLPHENOL		95-48-7	10	0.96	ug/L	5.00	30.00	35.00
4-METHYLPHENOL		106-44-5	10	1.4	ug/L	5.00	30.00	35.00
HEXACHLOROBENZENE		118-74-1	10	0.44	ug/L	5.00	30.00	35.00
HEXACHLOROBUTADIENE		87-68-3	10	0.75	ug/L	5.00	30.00	35.00
HEXACHLOROETHANE		67-72-1	10	0.55	ug/L	5.00	30.00	35.00
NITROBENZENE		98-95-3	10	1.6	ug/L	5.00	30.00	35.00
PENTACHLOROPHENOL		87-86-5	20	1.7	ug/L	5.00	30.00	35.00
PYRIDINE		110-86-1	20	0.57	ug/L	5.00	30.00	35.00
Method: 9045D	Matrix: SO							
Corrosivity		Corrosivity	1	1	pH	5.00	20.00	35.00
Method: EPA 1010	Matrix: SO							
IGNITABILITY		10-36-6	200		deg F	5.00	20.00	35.00
Method: SW846_7.3.1	Matrix: SO							
Reactive Cyanide		57-12-5	1	1	mg/kg	5.00	20.00	35.00

Target Analyte Name		Analyte	Quantitati	Detectio	Units	Blank Contaminati	LabDu	FieldDu
Method: SW846_7.3.2	Matrix: SO							
Reactive Sulfide		18496-25-8	1	1	mg/kg	5.00	20.00	35.00

Project Accuracy and Precision Report

eQapp Name: HR_WC_Spectrum(042415)
Description:

Analyte Name	Analyte	Lower	Lower	Upper	Upper	RPD (%)
Method: 6010C-TCLP	**Matrix: SO**					
QC Type: LCS						
ARSENIC	7440-38-2	50.00	80.00	120.00		20.00
BARIUM	7440-39-3	50.00	80.00	120.00		20.00
CADMIUM	7440-43-9	50.00	80.00	120.00		20.00
CHROMIUM	7440-47-3	50.00	80.00	120.00		20.00
LEAD	7439-92-1	50.00	80.00	120.00		20.00
SELENIUM	7782-49-2	50.00	80.00	120.00		20.00
SILVER	7440-22-4	50.00	80.00	120.00		20.00
QC Type: MS						
ARSENIC	7440-38-2	30.00	80.00	120.00		20.00
BARIUM	7440-39-3	30.00	80.00	120.00		20.00
CADMIUM	7440-43-9	30.00	80.00	120.00		20.00
CHROMIUM	7440-47-3	30.00	80.00	120.00		20.00
LEAD	7439-92-1	30.00	80.00	120.00		20.00
SELENIUM	7782-49-2	30.00	80.00	120.00		20.00
SILVER	7440-22-4	30.00	80.00	120.00		20.00
Method: 7470A-TCLP	**Matrix: SO**					
QC Type: LCS						
MERCURY	7439-97-6	50.00	80.00	120.00		20.00
QC Type: MS						
MERCURY	7439-97-6	30.00	80.00	120.00		25.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8081B-TCLP	**Matrix: SO**					
QC Type: LCS						
CHLORDANE (TECHNICAL)	57-74-9					
ENDRIN	72-20-8	10.00	55.00	135.00		30.00
GAMMA-BHC	58-89-9	10.00	25.00	135.00		30.00
HEPTACHLOR	76-44-8	10.00	40.00	130.00		30.00
METHOXYCHLOR	72-43-5	10.00	55.00	150.00		30.00
TOXAPHENE	8001-35-2					
QC Type: MS						
ENDRIN	72-20-8	10.00	55.00	135.00		30.00
GAMMA-BHC	58-89-9	10.00	25.00	135.00		30.00
HEPTACHLOR	76-44-8	10.00	40.00	130.00		30.00
METHOXYCHLOR	72-43-5	10.00	55.00	150.00		30.00
QC Type: SURR						
DECACHLOROBIPHENYL	2051-24-3	10.00	30.00	135.00		
TETRACHLORO-M-XYLENE	877-09-8	10.00	25.00	140.00		
Method: 8082	**Matrix: SO**					
QC Type: LCS						
AROCLOR 1016	12674-11-2	10.00	40.00	140.00		30.00
AROCLOR 1260	11096-82-5	10.00	60.00	130.00		30.00
QC Type: MS						
AROCLOR 1016	12674-11-2	10.00	40.00	140.00		30.00
AROCLOR 1260	11096-82-5	10.00	60.00	130.00		30.00
QC Type: SURR						
DECACHLOROBIPHENYL	2051-24-3	10.00	60.00	125.00		
TETRACHLORO-M-XYLENE	877-09-8	10.00	34.00	147.00		

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8151A-TCLP	**Matrix: SO**					
QC Type: LCS						
2,4,5-TP	93-72-1	10.00	36.00	136.00		30.00
2,4-D	94-75-7	10.00	24.00	133.00		30.00
QC Type: MS						
2,4,5-TP	93-72-1	10.00	36.00	136.00		30.00
2,4-D	94-75-7	10.00	24.00	133.00		30.00
QC Type: SURR						
2,4-DCPAA	19719-28-9	10.00	10.00	105.00		
Method: 8260C-TCLP	**Matrix: SO**					
QC Type: LCS						
1,1-DICHLOROETHENE	75-35-4	10.00	70.00	130.00		40.00
1,2-DICHLOROETHANE	107-06-2	10.00	70.00	130.00		40.00
2-BUTANONE	78-93-3	10.00	30.00	150.00		40.00
BENZENE	71-43-2	10.00	80.00	120.00		40.00
CARBON TETRACHLORIDE	56-23-5	10.00	65.00	140.00		40.00
CHLOROBENZENE	108-90-7	10.00	80.00	120.00		40.00
CHLOROFORM	67-66-3	10.00	65.00	135.00		40.00
TETRACHLOROETHENE	127-18-4	10.00	45.00	150.00		40.00
TRICHLOROETHENE	79-01-6	10.00	70.00	125.00		40.00
VINYL CHLORIDE	75-01-4	10.00	50.00	145.00		40.00
QC Type: MS						
1,1-DICHLOROETHENE	75-35-4	10.00	70.00	130.00		40.00
1,2-DICHLOROETHANE	107-06-2	10.00	70.00	130.00		40.00
2-BUTANONE	78-93-3	10.00	30.00	150.00		40.00
BENZENE	71-43-2	10.00	80.00	120.00		40.00
CARBON TETRACHLORIDE	56-23-5	10.00	65.00	140.00		40.00
CHLOROBENZENE	108-90-7	10.00	80.00	120.00		40.00
CHLOROFORM	67-66-3	10.00	65.00	135.00		40.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8260C-TCLP	**Matrix: SO**					
QC Type: MS						
TETRACHLOROETHENE	127-18-4	10.00	45.00	150.00		40.00
TRICHLOROETHENE	79-01-6	10.00	70.00	125.00		40.00
VINYL CHLORIDE	75-01-4	10.00	50.00	145.00		40.00
QC Type: SURR						
1,2-DICHLOROETHANE-D4	17060-07-0	10.00	70.00	120.00		
4-Bromofluorobenzene	460-00-4	10.00	75.00	120.00		
DIBROMOFLUOROMETHANE	1868-53-7	10.00	85.00	115.00		
TOLUENE-D8	2037-26-5	10.00	85.00	120.00		
Method: 8270D-TCLP	**Matrix: SO**					
QC Type: LCS						
1,4-DICHLOROBENZENE	106-46-7	10.00	30.00	100.00		40.00
2,4,5-TRICHLOROPHENOL	95-95-4	10.00	50.00	110.00		40.00
2,4,6-TRICHLOROPHENOL	88-06-2	10.00	50.00	115.00		40.00
2,4-DINITROTOLUENE	121-14-2	10.00	50.00	120.00		40.00
2-METHYLPHENOL	95-48-7	10.00	40.00	110.00		40.00
4-METHYLPHENOL	106-44-5	10.00	30.00	110.00		40.00
HEXACHLOROBENZENE	118-74-1	10.00	50.00	110.00		40.00
HEXACHLOROBUTADIENE	87-68-3	10.00	25.00	105.00		40.00
HEXACHLOROETHANE	67-72-1	10.00	30.00	95.00		40.00
NITROBENZENE	98-95-3	10.00	45.00	110.00		40.00
PENTACHLOROPHENOL	87-86-5	10.00	40.00	115.00		40.00
PYRIDINE	110-86-1	5.00	10.00	106.00		40.00
QC Type: MS						
1,4-DICHLOROBENZENE	106-46-7	10.00	30.00	100.00		40.00
2,4,5-TRICHLOROPHENOL	95-95-4	10.00	50.00	110.00		40.00
2,4,6-TRICHLOROPHENOL	88-06-2	10.00	50.00	115.00		40.00
2,4-DINITROTOLUENE	121-14-2	10.00	50.00	120.00		40.00
2-METHYLPHENOL	95-48-7	10.00	40.00	110.00		40.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8270D-TCLP	**Matrix: SO**					
QC Type: MS						
4-METHYLPHENOL	106-44-5	10.00	30.00	110.00		40.00
HEXACHLOROBENZENE	118-74-1	10.00	50.00	110.00		40.00
HEXACHLOROBUTADIENE	87-68-3	10.00	25.00	105.00		40.00
HEXACHLOROETHANE	67-72-1	10.00	30.00	95.00		40.00
NITROBENZENE	98-95-3	10.00	45.00	110.00		40.00
PENTACHLOROPHENOL	87-86-5	10.00	40.00	115.00		40.00
PYRIDINE	110-86-1	5.00	10.00	106.00		40.00
QC Type: SURR						
2,4,6-TRIBROMOPHENOL	118-79-6	10.00	40.00	125.00		
2-FLUOROBIPHENYL	321-60-8	10.00	50.00	110.00		
2-FLUOROPHENOL	367-12-4	10.00	20.00	110.00		
Nitrobenzene-d5	4165-60-0	10.00	40.00	110.00		
PHENOL-D5	4165-62-2	5.00	10.00	115.00		
Terphenyl-d14	1718-51-0	10.00	50.00	135.00		
Method: EPA 1010	**Matrix: SO**					
QC Type: LCS						
IGNITABILITY	10-36-6	10.00	80.00	120.00		25.00
Method: SW846_7.3.1	**Matrix: SO**					
QC Type: LCS						
Reactive Cyanide	57-12-5	0.00	0.00	12.40		20.00
QC Type: MS						
Reactive Cyanide	57-12-5	0.00	0.00	12.40		20.00
Method: SW846_7.3.2	**Matrix: SO**					
QC Type: LCS						
Reactive Sulfide	18496-25-8	10.00	22.60	114.00		20.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: SW846_7.3.2	Matrix: SO					
QC Type: MS						
Reactive Sulfide	18496-25-8	10.00	22.60	114.00		20.00

Project Target Analyte Reporting Limit, Blank Contamination, and Lab & Field Duplicate RPD Criteria

eQapp Name: HR_WWTP_Spectrum(042415)
Description:

Target Analyte Name		Analyte	Quantitati	Detectio	Units	Blank Contaminati	LabDu	FieldDu
Method: 6010B	**Matrix: AQ**							
ARSENIC		7440-38-2	20	4.3	ug/L	5.0	20.00	35.00
CHROMIUM		7440-47-3	20	0.64	ug/L	5.0	20.00	35.00
COPPER		7440-50-8	30	3.6	ug/L	5.0	20.00	35.00
LEAD		7439-92-1	10	4.2	ug/L	5.0	20.00	35.00
ZINC		7440-66-6	50	4.9	ug/L	5.0	20.00	35.00
Method: 7471B	**Matrix: AQ**							
MERCURY		7439-97-6	0.2	0.028	ug/L	5.0	20.00	35.00
Method: 8082A	**Matrix: AQ**							
AROCLOR 1248		12672-29-6	1.0	0.063	ug/L	5.00	20.00	35.00
Method: SM 2540D	**Matrix: AQ**							
Total Suspended Solids		WST160.2	10	10	mg/L	5.00	5.00	5.00
Method: SM 4500-H+ B	**Matrix: AQ**							
PH		PH	1	1	pH	5.00	20.00	35.00
Method: SM 5310B	**Matrix: AQ**							
TOTAL ORGANIC CARBON (TOC)		TOC	10	2	mg/L	5.0	20.00	35.00

Project Accuracy and Precision Report

eQapp Name: HR_WWTP_Spectrum(042415)
Description:

Analyte Name	Analyte	Lower	Lower	Upper	Upper RPD (%)
Method: 6010B	**Matrix: AQ**				
QC Type: LCS					
ARSENIC	7440-38-2	50	80	120	
CHROMIUM	7440-47-3	50	80	120	
COPPER	7440-50-8	50	80	120	
LEAD	7439-92-1	50	80	120	
ZINC	7440-66-6	50	80	120	
QC Type: MS					
ARSENIC	7440-38-2	50	75	125	
CHROMIUM	7440-47-3	50	75	125	
COPPER	7440-50-8	50	75	125	
LEAD	7439-92-1	50	75	125	
ZINC	7440-66-6	50	75	125	
Method: 7471B	**Matrix: AQ**				
QC Type: LCS					
MERCURY	7439-97-6	50	80	120	
QC Type: MS					
MERCURY	7439-97-6	50	75	125	
Method: 8082A	**Matrix: AQ**				
QC Type: LCS					
AROCLOR 1248	12672-29-6	10	40	140	30

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8082A **Matrix:** AQ						
QC Type: MS						
AROCLOR 1248	12672-29-6	10	40	140		30
QC Type: SURR						
DECACHLOROBIPHENYL	2051-24-3	10.00	60.00	125.00		
TETRACHLORO-M-XYLENE	877-09-8	10.00	34.00	147.00		
Method: SM 2540D **Matrix:** AQ						
QC Type: LCS						
Total Suspended Solids	WST160.2	50.00	80.00	120.00		5.00
Method: SM 5310B **Matrix:** AQ						
QC Type: LCS						
TOTAL ORGANIC CARBON (TOC)	TOC	10	80	120		25
QC Type: MS						
TOTAL ORGANIC CARBON (TOC)	TOC	10	75	125		30

Project Target Analyte Reporting Limit, Blank Contamination, and Lab & Field Duplicate RPD Criteria

eQapp Name: HR_PostEx_Spectrum(042416)
Description:

Target Analyte Name		Analyte	Quantitatic	Detectio	Units	Blank Contaminati	LabDu	FieldDu
Method: 6010C	Matrix: SO							
ARSENIC		7440-38-2	1.0	0.41	mg/Kg	5.00	20.00	35.00
Method: 7471A	Matrix: SO							
MERCURY		7439-97-6	0.033	0.0021	mg/Kg	5.00	20.00	35.00

Project Accuracy and Precision Report

eQapp Name: HR_PostEx_Spectrum(042415)
Description:

Analyte Name	Analyte	Lower	Lower	Upper	Upper	RPD (%)
Method: 6010C	**Matrix: SO**					
QC Type: LCS						
ARSENIC	7440-38-2	50	80	120		
QC Type: MS						
ARSENIC	7440-38-2	50	75	125		
Method: 7471A	**Matrix: SO**					
QC Type: LCS						
MERCURY	7439-97-6	50.00	80.00	120.00		
QC Type: MS						
MERCURY	7439-97-6	50.00	80.00	120.00		

Project Target Analyte Reporting Limit, Blank Contamination, and Lab & Field Duplicate RPD Criteria

eQapp Name: HR_Backfill_Spectrum(042415)
Description:

Target Analyte Name		Analyte	Quantitati	Detectio	Units	Blank Contaminati	LabDu	FieldDu
Method: 6010C	Matrix: SO							
ALUMINUM		7429-90-5	10	1.2	mg/Kg	5.00	20.00	35.00
ANTIMONY		7440-36-0	1.0	0.38	mg/Kg	5.00	20.00	35.00
ARSENIC		7440-38-2	1.0	0.41	mg/Kg	5.00	20.00	35.00
BARIUM		7440-39-3	10	0.031	mg/Kg	5.00	20.00	35.00
BERYLLIUM		7440-41-7	0.25	0.0015	mg/Kg	5.00	20.00	35.00
CADMIUM		7440-43-9	0.25	0.015	mg/Kg	5.00	20.00	35.00
COBALT		7440-48-4	2.5	0.044	mg/Kg	5.00	20.00	35.00
COPPER		7440-50-8	1.5	0.11	mg/Kg	5.00	20.00	35.00
LEAD		7439-92-1	0.5	0.17	mg/Kg	5.00	20.00	35.00
MANGANESE		7439-96-5	2.5	0.13	mg/Kg	5.00	20.00	35.00
NICKEL		7440-02-0	2.5	0.043	mg/Kg	5.00	20.00	35.00
SELENIUM		7782-49-2	1.5	0.64	mg/Kg	5.00	20.00	35.00
SILVER		7440-22-4	1.5	0.054	mg/Kg	5.00	20.00	35.00
THALLIUM		7440-28-0	1.0	0.22	mg/Kg	5.00	20.00	35.00
VANADIUM		7440-62-2	2.5	0.06	mg/Kg	5.00	20.00	35.00
ZINC		7440-66-6	2.5	0.18	mg/Kg	5.00	20.00	35.00
Method: 7471B	Matrix: SO							
MERCURY		7439-97-6	0.033	0.0021	mg/Kg	5.00	20.00	35.00
Method: 8081B	Matrix: SO							
4,4'-DDD		72-54-8	3.3	0.22	ug/Kg	5.00		35.00
4,4'-DDE		72-55-9	3.3	0.25	ug/Kg	5.00		35.00
4,4'-DDT		50-29-3	3.3	0.33	ug/Kg	5.00		35.00
ALDRIN		309-00-2	1.7	0.11	ug/Kg	5.00		35.00
ALPHA-BHC		319-84-6	1.7	0.056	ug/Kg	5.00		35.00
ALPHA-CHLORDANE		5103-71-9	1.7	0.087	ug/Kg	5.00		35.00
BETA-BHC		319-85-7	1.7	0.063	ug/Kg	5.00		35.00
DELTA-BHC		319-86-8	1.7	0.12	ug/Kg	5.00		35.00

Target Analyte Name		Analyte	Quantitati	Detectio	Units	Blank Contaminati	LabDu	FieldDu
Method: 8081B	**Matrix: SO**							
DIELDRIN		60-57-1	3.3	0.16	ug/Kg	5.00		35.00
ENDOSULFAN I		959-98-8	1.7	0.06	ug/Kg	5.00		35.00
ENDOSULFAN II		33213-65-9	3.3	0.15	ug/Kg	5.00		35.00
ENDOSULFAN SULFATE		1031-07-8	3.3	0.13	ug/Kg	5.00		35.00
ENDRIN		72-20-8	3.3	0.14	ug/Kg	5.00		35.00
GAMMA-BHC		58-89-9	1.7	0.055	ug/Kg	5.00		35.00
GAMMA-CHLORDANE		5103-74-2	1.7	0.21	ug/Kg	5.00		35.00
HEPTACHLOR		76-44-8	1.7	0.072	ug/Kg	5.00		35.00
HEPTACHLOR EPOXIDE		1024-57-3	1.7	0.16	ug/Kg	5.00		35.00
METHOXYCHLOR		72-43-5	17	0.88	ug/Kg	5.00		35.00
TOXAPHENE		8001-35-2	170	8.8	ug/Kg	5.00		35.00
Method: 8082A	**Matrix: SO**							
AROCLOR 1016		12674-11-2	33	2.5	ug/Kg	5.00		35.00
AROCLOR 1221		11104-28-2	33	4.4	ug/Kg	5.00		35.00
AROCLOR 1232		11141-16-5	33	2.4	ug/Kg	5.00		35.00
AROCLOR 1242		53469-21-9	33	2.5	ug/Kg	5.00		35.00
AROCLOR 1248		12672-29-6	33	3.8	ug/Kg	5.00		35.00
AROCLOR 1254		11097-69-1	33	4.4	ug/Kg	5.00		35.00
AROCLOR 1260		11096-82-5	33	1.8	ug/Kg	5.00		35.00
Method: 8260B	**Matrix: SO**							
1,1,1-TRICHLOROETHANE		71-55-6	5	0.53	ug/Kg	5.00		35.00
1,1,2,2-TETRACHLOROETHANE		79-34-5	5	0.68	ug/Kg	5.00		35.00
1,1,2-TRICHLOROETHANE		79-00-5	5	0.48	ug/Kg	5.00		35.00
1,1-DICHLOROETHANE		75-34-3	5	0.67	ug/Kg	5.00		35.00
1,1-DICHLOROETHENE		75-35-4	5	0.95	ug/Kg	5.00		35.00
1,2-DIBROMO-3-CHLOROPROPANE		96-12-8	5	1.9	ug/Kg	5.00		35.00
1,2-DIBROMOETHANE		106-93-4	5	0.74	ug/Kg	5.00		35.00
1,2-DICHLOROETHANE		107-06-2	5	0.54	ug/Kg	5.00		35.00
1,2-DICHLOROPROPANE		78-87-5	5	0.69	ug/Kg	5.00		35.00
2-BUTANONE		78-93-3	5	2.0	ug/Kg	5.00		35.00
ACETONE		67-64-1	5	1.6	ug/Kg	10.00		35.00
ACROLEIN		107-02-8	25	5.1	ug/Kg			

Target Analyte Name	Analyte	Quantitatic	Detectio	Units	Blank Contaminati	LabDu	FieldDu
Method: 8260B **Matrix: SO**							
ACRYLONITRILE	107-13-1	5	1.2	ug/Kg			
BENZENE	71-43-2	5	0.61	ug/Kg	5.00		35.00
BROMODICHLOROMETHANE	75-27-4	5	0.97	ug/Kg	5.00		35.00
BROMOFORM	75-25-2	5	2.0	ug/Kg	5.00		35.00
BROMOMETHANE	74-83-9	5	1.1	ug/Kg	5.00		35.00
CARBON DISULFIDE	75-15-0	5	0.3	ug/Kg	5.00		35.00
CARBON TETRACHLORIDE	56-23-5	5	0.33	ug/Kg	5.00		35.00
CHLOROBENZENE	108-90-7	5	0.51	ug/Kg	5.00		35.00
CHLOROETHANE	75-00-3	5	1.0	ug/Kg	5.00		35.00
CHLOROFORM	67-66-3	5	0.64	ug/Kg	5.00		35.00
CHLOROMETHANE	74-87-3	5	0.80	ug/Kg	5.00		35.00
CIS-1,2-DICHLOROETHENE	156-59-2	5	0.75	ug/Kg	5.00		35.00
CIS-1,3-DICHLOROPROPENE	10061-01-5	5	0.68	ug/Kg	5.00		35.00
DIBROMOCHLOROMETHANE	124-48-1	5	0.65	ug/Kg	5.00		35.00
DICHLORODIFLUOROMETHANE	75-71-8	5	0.98	ug/Kg	5.00		35.00
ETHYLBENZENE	100-41-4	5	0.50	ug/Kg	5.00		35.00
m,p-xylene	108-38-3	5	1.6	ug/Kg	5.00		35.00
METHYL ACETATE	79-20-9	5	1.4	ug/Kg	5.00		35.00
METHYLENE CHLORIDE	75-09-2	5	1.3	ug/Kg	10.00		35.00
methyl-t-butyl ether	1634-04-4	5	0.61	ug/Kg	5.00		35.00
O-XYLENE	95-47-6	5	1.6	ug/Kg	5.00		35.00
STYRENE	100-42-5	5	0.52	ug/Kg	5.00		35.00
TERT-BUTYL ALCOHOL	75-65-0	10	5	ug/Kg	5.00		35.00
TETRACHLOROETHENE	127-18-4	5	0.62	ug/Kg	5.00		35.00
TOLUENE	108-88-3	5	0.47	ug/Kg	5.00		35.00
TRANS-1,2-DICHLOROETHENE	156-60-5	5	0.53	ug/Kg	5.00		35.00
TRANS-1,3-DICHLOROPROPENE	10061-02-6	5	0.68	ug/Kg	5.00		35.00
TRICHLOROETHENE	79-01-6	5	0.62	ug/Kg	5.00		35.00
TRICHLOROFLUOROMETHANE	75-69-4	5	0.42	ug/Kg	5.00		35.00
VINYL CHLORIDE	75-01-4	5	0.63	ug/Kg	5.00		35.00
Method: 8270D **Matrix: SO**							
1,1'-Biphenyl	92-52-4	330	42	ug/Kg	5.00		35.00

Target Analyte Name	Analyte	Quantitatic	Detectio	Units	Blank Contaminati	LabDu	FieldDu
Method: 8270D Matrix: SO							
1,2,4-TRICHLOROBENZENE	120-82-1	330	46	ug/Kg	5.00		35.00
1,2-DICHLOROBENZENE	95-50-1	330	42	ug/Kg	5.00		35.00
1,3-DICHLOROBENZENE	541-73-1	330	40	ug/Kg	5.00		35.00
1,4-DICHLOROBENZENE	106-46-7	330	36	ug/Kg	5.00		35.00
2,4,5-TRICHLOROPHENOL	95-95-4	670	37	ug/Kg	5.00		35.00
2,4,6-TRICHLOROPHENOL	88-06-2	330	39	ug/Kg	5.00		35.00
2,4-DICHLOROPHENOL	120-83-2	330	38	ug/Kg	5.00		35.00
2,4-DIMETHYLPHENOL	105-67-9	330	36	ug/Kg	5.00		35.00
2,4-DINITROPHENOL	51-28-5	670	180	ug/Kg	5.00		35.00
2,4-DINITROTOLUENE	121-14-2	330	23	ug/Kg	5.00		35.00
2,6-DINITROTOLUENE	606-20-2	330	28	ug/Kg	5.00		35.00
2-CHLOROPHENOL	95-57-8	330	41	ug/Kg	5.00		35.00
2-METHYL-4,6-DINITROPHENOL	534-52-1	670	25	ug/Kg	5.00		35.00
2-METHYLNAPHTHALENE	91-57-6	330	42	ug/Kg	5.00		35.00
2-METHYLPHENOL	95-48-7	330	38	ug/Kg	5.00		35.00
2-NITROANILINE	88-74-4	670	21	ug/Kg	5.00		35.00
3,3'-DICHLOROBENZIDINE	91-94-1	330	35	ug/Kg	5.00		35.00
4-METHYLPHENOL	106-44-5	330	35	ug/Kg	5.00		35.00
ACENAPHTHENE	83-32-9	330	39	ug/Kg	5.00		35.00
ACENAPHTHYLENE	208-96-8	330	37	ug/Kg	5.00		35.00
ACETOPHENONE	98-86-2	330	31	ug/Kg	5.00		35.00
ANTHRACENE	120-12-7	330	27	ug/Kg	5.00		35.00
ATRAZINE	1912-24-9	330	47	ug/Kg	5.00		35.00
Azobenzene	103-33-3	330	33	ug/Kg	5.00		35.00
BENZALDEHYDE	100-52-7	330	44	ug/Kg	5.00		35.00
BENZIDINE	92-87-5	330	130	ug/Kg	5.00		35.00
BENZO(A)ANTHRACENE	56-55-3	330	33	ug/Kg	5.00		35.00
BENZO(A)PYRENE	50-32-8	330	31	ug/Kg	5.00		35.00
BENZO(B)FLUORANTHENE	205-99-2	330	40	ug/Kg	5.00		35.00
BENZO(G,H,I)PERYLENE	191-24-2	330	38	ug/Kg	5.00		35.00
BENZO(K)FLUORANTHENE	207-08-9	330	43	ug/Kg	5.00		35.00
BIS(2-CHLOROETHYL) ETHER	111-44-4	330	42	ug/Kg	5.00		35.00
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	330	33	ug/Kg	5.00		35.00

Target Analyte Name	Analyte	Quantitatic	Detectio	Units	Blank Contaminati	LabDu	FieldDu
Method: 8270D **Matrix: SO**							
BIS(2-ETHYLHEXYL) PHTHALATE	117-81-7	330	29	ug/Kg	5.00		35.00
BUTYLBENZYL PHTHALATE	85-68-7	330	28	ug/Kg	5.00		35.00
CAPROLACTAM	105-60-2	330	21	ug/Kg	5.00		35.00
CARBAZOLE	86-74-8	330	28	ug/Kg	5.00		35.00
CHRYSENE	218-01-9	330	29	ug/Kg	5.00		35.00
DIBENZ(A,H)ANTHRACENE	53-70-3	330	35	ug/Kg	5.00		35.00
DIETHYL PHTHALATE	84-66-2	330	24	ug/Kg	5.00		35.00
DI-N-BUTYL PHTHALATE	84-74-2	330	28	ug/Kg	5.00		35.00
DI-N-OCTYL PHTHALATE	117-84-0	330	28	ug/Kg	5.00		35.00
FLUORANTHENE	206-44-0	330	29	ug/Kg	5.00		35.00
FLUORENE	86-73-7	330	33	ug/Kg	5.00		35.00
HEXACHLOROBENZENE	118-74-1	330	32	ug/Kg	5.00		35.00
HEXACHLOROBUTADIENE	87-68-3	330	45	ug/Kg	5.00		35.00
HEXACHLOROCYCLOPENTADIENE	77-47-4	330	96	ug/Kg	5.00		35.00
HEXACHLOROETHANE	67-72-1	330	35	ug/Kg	5.00		35.00
INDENO(1,2,3-CD)PYRENE	193-39-5	330	37	ug/Kg	5.00		35.00
ISOPHORONE	78-59-1	330	34	ug/Kg	5.00		35.00
NAPHTHALENE	91-20-3	330	41	ug/Kg	5.00		35.00
NITROBENZENE	98-95-3	330	38	ug/Kg	5.00		35.00
N-NITROSODIMETHYLAMINE	62-75-9	330	34	ug/Kg	5.00		35.00
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	330	32	ug/Kg	5.00		35.00
N-NITROSODIPHENYLAMINE	86-30-6	330	29	ug/Kg	5.00		35.00
PENTACHLOROPHENOL	87-86-5	670	140	ug/Kg	5.00		35.00
PHENANTHRENE	85-01-8	330	26	ug/Kg	5.00		35.00
PHENOL	108-95-2	330	37	ug/Kg	5.00		35.00
PYRENE	129-00-0	330	32	ug/Kg	5.00		35.00
Method: 9012B **Matrix: SO**							
CYANIDE	57-12-5	1.0	0.45	mg/Kg	5.00	25.00	35.00
Method: EPH Rev3/NJ EPH **Matrix: SO**							
Extractable Petroleum Hydrocarbons	EPH						

Project Accuracy and Precision Report

eQapp Name: HR_Backfill_Spectrum(042415)
Description:

Analyte Name	Analyte	Lower	Lower	Upper	Upper	RPD (%)
Method: 6010C	**Matrix: SO**					
QC Type: LCS						
ALUMINUM	7429-90-5	50	80.00	120.00		35.00
ANTIMONY	7440-36-0	50	80.00	120.00		35.00
ARSENIC	7440-38-2	50	80.00	120.00		35.00
BARIUM	7440-39-3	50	80.00	120.00		35.00
BERYLLIUM	7440-41-7	50	80.00	120.00		35.00
CADMIUM	7440-43-9	50	80.00	120.00		35.00
COBALT	7440-48-4	50	80.00	120.00		35.00
COPPER	7440-50-8	50	80.00	120.00		35.00
LEAD	7439-92-1	50	80.00	120.00		35.00
MANGANESE	7439-96-5	50	80.00	120.00		35.00
NICKEL	7440-02-0	50	80.00	120.00		35.00
SELENIUM	7782-49-2	50	80.00	120.00		35.00
SILVER	7440-22-4	50	80.00	120.00		35.00
THALLIUM	7440-28-0	50	80.00	120.00		35.00
VANADIUM	7440-62-2	50	80.00	120.00		35.00
ZINC	7440-66-6	50	80.00	120.00		35.00
QC Type: MS						
ALUMINUM	7429-90-5	30.00	75.00	125.00		25.00
ANTIMONY	7440-36-0	30.00	75.00	125.00		25.00
ARSENIC	7440-38-2	30.00	75.00	125.00		25.00
BARIUM	7440-39-3	30.00	75.00	125.00		25.00
BERYLLIUM	7440-41-7	30.00	75.00	125.00		25.00
CADMIUM	7440-43-9	30.00	75.00	125.00		25.00
COBALT	7440-48-4	30.00	75.00	125.00		25.00
COPPER	7440-50-8	30.00	75.00	125.00		25.00
LEAD	7439-92-1	30.00	75.00	125.00		25.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 6010C	**Matrix: SO**					
QC Type: MS						
MANGANESE	7439-96-5	30.00	75.00	125.00		25.00
NICKEL	7440-02-0	30.00	75.00	125.00		25.00
SELENIUM	7782-49-2	30.00	75.00	125.00		25.00
SILVER	7440-22-4	30.00	75.00	125.00		25.00
THALLIUM	7440-28-0	30.00	75.00	125.00		25.00
VANADIUM	7440-62-2	30.00	75.00	125.00		25.00
ZINC	7440-66-6	30.00	75.00	125.00		25.00
Method: 7471B	**Matrix: SO**					
QC Type: LCS						
MERCURY	7439-97-6	50.00	80.00	120.00		25.00
QC Type: MS						
MERCURY	7439-97-6	30.00	75.00	125.00		25.00
Method: 8081B	**Matrix: SO**					
QC Type: LCS						
4,4'-DDD	72-54-8	10.00	30.00	135.00		30.00
4,4'-DDE	72-55-9	10.00	70.00	125.00		30.00
4,4'-DDT	50-29-3	10.00	45.00	140.00		30.00
ALDRIN	309-00-2	10.00	45.00	140.00		30.00
ALPHA-BHC	319-84-6	10.00	60.00	125.00		30.00
ALPHA-CHLORDANE	5103-71-9	10.00	65.00	120.00		30.00
BETA-BHC	319-85-7	10.00	60.00	125.00		30.00
DELTA-BHC	319-86-8	10.00	55.00	130.00		30.00
DIELDRIN	60-57-1	10.00	65.00	125.00		30.00
ENDOSULFAN I	959-98-8	10.00	15.00	135.00		30.00
ENDOSULFAN II	33213-65-9	10.00	35.00	140.00		30.00
ENDOSULFAN SULFATE	1031-07-8	10.00	60.00	135.00		30.00
ENDRIN	72-20-8	10.00	60.00	135.00		30.00
GAMMA-BHC	58-89-9	10.00	60.00	125.00		30.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8081B	**Matrix: SO**					
QC Type: LCS						
GAMMA-CHLORDANE	5103-74-2	10.00	65.00	125.00		30.00
HEPTACHLOR	76-44-8	10.00	50.00	140.00		30.00
HEPTACHLOR EPOXIDE	1024-57-3	10.00	65.00	130.00		30.00
METHOXYCHLOR	72-43-5	10.00	55.00	145.00		30.00
QC Type: MS						
4,4'-DDD	72-54-8	10.00	30.00	135.00		30.00
4,4'-DDE	72-55-9	10.00	70.00	125.00		30.00
4,4'-DDT	50-29-3	10.00	45.00	140.00		30.00
ALDRIN	309-00-2	10.00	45.00	140.00		30.00
ALPHA-BHC	319-84-6	10.00	60.00	125.00		30.00
ALPHA-CHLORDANE	5103-71-9	10.00	65.00	120.00		30.00
BETA-BHC	319-85-7	10.00	60.00	125.00		30.00
DELTA-BHC	319-86-8	10.00	55.00	130.00		30.00
DIELDRIN	60-57-1	10.00	65.00	125.00		30.00
ENDOSULFAN I	959-98-8	10.00	15.00	135.00		30.00
ENDOSULFAN II	33213-65-9	10.00	35.00	140.00		30.00
ENDOSULFAN SULFATE	1031-07-8	10.00	60.00	135.00		30.00
ENDRIN	72-20-8	10.00	60.00	135.00		30.00
GAMMA-BHC	58-89-9	10.00	60.00	125.00		30.00
GAMMA-CHLORDANE	5103-74-2	10.00	65.00	120.00		30.00
HEPTACHLOR	76-44-8	10.00	50.00	140.00		30.00
HEPTACHLOR EPOXIDE	1024-57-3	10.00	65.00	130.00		30.00
METHOXYCHLOR	72-43-5	10.00	55.00	145.00		30.00
QC Type: SURR						
DECACHLOROBIPHENYL	2051-24-3	10.00	55.00	130.00		
Tetrachloro-meta-xylene	877-09-8	10.00	14.00	113.00		

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8082A	**Matrix: SO**					
QC Type: LCS						
AROCLOR 1016	12674-11-2	10.00	40.00	140.00		30.00
AROCLOR 1260	11096-82-5	10.00	60.00	130.00		30.00
QC Type: MS						
AROCLOR 1016	12674-11-2	10.00	40.00	140.00		30.00
AROCLOR 1260	11096-82-5	10.00	60.00	130.00		30.00
QC Type: SURR						
DECACHLOROBIPHENYL	2051-24-3	10.00	60.00	125.00		
TETRACHLORO-M-XYLENE	877-09-8	10.00	34.00	147.00		
Method: 8260B	**Matrix: SO**					
QC Type: LCS						
1,1,1-TRICHLOROETHANE	71-55-6	10.00	70.00	135.00		40.00
1,1,2,2-TETRACHLOROETHANE	79-34-5	10.00	65.00	130.00		40.00
1,1,2-TRICHLOROETHANE	79-00-5	10.00	60.00	125.00		40.00
1,1-DICHLOROETHANE	75-34-3	10.00	75.00	125.00		40.00
1,1-DICHLOROETHENE	75-35-4	10.00	65.00	135.00		40.00
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	10.00	40.00	135.00		40.00
1,2-DIBROMOETHANE	106-93-4	10.00	70.00	125.00		40.00
1,2-DICHLOROETHANE	107-06-2	10.00	70.00	135.00		40.00
1,2-DICHLOROPROPANE	78-87-5	10.00	70.00	120.00		40.00
2-BUTANONE	78-93-3	10.00	30.00	160.00		40.00
ACETONE	67-64-1	10.00	20.00	160.00		40.00
BENZENE	71-43-2	10.00	75.00	125.00		40.00
BROMODICHLOROMETHANE	75-27-4	10.00	70.00	130.00		40.00
BROMOFORM	75-25-2	10.00	55.00	135.00		40.00
BROMOMETHANE	74-83-9	10.00	30.00	160.00		40.00
CARBON DISULFIDE	75-15-0	10.00	45.00	160.00		40.00
CARBON TETRACHLORIDE	56-23-5	10.00	65.00	135.00		40.00
CHLOROBENZENE	108-90-7	10.00	75.00	125.00		40.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8260B	**Matrix: SO**					
QC Type: LCS						
CHLOROETHANE	75-00-3	10.00	40.00	155.00		40.00
CHLOROFORM	67-66-3	10.00	70.00	125.00		40.00
CHLOROMETHANE	74-87-3	10.00	50.00	130.00		40.00
CIS-1,2-DICHLOROETHENE	156-59-2	10.00	85.00	125.00		40.00
CIS-1,3-DICHLOROPROPENE	10061-01-5	10.00	70.00	125.00		40.00
DIBROMOCHLOROMETHANE	124-48-1	10.00	65.00	130.00		40.00
DICHLORODIFLUOROMETHANE	75-71-8	10.00	35.00	135.00		40.00
ETHYLBENZENE	100-41-4	10.00	75.00	125.00		40.00
m,p-xylene	108-38-3	10.00	80.00	125.00		40.00
METHYL ACETATE	79-20-9	10.00	70.00	130.00		40.00
METHYLENE CHLORIDE	75-09-2	10.00	65.00	140.00		40.00
methyl-t-butyl ether	1634-04-4	10.00	75.00	126.00		40.00
O-XYLENE	95-47-6	10.00	75.00	125.00		40.00
STYRENE	100-42-5	10.00	75.00	125.00		40.00
TERT-BUTYL ALCOHOL	75-65-0	10.00	50.00	130.00		40.00
TETRACHLOROETHENE	127-18-4	10.00	65.00	140.00		40.00
TOLUENE	108-88-3	10.00	70.00	125.00		40.00
TRANS-1,2-DICHLOROETHENE	156-60-5	10.00	65.00	135.00		40.00
TRANS-1,3-DICHLOROPROPENE	10061-02-6	10.00	65.00	125.00		40.00
TRICHLOROETHENE	79-01-6	10.00	75.00	125.00		40.00
TRICHLOROFLUOROMETHANE	75-69-4	10.00	25.00	185.00		40.00
VINYL CHLORIDE	75-01-4	10.00	60.00	125.00		40.00
QC Type: MS						
1,1,1-TRICHLOROETHANE	71-55-6	10.00	70.00	135.00		40.00
1,1,2,2-TETRACHLOROETHANE	79-34-5	10.00	55.00	130.00		40.00
1,1,2-TRICHLOROETHANE	79-00-5	10.00	60.00	125.00		40.00
1,1-DICHLOROETHANE	75-34-3	10.00	75.00	125.00		40.00
1,1-DICHLOROETHENE	75-35-4	10.00	65.00	135.00		40.00
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	10.00	40.00	135.00		40.00
1,2-DIBROMOETHANE	106-93-4	10.00	70.00	125.00		40.00
1,2-DICHLOROETHANE	107-06-2	10.00	70.00	135.00		40.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8260B	Matrix: SO					
QC Type: MS						
1,2-DICHLOROPROPANE	78-87-5	10.00	70.00	120.00		40.00
2-BUTANONE	78-93-3	10.00	30.00	160.00		40.00
ACETONE	67-64-1	10.00	20.00	160.00		40.00
BENZENE	71-43-2	10.00	75.00	125.00		40.00
BROMODICHLOROMETHANE	75-27-4	10.00	70.00	130.00		40.00
BROMOFORM	75-25-2	10.00	55.00	135.00		40.00
BROMOMETHANE	74-83-9	10.00	30.00	160.00		40.00
CARBON DISULFIDE	75-15-0	10.00	45.00	160.00		40.00
CARBON TETRACHLORIDE	56-23-5	10.00	65.00	135.00		40.00
CHLOROBENZENE	108-90-7	10.00	75.00	125.00		40.00
CHLOROETHANE	75-00-3	10.00	40.00	155.00		40.00
CHLOROFORM	67-66-3	10.00	70.00	125.00		40.00
CHLOROMETHANE	74-87-3	10.00	50.00	130.00		40.00
CIS-1,2-DICHLOROETHENE	156-59-2	10.00	65.00	125.00		40.00
CIS-1,3-DICHLOROPROPENE	10061-01-5	10.00	70.00	125.00		40.00
DIBROMOCHLOROMETHANE	124-48-1	10.00	65.00	130.00		40.00
DICHLORODIFLUOROMETHANE	75-71-8	10.00	35.00	135.00		40.00
ETHYLBENZENE	100-41-4	10.00	75.00	125.00		40.00
m,p-xylene	108-38-3	10.00	80.00	125.00		40.00
METHYL ACETATE	79-20-9	10.00	70.00	130.00		40.00
METHYLENE CHLORIDE	75-09-2	10.00	55.00	140.00		40.00
methyl-t-butyl ether	1634-04-4	10.00	75.00	128.00		40.00
O-XYLENE	95-47-6	10.00	75.00	125.00		40.00
STYRENE	100-42-5	10.00	75.00	125.00		40.00
TERT-BUTYL ALCOHOL	75-65-0	10.00	50.00	130.00		40.00
TETRACHLOROETHENE	127-18-4	10.00	65.00	140.00		40.00
TOLUENE	108-88-3	10.00	70.00	125.00		40.00
TRANS-1,2-DICHLOROETHENE	156-60-5	10.00	65.00	135.00		40.00
TRANS-1,3-DICHLOROPROPENE	10061-02-6	10.00	65.00	125.00		40.00
TRICHLOROETHENE	79-01-6	10.00	75.00	125.00		40.00
TRICHLOROFLUOROMETHANE	75-69-4	10.00	25.00	185.00		40.00
VINYL CHLORIDE	75-01-4	10.00	60.00	125.00		40.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8260B	**Matrix: SO**					
QC Type: SURR						
1,2-DICHLOROETHANE-D4	17060-07-0	10.00	65.00	126.00		
BROMOFLUOROBENZENE	30135-88-7	10.00	77.00	111.00		
DIBROMOFLUOROMETHANE	1868-53-7	10.00	65.00	132.00		
TOLUENE-D8	2037-26-5	10.00	85.00	115.00		
Method: 8270D	**Matrix: SO**					
QC Type: LCS						
1,1'-Biphenyl	92-52-4	10.00	50.00	150.00		40.00
1,2,4-TRICHLOROBENZENE	120-82-1	10.00	45.00	110.00		40.00
1,2-DICHLOROBENZENE	95-50-1	10.00	45.00	95.00		40.00
1,3-DICHLOROBENZENE	541-73-1	10.00	40.00	100.00		40.00
1,4-DICHLOROBENZENE	106-46-7	10.00	35.00	105.00		40.00
2,4,5-TRICHLOROPHENOL	95-95-4	10.00	50.00	110.00		40.00
2,4,6-TRICHLOROPHENOL	88-06-2	10.00	45.00	110.00		40.00
2,4-DICHLOROPHENOL	120-83-2	10.00	45.00	110.00		40.00
2,4-DIMETHYLPHENOL	105-67-9	10.00	30.00	105.00		40.00
2,4-DINITROPHENOL	51-28-5	10.00	15.00	130.00		40.00
2,4-DINITROTOLUENE	121-14-2	10.00	50.00	115.00		40.00
2,6-DINITROTOLUENE	606-20-2	10.00	50.00	110.00		40.00
2-CHLOROPHENOL	95-57-8	10.00	45.00	105.00		40.00
2-METHYL-4,6-DINITROPHENOL	534-52-1	10.00	30.00	135.00		40.00
2-METHYLNAPHTHALENE	91-57-6	10.00	45.00	105.00		40.00
2-METHYLPHENOL	95-48-7	10.00	40.00	105.00		40.00
2-NITROANILINE	88-74-4	10.00	45.00	120.00		40.00
3,3'-DICHLOROBENZIDINE	91-94-1	10.00	10.00	130.00		40.00
4-METHYLPHENOL	106-44-5	10.00	50.00	150.00		40.00
ACENAPHTHENE	83-32-9	10.00	45.00	110.00		40.00
ACENAPHTHYLENE	208-96-8	10.00	45.00	105.00		40.00
ACETOPHENONE	98-86-2	10.00	50.00	150.00		40.00
ANTHRACENE	120-12-7	10.00	55.00	105.00		40.00
ATRAZINE	1912-24-9	10.00	50.00	150.00		40.00
Azobenzene	103-33-3	10.00	50.00	150.00		40.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8270D	**Matrix:** SO					
QC Type: LCS						
BENZALDEHYDE	100-52-7	10.00	10.00	118.00		40.00
BENZIDINE	92-87-5	0.00	10.00	150.00		40.00
BENZO(A)ANTHRACENE	56-55-3	10.00	50.00	110.00		40.00
BENZO(A)PYRENE	50-32-8	10.00	50.00	110.00		40.00
BENZO(B)FLUORANTHENE	205-99-2	10.00	45.00	115.00		40.00
BENZO(G,H,I)PERYLENE	191-24-2	10.00	40.00	125.00		40.00
BENZO(K)FLUORANTHENE	207-08-9	10.00	45.00	125.00		40.00
BIS(2-CHLOROETHYL) ETHER	111-44-4	10.00	40.00	105.00		40.00
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	10.00	20.00	115.00		40.00
BIS(2-ETHYLHEXYL) PHTHALATE	117-81-7	10.00	45.00	125.00		40.00
BUTYLBENZYL PHTHALATE	85-68-7	10.00	50.00	125.00		40.00
CAPROLACTAM	105-60-2	10.00	50.00	150.00		40.00
CARBAZOLE	86-74-8	10.00	45.00	115.00		40.00
CHRYSENE	218-01-9	10.00	55.00	110.00		40.00
DIBENZ(A,H)ANTHRACENE	53-70-3	10.00	40.00	125.00		40.00
DIETHYL PHTHALATE	84-66-2	10.00	50.00	115.00		40.00
DI-N-BUTYL PHTHALATE	84-74-2	10.00	55.00	110.00		40.00
DI-N-OCTYL PHTHALATE	117-84-0	10.00	40.00	130.00		40.00
FLUORANTHENE	206-44-0	10.00	55.00	115.00		40.00
FLUORENE	86-73-7	10.00	50.00	110.00		40.00
HEXACHLOROBENZENE	118-74-1	10.00	45.00	120.00		40.00
HEXACHLOROBUTADIENE	87-68-3	10.00	40.00	115.00		40.00
HEXACHLOROCYCLOPENTADIENE	77-47-4	5.00	8.00	148.00		40.00
HEXACHLOROETHANE	67-72-1	10.00	35.00	110.00		40.00
INDENO(1,2,3-CD)PYRENE	193-39-5	10.00	40.00	120.00		40.00
ISOPHORONE	78-59-1	10.00	45.00	110.00		40.00
NAPHTHALENE	91-20-3	10.00	40.00	105.00		40.00
NITROBENZENE	98-95-3	10.00	40.00	115.00		40.00
N-NITROSODIMETHYLAMINE	62-75-9	10.00	50.00	150.00		40.00
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	10.00	40.00	115.00		40.00
N-NITROSODIPHENYLAMINE	86-30-6	10.00	50.00	115.00		40.00
PENTACHLOROPHENOL	87-86-5	10.00	25.00	120.00		40.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8270D	Matrix: SO					
QC Type: LCS						
PHENANTHRENE	85-01-8	10.00	50.00	110.00		40.00
PHENOL	108-95-2	10.00	40.00	100.00		40.00
PYRENE	129-00-0	10.00	45.00	125.00		40.00
QC Type: MS						
1,1'-Biphenyl	92-52-4	10.00	50.00	150.00		40.00
1,2,4-TRICHLOROBENZENE	120-82-1	10.00	45.00	110.00		40.00
1,2-DICHLOROBENZENE	95-50-1	10.00	45.00	95.00		40.00
1,3-DICHLOROBENZENE	541-73-1	10.00	40.00	100.00		40.00
1,4-DICHLOROBENZENE	106-46-7	10.00	35.00	105.00		40.00
2,4,5-TRICHLOROPHENOL	95-95-4	10.00	50.00	110.00		40.00
2,4,6-TRICHLOROPHENOL	88-06-2	10.00	45.00	110.00		40.00
2,4-DICHLOROPHENOL	120-83-2	10.00	45.00	110.00		40.00
2,4-DIMETHYLPHENOL	105-67-9	10.00	30.00	105.00		40.00
2,4-DINITROPHENOL	51-28-5	10.00	15.00	130.00		40.00
2,4-DINITROTOLUENE	121-14-2	10.00	50.00	115.00		40.00
2,6-DINITROTOLUENE	606-20-2	10.00	50.00	110.00		40.00
2-CHLOROPHENOL	95-57-8	10.00	45.00	105.00		40.00
2-METHYL-4,6-DINITROPHENOL	534-52-1	10.00	30.00	135.00		40.00
2-METHYLNAPHTHALENE	91-57-6	10.00	45.00	105.00		40.00
2-METHYLPHENOL	95-48-7	10.00	40.00	105.00		40.00
2-NITROANILINE	88-74-4	10.00	45.00	120.00		40.00
3,3'-DICHLOROBENZIDINE	91-94-1	10.00	10.00	130.00		40.00
4-METHYLPHENOL	106-44-5	10.00	50.00	150.00		40.00
ACENAPHTHENE	83-32-9	10.00	45.00	110.00		40.00
ACENAPHTHYLENE	208-96-8	10.00	45.00	105.00		40.00
ACETOPHENONE	98-86-2	10.00	50.00	150.00		40.00
ANTHRACENE	120-12-7	10.00	55.00	105.00		40.00
ATRAZINE	1912-24-9	10.00	50.00	150.00		40.00
Azobenzene	103-33-3	10.00	50.00	150.00		40.00
BENZALDEHYDE	100-52-7	10.00	10.00	118.00		40.00
BENZIDINE	92-87-5	10.00	10.00	150.00		40.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8270D	Matrix: SO					
QC Type: MS						
BENZO(A)ANTHRACENE	56-55-3	10.00	50.00	110.00		40.00
BENZO(A)PYRENE	50-32-8	10.00	50.00	110.00		40.00
BENZO(B)FLUORANTHENE	205-99-2	10.00	45.00	115.00		40.00
BENZO(G,H,I)PERYLENE	191-24-2	10.00	40.00	125.00		40.00
BENZO(K)FLUORANTHENE	207-08-9	10.00	45.00	125.00		40.00
BIS(2-CHLOROETHYL) ETHER	111-44-4	10.00	40.00	105.00		40.00
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	10.00	20.00	115.00		40.00
BIS(2-ETHYLHEXYL) PHTHALATE	117-81-7	10.00	45.00	125.00		40.00
BUTYLBENZYL PHTHALATE	85-68-7	10.00	50.00	125.00		40.00
CAPROLACTAM	105-60-2	10.00	50.00	150.00		40.00
CARBAZOLE	86-74-8	10.00	45.00	115.00		40.00
CHRYSENE	218-01-9	10.00	55.00	110.00		40.00
DIBENZ(A,H)ANTHRACENE	53-70-3	10.00	40.00	125.00		40.00
DIETHYL PHTHALATE	84-66-2	10.00	50.00	115.00		40.00
DI-N-BUTYL PHTHALATE	84-74-2	10.00	55.00	110.00		40.00
DI-N-OCTYL PHTHALATE	117-84-0	10.00	40.00	130.00		40.00
FLUORANTHENE	206-44-0	10.00	55.00	115.00		40.00
FLUORENE	86-73-7	10.00	50.00	110.00		40.00
HEXACHLOROBENZENE	118-74-1	10.00	45.00	120.00		40.00
HEXACHLOROBUTADIENE	87-68-3	10.00	40.00	115.00		40.00
HEXACHLOROCYCLOPENTADIENE	77-47-4	5.00	8.00	148.00		40.00
HEXACHLOROETHANE	67-72-1	10.00	35.00	110.00		40.00
INDENO(1,2,3-CD)PYRENE	193-39-5	10.00	40.00	120.00		40.00
ISOPHORONE	78-59-1	10.00	45.00	110.00		40.00
NAPHTHALENE	91-20-3	10.00	40.00	105.00		40.00
NITROBENZENE	98-95-3	10.00	40.00	115.00		40.00
N-NITROSODIMETHYLAMINE	62-75-9	10.00	50.00	150.00		40.00
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	10.00	40.00	115.00		40.00
N-NITROSODIPHENYLAMINE	86-30-6	10.00	50.00	115.00		40.00
PENTACHLOROPHENOL	87-86-5	10.00	25.00	120.00		40.00
PHENANTHRENE	85-01-8	10.00	50.00	110.00		40.00
PHENOL	108-95-2	10.00	40.00	100.00		40.00

Analyte Name	Analyte Label (CAS)	Lower	Lower	Upper	Upper	RPD (%)
Method: 8270D	Matrix: SO					
QC Type: MS						
PYRENE	129-00-0	10.00	45.00	125.00		40.00
QC Type: SURR						
2,4,6-TRIBROMOPHENOL	118-79-6	10.00	35.00	125.00		
2-FLUOROBIPHENYL	321-60-8	10.00	45.00	105.00		
2-FLUOROPHENOL	367-12-4	10.00	35.00	105.00		
NITROBENZENE-D5	20810-28-0	10.00	35.00	100.00		
PHENOL-D5	4165-62-2	10.00	40.00	100.00		
TERPHENYL-D14	98904-43-9	10.00	30.00	125.00		
Method: 9012B	Matrix: SO					
QC Type: LCS						
CYANIDE	57-12-5	30	74	124		
QC Type: MS						
CYANIDE	57-12-5	30	75	125		

Appendix 4

Sampling Standard Operating Procedures (SOP)

- Stockpile and Offsite Source Soil Sampling
- Surface Soil Sampling
- Subsurface Soil Sampling
- Debris Stockpile Sampling
- Aboveground Storage Tank (AST) Sampling
- Packing, Storing and Shipping of Samples Checklist
- Sample Cooler Shipment Checklist

PROJECT PROCEDURE SEVENSON ENVIRONMENTAL SERVICES, INC.					
TITLE: Stockpile & Off-Site Source Soil Sampling			NO.: M-120.45-01		
			PAGE: 1 of 14 (incl. Attachment)		
			DATE: March 12, 2013		
Revision Date	Page(s) Revised	Revision Date	Page(s) Revised	Revision Date	Page(s) Revised

1.0 PURPOSE

1.1 The purpose of this procedure is to present protocol for collecting stockpile and off-site source soil samples at various sites and in various geometries. This includes protocols for both stockpile and in situ sampling.

2.0 APPLICABILITY

2.1 Soil samples may be collected from stockpiles or in situ from onsite stockpiles or from in-place from off-site source material that is presumed to be suitable for use as backfill at the site. The Field Sampling Manager (FSM) or his/her designee will coordinate the sampling efforts.

3.0 REFERENCES AND COMMENTS

3.1 Site-specific UFP Quality Assurance Project Plan (QAPP)

3.2 Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, U.S. EPA SW846, Revision 3, 1996.

3.3 Requirements for the Preparation of Sampling and analysis Plans, CEMP-RA, Manual No. 200-1-3, February 2001.

3.4 Field Sampling Procedures Manual, NJ Department of Environmental Protection, May, August 2005.

3.5 1A Compendium of Superfund Field Operations Methods, EPA-540/P-87/001, December 1987.

4.0 GENERAL

4.1 Discussion

Stockpiled site materials

4.2 Definitions

Not Applicable.

5.0 RESPONSIBILITIES

5.1 Field Sampling Manager - FSM

5.1.1 Oversees implementation of this procedure

5.1.2 Ensures completed sample collection is adequately documented and reviewed.

5.1.3 Ensures Project Management, the CQC Systems Manager, USACE, and any appropriate regulatory bodies are notified if a problem occurs during sampling or if the material does not meet the requirements for its intended use.

5.2 Regulatory Specialist - responsible for approving this procedure.

5.3 Chemical Quality Control (QC) Coordinator - responsible for approving this procedure and verifying that it is being implemented.

5.4 Health and Safety (H&S) Officer - responsible for ensuring that appropriate SES and contractual H&S policies and procedures are in effect and verifying enforcement by management.

5.5 Program and Project Manager - responsible for ensuring that all personnel are properly trained; ensuring that this and all appropriate procedures are followed; and verifying that the appropriate training records are available.

5.6 CQC Systems Manager - responsible for ensuring that all personnel perform their assigned duties in accordance with this procedure when applicable; ensuring compliance with the QAAP, and overall management of field activities.

6.0 PREREQUISITES

6.1 FSM shall ensure that the correct and sufficient supplies of sampling equipment are available.

6.2 FSM shall confirm the identity and location of overburden material or offsite borrow source material.

6.3 FSM shall ensure that all appropriate documentation is legible and complete according to established procedures.

6.4 FSM shall notify the CQCM of any anomalies or problems that occur during soil sampling activities.

6.5 All personnel will follow the requirements and guidelines established in the Site-specific QAPP and SSHP.

7.0 PRECAUTIONS AND LIMITATIONS

7.1 Personnel shall use caution when sampling stockpiles to avoid potential engulfment, or other health and safety related issues that may occur during sampling.

7.2 Sampling under precipitation conditions is possible, but should not be considered a routinely accepted activity. If sampling under wet conditions, make notations in the field logbook of the weather conditions and abnormal occurrences.

8.0 APPARATUS

8.1 Equipment and Materials Management

8.1.1 Downhole and sampling tools are either pre-cleaned cleaned in accordance with Section 14.0 or disposable.

8.2 Sampling Equipment and Materials

8.2.1 Auger or other coring tool;

8.2.2 Shovel and trowel;

8.2.3 Plastic collection bags;

8.2.4 Sample chain of custody

8.2.5 Field logbook and pen/sharpie

8.2.6 Container for collecting debris generated during the sampling process; i.e. gloves, paper towels, etc.

8.2.7 Bucket or stainless steel mixing bowl (for homogenizing sample)

8.2.8 Appropriate personal protective equipment;

8.2.9 Paper towels for decontamination;

8.2.10 Spray bottle(s) for cleaning solution and rinse water; and

8.2.11 Appropriate sample containers and shipment coolers.

8.3 Other equipment may be suitable if necessary because of availability of items listed or the conditions encountered at the sites. Substituted equipment shall be approved by the FSM and documented in the Field Logbook.

9.0 RECORDS

9.1 Field Logbook

9.2 Chain of Custody (Attachment 18.1)

10.0 PROCEDURE

10.1 Stockpile Soil Sampling

10.1.1 The following steps are to be followed for stockpile sampling. This is applicable to both onsite stockpiles (waste characterization) or off-site borrow material.

10.1.1.1 Excavated soil may be stockpiled inside of bermed contained areas in lifts or piles. Samples from the stockpiles may be analyzed as grab or composite samples.

10.1.1.2 The soil may be stockpiled varying from a few to several thousand cubic yards. Because of this potential variation in pile size, no single method for sampling or type of equipment can be prescribed that will apply to every situation. The two basic methods that can be used for sampling stockpiles, core sampling method and lift sampling method, are described in paragraphs 13.3 and 13.4, respectively. Both methods are based on the premise that in order for a sample to be representative of the pile, every particle in the pile must have an equal probability of being included in the sample.

10.1.1.3 One of the methods, the core sampling method, assumes that the pile can be adequately penetrated using a coring tool (i.e., sample trowel, sampling probe, drill rig or backhoe). On conical shaped piles, the

sample is to be taken approximately perpendicular to the surface of the pile. On piles with flattened tops, the sample is to be taken perpendicular to the surface midway between the top and the bottom of the pile.

10.1.1.4 The other stockpile sampling method, the lift sampling method, assumes that the pile is sampled either as the soil is placed in lifts onto the pile or before the soil is removed in lifts for use. The samples will, therefore, only be representative of the discrete layer of soil that is exposed to the sampling. The lift method is suitable for spread out thin lifts, as well as the outer "skin" of a large stockpile.

10.2 In-situ Sampling

10.2.1 Appropriate in-situ soil sample locations are determined by the size and uniformity of the deposit being sampled. The sampling pattern depends upon the size of the area, the uniformity of the soil stratum being sampled, and the volume of the soil that is being sampled.

10.2.2 Sampling plans for particular purposes may specify a pre-established sampling frequency in terms of the maximum volume of soil represented by a sample. If the soil being sampled is statistically homogeneous, then the locations for samples can be selected randomly over the area and thickness of the deposit. If the soil is not statistically homogeneous, then the area must be broken into sub areas within which the soils are statistically homogeneous, and each area sampled separately. The issue of statistical homogeneity is resolved by comparing the range of variation of the property being judged to the acceptable criteria. For example, a deposit of sand and gravel may be statistically homogeneous when judged against a standard that the material not contain boulders and not be homogeneous when judged against a standard that no gravels be larger than one inch.

11.0 SAMPLE TRACKING

11.1 To establish the documentation necessary to track the sample from the time of collection, the sample identification and Chain of Custody (COC) forms must accompany samples that are sent to the laboratory(ies).

12.0 SAMPLING METHODS

12.1 Surface Soil Sampling

12.1.1 If necessary, to minimize contamination, spread a clean sheet of plastic/poly next to the area to be sampled; assemble the sampling equipment required.

12.1.2 Enter the complete information on the COC:

12.1.2.1 Sample Number

12.1.2.2 Sample Matrix

12.1.2.3 Sample Location

12.1.2.4 Purpose of Sample Collection

12.1.2.5 Include applicable comments regarding sample, and location

12.1.2.6 Collected By (your name)

12.1.3 Collect the soil samples that are representative of the soil in the area surveyed. Use a shovel or trowel to collect soil from the required depth. Place the representative soil sample in containers and stir to ensure homogeneity and sample uniformity, if necessary.

12.1.4 Remove rocks, sticks, and foreign objects greater than approximately 1-inch.

12.1.5 Attach the identification tag to the sample container.

12.1.6 If necessary, decontaminate the sampling equipment as required by Section 14.0.

12.1.7 Record the sample locations in a neat sketch in the Field Logbook.

12.2 Subsurface Sampling (Undisturbed Soils)

12.2.1 If necessary, to minimize contamination, spread a clean sheet of plastic/poly next to the area to be sampled; assemble the sampling equipment required.

12.2.2 Enter the complete information on the COC:

12.2.2.1 Sample Number

12.2.2.2 Sample Matrix

12.2.2.3 Sample Location

12.2.2.4 Purpose of Sample Collection

12.2.2.5 Include applicable comments regarding sample, and location

12.2.2.6 Collected By (your name)

12.2.3 Sample the material using a hand core sampling tool or hammer driven split spoon sampler or auger.

12.2.3.1 Using an auger, drill to the desired sampling depth; keep the auger turning until no more material comes up. The soil around the hole is fairly well mixed and representative of the interval just drilled. Origin surface material adjacent to or far away from the hole will not be part of the sample.

12.2.3.2 If the soil sample is to be obtained from a particular depth (not a composite from the surface to depth), and the material refuses to pass into the coring tool, the following sampling method will be performed. Drill to the top of the desired sampling depth; keep the auger turning until no more material comes up. Remove the auger and sample the material using a hand core sampling tool or hammer driven split spoon sampler. The first three inches of the sample obtained will be considered slough and not part of the desired sample.

NOTE: If, due to the conditions of the sampling area, this method is not successful, an alternative method(s), approved by the FSM or designee may be used. Alternative methods, when used, will be documented by the field personnel in the Field Logbook.

12.2.4 Remove rocks, sticks, and foreign objects greater than approximately one (1) inch.

12.2.5 Label the sample container(s).

12.2.6 Return unused material to the sampling hole and fill in the hole to eliminate possible tripping hazard.

12.2.7 If necessary, decontaminate the sampling equipment as required by Section 14.0.

12.2.8 Record the sample locations in a neat sketch in the Field Logbook.

12.3 Stockpile Sampling (Core Sampling Method)

12.3.1 If necessary, to minimize contamination, spread a clean sheet of plastic/poly next to the area to be sampled; assemble the sampling equipment required.

12.3.2 Enter the complete information on the COC:

12.3.2.1 Sample Number

12.3.2.2 Sample Matrix

12.3.2.3 Sample Location

12.3.2.4 Purpose of Sample Collection

12.3.2.5 Include applicable comments regarding sample, location, and identify the approximate size of the stockpile. Include a brief description of the equipment used to obtain the sample (i.e., sub-soil sampler, drill rig, etc.); and

12.3.2.6 Collected By (your name)

12.3.3 Before sampling, determine the volume of the stockpile and the corresponding number of samples and duplicates required. Record the information in the Field Logbook.

12.3.4 Using a sample trowel, shovel, auger or other coring tool, take the required number of samples from the pile. A hollow stem auger will be used when discrete, rather than composite samples are collected.

12.3.5 Place the sample in the sample container(s).

12.3.6 If necessary, decontaminate the sampling equipment as required by Section 14.0.

12.4 Stockpile Sampling (Lift Sampling Method)

12.4.1 If necessary, to minimize contamination, spread a clean sheet of plastic/poly next to the area to be sampled; assemble the sampling equipment required.

12.4.2 Enter the complete information on the COC:

12.4.2.1 Sample Number

12.4.2.2 Sample Matrix

12.4.2.3 Sample Location

12.4.2.4 Purpose of Sample Collection

12.4.2.5 Include applicable comments regarding sample, location, and identify the approximate size of the stockpile. Include a brief description of the equipment used to obtain the sample (i.e., sub-soil sampler, drill rig, etc.); and

12.4.2.6 Collected By (your name)

12.4.3 Before sampling, determine the volume of the stockpile and the corresponding number of samples and duplicates required. Record the information in the Field Logbook.

12.4.4 Using a sample trowel, shovel, auger or other coring tool, take the required number of samples from the pile. A hollow stem auger will be used when discrete, rather than composite samples are collected.

12.4.5 Place the sample in the sample container.

12.4.6 Decontaminate the sampling equipment as required by Section 14.0

12.5 Soil Sample Size

12.5.1 Each soil sample collected as a grab sample shall be of sufficient volume to fill the required sample containers. Samples collected as grabs for compositing shall be of approximately the same volume and of sufficient volume to fill the required sample containers.

13.0 DECONTAMINATION OF SAMPLING EQUIPMENT

13.1 To avoid cross-contamination, the non-disposable sampling equipment will be cleaned prior to and between samples. The following steps will be followed to clean the equipment.

13.1.1 Remove loose contamination by gently tapping/shaking the item;

13.1.2 Using a stainless steel brush or paper towels, remove material that did not dislodge;

13.1.3 Wash and scrub, as necessary, with a solution of non-phosphate detergent (e.g., Alconox) and potable water

13.1.4 Rinse thoroughly with potable water

13.1.5 Rinse with 1% HNO3 solution

13.1.6 Rinse with DI water

13.1.7 Dry the item with paper towels or repeat the scrubbing sequence as necessary;

13.1.8 Dispose of cleaning materials in accordance with instructions provided by the FSM or designee.

14.0 QUALITY CONTROL

14.1 QC Samples

14.1.1 Collect QC samples by type and frequency as described in the site QAPP. These QC samples will be identified and noted in the Field Logbook.

14.2 Data Review

14.2.1 The Quality Control Manager will resolve any discrepancies that were noted by field personnel in the Field Logbook.

15.0 HEALTH AND SAFETY

15.1 Personnel protective equipment and clothing, as required by the Health and Safety Plan, will be used when collecting and handling contaminated material.

16.0 RECORDS

16.1 The following documents will be maintained as quality records:

16.1.1 Field Logbooks;

16.1.2 Chain of Custodies; and

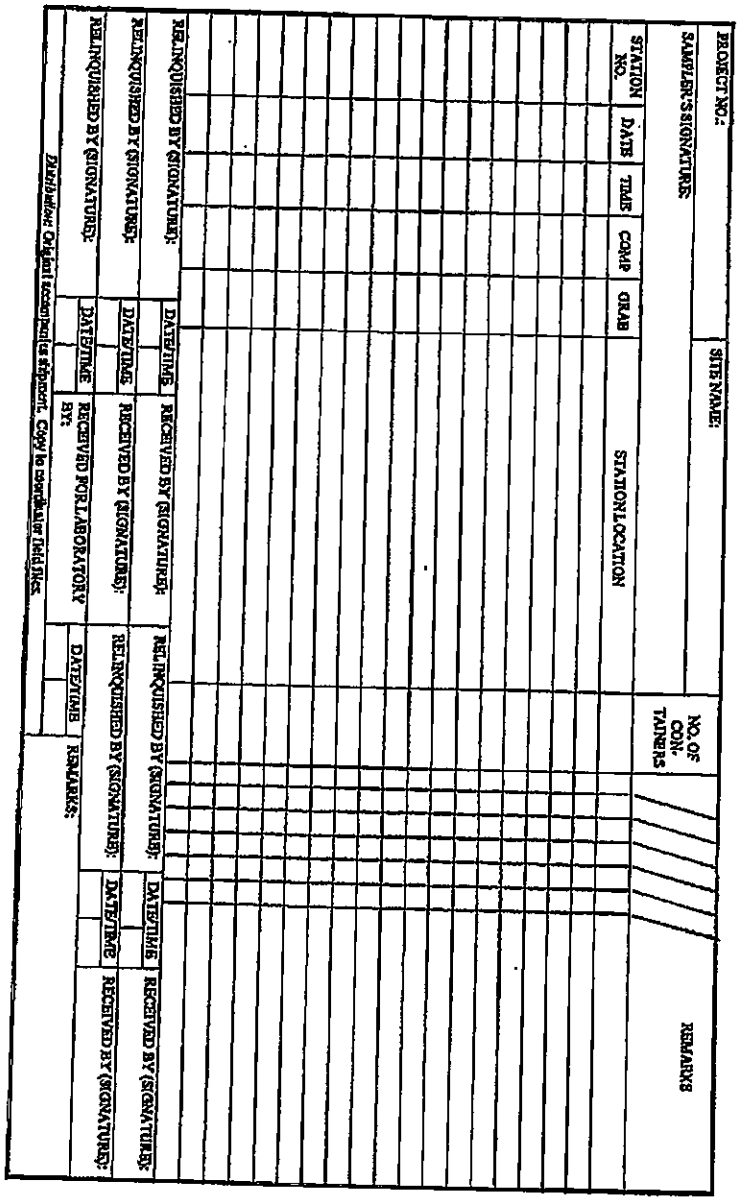
16.1.3 Results of any calculations performed in the field.

16.1.4 A field diagram of sampling areas noting sample locations.

17.0 ATTACHMENTS

17.1 Chain-of-Custody Form

Attachment 17.1 – Sevenson Chain of Custody (Example)



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Sevenson Environmental Services, Inc.

STANDARD OPERATING PROCEDURE
FOR SURFACE SOIL SAMPLING

SOP NUMBER: M-120.13-01

PREPARED BY: _____ 2/11/14 Date

STANDARD OPERATING PROCEDURE
FOR SURFACE SOIL SAMPLING

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1.0 Scope and Application
2.0 Method Summary
3.0 Method Validation
4.0 Safety Precautions
5.0 Apparatus and Materials
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12.0 Method Flow Chart
13.0 References and Definitions

List of Figures and Tables

Figure 1 Method Flow Chart
Table 1 Field Checklist

1.0 Scope and Application

The purpose of this procedure is to describe the standard method and equipment used to collect soil samples at the surface.

This procedure provides a disturbed sample. This procedure applies to a wide variety of soil types including sands, clays, and silts.

This procedure is not appropriate for taking samples at a discrete depth, but may be used to take samples at an approximate depth.

2.0 Method Summary

2.1 A sample location is identified and the surrounding area is cleared prior to sampling.

2.2 A typical garden spade is used to remove the top cover of soil to the desired depth, and a stainless steel scoop is used to collect the sample.

2.3 A representative aliquot is placed into an appropriate container.

2.4 The labeled container is packed in ice as soon as possible.

3.0 Method Validation

3.1 The methods used are according to the procedures specified in Standard Methods for the Examination of Water and Waste Water (22nd edition) and applicable EPA and other regulatory documents (refer to Section 13.0). Therefore, method validation is not required.

4.0 Safety Precautions

4.1 Proper personal safety equipment will be worn at all times during the procedure. This includes safety glasses, gloves, and appropriate protective clothing (as required by the Health and Safety Plan).

5.0 Apparatus and Materials

5.1 Health and safety equipment (as required by the Health and Safety Plan).
5.2 Cleaning equipment.
5.3 Disposable aluminum pan.
5.4 Dedicated stainless steel scoops or disposable scoops or disposable trowel.
5.5 200-foot tape measure.

5.6 Appropriate sample containers and chain of custody forms.
5.7 Coolers with ice.
5.8 Field book.
5.10 Flame Ionization Detector (FID).
5.11 Camera.

6.0 Reagents (for decon of non-disposable equipment)

6.1 Reagent Grade water.

6.2 Acetone - ACS Reagent (JT Baker #9006, Phillipsburg NJ).

6.3 Hexane - ACS Reagent (JT Baker #9309).

6.4 Nitric acid - concentrated, trace metals grade (JT Baker #9598).

6.5 Hydrochloric acid - concentrated, trace metals grade (JT Baker #9535).

7.0 Sample Preservation and Storage

7.1 Store all samples collected for metals analysis in either plastic or glass bottles.

7.2 Volatile samples are filled to zero headspace and stored in widemouth glass containers with PTFE (Teflon)-lined caps at 4°C.

7.3 All other samples are stored in widemouth glass containers with Teflon-lined caps at 4°C.

8.0 Holding Times

8.1 Metals must be analyzed within six months; semivolatile samples within seven days, and volatile samples within fourteen days of sampling. See Site-specific QAPP.

9.0 Procedure

9.1 Don personal protective equipment (as required by the Health and Safety Plan).

9.2 Identify sample locations from sample location plan and note locations in field notebook. To collect soil samples, carefully cut into the soil with a disposable trowel to the desired depth. Record appropriate information and observations in the field logbook.

9.3 Transfer the sub-samples to the appropriate container (grab) or a disposable aluminum pan for compositing or homogenizing.

9.4 Screen the headspace with an FID. Record FID reading in field book.

9.5 Label sample container and cap in accordance with procedures in Sevenson Task Specific SOP 130.13, "Sample Handling".

9.7 Place sample container in a shipping cooler.

9.8 Discard gloves and any other trash in designated location.

9.9 Handle, pack and ship the samples with appropriate chain-of-custody procedures in accordance with Sevenson Task Specific SOP 130.20, "Sample Shipment".

9.10 Record all other appropriate information in the field log book.

10.0 Responsibilities

10.1 Field Sampling Manager - responsible for the oversight of Sediment Sampling.
10.2 Regulatory Specialist - responsible for approving this procedure.
10.3 Chemical Quality Control (QC) Coordinator - responsible for approving this procedure and verifying that it is being implemented.
10.4 Health and Safety (H&S) Officer - responsible for ensuring that appropriate SES and contractual H&S policies and procedures are in effect and verifying enforcement by management.
10.5 Program and Project Manager - responsible for ensuring that all personnel are properly trained; ensuring that this and all appropriate procedures are followed; and verifying that the appropriate training records are available.
10.6 CQC Systems Manager - responsible for ensuring that all personnel perform their assigned duties in accordance with this procedure when applicable; ensuring compliance with the SAP, and overall management if field activities.

11.0 Preventative Maintenance

11.1 Equipment should either be disposable and never used for more than one test location, or properly decontaminated prior to use. All equipment must be handled with new latex gloves which must be changed between sampling locations. Protect tools and equipment from sources of contamination.

12.0 Method Flow Chart - Figure 1

13.0 References and Definitions

13.1 References

13.1.1 Standard Methods for the Examination of Water and Wastewater, 22nd edition, January 2012.

13.1.2 Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, U.S. EPA SW846, Revision 3, 1996.

13.1.3 Requirements for the Preparation of Sampling and analysis Plans, CEMP-RA, Manual No. 200-1-3, February 2001.

13.1.4 Field Sampling Procedures Manual, NJ Department of Environmental Protection, May, August 2005.

13.1.5 A Compendium of Superfund Field Operations Methods, EPA-540/P-87/001, December 1987. 13.1.1 Standard Methods for the Examination of Water and Wastewater, 22nd edition, Method 9060.

13.2 Definitions

13.2.1 None.

Figure 1
Method Flow Chart

Locate and prepare sample location
↓
Record appropriate information and observations
↓
Prepare decontaminated sampling equipment
↓
Obtain sample and put in container or in steel bowl or aluminum pan
↓
Put sample in appropriate container, seal, and label
↓
Fill out Chain of Custody

Table 1
Field Checklist

_____Camera	_____Sample log
_____Chain-of-custody forms	_____Trowel
_____Cleaning Equipment	_____Stainless steel bowl or disposable aluminum pan
_____Coolers with ice	_____Tape measure, 200-foot
_____Flame Ionization Detector (FID)	_____Tyvek suits & appropriate safety gear
_____Field Book	_____Work Plan
_____Health and safety equipment	
_____Labels	REAGENTS
_____Sample gloves	_____Reagent Grade water
_____Sample jars/vials	_____Acetone
	_____Hexane
	_____Nitric acid
	_____Hydrochloric acid

STANDARD OPERATING PROCEDURE
FOR SUBSURFACE SOIL SAMPLING

SOP NUMBER: M-120.15-01

PREPARED BY: _____ 6/24/16 Date

STANDARD OPERATING PROCEDURE
FOR SUBSURFACE SOIL SAMPLING

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13.0 References and Definitions

List of Figures and Tables

Figure 1 Method Flow Chart
Table 1 Field Checklist

1.0 Scope and Application

The purpose of this procedure is to describe the standard method and equipment used to collect subsurface (6" to 36") soil samples.

This procedure provides a disturbed sample. This procedure applies to a wide variety of soil types including sands, clays, and silts.

This procedure is not appropriate for taking samples at a discrete depth, but may be used to take samples at an approximate depth.

2.0 Method Summary

2.1 A sample location is identified and the surrounding area is cleared prior to sampling.

2.2 A typical garden spade is used to remove the top cover of soil to the desired depth, and a disposal sample trowel or small field spade is used to collect the sample.

2.3 A representative aliquot is placed into an appropriate container(s).

2.4 The labeled container is packed in ice as soon as possible.

3.0 Method Validation

3.1 The methods used are according to the procedures specified in Standard Methods for the Examination of Water and Waste Water (22nd edition) and applicable EPA and other regulatory documents (refer to Section 13.0). Therefore, method validation is not required.

4.0 Safety Precautions

4.1 Proper personal safety equipment will be worn at all times during the procedure. This includes safety glasses, gloves, and appropriate protective clothing (as required by the Health and Safety Plan).

5.0 Apparatus and Materials

5.1 Health and safety equipment (as required by the Health and Safety Plan).
5.2 Cleaning equipment.
5.3 Disposable aluminum pan.
5.4 Dedicated stainless steel scoops or disposable scoops or disposable trowel.
5.5 200-foot tape measure.

5.6 Appropriate sample containers and chain of custody forms.
5.7 Coolers with ice.
5.8 Field book.
5.10 Flame Ionization Detector (FID).
5.11 Camera.

6.0 Reagents (for decon of non-disposable equipment)

6.1 Reagent Grade water.

6.2 Acetone - ACS Reagent (JT Baker #9006, Phillipsburg NJ).

6.3 Hexane - ACS Reagent (JT Baker #9309).

6.4 Nitric acid - concentrated, trace metals grade (JT Baker #9598).

6.5 Hydrochloric acid - concentrated, trace metals grade (JT Baker #9535).

7.0 Sample Preservation and Storage

7.1 Store all samples collected for metals analysis in either plastic or glass bottles.

7.2 Volatile samples are filled to zero headspace and stored in widemouth glass containers with PTFE (Teflon)-lined caps at 4°C.

7.3 All other samples are stored in widemouth glass containers with Teflon-lined caps at 4°C.

8.0 Holding Times

8.1 Metals must be analyzed within six months; semivolatile samples within seven days, and volatile samples within fourteen days of sampling. See Site-specific QAPP.

9.0 Procedure

9.1 Don personal protective equipment (as required by the Health and Safety Plan).

9.2 Identify sample locations from sample location plan and note locations in field notebook. To collect subsurface (6" to 36") soil samples, carefully cut into the soil with a small shovel to expose the sample depth. Samples are then obtained at the desired sample depth(s) with a disposable trowel or sample small shovel. Record appropriate information and observations in the field logbook.

9.3 Transfer the sub-samples to the appropriate container (grab) or a disposable aluminum pan for compositing or homogenizing.

9.4 Screen the headspace with an FID. Record FID reading in field book.

9.5 Label sample container and cap in accordance with procedures in Sevenson Task Specific SOP 130.13, "Sample Handling".

9.7 Place sample container in a shipping cooler.

9.8 Discard gloves and any other trash in designated location.

9.9 Handle, pack and ship the samples with appropriate chain-of-custody procedures in accordance with Sevenson Task Specific SOP 130.20, "Sample Shipment".

9.10 Record all other appropriate information in the field log book.

10.0 Responsibilities

10.1 Field Sampling Manager - responsible for the oversight of Sediment Sampling.
10.2 Regulatory Specialist - responsible for approving this procedure.
10.3 Chemical Quality Control (QC) Coordinator - responsible for approving this procedure and verifying that it is being implemented.
10.4 Health and Safety (H&S) Officer - responsible for ensuring that appropriate SES and contractual H&S policies and procedures are in effect and verifying enforcement by management.
10.5 Program and Project Manager - responsible for ensuring that all personnel are properly trained; ensuring that this and all appropriate procedures are followed; and verifying that the appropriate training records are available.
10.6 CQC Systems Manager - responsible for ensuring that all personnel perform their assigned duties in accordance with this procedure when applicable; ensuring compliance with the SAP, and overall management if field activities.

11.0 Preventative Maintenance

11.1 Equipment should either be disposable and never used for more than one test location, or properly decontaminated prior to use. All equipment must be handled with new latex gloves which must be changed between sampling locations. Protect tools and equipment from sources of contamination.

12.0 Method Flow Chart - Figure 1

13.0 References and Definitions

13.1 References

13.1.1 Standard Methods for the Examination of Water and Wastewater, 22nd edition, January 2012.

13.1.2 Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, U.S. EPA SW846, Revision 3, 1996.

13.1.3 Requirements for the Preparation of Sampling and analysis Plans, CEMP-RA, Manual No. 200-1-3, February 2001.

13.1.4 Field Sampling Procedures Manual, NJ Department of Environmental Protection, May, August 2005.

13.1.5 A Compendium of Superfund Field Operations Methods, EPA-540/P-87/001, December 1987. 13.1.1 Standard Methods for the Examination of Water and Wastewater, 22nd edition, Method 9060.

13.2 Definitions

13.2.1 None.

Figure 1
Method Flow Chart

Locate and prepare sample location
↓
Record appropriate information and observations
↓
Prepare decontaminated sampling equipment (if necessary)
↓
Obtain sample and put in container or in steel bowl or aluminum pan
↓
Put sample in appropriate container, seal, and label
↓
Fill out Chain of Custody

Table 1
Field Checklist

_____Camera	_____Sample log
_____Chain-of-custody forms	_____Trowel (disposable)
_____Cleaning Equipment	_____ Small shovel or spade
_____Coolers with ice	_____Stainless steel bowl or disposable aluminum pan
_____Flame Ionization Detector (FID)	_____Tape measure, 200-foot
_____Field Book	_____Tyvek suits & appropriate safety gear
_____Health and safety equipment	_____Work Plan
_____Labels	
_____Sample gloves	REAGENTS
_____Sample jars/vials	_____Reagent Grade water
	_____Acetone
	_____Hexane
	_____Nitric acid
	_____Hydrochloric acid

Sevenson Environmental Services, Inc.

STANDARD OPERATING PROCEDURE
FOR DEBRIS STOCKPILE SAMPLING

SOP NUMBER: M-120.17-01

PREPARED BY: Kim Riley 10-19-16 Date

STANDARD OPERATING PROCEDURE
FOR DEBRIS STOCKPILE SAMPLING

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Figure 1 Method Flow Chart
Table 1 Field Checklist

1.0 Scope and Application

The purpose of this procedure is to describe the standard method and equipment used to collect debris stockpile samples.

This procedure provides a composite sample of a debris stockpile (typically 500 yd3 or more).

2.0 Method Summary

2.1 Sample locations (typically 5 discrete grab sample locations) are identified and the surrounding area is cleared prior to sampling.

2.2 A typical garden spade is used to remove the top cover of debris to the desired depth at each discrete sample location, and a stainless steel scoop is used to collect the sample. NOTE: VOC samples will be collected from a single sample location, with any excess sample material added to complete the sample composite.

2.3 A representative aliquot is placed into an appropriate container.

2.4 The labeled container is packed in ice as soon as possible.

3.0 Method Validation

3.1 The methods used are according to the procedures specified in Standard Methods for the Examination of Water and Waste Water (22nd edition) and applicable EPA and other regulatory documents (refer to Section 13.0). Therefore, method validation is not required.

4.0 Safety Precautions

4.1 Proper personal safety equipment will be worn at all times during the procedure. This includes safety glasses, gloves, and appropriate protective clothing (as required by the Health and Safety Plan).

5.0 Apparatus and Materials

5.1 Health and safety equipment (as required by the Health and Safety Plan).
5.2 Cleaning equipment.
5.3 Disposable aluminum pan.
5.4 Dedicated stainless steel scoops or disposable scoops or disposable trowel.
5.5 200-foot tape measure.

5.6 Appropriate sample containers and chain of custody forms.
5.7 Coolers with ice.
5.8 Field book.
5.10 Flame Ionization Detector (FID).
5.11 Camera.

6.0 Reagents (for decon of non-disposable equipment)

6.1 Reagent Grade water.

6.2 Acetone - ACS Reagent (JT Baker #9006, Phillipsburg NJ).

6.3 Hexane - ACS Reagent (JT Baker #9309).

6.4 Nitric acid - concentrated, trace metals grade (JT Baker #9598).

6.5 Hydrochloric acid - concentrated, trace metals grade (JT Baker #9535).

7.0 Sample Preservation and Storage

7.1 Store all samples collected for metals analysis in either plastic or glass bottles.

7.2 Volatile samples are filled to zero headspace and stored in widemouth glass containers with PTFE (Teflon)-lined caps at 4°C.

7.3 All other samples are stored in widemouth glass containers with Teflon-lined caps at 4°C.

8.0 Holding Times

8.1 Metals must be analyzed within six months; semivolatile samples within seven days, and volatile samples within fourteen days of sampling. See Site-specific QAPP.

9.0 Procedure

9.1 Don personal protective equipment (as required by the Health and Safety Plan).

9.2 Identify sample locations from sample location plan and note locations in field notebook. Collect grab samples from each sample point throughout pile. VOC sample shall be taken as a grab; the remainder of this sample and all subsequent samples are taken as composites. Record appropriate information and observations in the field logbook.

9.3 Transfer the sub-samples to the appropriate container (grab) or a disposable aluminum pan for compositing or homogenizing.

9.4 Screen the headspace with an FID. Record FID reading in field book.

9.5 Label sample container and cap in accordance with procedures in Sevenson Task Specific SOP 130.13, "Sample Handling".

9.7 Place sample container in a shipping cooler.

9.8 Discard gloves and any other trash in designated location.

9.9 Handle, pack and ship the samples with appropriate chain-of-custody procedures in accordance with Sevenson Task Specific SOP 130.20, "Sample Shipment".

9.10 Record all other appropriate information in the field log book.

10.0 Responsibilities

10.1 Field Sampling Manager - responsible for the oversight of Sediment Sampling.
10.2 Regulatory Specialist - responsible for approving this procedure.
10.3 Chemical Quality Control (QC) Coordinator - responsible for approving this procedure and verifying that it is being implemented.
10.4 Health and Safety (H&S) Officer - responsible for ensuring that appropriate SES and contractual H&S policies and procedures are in effect and verifying enforcement by management.
10.5 Program and Project Manager - responsible for ensuring that all personnel are properly trained; ensuring that this and all appropriate procedures are followed; and verifying that the appropriate training records are available.
10.6 CQC Systems Manager - responsible for ensuring that all personnel perform their assigned duties in accordance with this procedure when applicable; ensuring compliance with the SAP, and overall management if field activities.

11.0 Preventative Maintenance

11.1 Equipment should either be disposable and never used for more than one test location, or properly decontaminated prior to use. All equipment must be handled with new latex gloves which must be changed between sampling locations. Protect tools and equipment from sources of contamination.

12.0 Method Flow Chart - Figure 1

13.0 References and Definitions

13.1 References

13.1.1 Standard Methods for the Examination of Water and Wastewater, 22nd edition, January 2012.

13.1.2 Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, U.S. EPA SW846, Revision 3, 1996.

13.1.3 Requirements for the Preparation of Sampling and analysis Plans, CEMP-RA, Manual No. 200-1-3, February 2001.

13.1.4 Field Sampling Procedures Manual, NJ Department of Environmental Protection, May, August 2005.

13.1.5 A Compendium of Superfund Field Operations Methods, EPA-540/P-87/001, December 1987. 13.1.1 Standard Methods for the Examination of Water and Wastewater, 22nd edition, Method 9060.

13.2 Definitions

13.2.1 None.

Figure 1
Method Flow Chart

Locate and prepare sample locations (VOC Grab and 4 Comp)
↓
Record appropriate information and observations
↓
Prepare decontaminated sampling equipment (if necessary)
↓
Obtain samples and put in container or in steel bowl or aluminum pan
↓
Put sample in appropriate container, seal, and label
↓
Fill out Chain of Custody

Table 1
Field Checklist

_____Camera	_____Sample log
_____Chain-of-custody forms	_____Trowel
_____Cleaning Equipment	_____Stainless steel bowl or disposable aluminum pan
_____Coolers with ice	_____Tape measure, 200-foot
_____Flame Ionization Detector (FID)	_____Tyvek suits & appropriate safety gear
_____Field Book	_____Work Plan
_____Health and safety equipment	
_____Labels	REAGENTS
_____Sample gloves	_____Reagent Grade water
_____Sample jars/vials	_____Acetone
	_____Hexane
	_____Nitric acid
	_____Hydrochloric acid

Sevenson Environmental Services, Inc.

STANDARD OPERATING PROCEDURE

FOR ABOVE STORAGE TANK (AST) SAMPLES

SOP NUMBER: M-120.28-02

PREPARED BY: Ken Rainey 6/15/07

Date

STANDARD OPERATING PROCEDURE

FOR ABOVE STORAGE TANK (AST) SAMPLES

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10.0 Responsibilities

11.0 Preventative Maintenance

12.0 Method Flow Chart

13.0 References and Definitions

List of Figures and Tables

Figure 1 Method Flow Chart

Table 1 Field Checklist

1.0 Scope and Application

The purpose of this procedure is to describe the standard method and equipment used to collect representative grab samples from onsite product or waste Above Ground Storage (AST) tanks.

Samples may be collected from either tank sample ports or access points into tanks.

Sampling devices may not be necessary in the case of obtaining samples from sample ports. Samples collected from hold tanks may be obtained with typical tank liquid samples such as a bailer or Bacon Bomb.

2.0 Method Summary

2.1 A sample location is identified and it is determined how sample is to be obtained.

2.2 Upon retrieval, the contents of the sampling device are directly transferred into the sample container (grab samples) or a disposable aluminum mixing bowl (composite samples or for sample homogenization).

3.0 Method Validation

3.1 The methods used are according to the procedures specified in Standard Methods for the Examination of Water and Waste Water (22nd edition) and applicable EPA and other regulatory documents (refer to Section 13.0). Therefore, method validation is not required.

4.0 Safety Precautions

4.1 Proper personal safety equipment will be worn at all times during the procedure. This includes safety glasses, gloves, and appropriate protective clothing (as required by the Site Health and Safety Plan).

5.0 Apparatus and Materials

5.1 Health and safety equipment (as required by the Site Health and Safety Plan).

5.2 Cleaning equipment.

5.3 Field book, and Chain of custody forms.

5.4 New 5-gallon bucket

5.5 Bacon Bomb (as necessary)

5.6 Bailer (disposable or steel, as necessary)

5.7 Coolers with ice.

5.8 Buoy and rope.

5.19 Sample containers.

6.0 Reagents (for decon of non-disposable equipment)

6.1 Reagent Grade water.

6.2 Acetone - ACS Reagent (JT Baker #9006, Phillipsburg NJ).

6.3 Hexane - ACS Reagent (JT Baker #9309).

6.4 Nitric acid - concentrated, trace metals grade (JT Baker #9598).

6.5 Hydrochloric acid - concentrated, trace metals grade (JT Baker #9535).

7.0 Sample Preservation and Storage

7.1 Store all samples collected for metals analysis in either plastic or glass bottles.

7.2 Volatile samples are filled to zero headspace and stored in glass containers (VOA vials) with PTFE (Teflon)-lined caps at 4°C.

7.3 All other samples are stored in glass containers with Teflon-lined caps at 4°C.

8.0 Holding Times

8.1 Metals must be analyzed within six months; semi-volatile samples extracted within seven days, and volatile samples within fourteen days of sampling. See Site-specific QAPP.

9.0 Procedure

9.1 Don personal protective equipment (as required by the Health and Safety Plan).

9.2 Identify sample access location and note locations in field notebook. Record appropriate information and observations in the field logbook.

9.3 Place plastic sheeting on the ground around the sampling location to prevent cross-contamination.

9.4 Open tank hatch or access port and prepare Bacon Bomb or disposable bailer.

9.4.1 Place plastic sheeting around the tank hatch or access port sampling to prevent cross-contamination.

9.4.2 Lower sampler to the mid-point of the tank to obtain sample.

9.4.3 Retrieve sampler and fill containers. In general, samples should be collected for volatiles first, followed by semi-volatiles and then other parameters. Go to Section 9.10.

9.5 Label sample container and cap in accordance with procedures in Sevenson Task Specific SOP 130.13, "Sample Handling".

9.6 Place sample container in a shipping cooler.

9.7 Discard gloves and any other waste designated location. Unused portions of the sample shall be placed back into AST.

9.15 Handle, pack and ship the samples with appropriate chain-of-custody procedures in accordance with Sevenson Task Specific SOP 130.20, "Sample Shipment".

9.16 Record all other information in the field log book.

10.0 Responsibilities

10.1 Field Sampling Manager - responsible for the oversight of Sediment Sampling.

10.2 Regulatory Specialist - responsible for approving this procedure.

10.3 Chemical Quality Control (QC) Coordinator - responsible for approving this procedure and verifying that it is being implemented.

10.4 Health and Safety (H&S) Officer - responsible for ensuring that appropriate SES and contractual H&S policies and procedures are in effect and verifying enforcement by management.

10.5 Program and Project Manager - responsible for ensuring that all personnel are properly trained; ensuring that this and all appropriate procedures are followed; and verifying that the appropriate training records are available.

10.6 CQC Systems Manager - responsible for ensuring that all personnel perform their assigned duties in accordance with this procedure when applicable; ensuring compliance with the SAP, and overall management if field activities.

11.0 Preventative Maintenance

11.1 Equipment should either be disposable and never used for more than one test location, or properly decontaminated prior to use. All equipment must be handled with new latex gloves which must be changed between sampling locations. Protect tools and equipment from sources of contamination.

12.0 Method Flow Chart - Figure 1

13.0 References and Definitions

13.1 References

13.1.1 Standard Methods for the Examination of Water and Wastewater, 22nd edition, January 2012.

13.1.2 Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, U.S. EPA SW846, Revision 3, 1996.

13.1.3 Requirements for the Preparation of Sampling and analysis Plans, CEMP-RA, Manual No. 200-1-3, February 2001.

13.1.4 Field Sampling Procedures Manual, NJ Department of Environmental Protection, May, August 2005.

13.1.5 A Compendium of Superfund Field Operations Methods, EPA-540/P-87/001, December 1987.

13.2 Definitions

13.2.1 AST – Above Ground Storage Tank system inclusive of all of its components (i.e., piping)

13.2.2 Bacon Bomb - brass or stainless steel collector that can range in volume from 4 oz. up to 32 oz. It is equipped with a trigger, which is spring loaded, which prevents liquid from flowing into or out of the collection chamber.

13.2.3 Bailer - cylindrical length of PTFE or stainless steel with a check valve at the bottom.

Figure 1

Method Flow Chart

Locate and prepare sample location

↓

Record appropriate information and observations

↓

Determine sampling scenario necessary equipment

↓

Obtain sample and put in appropriate containers

↓

When sample is in appropriate container, seal, and label

↓

Fill out Chain of Custody

Table 1

Field Checklist

____Buoy and rope	____Sample log
____Camera	____Stopwatch
____Chain-of-custody forms	____Tyvek suits & appropriate safety gear
____Cleaning Equipment	____Work Plan
____Coolers with ice	
____Field Book	REAGENTS
____5 gallon bucket(s)	____Reagent Grade water
____Bacon Bomb	____Acetone
____disposable or stainless steel	____Hexane
____Health and safety equipment	____Nitric acid
____Labels	____Hydrochloric acid
____Plastic sheeting	
____Sample gloves	
____Sample jars/vials	

Sevenson Environmental Services, Inc.

STANDARD OPERATING PROCEDURE

FOR WWTP GRAB SAMPLING

SOP NUMBER: M-120.42-00

PREPARED BY: _____

Date 6/15/2007

STANDARD OPERATING PROCEDURE

FOR WWTP GRAB SAMPLING

Table of Contents

1.0 Scope and Application

2.0 Method Summary

3.0 Method Validation

4.0 Safety Precautions

5.0 Apparatus and Materials

6.0 Reagents

7.0 Sample Preservation and Storage

8.0 Holding Times

9.0 Procedure

10.0 Responsibilities

11.0 Preventative Maintenance

12.0 Method Flow Chart

13.0 References and Definitions

List of Figures and Tables

Figure 1 Method Flow Chart

Table 1 Field Checklist

1.0 Scope and Application

The purpose of this procedure is to describe the standard method and equipment used to collect representative grab samples from onsite wastewater treatment plants (WWTP).

Samples may be collected from either sample ports or water hold tanks from along the treatment system.

Sampling devices may not be necessary in the case of obtaining samples from sample ports. Samples collected from hold tanks may be obtained with typical tank liquid samples such as a bailer or Bacon Bomb.

2.0 Method Summary

2.1 A sample location is identified and it is determined how sample is to be obtained.

2.2 For multiple sample locations within the WWTP system, collection activities should proceed from components suspected be least concentrated to the suspected most concentrated areas.

2.3 Upon retrival, the contents of the sampling device are directly transferred into the sample container (grab samples) or a disposable aluminum mixing bowl (composite samples or for sample homogenization).

3.0 Method Validation

3.1 The methods used are according to the procedures specified in Standard Methods for the Examination of Water and Waste Water (22nd edition) and applicable EPA and other regulatory documents (refer to Section 13.0). Therefore, method validation is not required.

4.0 Safety Precautions

4.1 Proper personal safety equipment will be worn at all times during the procedure. This includes safety glasses, gloves, and appropriate protective clothing (as required by the Site Health and Safety Plan).

5.0 Apparatus and Materials

5.1 Health and safety equipment (as required by the Site Health and Safety Plan).

5.2 Cleaning equipment.

5.3 Field book, and Chain of custody forms.

5.4 New 5-gallon bucket

5.5 Bacon Bomb

5.6 Bailer (disposable or steel)

5.7 Coolers with ice.

5.8 Buoy and rope.

5.19 Sample containers.

6.0 Reagents (for decon of non-disposable equipment)

6.1 Reagent Grade water.

6.2 Acetone - ACS Reagent (JT Baker #9006, Phillipsburg NJ).

6.3 Hexane - ACS Reagent (JT Baker #9309).

6.4 Nitric acid - concentrated, trace metals grade (JT Baker #9598).

6.5 Hydrochloric acid - concentrated, trace metals grade (JT Baker #9535).

7.0 Sample Preservation and Storage

7.1 Store all samples collected for metals analysis in either plastic or glass bottles.

7.2 Volatile samples are filled to zero headspace and stored in glass containers (VOA vials) with PTFE (Teflon)-lined caps at 4°C.

7.3 All other samples are stored in glass containers with Teflon-lined caps at 4°C.

8.0 Holding Times

8.1 Metals must be analyzed within six months; semi-volatile samples extracted within seven days, and volatile samples within fourteen days of sampling. See Site-specific QAPP.

9.0 Procedure

9.1 Don personal protective equipment (as required by the Health and Safety Plan).

9.2 Identify sample access location and note locations in field notebook. Record appropriate information and observations in the field logbook.

9.3 Sample port (or spigot): 5-gallon bucket(s) to catch released water.

9.3.1 Place plastic sheeting on the ground around the sampling location to prevent cross-contamination.

9.3.2 Open port and allow water to flow for ~ 30 seconds. Fill sample containers from flow. In general, samples should be collected for volatiles first, followed by semi-volatiles and then other parameters. Go to Section

9.4 Tank hatch or access port: Bacon Bomb or disposable bailer.

9.4.1 Place plastic sheeting around the tank hatch or access port sampling to prevent cross-contamination.

9.4.2 Lower sampler to the mid-point of the tank to obtain sample.

9.4.3 Retrieve sampler and fill containers. In general, samples should be collected for volatiles first, followed by semi-volatiles and then other parameters. Go to Section 9.10.

9.5 Label sample container and cap in accordance with procedures in Sevenson Task Specific SOP 130.13, "Sample Handling".

9.6 Place sample container in a shipping cooler.

9.7 Discard gloves and any other waste designated location. Unused portions of the sample shall be placed back into WWTP.

9.15 Handle, pack and ship the samples with appropriate chain-of-custody procedures in accordance with Sevenson Task Specific SOP 130.20, "Sample Shipment".

9.16 Record all other information in the field log book.

10.0 Responsibilities

10.1 Field Sampling Manager - responsible for the oversight of Sediment Sampling.

10.2 Regulatory Specialist - responsible for approving this procedure.

10.3 Chemical Quality Control (QC) Coordinator - responsible for approving this procedure and verifying that it is being implemented.

10.4 Health and Safety (H&S) Officer - responsible for ensuring that appropriate SES and contractual H&S policies and procedures are in effect and verifying enforcement by management.

10.5 Program and Project Manager - responsible for ensuring that all personnel are properly trained; ensuring that this and all appropriate procedures are followed; and verifying that the appropriate training records are available.

10.6 CQC Systems Manager - responsible for ensuring that all personnel perform their assigned duties in accordance with this procedure when applicable; ensuring compliance with the SAP, and overall management if field activities.

11.0 Preventative Maintenance

11.1 Equipment should either be disposable and never used for more than one test location, or properly decontaminated prior to use. All equipment must be handled with new latex gloves which must be changed between sampling locations. Protect tools and equipment from sources of contamination.

12.0 Method Flow Chart - Figure 1

13.0 References and Definitions

13.1 References

13.1.1 Standard Methods for the Examination of Water and Wastewater, 22nd edition, January 2012.

13.1.2 Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, U.S. EPA SW846, Revision 3, 1996.

13.1.3 Requirements for the Preparation of Sampling and analysis Plans, CEMP-RA, Manual No. 200-1-3, February 2001.

13.1.4 Field Sampling Procedures Manual, NJ Department of Environmental Protection, May, August 2005.

13.1.5 A Compendium of Superfund Field Operations Methods, EPA-540/P-87/001, December 1987.

13.2 Definitions

13.2.1 WWTP – Wastewater Treatment system inclusive of all of its components (i.e., influent tanks, reaction vessels, filter tanks, effluent holding tanks and discharge piping)

13.2.2 Bacon Bomb - brass or stainless steel collector that can range in volume from 4 oz. up to 32 oz. It is equipped with a trigger, which is spring loaded, which prevents liquid from flowing into or out of the collection chamber.

13.2.3 Bailer - cylindrical length of PTFE or stainless steel with a check valve at the bottom.

Figure 1

Method Flow Chart

Locate and prepare sample location

↓

Record appropriate information and observations

↓

Determine sampling scenario necessary equipment

↓

Obtain sample and put in appropriate containers

↓

When sample is in appropriate container, seal, and label

↓

Fill out Chain of Custody

Table 1

Field Checklist

____Buoy and rope

____Camera

____Chain-of-custody forms

____Cleaning Equipment

____Coolers with ice

____Field Book

____5 gallon bucket(s)

____Bacon Bomb

____disposable or stainless steel

____Health and safety equipment

____Labels

____Plastic sheeting

____Sample gloves

____Sample jars/vials

____Sample log

____Stopwatch

____Tyvek suits & appropriate safety gear

____Work Plan

REAGENTS

____Reagent Grade water

____Acetone

____Hexane

____Nitric acid

____Hydrochloric acid

TASK SPECIFIC QC CHECKLIST

Work Task: Packing, Storing, and Shipment of Samples
Sevenson Checklist #: 130.13

Project Name/Job Number: _____
Inspection Date: _____

Complete this form for each cooler/shipment inspected. Answer each question by checking the appropriate column (yes, no, not observed (N/O) or not applicable (N/A). If "no" is checked, provide an explanation of the non-compliance and associated corrective action(s).

		Yes	No	N/O	N/A
1.	Were the samples handled according to the FSP and QAPP?	☐	☐	☐	☐
2.	Did the samples remain on ice or refrigerated (except for sample transfer from coolers or refrigerators) from collection until the cooler was taped for shipment?	☐	☐	☐	☐
3.	Where sample containers prepared for shipment (bubble-wrap, Zip-Lock™ bags, etc) per SAP procedures?	☐	☐	☐	☐
4.	Was a trip blank (for VOC samples only) and a temperature blank included in each cooler?	☐	☐	☐	☐
5.	Was loose ice double Zip-Lock™-bagged prior to placement in cooler?	☐	☐	☐	☐
6.	Was ice placed in equal proximity to all sample containers and the temperature blank to ensure samples arrive at lab at 4°C?	☐	☐	☐	☐
7.	Were Chain-of-Custody forms filled out accurately and completely, including the project name and number, sampling date and time, analytical parameters, preservatives, size and number of containers for each analytical parameter, and media sampled?	☐	☐	☐	☐
8.	Were Chain-of-Custody forms signed and dated by the preparer and the form taped to the inside of the cooler lid?	☐	☐	☐	☐
9.	Were signed and dated custody seals properly placed on the cooler and the cooler sealed with strapping tape?	☐	☐	☐	☐
10.	Was a shipping label attached to the cooler?	☐	☐	☐	☐
11.	Were COCs and shipping tracking labels fax'd to lab?	☐	☐	☐	☐

Notes/Comments

QC Inspector Name and Signature _____

Date _____

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TASK SPECIFIC QC CHECKLIST

Work Task: Sample Cooler Shipment
Sevenson Checklist #: SES 130.20

Project Name: _____
Sevenson Job No. _____
QC Inspection Report Date _____

☐ **PREPARATORY PHASE**

Yes	*No*	*N/A*		*Comment*
☐	☐	☐	Have sample shipment procedures in the QAPP been reviewed by all field sampling personnel?	
☐	☐	☐	Are sufficient numbers of clean, hard plastic coolers available onsite to meet current sampling schedule?	
☐	☐	☐	Are sufficient packing supplies (i.e. Ziplock™ plastic bags, packing "peanuts", sealing tape, etc.) available onsite?	
☐	☐	☐	Are laboratory chain-of-custody forms, custody seals, and extra sample container labels available onsite?	
☐	☐	☐	Has a common carrier (Federal Express, UPS, etc.) been selected and have package pickup points and times been identified?	
☐	☐	☐	Will sample coolers be D.O.T. regulated for shipping purposes and are D.O.T. required shipping labels and logs available at the site?	
☐	☐	☐	Have the offsite primary and QA laboratories been contacted to verify anticipated sample collection and shipment schedules?	
☐	☐	☐	Does the primary and QA laboratory have a list of sample shipping site contacts should there be problems or questions?	
☐	☐	☐	Is an ice source available on or near the site?	

☐ **INITIAL PHASE** **OR** ☐ **FOLLOW-UP PHASE**

Yes	*No*	*N/A*		*Comment*
☐	☐	☐	Has a Preparatory Phase meeting been conducted?	
☐	☐	☐	Where sample containers received from the field properly labeled , prepared, and recorded in the field logbook and in the site sample summary log per the QAPP?	
☐	☐	☐	Was the sample cooler inspected to verify that it was clean, undamaged, and had no external markings or shipping addresses unrelated to the project?	
☐	☐	☐	Was the cooler inspected to verify that the site name, address, telephone number and contact name was written in indelible ink on the interior of the cooler lid?	
☐	☐	☐	Was the cooler drain plug (if present) securely taped shut on both the interior and exterior sides?	
☐	☐	☐	Was a clean, new plastic garbage bag placed into the cooler as a secondary liner?	

☐	☐	☐	Where all samples, field duplicates, QA splits, and rinse blanks verified by checking sample labels against field logbook entries as chain-of-custody forms were completed?	
☐	☐	☐	Were chain-of-custody forms completed per QAPP?	
☐	☐	☐	Were sample containers placed into separate Ziplock™ bags before being placed in an upright position in the cooler?	
☐	☐	☐	Was packing material placed between sample containers to prevent shifting or breakage during shipment?	
☐	☐	☐	Was a temperature blank placed in close proximity to sample containers?	
☐	☐	☐	If required, was double Ziplock™-bagged ice placed in the cooler in contact with all sample containers?	
☐	☐	☐	Was the outer garbage bag sealed with a twist-tie or knot?	
☐	☐	☐	Were chain-of-custody forms placed inside a Ziplock™ bag and taped to the inner lid of the cooler?	
☐	☐	☐	Was the closed cooler lid checked to verify a proper closure and was fiber-reinforced strapping tape placed around both of its ends at least twice?	
☐	☐	☐	Were handling labels and D.O.T. hazard labels (if required) placed on the outside of the cooler?	
☐	☐	☐	Were a minimum of two (front and side) completed custody seals placed across the lid opening to verify cooler integrity?	
☐	☐	☐	Was an address label with both the "shipped from" and "shipped to" addresses applied to the top of the cooler?	
☐	☐	☐	Was the common carrier airbill (or other shipping form) properly completed and attached to the cooler?	
☐	☐	☐	Was the "shipper's copy" of the airbill retained at the site and attached to the DCQCR?	
☐	☐	☐	Were all destination laboratories notified of sample shipments?	

Comments: _____

Sevenson Project Manager _____
Name Signature Date

QC Reviewer _____
Name Signature Date

CQC Systems Manager _____
Name Signature Date

Appendix 5

Standard Sampling Tracking and Documentation Forms, Review Forms and Checklists

- Chain of Custody Form
- Sample Labels
- Daily Chemical Quality Control Report
- Field Change Request Form
- Non-Conformance/Quality Control Report
- Master Sample Log
- Field Audit Checklist

Sevenson Environmental Services

CHAIN OF CUSTODY RECORD

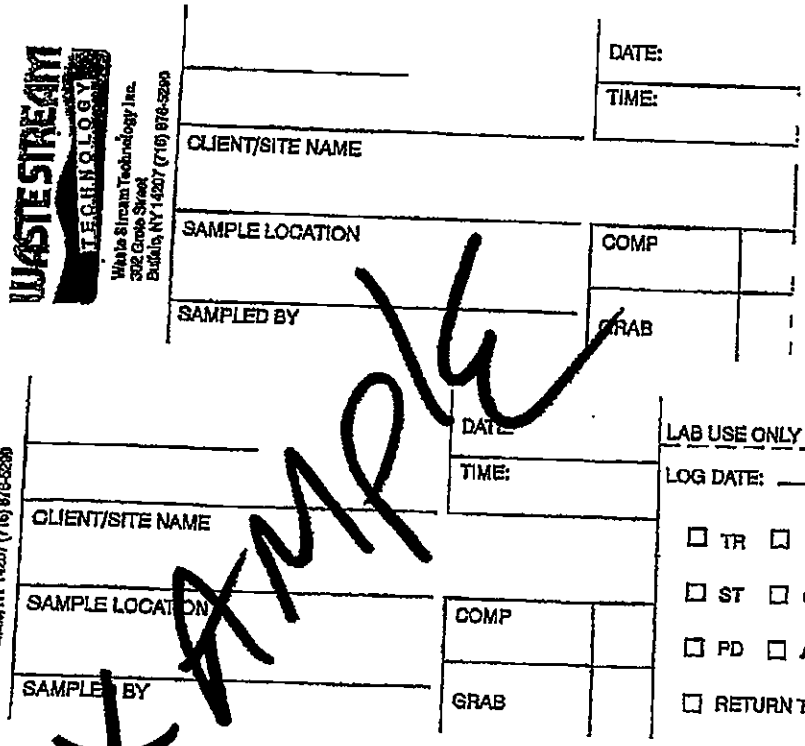
PROJECT NO.:	SITE NAME:
SAMPLER'S (SIGNATURE):	

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CON-TAINERS							REMARKS

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	

Distribution: Original accompanies shipment. Copy to coordinator field files.

SAMPLE LABELS



Sample

CUSTODY SEAL

SECURITY SEAL DATE _____
DO NOT TAMPER INITIALS _____

DAILY CHEMICAL QUALITY CONTROL REPORT

Project:
Location: Sevenson Project:
Date:

1. Weather Conditions:
   Temperature Range: Wind Speed and Direction:
   Barometric Readings: Significant Wind Changes:

2. Chemical Data Acquisition:

3. Sample Shipment Summary:

4. Measurement Problems Encountered:

5. Contingency Sampling Performed:

6. Deviations from SAP and Corrective Actions:

7. Chemical Quality Control Activities:
   Inspections Conducted:
   Deviations and Corrective Actions:

Signature of Sampling Manager

CQCSM Signature

Sevenson
Field Change
Request Form

Date: _____

Day	S	M	T	W	T	F	S
Weather	Bright Sun	Clear		Overcast	Rain		Snow
Temp	To 32	32-50		50-70	70-85		85 up
Wind	Calm	Moderate		High	REPORT NO.		
Humidity	Dry	Moderate		Humid			

PROJECT MANAGER _____

PROJECT _____

JOB NO _____

CONTRACT NO. _____

SUB-CONTRACTORS ON SITE:

EQUIPMENT ON SITE:

SAMPLING PERFORMED:

NON-CONFORMANCE/PROBLEM ITEM(S):

PROJECT QA/QC OFFICER NOTIFIED :	TIME	DATE	INITIALS
PROJECT MANAGER NOTIFIED:	TIME	DATE	INITIALS
CONTRACTING OFFICER NOTIFIED:	TIME	DATE	INITIALS
PROJECT TECHNICAL DIRECTOR NOTIFIED:	TIME	DATE	INITIALS

WORK STOPPED? _____ YES _____ NO

IF NOT, EXPLAIN

Sheet _____

NON-CONFORMANCE/QUALITY CONTROL REPORT

Date: _____

Organization Name: _____

Initiator's Name and Title: _____

Problem Description:

_____

_____

_____

_____

_____

_____

_____

Reported To: _____

Corrective Action:

_____

_____

_____

_____

_____

_____

_____

Reviewed and Implemented by: _____

MASTER SAMPLE LOG

Sample No.	Date Collected	Sample Matrix	Location/Description	Req'd Analysis	Shipping Date	C/C No.	Lab Name	QA/QC (OHD)	OHD MIPR#	Results Received	Comments

Field Audit

Auditor(s) / Affiliations(s): _____

Audit Date(s): _____

Sampler(s) / Company(ies): _____

Location(s): _____

	Were the following accomplished:	Y/N/NA	Comment
1	Were soil boring logs and other documentation completed at each location, including photos and GPS coordinates?		
2	Was all involved sampling equipment properly cleaned (decontaminated) before sampling and between locations?		
3	Was sampling completed in full accord with the "sample analysis matrix", including primary and QC samples, sample names?		
4	Were duplicate and/or split samples obtained within 1 foot of the primary sample?		
5	Are daily activities and site conditions being recorded and maintained by the field sampler?		
6	Is health and safety documentation being maintained by the on-site safety officer?		
7	Were chain-of-custody (COC) records completed properly, reviewed, and signed to transfer sample custody to all parties involved in their handling in the field?		
8	Were samples transferred to iced coolers within 4 hours?		
9	Were samples properly packed within the shipping coolers and custody seals affixed?		
10	Did the lead sampler retain copies of the COCs (for faxing to he laboratories)?		
11	Was one trip blank placed in each cooler containing samples for VOC analyses?		
12	Were equipment rinsate blanks prepared using deionized water (or commercially available high-purity water) and cleaned sampling equipment? (daily basis)		
13	Were field blanks prepared using deionized water (or commercially available high-purity water)?		
14	Were temperature blanks included in each cooler?		
15	Was IDW, including PPE, wash and rinse water, solid waste, etc., collected and either properly stored for later disposal or discarded?		
16	Was sampling equipment cleaned before being removed from either the site or staging area?		
17	Were health and safety tailgate briefings held each morning before beginning the fieldwork?		
18	Were sample bottles received clean and pre-preserved from the laboratory?		

Additional notes/comments:

Signature

Date

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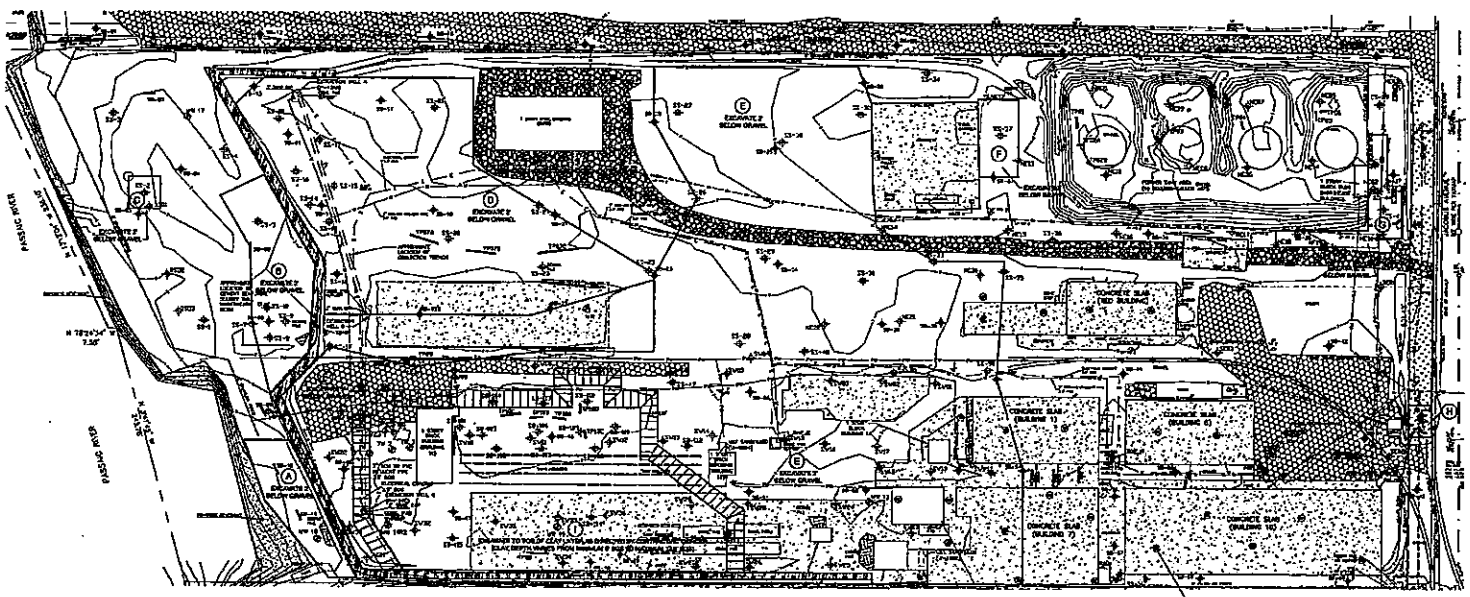
Appendix 6

Sample Maps C2 and C4



NOTES:

1. FOLLOWING BUILDING DEMOLITION, THE CONTRACTOR SHALL COLLECT PRE-EXCAVATION SOIL SAMPLES FROM 24 SOIL BORINGS AS SHOWN ON THIS PLAN. SURFACE AND SUBSURFACE SOIL SAMPLES SHALL BE COLLECTED IN 2-FOOT INTERVALS APPROXIMATELY AS FOLLOWS OR AS DIRECTED BY THE CONTRACTING OFFICER.

INTERVAL	DEPTH (FEET BGS OR BENEATH SLAB)
A	0-2 (SURFACE)
B	2-4
C	5-7
D	9-11

2. ALL SAMPLES SHALL BE COLLECTED AND ANALYZED IN ACCORDANCE WITH SPECIFICATIONS SECTION 01450, AND CONTRACTOR'S APPROVED UNIFORM FEDERAL POLICY QUALITY ASSURANCE PROJECT PLAN. SAMPLES SHALL BE ANALYZED BY AN OFFSITE SUBCONTRACT LABORATORY ON A 14-DAY QUICK TURN AROUND TIME.

3. PRE-EXCAVATION SAMPLES WILL BE COMPARED TO EITHER SURFACE OR SUBSURFACE SITE CLEANUP CRITERIA AS DESCRIBED IN SECTION 03131 AND SUBMITTED TO CONTRACTING OFFICER. UPON RECEIPT OF SAMPLE RESULTS, THE CONTRACTING OFFICER WILL REVISE THE EXCAVATION PLAN, AS NECESSARY.

4. BORING LOCATIONS ARE APPROXIMATE. EXACT LOCATIONS TO BE DETERMINED IN FIELD BY CONTRACTOR IN CONSULTATION WITH THE CONTRACTING OFFICER.

1" = 40'

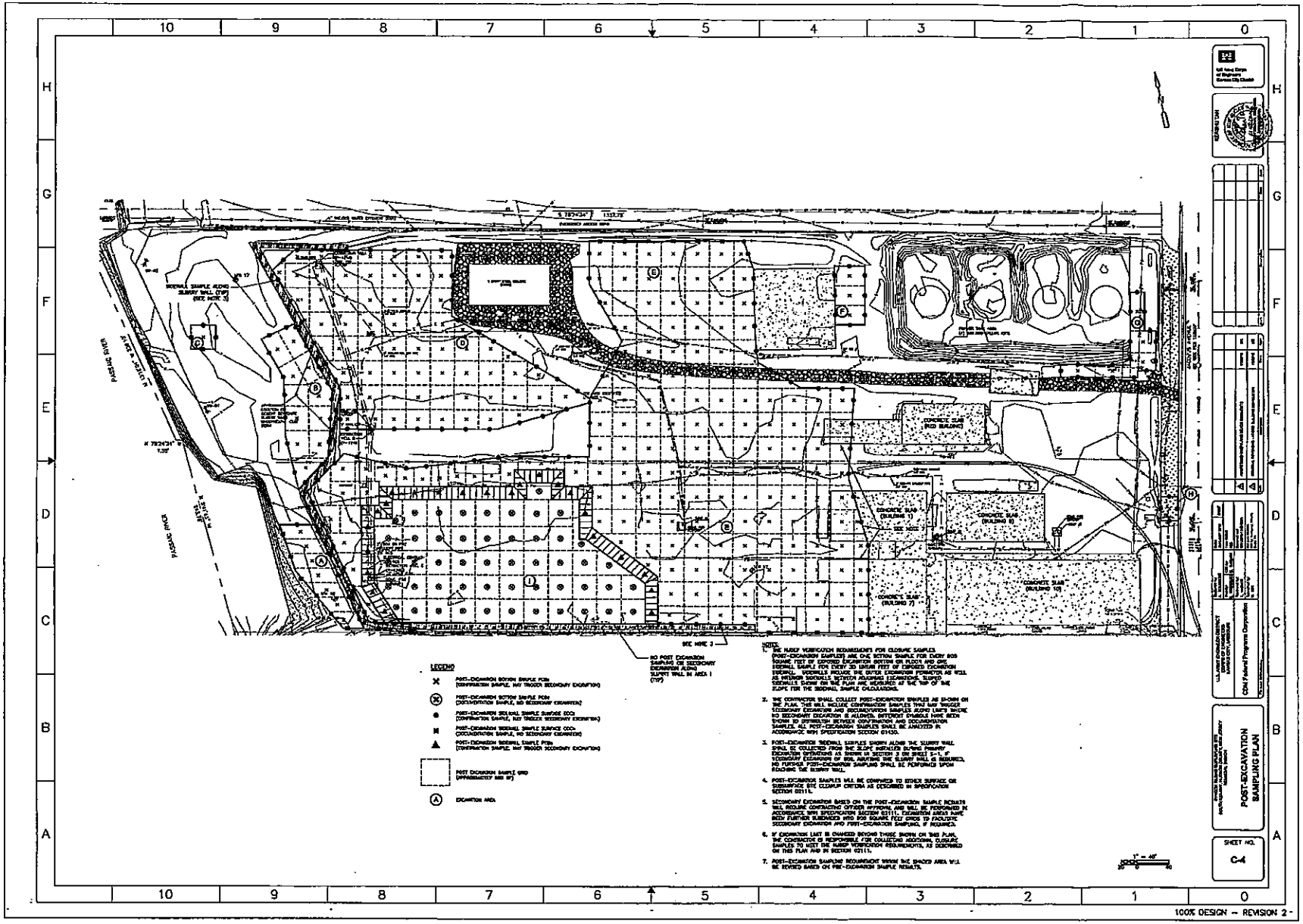
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

COM Federal Programs Corporation

PRE-EXCAVATION SAMPLING PLAN

SHEET NO.
C-2

100% DESIGN – REVISION 2


POST-EXCAVATION SAMPLING PLAN
SHEET NO.
C-4
100% DESIGN – REVISION 2 -

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APPENDIX 7

Contract Specification Table 01450-1, 01450-2 and 01450-4

TABLE 01450-1
Record of Decision Remediation Goals

Contaminant of Concern	Cleanup Criteria (mg/kg)
Surface Soil	
VOCs	
Benzene	5
Ethylbenzene	29
Toluene	46,000
Xylenes (total)	2,600
SVOCs	
Naphthalene	17
Pesticides/PCBs	
Aldrin	0.1
Dieldrin	0.11
4,4'-DDD	7.2
4,4'-DDT	7
Heptachlor	0.38
PCBs (total)	10
Metals	
Arsenic	38.86
Cadmium	78
Subsurface Soil	
PCBs	500

TABLE 01450-2
Soil Remediation Standards (mg/kg)
NJAC 7:26D

Contaminant	CAS No.	Non-Residential Direct Contact Soil Remediation Standard
Acenaphthene	83-32-9	37,000
Acenaphthylene	208-96-8	300,000
Acetone (2-Propanone)	67-64-1	NA
Acetophenone	98-86-2	5
Acrolein	107-02-8	1
Acrylonitrile	107-13-1	3
Aldrin	309-00-2	0.2
Aluminum	7429-90-5	NA
Anthracene	120-12-7	30,000
Antimony	7440-36-0	450
Arsenic	7440-38-2	19*
Atrazine	1912-24-9	2,400
Barium	7440-39-3	59,000
Benzaldehyde	100-52-7	68,000
Benzene	71-43-2	5
Benzidine	92-87-5	0.7
Benzo(a)anthracene (1,2-Benzanthracene)	56-55-3	2
Benzo(a)pyrene	50-32-8	0.2
Benzo(b)fluoranthene (3,4-Benzofluoranthene)	205-99-2	2
Benzo(ghi)perylene	191-24-2	30,000
Benzo(k)fluoranthene	207-08-9	23
Beryllium	7440-41-7	140
1,1'-Biphenyl	92-52-4	34,000
Bis(2-chloroethyl)ether	111-44-4	2
Bis(2-chloroisopropyl)ether	108-60-1	67
Bis(2-ethylhexyl)phthalate	117-81-7	140
Bromodichloromethane (Dichlorobromomethane)	75-27-4	3
Bromoform	75-25-2	280
Bromomethane	74-83-9	59
2-Butanone (Methyl ethyl ketone) (MEK)	78-93-3	44,000
Butyl benzyl phthalate	85-68-7	14,000
Cadmium	7440-43-9	78
Caprolactam	105-60-2	340,000
Carbazole	86-74-8	96
Carbon disulfide	75-15-0	110,000

Contaminant	CAS No.	Non-Residential Direct Contact Soil Remediation Standard
Carbon tetrachloride	56-23-5	2
Chlordane (alpha and gamma)	57-74-9	1
Chlorobenzene	108-90-7	7,400
Chloroethane (Ethyl chloride)	75-00-3	1,100
Chloroform	67-66-3	2
Chloromethane (Methyl chloride)	74-87-3	12
2-Chlorophenol (o-Chlorophenol)	95-57-8	2,200
Chrysene	218-01-9	230
Cobalt	7440-48-4	590
Copper	7440-50-8	45,000
Cyanide	57-12-5	23,000
4,4'-DDD	72-54-8	13
4,4'-DDE	72-55-9	9
4,4'-DDT	50-29-3	8
Dibenz(a,h)anthracene	53-70-3	0.2
Dibromochloromethane (Chlorodibromomethane)	124-48-1	8
1, 2-Dibromo-3-chloropropane	96-12-8	0.2
1,2-Dibromoethane	106-93-4	0.04
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	59,000
1,3-Dichlorobenzene (m-Dichlorobenzene)	541-73-1	59,000
1,4-Dichlorobenzene (p-Dichlorobenzene)	106-46-7	13
3,3'-Dichlorobenzidine	91-94-1	4
Dichlorodifluoromethane	75-71-8	230,000
1,1-Dichloroethane	75-34-3	24
1,2-Dichloroethane	107-06-2	3
1,1-Dichloroethene	75-35-4	150
1,2-Dichloroethene (cis) (c-1,2-Dichloroethylene)	156-59-2	560
1,2-Dichloroethene (trans) (t-1,2-Dichloroethylene)	156-60-5	720
2,4-Dichlorophenol	120-83-2	2,100
1,2-Dichloropropane	78-87-5	5
1,3-Dichloropropene (cis and trans)	542-75-6	7
Dieldrin	60-57-1	0.2
Diethyl phthalate	84-66-2	550,000
2,4-Dimethyl phenol	105-67-9	14,000
Di-n-butyl phthalate	84-74-2	68,000
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	68
2,4-Dinitrophenol	51-28-5	1,400
2,4-Dinitrotoluene	121-14-2	3
2,6-Dinitrotoluene	606-20-2	3

Contaminant	CAS No.	Non-Residential Direct Contact Soil Remediation Standard
2,4-Dinitrotoluene/2,6-Dinitrotoluene (mixture)	25321-14-6	3
Di-n-octyl phthalate	117-84-0	27,000
1,2-Diphenylhydrazine	122-66-7	2
Endosulfan I and Endosulfan II (alpha and beta)	115-29-7	6,800
Endosulfan sulfate	1031-07-8	6,800
Endrin	72-20-8	340
Ethyl benzene	100-41-4	110,000
Fluoranthene	206-44-0	24,000
Fluorene	86-73-7	24,000
alpha-HCH (alpha-BHC)	319-84-6	0.5
beta-HCH (beta-BHC)	319-85-7	2
Heptachlor	76-44-8	0.7
Heptachlor epoxide	1024-57-3	0.3
Hexachlorobenzene	118-74-1	1
Hexachloro-1,3-butadiene	87-68-3	25
Hexachlorocyclopentadiene	77-47-4	110
Hexachloroethane	67-72-1	140
Indeno(1,2,3-cd)pyrene	193-39-5	2
Isophorone	78-59-1	2,000
Lead	7439-92-1	800
Lindane (gamma-HCH) (gamma-BHC)	58-89-9	2
Manganese	7439-96-5	5,900
Mercury	7439-97-6	65
Methoxychlor	72-43-5	5,700
Methyl acetate	79-20-9	NA
Methylene chloride (Dichloromethane)	75-09-2	97
2-Methylnaphthalene	91-57-6	2,400
2-Methylphenol (o-Creosol)	95-48-7	3,400
4-Methylphenol (p-Creosol)	106-44-5	340
Methyl tert-butyl ether	1634-04-4	320
Naphthalene	91-20-3	17
Nickel (Soluble salts)	7440-02-0	23,000
2-Nitroaniline	88-74-4	23,000
Nitrobenzene	98-95-3	340
N-Nitrosodimethylamine	62-75-9	0.7
N-Nitrosodi-n-proplyamine	621-64-7	0.3
N-Nitrosodiphenylamine	86-30-6	390
Pentachlorophenol	87-86-5	10
Phenanthrene	85-01-8	300,000

Contaminant	CAS No.	Non-Residential Direct Contact Soil Remediation Standard
Phenol	108-95-2	210,000
Polychlorinated biphenyls (PCBs)	1336-36-3	1
Pyrene	129-00-0	18,000
Selenium	7782-49-2	5,700
Silver	7440-22-4	5,700
Styrene	100-42-5	260
Tertiary butyl alcohol	75-65-0	11,000
1,1,2,2-Tetrachloroethane	79-34-5	3
Tetrachloroethene (PCE) (Tetrachloroethylene)	127-18-4	5
Thallium	7440-28-0	79
Toluene	108-88-3	91,000
Toxaphene	8001-35-2	3
1,2,4-Trichlorobenzene	120-82-1	820
1,1,1-Trichloroethane	71-55-6	4,200
1,1,2-Trichloroethane	79-00-5	6
Trichloroethene (TCE) (Trichloroethylene)	79-01-6	20
Trichlorofluoromethane	75-69-4	340,000
2,4,5-Trichlorophenol	95-95-4	68,000
2,4,6-Trichlorophenol	88-06-2	74
Vanadium	7440-62-2	1,100
Vinyl chloride	75-01-4	2
Xylenes	1330-20-7	170,000
Zinc	7440-66-6	110,000

Source: NJAC 7:26D, Table 1B

NA = Standard not available

* The direct contact standard for arsenic is based on natural background

TABLE 01450-4
Analytical Methods for Chemical Parameters

Data Use	Parameter	Analytical Method (All methods are based on SW-846 except as noted)	
		Extraction	Analysis
Waste Characterization – Soil **Waste Characterization – Railroad Ties[2]**	TCLP VOC	1311, 5030B	8260B
	TCLP SVOC	1311, 3510C/ 3520C	8270D
	TCLP Pesticide	1311, 3510C/ 3520C	8081B
	TCLP Herbicide	1311, 8151A	8151A
	TCLP Metals	1311, 3010A	6010C, 7471B
	PCBs	PCBs: 3540C/3541	PCBs – 8082A
	Paint Filter Test	NA	9095B
	Reactivity, Corrosivity, and Ignitability	NA	Reactivity-Cyanide – 9014 Reactivity-Sulfide – 9034 Corrosivity –1110A/9040C; Ignitability – 1010A
	Moisture Content	NA	ASTM D 2216 - 10
Waste Characterization – AST Content	DRO	NA	Modified 8015C
	GRO	NA	Modified 8015B
	EPH	NA	NJDEP EPH Method Revision 3
	Oil and Grease	NA	1664A

Data Use	Parameter	Analytical Method (All methods are based on SW-846 except as noted)	
		Extraction	Analysis
Pre-Excavation, UST Closure, Post Excavation, Concrete, Backfill, and Topsoil Characterization	TCL VOC	5030B/5031	8260B
	TCL SVOC	3540C	8270D
	TCL Pesticide/PCBs	Pesticide: 3510C/3520C PCBs: 3540C/3541	Pesticides – 8081B PCBs – 8082A
	TAL Metals, Mercury and Cyanide	Metals 3050B; Cyanide 9013	Metals – 6010C, 7471B; Cyanide – 9012B/ 9010C
	Radium- 226	NA	HASL-300 or EPA approved method
	EPH	NA	NJDEP EPH Method Revision 3
	TOC	3050B	9060A, AASHTO T 194
	Nutrients	Potassium and phosphate – 3050B or Mehlich Nitrogen – KCl	Potassium and phosphate - 6010D Nitrogen - KCl-extraction/Cd-reduction or other approved method
	pH	NA	9045D, ASTM D4972

Footnotes:

Test Methods for Evaluating Solid Wastes, SW-846, revised 2008

1. Refer to Paragraph 1.5.3 for data use and associated parameter requirements.
2. Exclude Paint Filter Test and Moisture Content analyses.

END OF SECTION

APPENDIX 8

WWTP P&ID

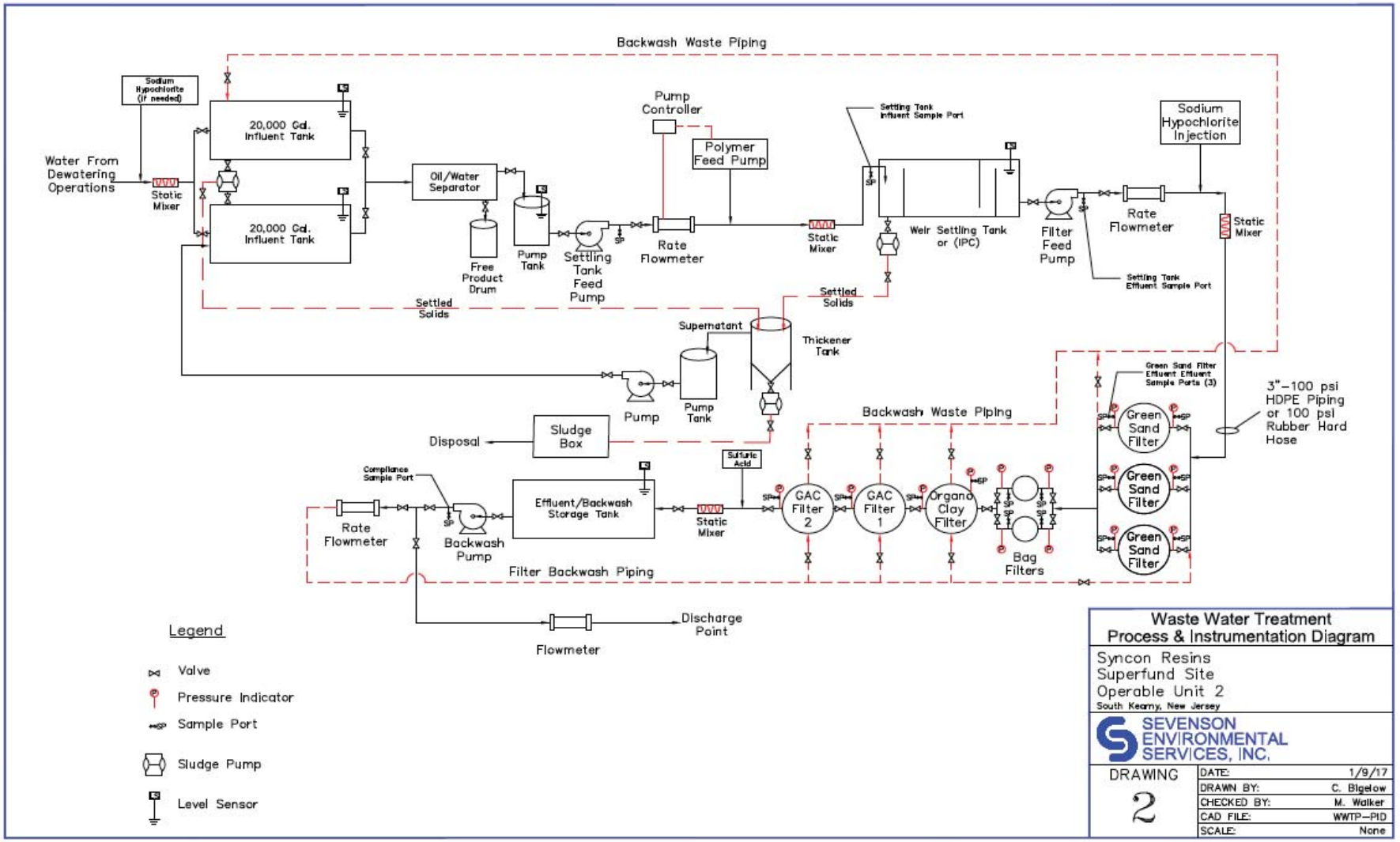


Figure 6: Syncon Resins Piping and Instrumentation (P&ID) Diagram

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE		DATE	TRANSMITTAL NO. 02100-6.1
PROJECT TITLE	Syncon Resins Superfund Site OU2	CONTRACT NO. W912DQ-15-D-3002 0002	PAGE 1 of 1
LOCATION	77 Jacobus Ave, Kearny, NJ		

Item	*Description*	*Variation*	*QA Code*
2	Site Preparation Plan Rev 1	No	C

SECTION III - GOVERNMENT REVIEW REMARKS

1) General - Please add a reference to the soil erosion and sediment control plan. Reference added to Section 2

2) 4.0 - This section states that utility-mark-out will be implemented using NJ One Call System (1-800-272-1000). Please note that Syncon site is located on a private property and these companies will not perform utility mark-out on a private property. In addition to contacting the utilities company, Sevenson shall perform a geophysics survey to field verify the locations of utilities (Contract Drawing, G-1, Note 2) Text added to Section 4 indicating the need for the survey.

3) 6.0 - Change number of monitoring wells to be abandoned from "six" to "eight" Correction made.

Site Preparation Plan

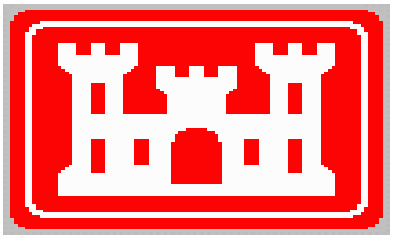
Syncon Resin Superfund Site
OU 2
South Kearny, New Jersey

Submitted by:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Prepared for:

U.S Army Engineer District
Corps of Engineers
Kansas City, Missouri



October 2016

Revision 2

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Layout Plan

1.0 Introduction

Sevenson Environmental Services, Inc. (SES) presents this plan to outline the manner in which SES intends to set up the temporary facilities and establish work areas at the Syncon Resin Superfund Site.

2.0 Site Preparation

In accordance with Section 02100, SES will obtain all permits required for site preparation work prior to proceeding with the work. SES will field-verify the existing conditions of the site prior to performing any site preparation activities using photographs and videotape. A written report will be submitted prior to the start of the preparation work. Any changes between the assumed conditions and the actual conditions will be discussed prior to the preparation work.

In addition, Sevenson will ensure to remain in compliance with the approved Soil Erosion and Sediment Control Plan during all site preparation activities.

3.0 Key Plan Components:

- Staging Area
- Clearing and Grubbing
- Locate and Abandon Utilities
- Storm water Control
- Setup Trailer Compound and utilities
- Water Treatment System
- Monitoring Wells and Piezometers Abandonment
- Contaminated Stockpile Area

4.0 Utility Mark-out

Utility Mark-out will be implemented using NJ One Call (1 800-272-1000) and SES will conduct its own inspection on site by means of the QC Officer and Superintendent.

Since the Syncon site is located on private property, the utility mark-out companies will not enter the site and perform utility mark-out on the private property. To field verify utility locations on the site, Sevenson shall perform a geophysical survey as per Contract Drawing, G-1, Note 2.

5.0 Temporary facilities

Upon the completion of the mobilization of the necessary equipment, clearing of trees will be performed within the excavation limits. Grubbing will be performed as necessary during the remedial excavation.

SES will begin to establish the temporary facilities for the project. The temporary facilities will consist of temporary office trailers, the temporary water treatment plant, staging containment area, soil erosion, sediment and storm water control barriers and the decontamination pad. Existing potable water service lines will be capped as well as sanitary lines and the remainder of the water lines and other underground utilities will be removed during excavation within the excavation limits.

Throughout the duration of the project, SES will obtain the following temporary offices/trailers for the necessary parties:

- (1) 60'x24' office trailer for the USACE / EPA field office
- (1) 60'x12' office trailer for SES field office
- (1) 60'x12' Health & Safety, E. M. F. / break trailer for work crews
- (1) shower trailer for personnel hygiene and decontamination
- (1) 20'x8' security trailer.
- (1) 8'x20' Government owned sea box (PPE) Storage

Each of the office trailers will possess adequate lighting, heating and cooling, adequate fire extinguishers, first aid kits, and sufficient electrical outlets. SES will obtain the necessary furniture (i.e. chairs, desks, tables, etc.) as needed for the temporary office trailers as well as the required office supplies (i.e. copiers, fax machines, bulletin boards, filing cabinets, etc.). Prior to obtaining office equipment, SES will discuss what is required with USACE reps based on their current inventory. Based on the results of the discussions, USACE will indicate what will be required.

6.0 Monitoring Wells Abandonment

As part of the site preparation phase, Sevenson will abandon eight monitoring wells (MW-4, MW-5, MW-6, MW-10R, MW-11, MW-14R2, MW-19 and MW-20R) and three piezometers (PZ-1, PZ-2 and PZ-3) prior to excavation in accordance with Specification Section 02525 and plans.

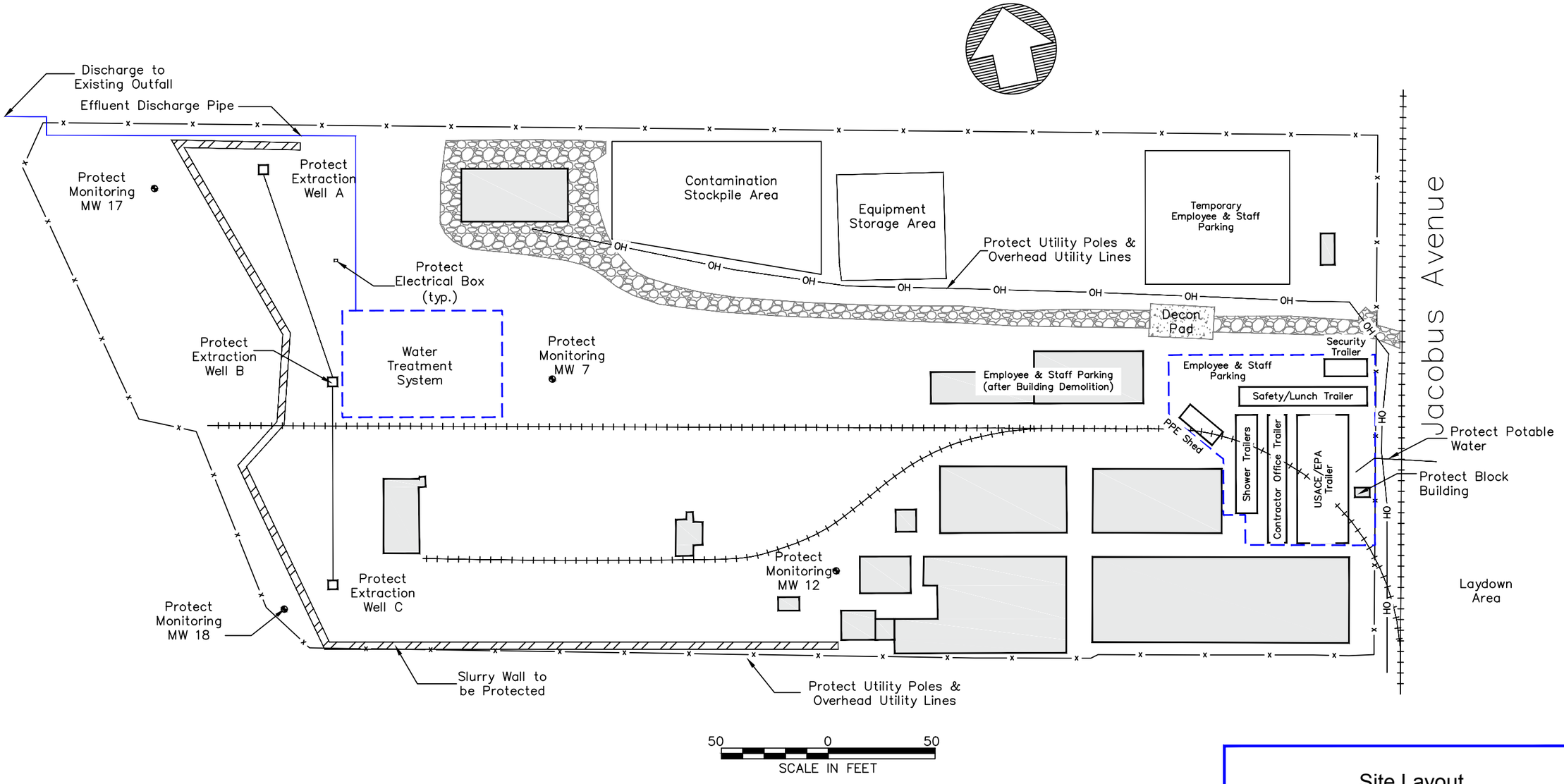
7.0 Contaminated Stockpile Area

Sevenson will construct the contaminated material stockpile area as shown on the contract drawings and detailed in Section 2100

8.0 Water Treatment System Containment Area

Sevenson will construct water treatment system containment area as shown on the contract drawings and as detailed in Section 2100.

Installation of the water treatment system shall be as per specification detailed in Section 13300 and in the contract drawings.



Site Layout

Syncon Resins
Superfund Site
Operable Unit 2
South Kearny, New Jersey

SEVENSON ENVIRONMENTAL SERVICES, INC.

DRAWING		
	DATE:	7//16
	DRAWN BY:	C. Bigelow
	CHECKED BY:	A. LaGreca
	CAD FILE:	Site Layout
	SCALE:	As Shown

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE	DATE 9/19/2016	TRANSMITTAL NO. 02120-24
PROJECT TITLE Syncon Resins Superfund Site OU2	CONTRACT NO. W912DQ-15-D-3002 0002	PAGE 1 of 1
LOCATION 77 Jacobus Ave, Kearny, NJ		

Item	*Description*	*Variation*	*QA Code*
2	Site Security Plan	No	C

SECTION III - GOVERNMENT REVIEW REMARKS

01) General - 49 CFR 172, Subpart I 172.802 (a)(1) states that a Security Plan will include "Measures to confirm information provided by job applicants hired for positions that involve access to and handling the hazardous materials covered by the security plan." Please include these measures in the Site Security Plan.

02) General - 49 CFR 172, Subpart I 172.802 (a)(3) states that a Security Plan will include "Measures to address the assessed security risks of shipments of hazardous materials covered by the security plan en route from origin to destination, including shipments stored incidental to movement." Please include these measures in the Site Security Plan.

1.) Section 3, Personnel Security, added to address comment.

2.) Section 7, Hazardous Materials Shipping Security, added to address comment.

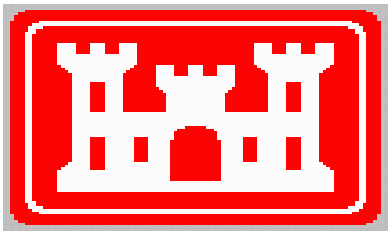
Site Security Plan

Syncon Resins Superfund Site
OU-2
South Kearny, New Jersey
Contract No. W912DQ-15-D-3002, TO 0002

Submitted by:
Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Prepared for:

U.S Army Engineer District
Corps of Engineers
Kansas City, Missouri



September 2016
Revision 1

SITE SECURITY PLAN

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Appendix B - Daily Security Report

Appendix C - Site Sign Entrance and Exit Log

1.0 INTRODUCTION

This Security Plan outlines Sevenson Environmental Services, Inc.'s (Sevenson) plan to maintain site security at the Syncon Resins Superfund Site – 77 Jacobus Ave. in South Kearny, New Jersey through the presence of onsite security officers throughout the duration of field activities. The plan addresses the training of security personnel, duties of security officers, and methods and frequency for conducting security checks. The plan also describes how a breach of security will be handled and provides a list of emergency contacts along with their phone numbers.

Security during the remedial activities at the Syncon Project will be conducted 7 days a week including holidays, throughout the duration of the project. A security firm will have guards at the site from 4:00 P.M. when construction operation has stopped until 7:00 A.M. when the construction work starts. (Note: work hours may adjust based on work progress, work activities, etc.).

2.0 ORGANIZATION, AUTHORITY, AND RESPONSIBILITY

While the Sevenson Quality Control Department has the direct responsibility for site security, the responsibility for site security extends throughout the Sevenson organization from senior management to every employee. For this reason, it is each person's duty to notify the management personnel if a security threat and/or condition is identified.

2.1 Quality Control Manager

The Quality Control Manager for Sevenson is Eric DeLellis, with William Zambrana designated as the CQCSM Alternate. He has the overall responsibility for the preparation, implementation, and enforcement of the Site Security Plan, and serves as the Site Security Officer. The enforcement of this plan will be designated to the Site Superintendent, Perry Novak. Mr. DeLellis and Mr. Zambrana have developed, implemented, and managed the safety and security programs at many HTRW sites, many of which were Superfund Sites.

2.2 Site Superintendent

Under the direction of the Quality Control Manager, the Site Superintendent, Mr. Perry Novak, has been designated as the Alternate Security Officer and will be responsible for

the implementation of this Site Security Plan. He will also be responsible for coordinating security activities with security personnel on a daily basis to ensure that the planned work objectives reflect adequate security considerations.

2.3 Site Security Personnel

Site security personnel will consist of onsite staff during work hours and the subcontracted security firm (TBD) during off shift hours. As conditions warrant or per request of USACE, the subcontracted security firm may be tasked to provide security during work hours in lieu of the onsite SES staff. This action requires the approval of the USACE COR. Security personnel and anyone onsite will not be permitted to carry firearms. They will be responsible for day-to-day off-hour security operations, including site entry control, conducting security checks, and handling breaches of security.

3.0 PERSONNEL SECURITY

Sevenson Personnel

Site Hazmat personnel possessing a Commercial Driver's License are confirmed in accordance with the Federal Motor Carrier Safety Requirements are considered to satisfy the requirements of 49 CFR 172, Subpart I. All other Site Hazmat personnel will be subject to a background check to be conducted by the Human Resources Manager. This check will include: confirmation of legal status to work in USA; obtaining copy of driver's license with legal name; and, check of employment history by request of the Project Manager.

Client Personnel

Sevenson will confirm with the Client that any Client-employed Hazmat personnel meet, at a minimum, Sevenson's background check criteria. Written record of compliance with these criteria will be maintained by the Project Manager in the Project records.

Subcontractor Personnel

Subcontractor Hazmat personnel possessing a Commercial Driver's License are confirmed in accordance with the Federal Motor Carrier Safety Requirements are considered to satisfy the requirements of 49 CFR 172, Subpart I. All other subcontractor Hazmat personnel will be confirmed as meeting a minimum background check to include: confirmation of legal status to work in USA; and, a copy of driver's license with legal name on file with subcontractor. Written

record of compliance with these criteria will be maintained by the Project Manager in the Project records.

4.0 TRAINING OF SECURITY PERSONNEL

Sevenson's Site Safety and Health Officer will be responsible for the training of the security personnel in the hazards associated with the site, and will explain all emergency procedures. Security personnel will receive Site Specific Training in accordance with the approved Site Safety and Health Plan.

5.0 SITE CONTROL MEASURES

Site control measures will be implemented to minimize the potential exposure to, and accidental spread of hazardous substances during remedial activities. The Site will be divided into three work zones: Exclusion Zone (EZ), Contamination Reduction Zone (CRZ), and Support Zone (SZ). The outer boundary of the EZ will be delineated with barrier/caution tape or orange safety fence. Security personnel will perform their assigned duties outside of the Exclusion Zone in the Support Zone, which is uncontaminated. Areas will be posted with appropriate warning signs strategically placed where people enter the restricted area, posted areas, CRZ, and at other locations where personnel may approach the area. In addition, the perimeter fence will be posted with signs stating, "Danger Do Not Enter – Authorized Personnel Only."

5.1 Work Zones

Sevenson will delineate the Exclusion Zone utilizing colored rope (Yellow and Magenta) with attached appropriate signs. Site workers, site supervision, and visitors shall strictly adhere to all marked Exclusion and Contamination Reduction Zones while onsite.

5.2 Entrance Control

Security personnel will control access of all personnel, equipment, and vehicles entering and leaving the site during off-work hours. Personnel entering the site will be required to show proper identification.

Security personnel will require all personnel and visitors having access to the site to sign in and out, and will keep records of all site access. Security personnel will maintain a Visitors Log.

6.0 DAILY RESPONSIBILITIES OF SECURITY PERSONNEL

This section details the daily responsibilities and necessary records to be kept by the security personnel. Only one security officer will be required per shift. Security patrols currently will be limited to site boundaries delineated by the temporary perimeter fence. Security personnel will not be allowed to enter the Contamination Reduction or Exclusion Zones.

6.1 Shift Security Log

Security personnel will maintain a Shift Security Log. The log will include the date, name of security officer onsite, the hours worked, and any security incidents at the site during that shift. Hourly security checks, as discussed in Section 5.3, shall be logged in the Shift Security Log. The Shift Security Log will be filed at the site and will be furnished to the COR upon request. Each day's Shift Security Logs will be provided to USACE as an attachment to the Daily CQC Report. An example of the log is attached in Appendix A.

6.2 Site Entry and Exit Log

As previously mentioned, Sevenson and security personnel will maintain a Site Entry and Exit Log of all work personnel and visitors who enter the jobsite; an example of this log is presented in Appendix A. This includes everyone who enters the site, including all EPA, NJDEP, Sevenson, and USACE personnel, as well as any subcontractors or visitors to the site. All personnel will be required to sign in and out when entering and leaving the site. The time of entry and exit will also be noted in the log. All personnel will be required to indicate their name, affiliation, and purpose of the visit/task to be performed. All vehicles and equipment entering the site will be logged in and out as well.

6.3 Security Checks

Security checks must be done at a minimum of once per hour using a scan verification system with time and date of each inspection. These scan readers will be placed in several locations around the property that would be accessible to the security guard as set up by discussions between USACE and SES field staff around the worksite until deemed completed. Security personnel shall walk the worksite, based on accessibility, to visually inspect the fences that surround the sites and look for any breaks or security breaches in the fence.

7.0 HAZARDOUS MATERIALS SHIPPING SECURITY

Once placarded materials have been loaded, and each load has been checked and confirmed as secure and ready for transport, Sevenson will release the load under the manifest system to its site-approved transportation subcontractor. Sevenson will continue to coordinate with all subcontracted transporters while each vehicle is en route until confirmation of delivery (via either a facility-signed manifest or telephone communication) is received.

While en route, each subcontractor's driver will operate and maintain his manifested load of material per that company's Security Plan. Copies of each site-approved transporter's Security Plans will be maintained at the Site by the CQCS manager. Each individual driver will be responsible for load security under his particular Security Plan; however, the following general procedures will be stressed:

- Confirm that CDL, medical cards, and subcontractor ID information is current and available should law enforcement officials stop the vehicle en route
- Driver should conduct pre- and post-delivery inspections of his vehicle whenever his vehicle is stopped that include a "walk-around" to confirm the continued integrity of the load and that unauthorized access or tampering has not occurred
- Drivers will use site-designated routes when entering or leaving the Site
- Drivers may use alternate delivery routes to designated disposal facilities; however, drivers will use designated routes, if such routes are specified
- Drivers nay avoid high population centers when possible
- Minimize stops en route
- If stops are made, select locations that are well-lighted, along well-traveled routes, that avoid high-crime areas
- Anytime a Hazmat driver leaves sight of his vehicle, that vehicle must have the keys removed from the ignition with the windows rolled up and all doors locked
- Avoid tunnels and bridges where possible
- At no time may drivers pick up hitchhikers or allow any unauthorized persons in their vehicles

- If driver must alter his pre-planned route or delivery schedule, he must immediately contact his fleet dispatcher; significant delays due to unforeseen circumstances (e.g. traffic delays, weather conditions, etc.) must likewise be communicated with the dispatcher
- Driver will made scheduled calls to communicate with his dispatcher while en route
- Hazmat drivers should not talk to unknown or unauthorized persons regarding delivery schedules, routes or destinations; any suspicious interest by unauthorized persons will be immediately reported to his dispatcher and/or the Sevenson CQCS Manager
- Drivers should be alert to any suspicious activities while en route such as roadside distractions, occupants of other vehicles trying to distract or contact him or erratic operations of other vehicles near his truck; all such suspicions should be immediately reported to his dispatcher

Contact telephone numbers for the Project will be distributed to each driver. This list is included in Appendix A of this Security Plan.

8.0 PROCEDURES FOR HANDLING A BREACH OF SECURITY

No visitors for security allowed. All personnel visiting the project site after regular work hours require authorization by Sevenson and USACE. In the event that unauthorized persons gain access to the site, the visitor(s) will be informed that they are on private property, are trespassing, and will be asked to leave immediately. They will be asked for identification, and if they respond, the information will be recorded on the Shift Security Log. The COR will be contacted by Sevenson to determine if a complaint should be filed and filed with the local police. If a complaint is not envisioned, the trespasser(s) will be politely escorted off the property. Any remedial activities that pose a threat of harmful exposure will cease while the trespasser(s) is removed.

In the event of a discovery of a breach of security, a visual search of the site from outside of the exclusion zone by security personnel would be made to try and ascertain what, if anything was damaged or stolen. Entry into the exclusion zone by security personnel will be limited to emergency circumstances only (i.e. to provide first aid or rescue services).

9.0 EMERGENCY NOTIFICATIONS

In the event of any incident (i.e. assault, vandalism, fire) during non-working hours, security personnel will immediately contact the police, fire, or ambulance services as required. After contacting emergency services, security personnel will notify Sevenson management, refer to Appendix A – Emergency Telephone Numbers. Sevenson management personnel will contact the COR and determine if assistance from Municipal and/or State agencies is required. If assistance from Municipal and/or State agencies is required, they will be notified immediately. The Emergency Contingency Plan and the responsibilities of specific personnel are outlined in the Site Safety and Health Plan (SSHP). During working hours, any incident will be directly reported to the Site Superintendent and/or the Site Safety and Health Officer (SSHO).

APPENDIX A

Emergency Contact Phone Numbers
SYNCON RESINS SUPERFUND SITE

Sevenson ****Primary Contact**** **Project Site - TBD**
Facsimile – TBD

1. **Steve Gillespie**
   (Project Manager): Cell - (716) 609-1416

2. **Perry Novak**
   (Superintendent): Cell - (973) 462-1155

3. **William Zambrana**
   (QC Manager Alt): Cell - (973) 518-0257

4. **Eric DeLellis**
   (QC Manager): Cell – (610) 416-8432

USACE **Project Site - TBD**
Facsimile - TBD

1. Matthew Creamer **(Project Engineer)**:	Site - TBD	Alternate Work – (201) 909-0087 Cell – (347) 495-6570
2. Michael C. Johnson **(Team Leader/COR)**:	Site - TBD	Work – (201)-909-0019
3. Neal Kolb **(Resident Engineer)**:	Office - (732) 846- 5830	Cell- (732) 616-8209
4. Gene Urbanik **(Area Engineer)**:	Office - (732) 846-5830	Cell- (917) 418-2870

USEPA **Project Site - TBD**

1. Pamela Baxter **(Remedial Project Manager)**:	Site - TBD	Work No. – (212) 637-4416
2. Pat Seppi **(Community Relations)**:	Site - TBD	Work No. - (212) 637-3679

APPENDIX B

DAILY SECURITY REPORT

For Clients Use Only	Security Officer	Badge No.	Operation
	Date / Day of Week / Shift to		Post
	Relieved	Badge No.	Revolver Serial No.
	Relieved By	Badge No.	Revolver Received From
	Keys Received From	Keys Passed To	Revolver Passed To

Check "Yes" or "No" on all, or any of the items below you were instructed to report on. Items checked "Yes" must be explained in detail.

	WERE THERE ANY?	Yes	No
1.	Thefts Committed: Attempted		
2.	Trespassers: Suspicious Activities?		
3.	Property Damaged		
4.	Doors or Windows Open? Broken?		
5.	Vaults or Safes Open?		
6.	Visitors: Names? Time?		
7.	Accidents?		
8.	Security Lights Out?		
9.	Parking Violations? License Numbers?		
10.	Fire Hazards?		
11.	Smoking Violations?		
12.	Telephone Calls?		
13.	Tours, Stations Missed?		
14.	New Instructions Received?		
15.	Fire Extinguisher Check?		
16.	Unusual Odors?		
17.	Noisy Machinery?		
18.	General Safety Hazards?		
19.	Machinery Guards Broken?		
20.	Machinery Left Running?		
21.	Hazardous Stacking?		
22.	Elec. Equip. Box Violation?		
23.	Unsafe Vehicle Operation?		
24.	Unsafe Practices?		
25.	Health Hazards?		
26.	Safety Complaints?		
27.	Other Than Above?		

DETAILS

Report below the details of each item checked "Yes," and any other important or unusual occurences, or matters of interest, occuring during your tour of duty, or brought to your attention, also list each round made during your tour of duty.

True Hours Worked ____ Hrs. ____ Minutes	Security Officer's Signature	

FOR INSPECTOR'S USE ONLY

Inspected By	Time In	Time Out
Training Topic	Training Given By	
Special Orders Reviewed		
Comments		

APPENDIX C

SIGN-IN/SIGN-OUT LOG

SITE:_____ LOCATION:_____

WEEK ENDING SUNDAY:___/___/_____

NAME	DATE	TIME IN	TIME OUT	SIGNATURE

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE	DATE	TRANSMITTAL NO. 02370-18.1
PROJECT TITLE Syncon Resins Superfund Site OU2	CONTRACT NO. W912DQ-15-D-3002 0002	PAGE 1 of 1
LOCATION 77 Jacobus Ave, Kearny, NJ		

Item	*Description*	*Variation*	*QA Code*
2	Soil Erosion & Sediment Contr Plan Rev 1	No	C

SECTION III - GOVERNMENT REVIEW REMARKS

1) Missing Environmental/ Spill/ Soil Erosion Protection Review Form referenced in Section IV, Page 5, Bullet 1.

Appendix B - Forms, with the form, was added.

Soil Erosion and Sediment Control Plan

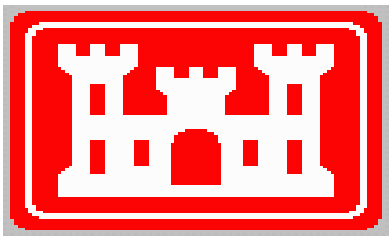
Syncon Resin Superfund Site
OU 2
South Kearny, New Jersey

Submitted by:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Prepared for:

U.S Army Engineer District
Corps of Engineers
Kansas City, Missouri



October 2016
Revision 2

Soil Erosion and Sediment Control Plan

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APPENDICES

APPENDIX A – SOIL EROSION AND SEDIMENT CONTROL DRAWINGS AND DETAILS

APPENDIX B – FORMS

Soil Erosion and Sediment Control Plan

I. PROJECT SUMMARY

The Syncon Resin Superfund Site, Operable Unit 02 (OU-2) is located in The Borough of South Kearny, Hudson County, New Jersey and consists of 15 acre contaminated commercial property.

The site is listed on the National Priorities List due to contamination found in the soil and building materials. Work under OU-2 includes demolition, excavation, and transportation of all wastes and offsite disposal of all wastes including debris and soils; restoration with backfill, topsoil, and seed; and other activities necessary for the complete and proper remediation of the properties.

II. PLAN OBJECTIVE

The objective of this plan is to state the soil erosion and sediment control measures Sevenson will implement on the Syncon Resin Superfund site to prevent and minimize erosion and sedimentation. Soil, water, and other natural resources will be protected from degradation and depletion that often result from land-disturbing development activities through the use of measures outlined in this Soil Erosion and Sediment Control Plan.

The soil erosion and sediment control measures described herein are designed based on the following principles:

- Minimize exposure of bare soil;
- Preserve existing vegetative cover wherever possible;
- Prevent soil from leaving the site through the use of silt fences, hay bales, and/or stone (as necessary);
- Stabilize disturbed areas soon after final grading;
- Keep runoff velocities low;

- Divert run-on water away from disturbed areas; and Reduce sedimentation by utilizing erosion control practices on site.

This plan is based on New Jersey State Code NJAC 7:14 and the requirements of the USACE's contract drawings and specifications. A copy of the approved Soil Erosion and Sediment Control Plan, including related drawings and inspection logs, will be kept on site at all times for inspection by the USACE. Revisions to the approved plan will be submitted to the Hudson, Essex, Passaic Soil Conservation District for approval with acceptance criteria submitted to the USACE.

III. PLAN IMPLEMENTATION

All erosion and sediment controls will be put into effect and functional prior to commencement of any earthwork activities. Once in place, Sevenson's Quality Control Manager, or his representative, will be responsible for the inspection of all control measures daily and after each rain event. Any items found noncompliant with this plan will either be repaired or replaced immediately.

The Quality Control Manager has the authority to stop work until these repairs are completed. He will also maintain a log of his inspections and a list of deficiencies found, and the corrective action(s) taken.

IV. PLAN COMPONENTS

Siltation and erosion control practices will be consistent with currently acceptable practices, including the placement of silt fencing and hay bales to mitigate sedimentation transport; the use of berms and trenches to re-direct surface water run-off/run-on to prevent contamination of adjacent properties; and the use of absorbent booms, where applicable, to prevent the flow of contaminated liquids from entering navigable waterways and/or storm sewer pathways.

- Surface drainage from cuts and fills within the limits of the work will be graded to control surface water flow (i.e., mitigate run-off and run-on) and mitigate soil

erosion.

- Sedimentation barriers will be installed using siltation fencing and/or hay bales around the perimeter of the work area (i.e., excavation areas). All sedimentation barriers will be inspected (inspections will be documented on the attached Environmental/Spill/Soil Erosion Protection Review Form) and maintained until interim site restoration is completed.
- Previously established grades will be maintained in a true and even condition.
- Areas of bare soil exposed by construction activities will be restricted to a minimum.
- Any piece of equipment coming into contact with contaminated soils will be decontaminated with a pressure washer at the equipment decontamination station. All equipment will be inspected prior to leaving the decontamination area and prior to authorization to leave the site.
- Sevenson or its subcontractors will immediately clean up any uncontaminated mud or soil *tracked* on the site prior to the vehicle reaching roadways.
- All soil erosion and sediment control measures (silt fence, hay bales, trenches, berms, etc.) will be installed prior to any major soil disturbances, or in their proper sequence, and maintained until permanent protection is established.
- All work will be performed in accordance with the State Standards for Soil Erosion and Sediment Control in New Jersey.
- Submittal of the SESCP to the Hudson, Essex Soil, Passaic Soil Conservation District will serve as notification of excavation/land disturbance activity.
- Any changes to the approved SESCP will require the submission of revised SESCPs to USACE and the Hudson, Essex, Passaic Soil Conservation District. The revised plans must meet all current soil erosion and sediment control

standards.

SITE SEDIMENT CONTROLS

The following control devices will be constructed as indicated below and installed in the order shown:

- **Silt Fence**: Sevenson will install wire-reinforced silt fencing along the down slope sides of the work (excavation) areas. The lower edge of the silt fencing will buried a minimum of six inches and will be placed with the wire reinforcing on the upslope side. The silt fencing will be monitored daily for silt accumulation and when the silt build up causes the silt fence to either bulge, or accumulates half way up the silt fence, the silt will removed, placed on the site and re-graded.
- **Sedimentation barriers**: Pre-manufactured siltation fences will be used as sedimentation barriers and will be installed in areas where the potential of soil runoff and erosion may occur. Siltation fences will be installed on natural ground, at the bottom of fill slopes, and in ditches and other areas where siltation is a problem and will be maintained until grass is established. These fences will be embedded to prevent water from running under them. Fences will be monitored daily and maintained in satisfactory condition for the duration of the project.
- **Inlet Protection:** Sevenson will construct sediment barriers at curb inlets and drop inlets as appropriate. In the event that demolition or excavation work is conducted near the road that could impact any off-site drains, the off-site drains will have protection measures installed, including installation of siltation curtains to mitigate sediment flow into the drain system. In addition, Sevenson will maintain absorbent booms on-site for use in preventing contaminated materials from entering the drainage system in the event of a spill.

- **Stockpiles:** Silt fencing will be placed to surround all stockpiles of soil materials. Sevenson will prevent the migration of surface water to the disturbed areas through use of berms, temporary swales, etc.
- **Additional Measures:** Immediately upon recognizing that unforeseen circumstances pose the potential for accelerated erosion or sedimentation, Sevenson will use appropriate best management practices to eliminate the potential for accelerated erosion and sedimentation. Sevenson will supplement the above control devices with, but not limited to, hay bales, rock dams, erosion control matting, riprap lining and/or sedimentation basins. Water from excavations will be collected, stored, in area I or Containerized until the water treatment system is in operation.
- **Final Grading and Restoration:** Final grading will consist of the placement and compaction of fill material followed by the placement of topsoil and seed to the final design contours.
- **Removal:** Removal of the erosion and sediment controls will be accomplished, as the items are no longer needed. Inlet protection structures and silt fencing around stockpiles will be removed once stockpiles are depleted. Remaining soil erosion controls will be removed upon the USACE's approval. The last sedimentation controls to be removed are the perimeter silt fencing, and the stabilized construction entrances. Any disturbances due to the removal of the silt fence, or other control item, will be repaired, seeded, or stabilized immediately.

Conservation District-specific Notations

The Hudson, Essex, Passaic Soil Conservation District requires the following notes be included on all plans submitted to them:

Soil Erosion and Sediment Control Plan

Hudson, Essex, Passaic Soil Conservation District

80 Orchard Street, Bloomfield, N.J. 07003
Phone: 862-333-4505 / Fax: 862-333-4507

1. All soil erosion and sediment control practices on this plan will be constructed in accordance with the **"New Jersey Standards for Soil Erosion and Sediment Control"** 7th Edition **last revised January 2014.** These measures will be installed prior to any major soil disturbance or in their proper sequence and maintained until permanent protection is established.

2. All soil to be exposed or stockpiled for a period of greater than 14 days, and not under active construction, will be temporarily seeded and hay mulched or otherwise provided with vegetative cover. This temporary cover shall be maintained until such time whereby permanent restabilization is established.

3. *Seeding Dates:* The following seeding dates are recommended to best establish permanent vegetative cover within most locations in the HEPSCD: Spring - 3/1-5/15 and Fall – 8/15 – 10/1

4. Sediment fences are to be properly trenched and maintained until permanent vegetative cover is established

5. All storm drainage inlets shall be protected by one of the practices accepted in the Standards, and protection shall remain until permanent stabilization has been established. Storm drainage outlet points shall be protected as required before they become functional.

6. Mulch materials shall be un-rotted small grain straw applied at the rate of 70 to 90 pounds per 1,000 square feet and anchored with a mulch anchoring tool, liquid mulch binders, or netting tie down. Other suitable materials may be used if approved by the Soil Conservation District.

Soil Erosion and Sediment Control Plan

7. All erosion control devices shall be periodically inspected, maintained and corrected by the contractor. Any damage incurred by erosion shall be rectified immediately.

8. The Hudson-Essex-Passaic Soil Conservation District will be notified in writing at least 48 hours prior to any soil disturbing activities. Fax - (862) 333-4507 OR email – INFORMATION@HEPSCD.ORG

9. **The applicant must obtain a District issued Report-of-Compliance prior to applying for the Certificate of Occupancy or Temporary Certificate of Occupancy from the respective municipality, NJ - DCA or any other controlling agency.** Contact the District at 862-333-4505 to request a Final Inspection, giving advanced notice upon completion of the restabilization measures. A performance deposit may be posted with the District when winter weather or snow cover prohibits the proper application of seed, mulch, fertilizer or hydro-seed.

10. Paved roadways must be kept clean at all times. Do not utilize a fire or garden hose to clean roads unless the runoff is directed to a properly designed and functioning sediment basin. Water pumped out of the excavated areas contains sediments that must be removed prior to discharging to receiving bodies of water using removable pumping stations, sump pits, portable sedimentation tanks and/or silt control bags.

11. All surfaces having lawn or landscaping as final cover are to be provided topsoil prior to re-seeding, sodding or planting. A depth of 5 inches (unsettled) is recommended.

12. All plan revisions must be submitted to the District for proper review and approval.

13. A crushed stone wheel cleaning tracking-pad is to be installed at all site exits using 2 ½ -1”crushed angular stone (ASTM 2 or 3) to a minimum length of 50 feet and minimum depth of 6”. All driveways must be provided with crushed stone until paving is complete.

14. Steep slopes incurring disturbance may require additional stabilization measures. These "special" measures shall be designed by the applicant's engineer and be approved by the Soil Conservation District.

15. **The Hudson-Essex-Passaic Soil Conservation District shall be notified, in writing, for the sale of any portion of the project or for the sale of individual lots. New owners' information shall be provided. Additional measures deemed necessary by District officials shall be implemented as conditions warrant.**

V. PERMIT EQUIVALENCY REQUIREMENTS

All work will be performed in accordance with the State Standards for Soil Erosion and Sediment Control in New Jersey.

VI. FINAL RESTORATION, MAINTENANCE, AND ACCEPTANCE

Following the completion of all remedial activities the site will be restored. Site restoration will include the repair of any site areas damaged or disturbed during the completion of remedial activities, as well as establishing vegetative cover at all disturbed site areas, and cleaning all work areas to remove all materials and waste.

All disturbed areas, once fine graded to final contours, will be covered with topsoil and sod in accordance with the Contract Specification.

FINAL INSPECTION

After Sevenson has restored all areas designated by the USACE, Sevenson will request that a Final Inspection be held by the USACE to determine that deficiencies noted in the preliminary inspection have been corrected.

Appendix A

Soil Erosion and Sediment Control Drawings and Details

SITE PREPARATION AND DEMOLITION PLAN

- EXISTING CONCRETE
- EXISTING CHAIN LINK FENCE
- EXISTING COLLECTION TRENCH
- EXISTING SURFACE CONTOUR (42)
- UTILITY POLE (TO BE PROTECTED) (OH — UP)
- UTILITY POLE (TO BE ABANDONED) (UP)
- EXISTING POTABLE WATER LINE (PW)
- EXISTING WATER LINE – CONTAMINATED WATER (W)
- EXISTING UNDERGROUND ELECTRIC LINE (E)
- EXISTING OVERHEAD UTILITY (OH)
- DEBRIS PILE
- EXISTING RAILROAD TRACKS
- EXISTING ROAD
- CEMENT–BENTONITE SLURRY WALL
- FIRE HYDRANT
- ASPHALT PAVEMENT
- EXISTING CONCRETE SLAB TO BE REMOVED
- EXISTING RAIL TO BE DEMOLISHED
- EXISTING BUILDING TO BE DEMOLISHED TO TOP OF SLAB
- EXISTING ASPHALT PAVEMENT TO BE DEMOLISHED
- EXISTING BUILDING TO BE DEMOLISHED, SLAB AND FOUNDATION TO BE REMOVED
- GRAVEL ACCESS ROAD

PRE-EXCAVATION SAMPLING PLAN / EXCAVATION PLAN

- (A) EXCAVATION AREA
- PRIMARY EXCAVATION LIMITS AND SLOPE 2H:1V

MISCELLANEOUS ABBREVIATIONS

ACM	ASBESTOS CONTAINING MATERIAL
AMSL	ABOVE MEAN SEA LEVEL
AST	ABOVEGROUND STORAGE TANK
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS
BGS	BELOW GROUND SURFACE
COCs	CONTAMINANTS OF CONCERN
CONC	CONCRETE
CWTS	CONTAMINATED WATER TREATMENT SYSTEM
DI	DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
EL	ELEVATION
EPA	ENVIRONMENTAL PROTECTION AGENCY
FT	FEET
GSC	GALVANIZED CARBON STEEL
HYD	HYDRANT
IN	INCH
LBS	POUNDS
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MW	MONITORING WELL
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NESHAP	NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS
NJDEP	NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
NJPDES	NEW JERSEY POLLUTANT DISCHARGE ELIMINATION SYSTEM
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE
OD	OUTER DIAMETER
PCBs	POLYCHLORINATED BIPHENYLS
PSE&G	PUBLIC SERVICE ELECTRIC & GAS COMPANY
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
PW	POTABLE WATER
PZ	PIEZOMETER
SCH	SCHEDULE
SF	SQUARE FEET
SS	STAINLESS STEEL
TP	TEST PIT
TSCA	TOXIC SUBSTANCES CONTROL ACT
TW	TEMPORARY WELL
TYP	TYPICAL
USACE	UNITED STATES ARMY CORPS OF ENGINEERS
UST	UNDERGROUND STORAGE TANK

Erosion & Sediment Control Legend

Syncon Resins
Superfund Site
Operable Unit 2
South Kearny, New Jersey

SEVENSON ENVIRONMENTAL SERVICES, INC.

DRAWING 1	
DATE:	9/8/16
DRAWN BY:	C. Bigelow
CHECKED BY:	P. Novak
CAD File:	Erosion & Sediment Control–1
SCALE:	As Shown

DATA TAKEN FROM PROJECT DRAWINGS BY SEVENSON ENVIRONMENTAL SERVICES, INC.

MARK W. GLYNN, PROFESSIONAL ENGINEER,
NJ LICENSE #24GE03700800

GGE
CIVIL STRUCTURAL GEOTECHNICAL
MATERIALS TESTING CONSULTING
GLYNN GEOTECHNICAL ENGINEERING
415 S. TRANSIT STREET
LOCKPORT, NEW YORK 14094
www.glynngroup.com
VOICE (716) 625 - 6933 / FAX (716) 625 - 6983

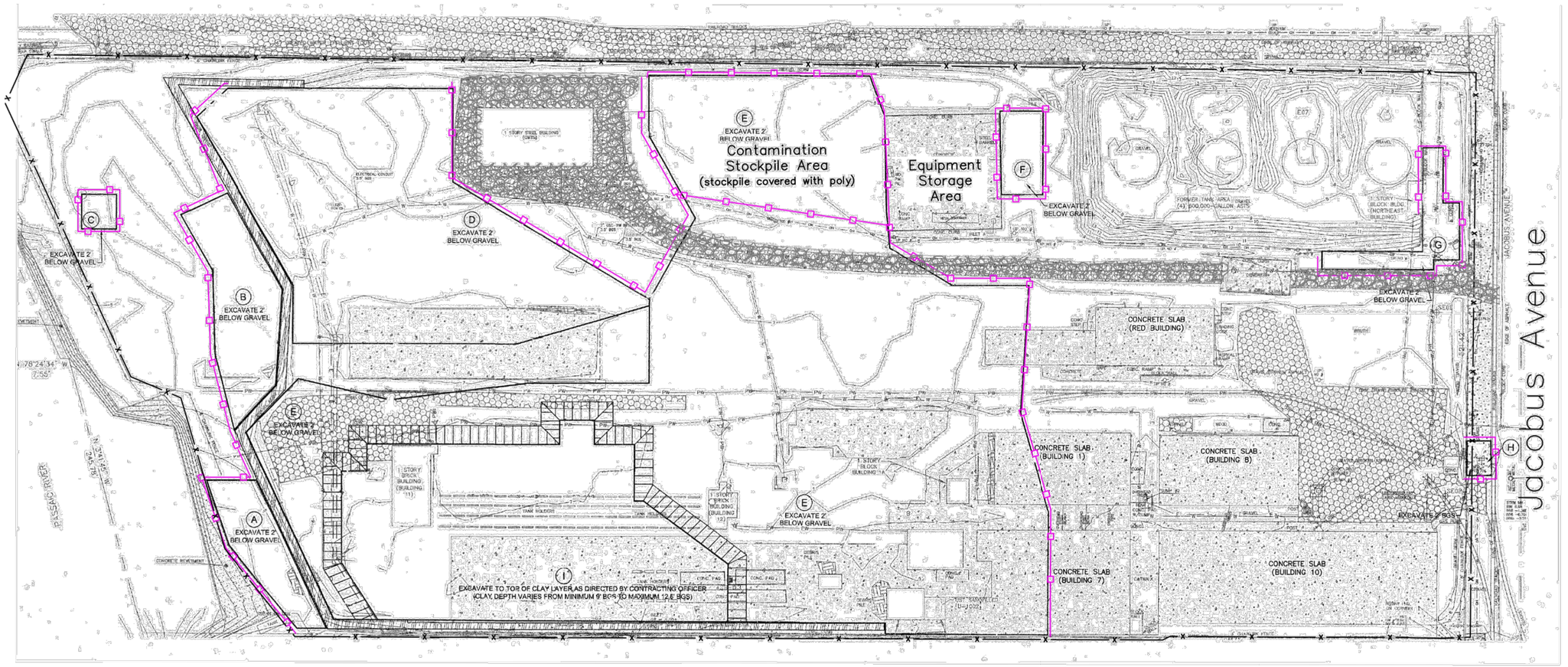
9-15-16

GGE PROJ.# 16-1118
FILE NAME: GGE DWGs
DATE: 9.15.16
DRAWN BY: VNF
CHECKED BY: MWG

CLIENT: SEVENSON ENVIRONMENTAL SERVICES, INC.
PROJECT: SYNCON RESINS SUPERFUND SITE, SOUTH KEARNY, NJ

TITLE: EROSION & SEDIMENT CONTROL LEGEND, SHT. 1 of 3

DWG # 1



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100 0 100
SCALE IN FEET

Legend

Silt Fence/Straw Bales

D Excavation Area

Erosion & Sediment Control Plan

Syncon Resins
Superfund Site
Operable Unit 2
South Kearny, New Jersey

SEVENSON ENVIRONMENTAL SERVICES, INC.

DRAWING 2	
DATE:	9/8/16
DRAWN BY:	C. Bigelow
CHECKED BY:	P. Novak
CAD FILE:	Erosion & Sediment Control-1
SCALE:	As Shown

BASE MAP TAKEN FROM PROJECT DRAWINGS BY SEVENSON ENVIRONMENTAL SERVICES, INC.

MARK W. GLYNN, PROFESSIONAL ENGINEER,
NJ LICENSE #24GE03700800

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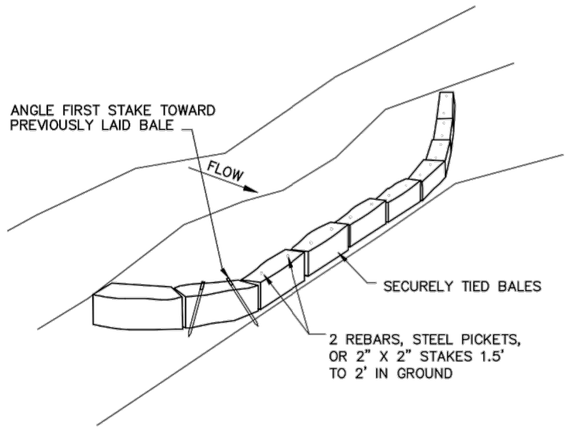
9-15-16

GGE PROJ.# 16-1118
FILE NAME: GGE DWG#
DATE: 9.15.16
DRAWN BY: VNF
CHECKED BY: MWG

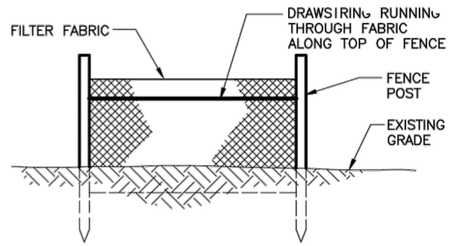
CLIENT: SEVENSON ENVIRONMENTAL SERVICES, INC.
PROJECT: SYNCON RESINS SUPERFUND SITE, SOUTH KEARNY, NJ

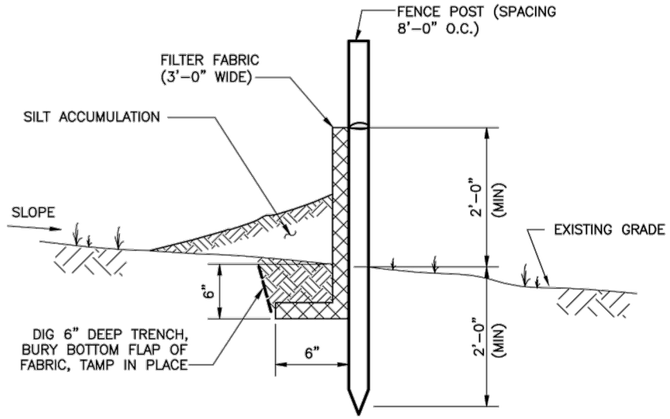
TITLE: EROSION & SEDIMENT CONTROL PLAN, SHT. 2 of 3

DWG #: 2



DIVERSION DETAIL

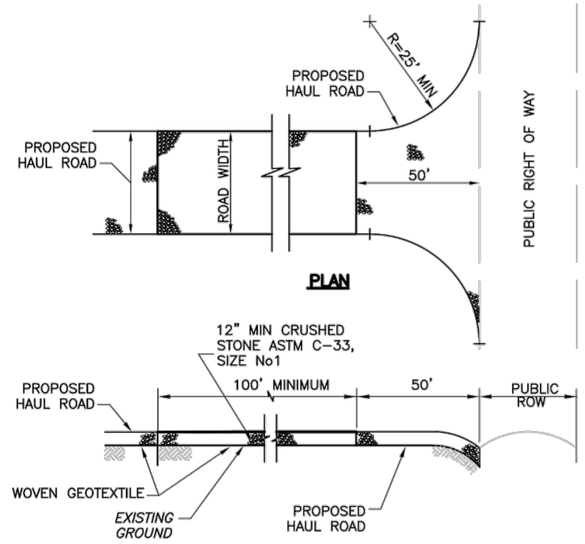




NOTE:
1. ALL SILT FENCE SHALL BE INSPECTED AND REMEDIAL MAINTENANCE PERFORMED BY THE CONTRACTOR WITHIN 24 HOURS AFTER EACH RAIN.

SILTATION CONTROL BARRIER DETAIL (SILT FENCE)

TEMPORARY SILT FENCES
The siltation fence fabric shall be a geotextile material suitable for siltation control use. The minimum tensile strength shall be 100 pounds, meeting ASTM D4632. The equivalent opening size shall be between the No. 50 and No. 70 sieve size. A 12-gauge metal fence with 4-inch by 4-inch openings shall be provided as support for the fence fabric.

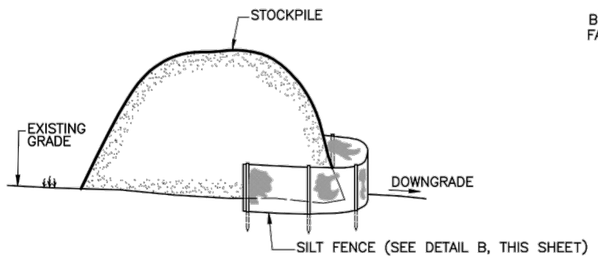


PLAN

PROFILE

NOTES:
1. PROVIDE APPROPRIATE TRANSITION BETWEEN STABILIZED CONSTRUCTION ENTRANCE AND PUBLIC RIGHT-OF-WAY.
2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR ADDITIONAL LENGTH AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY

STABILIZED CONSTRUCTION ACCESS



NOTE:
1. FOR IMPORTED FILL ONLY. NOT APPLICABLE TO EXCAVATED AND DREDGED SEDIMENTS, WHICH SHALL BE PLACED IN THE SEDIMENT CONTAINMENT AREA

TEMPORARY SOIL STOCKPILE

Erosion & Sediment Control Details

Syncon Resins
Superfund Site
Operable Unit 2
South Kearny, New Jersey

SEVENSON ENVIRONMENTAL SERVICES, INC.

DRAWING 3		
	DATE:	9/8/16
	DRAWN BY:	C. Bigelow
	CHECKED BY:	P. Novak
	CAD File:	Erosion & Sediment Control-1
	SCALE:	None

DETAILS TAKEN FROM PROJECT DRAWINGS BY SEVENSON ENVIRONMENTAL SERVICES, INC.

MARK W. GLYNN, PROFESSIONAL ENGINEER, NJ LICENSE #24GE03700800

GGE
CIVIL STRUCTURAL GEOTECHNICAL MATERIALS TESTING CONSULTING
GLYNN GEOTECHNICAL ENGINEERING
415 S. TRANSIT STREET
LOCKPORT, NEW YORK 14094
www.glynngroup.com
VOICE (716) 625 - 6933 / FAX (716) 625 - 6983

9-15-16

GGE PROJ.#: 16-1118
FILE NAME: GGE DWGs
DATE: 9.15.16
DRAWN BY: VNF
CHECKED BY: MWG

CLIENT: SEVENSON ENVIRONMENTAL SERVICES, INC.
PROJECT: SYNCON RESINS SUPERFUND SITE, SOUTH KEARNY, NJ

TITLE: EROSION & SEDIMENT CONTROL DETAILS, SHT. 3 of 3

DWG #: 3

Appendix B

Forms

Environmental/Spill/Soil Erosion Protection Review

Syncon Resins Superfund Site

Erosion Control Barriers

Barrier Types In-Place and Functional?:

- ☐ Silt Fence Location: _____
- ☐ Hay Bales Location: _____
- ☐ Trenches Location: _____
- ☐ Other _____ Location: _____
- ☐ Other _____ Location: _____
- ☐ Storm drains protected? _____
- ☐ Mud mats in-place and functional (i.e., not loaded with mud)? _____
- ☐ Stockpiled soil protection in-place? _____

Spill Response:

- ☐ Storm drain spill protection equipment on-hand (absorbent booms, sand, bentonite, etc.) ____

  _____
- ☐ Spill response equipment/materials on-hand _____
- ☐ Trained response personnel on-site _____
- ☐ Spill Hotline Number posted conspicuously in multiple locations _____

General Environmental Protection:

- ☐ Location of on-site fuels storage _____
- ☐ Noise Control/Monitoring _____
- ☐ Dust Control/Monitoring _____
- ☐ Proper housekeeping _____

_____

_____

_____ _____

CQC Systems Manager Date

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

For use of this form, see ER 415-1-10; the proponent agency is CECW-CE.

DATE	TRANSMITTAL NO.
09/20/2016	01351-8.1

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor)

TO:	FROM:	CONTRACT NO.	CHECK ONE:
Environmental Residency US Army Corps of Engineers 214 State Highway 18 East Brunswick, NJ 08816	Sevenson Environmental Services, Inc. 2749 Lockport Road Niagara Falls, NY 14305-2229	W912DQ-15-D-3002 0002	[X] THIS IS A NEW TRANSMITTAL [ ] THIS IS A RESUBMITTAL OF TRANSMITTAL _____

SPECIFICATION SEC. NO. (Cover only one section with each transmittal)	PROJECT TITLE AND LOCATION	THIS TRANSMITTAL IS FOR: (Check one)
01351 Safety, Health and Emergency Response	01-Main Register Syncon Resins (OU2) Superfund Site 77 Jacobus Ave, Kearny, NJ	[ ] FIO [X] GA [ ] DA [ ] CR [ ] DA/CR [ ] DA/GA

ITEM NO. (See Note 3) a.	DESCRIPTION OF SUBMITTAL ITEM (Type size, model number/etc.) b.	SUBMITTAL TYPE CODE (See Note 8) c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT		CONTRACTOR REVIEW CODE g.	VARIATION Enter "Y" if requesting a variation (See Note 6) h.	USACE ACTION CODE (Note 9) i.
				SPEC. PARA. NO. e.	DRAWING SHEET NO. f.			
8	Traffic Control Plan Rev 1	SD-01	0	1.3.9		A		

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in the strict conformance with the contract drawings and specifications except as otherwise stated.

JW ZAWISKAK

NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by item No.)	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE		DATE	TRANSMITTAL NO. 01351-8
PROJECT TITLE	Syncon Resins (OU2) Superfund Site	CONTRACT NO. W912DQ-15-D-3002 0002	PAGE 1 of 1
LOCATION	77 Jacobus Ave, Kearny, NJ 07032		

Item	*Description*	*Variation*	*QA Code*
3	Traffic Control Plan	No	C

SECTION III - GOVERNMENT REVIEW REMARKS

- Plan shall include site drawing for reference with roads
- Plan shall include discussion of access to the site; the use of one or both of the gates available on Jacobus Ave.
- Plan shall include discussion of haul roads, type of vehicular traffic, fencing, and speed controls for the site
- Plan shall include discussion of hauling materials and contaminated soils and their movement on local roads. Map shall be included.

1. A map for directions to the site and for leaving the site have been added.
2. Discussion of site access and which gate will be used was added.
3. Discussion of haul roads, type of vehicular traffic, fencing and speed controls were added.
4. Discussion of hauling materials, deconning, truck inspections, movement on local roads and maps were added.

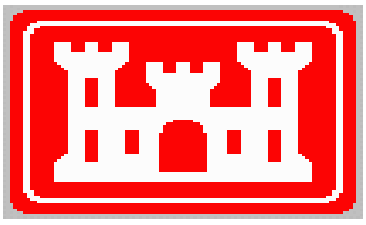
Traffic Control and Transportation Plan

Syncon Resins Superfund Site
OU-2
South Kearny, New Jersey
Contract No. W912DQ-15-D-3002, TO 0002

Submitted by:
Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Prepared for:

U.S Army Engineer District
Corps of Engineers
New York District



September 2016
Revision 1

Traffic Control and Transportation Plan

Table of Contents

I. Introduction..……3
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III. Site Coordination……..……4
IV. Truck Routes…….5

Traffic Control and Transportation Plan

I. Introduction

The basis of the Traffic Control and Transportation Plan is to minimize the congestion on public streets caused by an excess of vehicles at the site at one time and to ensure vehicular safety on the site. The major concern is the management and control of material hauling on and in the near vicinity of the site.

The site speed limit will be set at 5 MPH and signs will be posted at the gate and along the haul roads.

II. Site Access

There will be several types of vehicular traffic accessing the site on a daily basis. Sevenson expects normal vehicular traffic from employees entering and leaving the site, material deliveries, shipping companies (such as Fed Ex, UPS, USPS, etc) and the transportation and disposal subcontractors. Vehicles will range from personal vehicles and deliver trucks to large tractor/trailers.

As of this writing, Sevenson intends to use only the northern gate for access. This procedure will be re-evaluated after the office trailers are set and the buildings are demolished. If the southern gate can be utilized after building demolition has occurred, this plan will be revised accordingly.

The use of personal vehicles beyond the temporary facilities area and the employee parking areas will be restricted. Material deliveries, and deliveries in general, will be diverted to the appropriate area. Fed Ex, UPS, etc will be diverted to the temporary facilities area and material deliveries will be diverted according to what is being delivered, either to the temporary facilities area or the equipment storage area. T&D trucking will be diverted to appropriate excavation or stockpile area.

Sevenson will schedule material deliveries in such a way to avoid vehicles from queuing on Jacobus Avenue. Vehicles will only be scheduled which can be unloaded at the site in the minimal amount of time possible. In the unlikely event two or more unscheduled deliveries occur at one time, Sevenson will unload the vehicles as expeditiously as possible. Traffic will be monitored by flag men with reflective safety vests and orange flags to control and avoid any lane blockages, traffic jams, public inconvenience, etc.

Haul roads will be clearly marked out with signage and safety fence. Haul roads will change to coordinate with each excavation area.

Traffic Control and Transportation Plan

All trucks leaving the site will exit via the concrete decon pad where they will be deconned and inspected prior to leaving the site. They will be inspected to insure that tailgates are secured properly, loads are properly covered and there is no material on the outside of the containers. All trucks leaving the site will make a right on Jacobus Ave and follow the directions to Rt. 9 / I-95 as described below.

III. Site Coordination

Sevenson will coordinate with the fire department, police department and Emergency Management along the transportation route for construction equipment and disposal vehicles relative to the construction sequences of the project. The persons in contact are as follows:

A.	Emergency Management Coordinator Deputy Coordinator	Sgt. Anthony Limite Sgt. Rick Poplaski	201-998-8800
B.	Hudson County Emergency Coordinator	Jim Woods	201-369-5200
C.	Traffic Safety Unit	Lt. John Taylor	201-998-1313
D.	Fire Department	N/A	201-991-1402

As of this writing, Sevenson intends to use only the northern gate for access. This procedure will be re-evaluated after the office trailers are set and the buildings are demolished.

Traffic Control and Transportation Plan

IV. Truck Route

Sevenson proposes to utilize the following transportation route.

Directions to SYNCON RESIN SUPERFUND SITE
77 JACOBUS AVENUE, SOUTH KEARNY, NJ

1: **FROM I-95 SOUTH TAKE EXIT 15E to**

2: **US-1 Truck N / US-9 Truck N / Raymond Blvd.**

3: **Take Jacobus Avenue exit, continue onto Jacobus Avenue**

4: **77 Jacobus is on the left**

Refer to Figure 1 for a map of the site and local roads.

Traffic Control and Transportation Plan

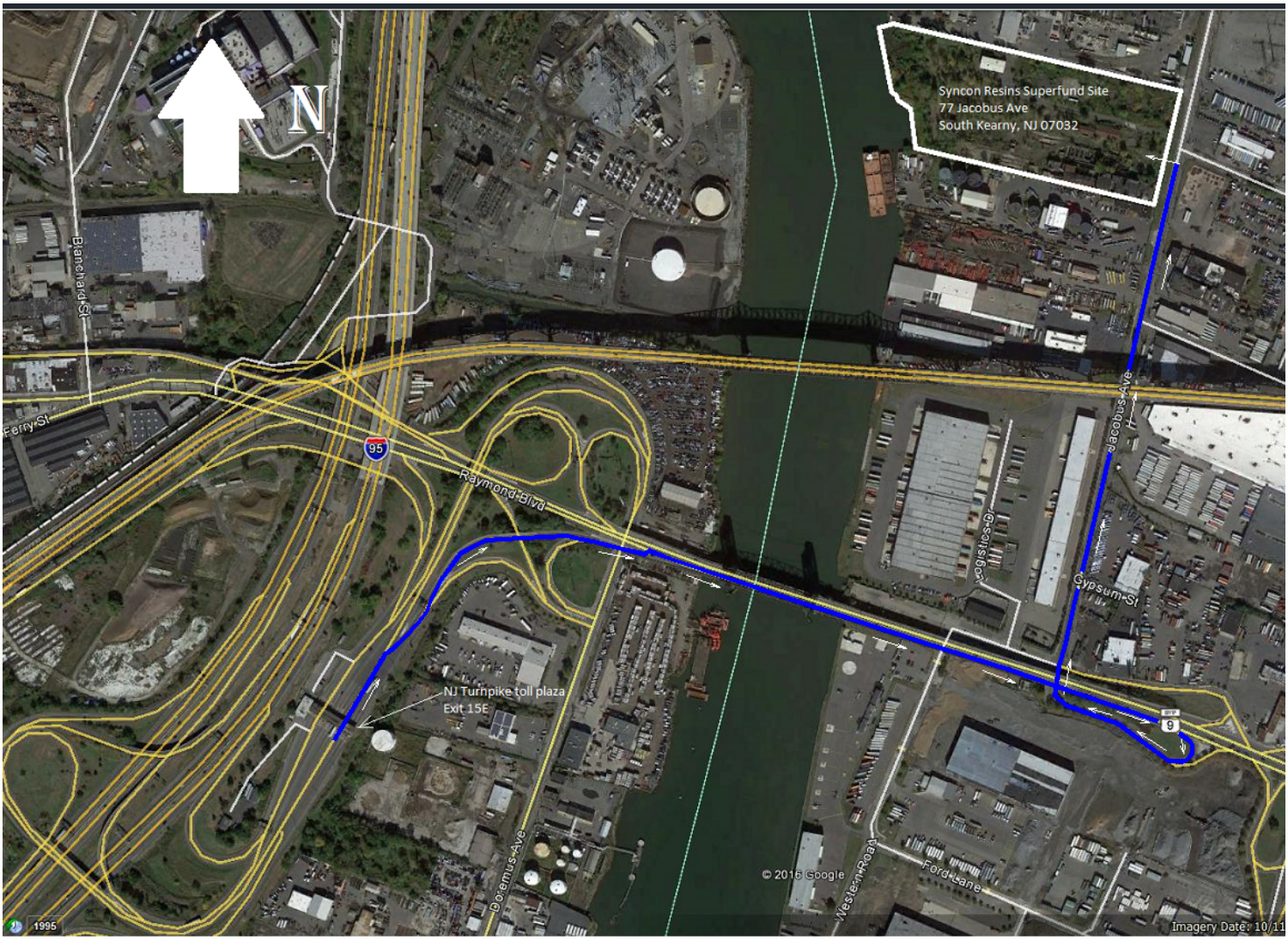

Figure 1 – Directions To the Syncon Resins Superfund Site.

Traffic Control and Transportation Plan

Directions Leaving SYNCON RESIN SUPERFUND SITE
77 JACOBUS AVENUE, SOUTH KEARNY, NJ

START 1: **Exit Syncon Resin Superfund Site**

2: **Turn Right onto Jacobus Avenue continue to the Intersection**

3: **Turn LEFT onto Logistics Drive**

I-95 4: **Take first ramp onto US-1 Truck S / US-9 Truck S**

INTERSTATE 95 5: **Take first exit ramp on the right to US-95**

Refer to Figure 2 for a map of the site and local roads.

Traffic Control and Transportation Plan

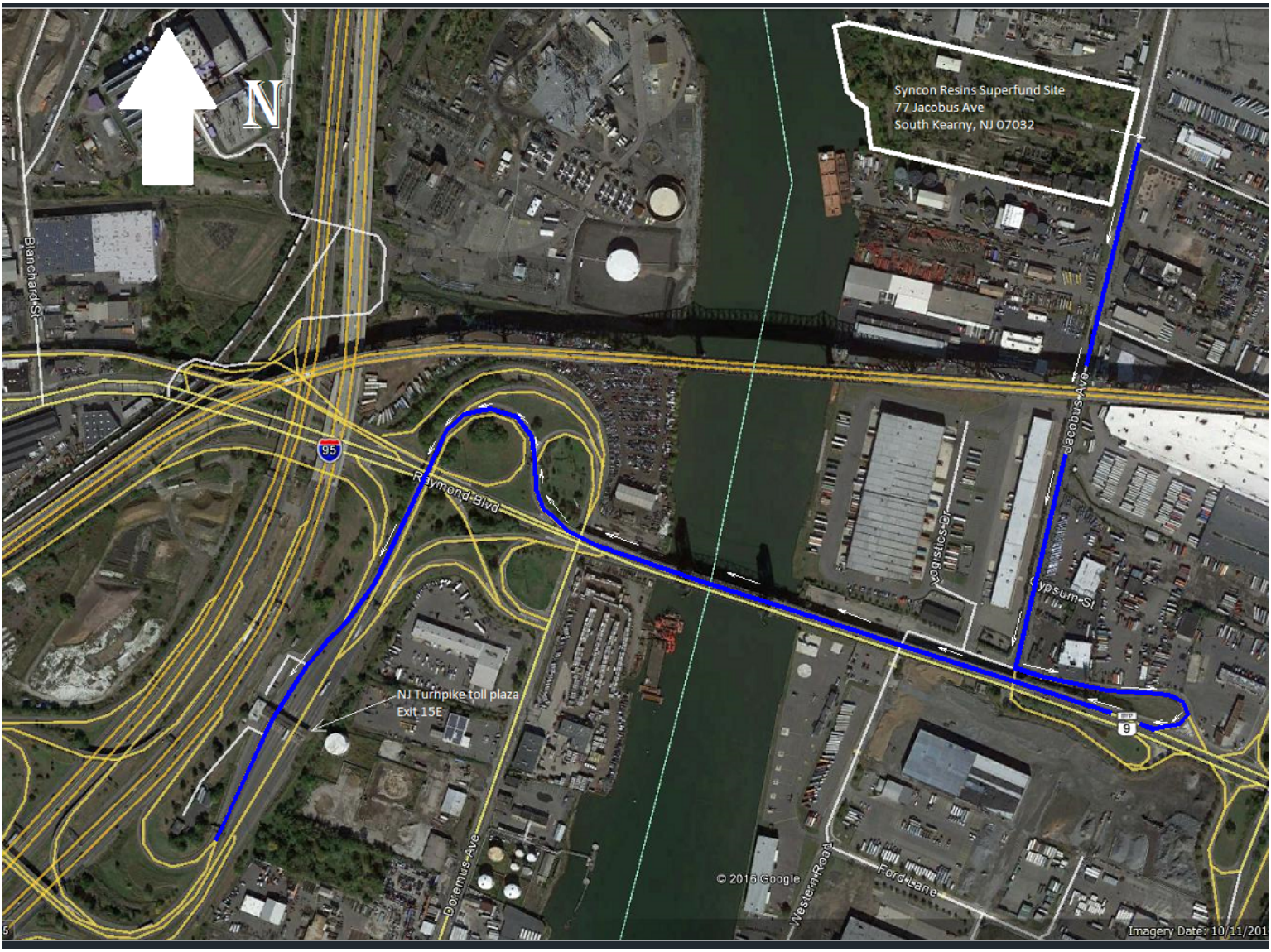

Figure 2 – Directions Leaving the Syncon Resins Superfund Site.

Vibration Monitoring Plan

Syncon Resins Superfund Site
South Kearny, New Jersey
Contract No. W912DQ-15-D-3002, TO 0002

Submitted by:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

May 2017
Revision 0

VIBRATION MONITORING PLAN

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2.0 Pre/Post-construction Inspection ……..……...3
3.0 Vibration Monitoring ……..…..…...…3

Figures

Figure 1

VIBRATION MONITORING PLAN

1.0 Vibration Monitoring Plan Objectives

During steel sheet pile installation activities, Sevenson has subcontracted Pre/Post-construction inspection and vibration monitoring to Vibra-Tech. The purpose of this activities are to document existing conditions in the vicinity of the work and to monitor for vibrations to may impact structures.

2.0 Pre/Post-construction Inspections

Prior to the start of sheet pile installation, Sevenson will arrange for the access of specific buildings/structures (within 100 feet from construction) for pre-construction inspection. Inspections will be conducted by Technician(s) of Vibra-Tech. A Spectraserv representative will be present during the pre- construction and post-construction inspection.

The inspections will cover open and accessible areas in any below-ground levels (basement, sub-basement, cellar, etc.) and all the upper levels. Interior inspections will consist of a recorded verbal narrative, supplemented by digital photographs as needed. Exterior inspections will consist of digital photographs of the building façade only, taken from ground level. Additional locations can be included based on needs and requirements of the project owner. Post-construction inspections will be carried out in the same manner as the pre-construction inspections.

A report on findings at the site will be prepared and provided to Sevenson; it will include a CD with photographs and PDF copy of the report. All original photographs, tapes, or notes will be stored and maintained by Vibra-Tech for future use.

The sole purpose of these inspections are to document the existing cosmetic conditions at the locations. These inspections do not evaluate the integrity of any structure or its vulnerability to any existing and/or external loads that may be induced by any project-related construction activities. Vibra-Tech Engineers will not prepare any calculations, perform a structural evaluation of the buildings or their components, or evaluate compliance with building codes. There may be structural and/or nonstructural conditions or deficiencies present at the properties which are not visible during the inspections.

3.0 Vibration Monitoring

Vibra-Tech personnel will install Remote Seismic Monitoring Stations at locations directed by Sevenson. Approximate locations are shown in Figure 1. The stations consist of a seismograph, geophone, and cellular modem. They are housed in secure enclosures and are equipped with a backup battery system. Stations installed inside a building will require dedicated 120V AC power to be provided. Stations installed outside

a building will be powered by solar panel where possible, but 120V AC power may be required. The equipment should be installed prior to the start of work in order to characterize ambient vibration levels.

Monitoring data will be downloaded on a daily basis. A summary of the data will be provided via email on a weekly basis.

An alert will be provided to the appropriate project personnel via email or text message should vibration levels reach or exceed the threshold provided by Sevenson. Please note with remote stations Sevenson must document the activities taking place in order to correlate the recorded exceedance with the vibration data. In the event that the maximum vibration level is reached or exceeded, Sevenson will stop work, contact USACE, discuss activities and revise their means and methods.

For budgeting purposes, it is estimated that three remote station may be required for two weeks. It is possible that some stations may require relocation as the project progresses.

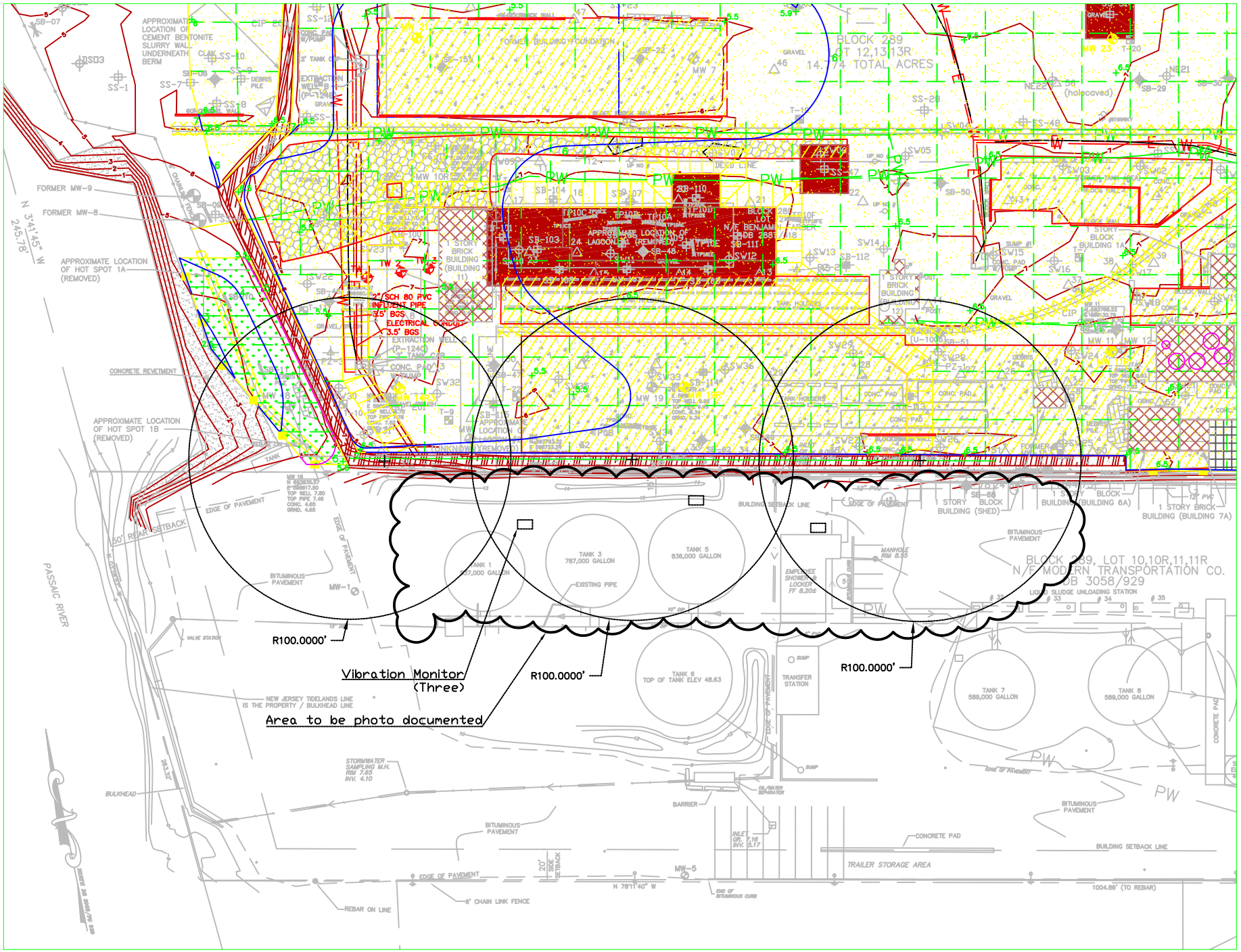
R100.0000'
Vibration Monitor
(Three)
R100.0000'
R100.0000'
Area to be photo documented
2" SCH 80 PVC
INFLUENT PIPE
3.5' BGS
ELECTRICAL CONDUIT
3.5' BGS
APPROXIMATE LOCATION OF HOT SPOT 1A (REMOVED)
APPROXIMATE LOCATION OF HOT SPOT 1B (REMOVED)
APPROXIMATE LOCATION OF CEMENT BENTONITE SLURRY WALL UNDERNEATH BERM
FORMER MW-9
FORMER MW-8
N 3°41'45" W
245.78'
CONCRETE REVETMENT
EDGE OF PAVEMENT
50' REAR SETBACK
BITUMINOUS PAVEMENT
PASSAIC RIVER
NEW JERSEY TIDELANDS LINE
IS THE PROPERTY / BULKHEAD LINE
BULKHEAD
BLOCK 289
LOT 12,13,13R
14.74 TOTAL ACRES
BLOCK 289, LOT 10,10R,11,11R
N/F MODERN TRANSPORTATION CO.
DB 3058/929
FORMER BUILDING FOUNDATION
1 STORY BRICK BUILDING (BUILDING 11)
1 STORY BLOCK BUILDING (SHED)
1 STORY BLOCK BUILDING 6A)
1 STORY BRICK BUILDING (BUILDING 7A)
TANK 1 857,000 GALLON
TANK 3 787,000 GALLON
TANK 5 836,000 GALLON
TANK 6 TOP OF TANK ELEV 48.63
TANK 7 589,000 GALLON
TANK 8 589,000 GALLON
EXISTING PIPE
TRANSFER STATION
LIQUID SLUDGE UNLOADING STATION
TRAILER STORAGE AREA
CONCRETE PAD
BUILDING SETBACK LINE
BARRIER
REBAR ON LINE
6' CHAIN LINK FENCE
1004.86' (TO REBAR)
N 78°11'40" W

Figure 1

Syncon Resins Superfund Site

South Kearney, New Jersey

Waste Management and Transportation Plan – Revision 1

1. General - Please provide the certificates, permits, licenses, and letters of commitment from the proposed waste haulers and disposal facilities, certifying acceptance of the Syncon Resins Superfund Site waste in accordance with Section 02120 1.3.1.

Response: Copies of all submittal documents for all facilities and transporters have been submitted separately.

2. General - Please provide the Trucking Company Information in Appendix F.

Response: Information regarding truckers to facilities included in Appendix F.

3. Section 3.1 - Please correct "demotion" to "demolition" in Section 3.1.

Response: Change made as required.

Waste Management and Transportation Plan
Syncon Resins Superfund Site OU-2
South Kearny, New Jersey

Prepared for:
U.S Army Engineer District
Corps of Engineers
Kansas City, Missouri

Prepared by:
Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Sevenson
Environmental
Services, Inc.

Date: January 2017
Revision 1

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Figure 1

LIST OF APPENDICES

Appendices

A EPA Region 2 Offsite Rule Request Form, Landfill Permit Waste Profile Forms and Facility Acceptance Letter

B Transportation Coordinator Resume

C Transporter Spill Response Plan

D Material and Waste Disposal Tracking Log

E Examples of Waste Manifest for the Project

F Trucking Company Information

LIST OF ACRONYMS

AST	Aboveground Storage Tank
CERCLA	Comprehensive Environmental Response Compensation Liability Act
CFR	Code of Federal Regulations
COC	Contaminants of Concern
CY	Cubic Yard
LDR	Land ban Disposal Restriction
OSR	Off-Site Rule
NCP	National Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
PCB	Polychlorinated Biphenyls
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
Sevenson	Sevenson Environmental Services, Inc.
SVOC	Semi-volatile Organic Carbon
TSCA	Toxic Substance Control Act
UFP-QAPP	Uniform Federal Policy – Quality Assurance Project Plan
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Carbon
WM&TP	Waste Management and Transportation Plan
WWTP	Wastewater Treatment Plant (onsite)

1 INTRODUCTION

The United States Army Corps of Engineers (USACE) New York District has been designated to remediate the contaminated sediments and debris located at the Syncon Resins Superfund Site located in South Kearny, New Jersey. Sevenson Environmental Services, Inc. (Sevenson), functioning under its Remedial Action Contract No. W-912DQ-15-D-3002, Task Order #0002, has been designated the Remedial Action Contractor for the Site. The primary objective of the remediation effort is the timely and effective cleanup of the Site in accordance with the Record of Decision for the Site (Record of Decision for OU2). The OU2 ROD addresses contaminated soils, building demolition and debris disposal. The OU2 ROD identified three contaminants of concern (COCs) in the soils and debris: VOCs, SVOCs, Metals, Pesticides, polychlorinated biphenyls (PCBs) and Asbestos. The selected remedy includes excavation, transportation, and offsite disposal of contaminated soils, backfilling and grading of the excavated areas and institutional controls for the site.

The remedial activities to be performed at the Site will result in the generation of various types of excavated/removed materials and remediation wastes. This Waste Management and Transportation Plan (WM&TP) identifies the procedures and guidelines that will govern material and waste handling operations during the remedial action activities.

Specifically, the WM&TP describes the classifications of materials and wastes that are anticipated to result from remedial activities, the regulatory requirements for management of such materials and wastes, the procedures to be followed during the remedial action activities for material and waste management, transportation, and disposal, and the applicable notification, documentation, and reporting requirements associated with the material and waste management activities.

2 MATERIAL AND WASTE SOURCES AND CLASSIFICATIONS

This section describes the sources and classifications of the materials and wastes that may be generated during the remedial activities to be performed at the Site.

2.1 SOURCES OF MATERIALS AND WASTES

Implementation of the remedial action activities at the Site will result in the generation of materials and wastes which will require appropriate on-site and off-site management. These materials and wastes will be generated during the demolition of site buildings, the removal of debris (wood timbers, concrete block and other wood/metal debris), the removal of contaminated soil, the testing and removal of the contents/associated soils of AST/USTs and waste generated during the execution of associated support operations (i.e., equipment decontamination, sampling, etc.). The anticipated materials and wastes to be generated from the implementation of the remedial action activities include, but are not limited to:

Source	Potential Materials and Wastes
Buildings and Demolition Debris (Buildings 1A, 6A, 7A, 9, 11 and Northeast Building/Shed within the excavation area and Buildings 1, 7, 8, 10 and the Red Building outside of the excavation areas.	Demolition Debris (brick/block, wood timbers, building footers and various demolition debris). Spent PPE and disposable equipment.
Excavated Soils and Concrete	Soils/concrete from designated removal areas. Spent PPE and disposable equipment.

AST Contents	Aboveground tank contents for waste disposal. Spent PPE and disposable equipment.
UST Soils	UST soils for clean closure confirmation. Spent PPE and disposable equipment.
Decontamination Activities	• Decontamination waters from onsite treatment system prior to discharge. • Spent PPE and disposable equipment
Other	• Common trash and garbage (non-contaminated) • Sanitary wastewater • Used oil, hydraulic fluids and coolants (from equipment maintenance)

2.2 MATERIAL AND WASTE CLASSIFICATIONS

Past investigations at the site relevant to the OU2 remediation have identified COC in soils and other site materials at the site as follows: VOCs, SVOCs, Metals, Pesticides and PCBs. In addition, asbestos and lead-impacted materials have been identified and will be managed during building demolition activities.

2.2.1 NON-IMPACTED WASTE

In addition to the waste identified above, remedial action activities may also result in the generation of waste materials that are not directly impacted by COCs at the site, but may contain

hazardous substances requiring special management procedures (Regulated Wastes). Such Regulated Wastes may include the following:

Non-Hazardous Wastewaters - Wastewaters generated during project activities may contain contaminants that must be treated or removed by the onsite Wastewater Treatment Plant (WWTP) system prior to discharge.

Construction Debris - This category includes material that has not been contaminated by site materials or otherwise impacted by hazardous substances or wastes. Clean debris will be disposed of at a licensed off-site Subtitle D landfill along with other site materials.

Trash and Rubbish - This material includes spent packaging materials, equipment, general garbage and trash that have not been impacted by site materials or hazardous substances. Trash and rubbish will be stored on-site in appropriate containers and will be disposed of at a licensed off-site municipal waste facility. This material will be transported by a licensed local municipal waste hauler.

3 REGULATORY REQUIREMENTS

Materials and wastes generated during the remedial action activities at the Site will be managed in accordance with the applicable local, State, and Federal regulations for each particular classification. In addition, all waste management activities will be performed in a manner that is protective of human health, safety, and the environment. A letter will be obtained for all disposal facilities under consideration certifying that EPA Region II considers the facility to be acceptable in accordance with the off-site policy established in 40 CFR 300.440.

All soils, building demolition wastes and generated wastes will be managed and transported, as required, per 49 CFR 172 requirements. All waste is subject to 40 CFR 261 (RCRA) regulations will be managed in accordance with these regulations. In particular, RCRA waste which exceeds Land ban Disposal Restrictions (LDR) per 40 CFR 268 will be treated offsite to meet LDR criteria prior to final disposal.

The anticipated offsite disposal facilies are:

Waste Type(s)

Hazardous – RCRA Waste (no treatment):

Disposal Facility: Clean Earth of New Jersey
US EPA ID Number: NJD991291105
Facility Location: 115 Jacobus Avenue, Kearny, NJ 07032
Name of Responsible Contact: Robert Fixter
Telephone Number: 973-344-4004 x 272
Unit of Measure for Costing Purposes: Ton

Hazardous – RCRA Waste (treatment):

Disposal Facility: Heritage Waste Solutions, Inc.
US EPA ID Number: IND980503890
Facility Location: 4370 W Co Rd 1275 N, Roachdale, IN 46172
Name of Responsible Contact: Dan Handsu
Telephone Number: (765) 435-3707
Unit of Measure for Costing Purposes: Ton

Hazardous – TSCA Waste:

Disposal Facility: Heritage Waste Solutions, Inc.
US EPA ID Number: IND980503890
Facility Location: 4370 W Co Rd 1275 N, Roachdale, IN 46172
Name of Responsible Contact: Dan Handsu
Telephone Number: (765) 435-3707
Unit of Measure for Costing Purposes: Ton

Hazardous – TSCA/RCRA Waste:

Disposal Facility: Heritage Waste Solutions, Inc.
US EPA ID Number: IND980503890
Facility Location: 4370 W Co Rd 1275 N, Roachdale, IN 46172
Name of Responsible Contact: Dan Handsu
Telephone Number: (765) 435-3707
Unit of Measure for Costing Purposes: Ton

Non-Hazardous - Subtitle D Material:

Disposal Facility: Beneficial Soil Solutions, Inc.
US EPA ID Number: N/A
Facility Location: Cumberland County Improvement Authority- 169 Jessses Bridge Road, Millville, NJ 08352
Name of Responsible Contact: Rick O'Brien
Telephone Number: (410) 531-3205
Unit of Measure for Costing Purposes: Ton

Non-Hazardous – Demolition Debris:

Disposal Facility: IESI Bethlehem Landfill/Progressive Waste
US EPA ID Number: N/A
Facility Location: 2335 Applebutter Road, Bethlehem, Pa 18015
Name of Responsible Contact: Jeffrey Koptya
Telephone Number: (610) 317-3200
Unit of Measure for Costing Purposes: Ton

Friable Asbestos – Contaminated Demolition Debris:

Disposal Facility: IESI Bethlehem Landfill/Progressive Waste
US EPA ID Number: N/A
Facility Location: 2335 Applebutter Road, Bethlehem, Pa 18015
Name of Responsible Contact: Jeffrey Koptya
Telephone Number: (610) 317-3200
Unit of Measure for Costing Purposes: Ton

Nonfriable Asbestos – Contaminated Demolition Debris:

Disposal Facility: IESI Bethlehem Landfill/Progressive Waste
US EPA ID Number: N/A
Facility Location: 2335 Applebutter Road, Bethlehem, Pa 18015
Name of Responsible Contact: Jeffrey Koptya
Telephone Number: (610) 317-3200
Unit of Measure for Costing Purposes: Ton

Transporter permits are included as Appendix F of this document.

3.1 CONTAMINATED EXCAVATED MATERIAL AND DEBRIS

On-Site Management Requirements

Management of site materials involves removal by mechanical means of soils and demolition debris from within the USACE-defined footprint areas of the Site. Excavated soils and demolition debris may be live loaded into transport vehicles for transport offsite (majority of material – except for TSCA or TSCA/RCRA materials) or placed in the Containment Stockpile Area prior to offsite disposal. A Site drawing showing the location of the Containment Stockpile Area is included as Figure 1 of the WM&TP.

All material management activities will be performed in accordance with applicable Local, State and Federal regulations for handling, labeling, and storage of waste materials.

Off-Site Transportation Requirements

Transportation of wastes to off-site disposal facilities may only be performed by firms that are licensed for transportation of wastes, in accordance with applicable local, State and Federal regulations. Various transportation companies, as managed by the disposal providers, will be available to manage waste for offsite disposal. A summary of the transportation route is included in Appendix C.

A properly completed waste manifest or bill-of-lading must accompany each off-site shipment of waste. Off-site transportation of wastes must also be performed in accordance with all applicable US Department of Transportation (USDOT) shipping requirements. A copy of the manifest to be utilized on the project for hazardous waste and a copy of a non-hazardous waste manifest have been provided in Appendix E.

Off-Site Disposal Requirements

Site waste will be disposed of at permitted Subtitle C (RCRA, TSCA and RCRA/TSCA hazardous) Subtitle D (non-RCRA hazardous) landfills that are currently approved under Comprehensive Environmental Response Compensation Liability Act (CERCLA) Off-site policy as included in the Off-Site Rule (OSR), set forth in the National Contingency Plan (NCP), at 40 CFR 300.440. The purpose of the OSR is to avoid having CERCLA wastes from response actions authorized or funded under CERCLA contribute to present or future environmental problems by directing these wastes to management units determined to be environmentally sound.

Other Disposal Options

The disposal options available for the various non-Subtitle C or Subtitle D wastes that may be encountered during performance of the work are presented below:

- **Trash and Rubbish** - Trash and rubbish will be hauled by a local, licensed hauler to an appropriate municipal or industrial waste facility.

- **Waters** - Options for the disposal of waters generated from within the footprint of the remedial action activities at the Site include use as a dust suppressant in stockpile areas, or treatment prior to release under permit to the site. Release of waters from the site WWTP will be managed under the Wastewater Treatment Plant Plan, submitted under separate cover for the site.

4 MATERIAL AND WASTE MANAGEMENT PROCEDURES

4.1 GENERAL

This section presents the specific guidelines and procedures that will be followed for the management of material and wastes handled during the remedial action activities at the Site. These procedures are generally applicable to the management of wastes after they have been excavated or removed. Specific procedures for material and waste excavation and/or removal are presented in the Excavation and Handling Plan, submitted under separate cover. The procedures presented in this section are based on the project goals of minimizing threats to Site workers, human health, and the environment during all material and waste handling activities. Specific procedures and guidelines for handling, staging, storing, sampling, packaging, labeling, and transporting material and waste are presented in the following sections.

4.2 MATERIAL AND WASTE HANDLING PRECAUTIONARY MEASURES

The following procedures will be implemented prior to or during remedial activities to ensure that there are no releases of material and/or waste to the environment and surrounding community, and to protect Site workers.

- Engineering controls such as water sprays will be used during activities that could potentially generate dust (i.e., excavation and loading) to prevent the spread of contaminants via wind dispersion.
- Double silt curtain barriers strung between sheet pilings will be used during water-based activities that could produce re-suspended solids to prevent further dispersion of contaminants.
- Plastic sheeting will be placed under and around containers while they are being loaded. Any material that falls onto the plastic sheeting during loading will be collected and placed in the container.

- Site workers will wear PPE appropriate for the specific task being performed, in accordance with the Accident Prevention Plan/ Site Safety and Health Plan. Spent PPE and contaminated disposable equipment and materials will be containerized and disposed of appropriately. Details of personnel PPE requirements and decontamination procedures are found in the Site-specific Health and Safety Plan, submitted under separate cover.
- Equipment used during construction activities in potentially contaminated areas will be properly decontaminated before moving through clean areas of the Site or leaving the Site. Site personnel will limit potential transfer of contaminated material from areas of higher concentration to lower concentration by performing limited surveys of equipment prior to exiting specific grid areas within the Exclusion Zone.
- A "clean road" will be established to allow material and waste hauling vehicles to operate around the site and move material to the Containment Area without coming into contact with contaminated media. This will prevent contaminated sediments from being "tracked" onto non-impacted areas of the site. Vehicles will undergo decontamination (wiping), as necessary. Details regarding decontamination are included in the Site-specific Health and Safety Plan, submitted under cover.
- Off-road haulers transporting the sediments and debris from the excavation areas to the Containment Stockpile Area will strictly follow the designated haul route and the requirements laid out in the Site Preparation Plan. All transporters of material for direct offsite disposal will follow routes specified for offsite disposal. A Traffic Control Plan containing the designated haul route has been submitted under a separate cover.

4.3 PRE-EXCAVATION SCREENING

Pre-excavation screen and analysis will be conducted in in accordance with procedures and protocols established in the Uniform Federal Policy Quality Assurance Project Plan (UFP QAPP), submitted under separate cover for the site.

4.4 MATERIAL AND WASTE HANDLING, STAGING, AND STORAGE

The procedures and guidelines that will be used for handling, staging, and storage of waste materials generated during the remedial activities at the Site are presented below.

Previously identified building debris will be removed first during initial site work. Buildings identified as asbestos-containing and/or lead-based paint containing will be managed as such. All other debris will be managed as non-asbestos containing waste. All soils from the site will be sampled and analyzed, prior to excavation wherever possible, in accordance with waste disposal facility requirements. Waste disposal characterization samples will also be obtained from all Aboveground Storage Tanks at the site.

All excavations will be completed to the depths and lateral extents specified in the Contract Drawings. If necessary, additional excavations may be completed after initial analysis is done.

As necessary, excavated or building materials which cannot be live-loaded into transport vehicles for offsite disposal at a designated disposal facility will be stockpiled (and possibly sampled) prior to disposal. A Contaminated Material Stockpile Report, per Specification Section 02120, 1.3.3, recording stockpile identification, waste-type information and stockpile history (i.e., date generated, volumes, date loaded, etc.) will be maintained by the loading supervisor. This report, along with waste characterization data to meet offsite disposal facility requirements, will be submitted for review on a weekly basis.

Materials transported for offsite disposal must not contain any free liquids and must pass the paint filter test. Site sediments are to be packaged into transport vehicles at the loading area. Each transport vehicle will be loaded with a front-end loader or a PC 300 unit. A weigh scale is located approximately ½ mile from the site in case any transport vehicles need to be weighed. Final weights of each transport vehicle as recorded by the receiving disposal facility will be recorded on the Waste Tracking Spreadsheet.

All trucks, excluding those dedicated to the excavation site(s), will remain on the "contaminant-free" haul road within the Exclusion Zone. In the unlikely event that contamination is discovered on the exterior surfaces of the truck, the vehicles will be decontaminated at the equipment decontamination facility, and inspected prior to release.

4.5 MATERIAL AND WASTE SAMPLING AND ANALYSIS

Sample analysis results for full RCRA/TSCA characterization from the initial waste characterization samples obtained will be submitted to the disposal facility along with a completed waste profile to obtain disposal approval. Ongoing waste characterization sampling of all solids will be performed. All samples will be obtained and analyzed as detailed in the site Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP), submitted under separate cover.

The waste approval profiles and approval documentation for the project materials can be found in Appendix A. Waste characterization samples, and any facility-specific periodic samples, will be collected and analyzed per the Site-specific UFP-QAPP.

4.6 MATERIAL AND WASTE PACKAGING

All material and waste scheduled for off-site transportation and disposal will be properly packaged in accordance with all applicable local, State and Federal regulations, including DOT Hazardous Materials Regulations contained in 49 CFR Parts 171 through 180. Materials scheduled for shipment will be packaged in either end dump trailers or triaxle trailer for shipment offsite. A summary spreadsheet will be maintained at the site to document waste shipments. A copy of this spreadsheet has been provided in Appendix D.

The following minimum packaging requirements apply for materials to be shipped:

Bulk Packaging

- Bulk packaging (e.g. end dump or dump trucks) must, at minimum, meet the applicable requirements contained in 49 CFR 173.24, General Requirements for Packaging and Packages.
- Bulk packaging must be covered. The top must be completely enclosed with no opening along the sides or openings in the top.
- Bulk packaging must be prepared to prevent material from leaking out or water from leaking in. Shipments containing free water will not be accepted by the disposal facility. Bulk containers must be equipped with an appropriate liner that can be folded and sealed to prevent contamination of the container itself and infiltration of water.
- Bulk packaging must be clean. It must not have any waste materials, or other material which could be mistaken for waste material, on the outer surface.
- Each bulk container which requires marking will be properly marked in accordance with 49 CFR 172 Subpart D.
- Each bulk container will have a copy of the appropriate manifest (hazardous) or Bill of Lading (non-hazardous).

4.7 MATERIAL AND WASTE TRANSPORTATION AND DISPOSAL

This section describes the procedures for transportation and disposal of material and waste during remedial activities. All materials will be managed and transported per applicable regulatory requirements as detailed in Section 3.0 of this Plan.

The proposed shipping route to the disposal facilities is included in Appendix C of this plan. A daily summary shipping locations will be provided to Sevenson by the transportation subcontractor. Based upon the present shipping schedule and material volume estimates, fifteen to twenty-five truckloads of material will be loaded daily.

Sevenson personnel and the designated onsite Transportation Coordinator will manage all aspects of transportation for disposal for all waste at the Site. This will include the scheduling, staging, directing from various Site locations, issuing of required paperwork, and performing final inspection prior to exit from the Site. The Transportation Coordinator will be onsite during loading operations. The proposed Transportation Coordinator's resume is included in Appendix B of this Plan.

The Waste Disposal Tracking Log (see Appendix D) will be maintained on site. This log, at a minimum, will contain the date shipped, truck number, estimated weight, manifest number, and any other pertinent information pertaining to a particular shipment.

4.8 WASTE MINIMIZATION

Waste minimization refers to the use of source reduction and environmentally sound recycling methods prior to disposal of wastes. Source reduction may be applied prior to the generation of waste at the site to reduce the sources of waste. Recycling of production by-products may also be applied. Waste minimization at the site will be evaluated on a case-by-case basis and applied where it is deemed sound and applicable.

5 NOTIFICATIONS, DOCUMENTATION, AND REPORTING

The following sections present the procedures to be used for notifications, documentation, and reporting activities associated with management of excavated material during the remedial activities.

5.1 NOTIFICATIONS

Notifications of material and waste management activities at the Site will be made in accordance with the requirements of applicable local, State, and Federal requirements. Additionally, daily notification of shipment activity will be communicated to the USACE onsite representative. This notification will be made by the transportation coordinator. In the unlikely event that an incident occurs during transport, the Waste Transportation Coordinator will notify the Sevenson Project Manager (or his designee), who will in turn notify the appropriate USACE representative as well as the required entities, as defined by USDOT requirements. At a minimum, this will require notification of the National Response Center at the earliest practicable moment. The type of information that must be provided includes:

- Location and name of person making report
- Name and address of carrier represented by person making the report
- Telephone number where person can be reached
- Date, time, and location of the hazardous materials incident
- Extent of injuries, if any
- Classification, proper shipping name, and quantity of hazardous materials involved
- Type of incident and nature of any hazardous materials involved
- Whether or not a continuing danger to life exists

In the event of a spill or emergency onsite, Sevenson personnel will respond as necessary. Spill response equipment will be maintained in the Health and Safety trailer under the direction of the Site Safety and Health Officer. USACE will be informed of any incident within 2 hours of occurrence. Local emergency contact for Fire, Police, Ambulance and Hospitals will be posted near the doors of each trailer onsite. Fire extinguishers and First Aid equipment will also be maintained in each personnel trailer.

Sevenson has contracted with Chemtrec to serve as the 24-hour emergency contact for all shipments from the site to the disposal facilities. The Transportation Coordinator will serve as the site contact for the project. The Emergency Contact Number is 1-800-862-8200.

5.2 DOCUMENTATION PROCEDURES

Documentation will be required for material management activities associated with the remedial activities to be performed at the Site. Material and waste characterization activities will be documented to ensure that material and waste characterization data can be easily and clearly correlated to a particular material or waste container or waste stream. Material and waste management activities will be closely documented to ensure that all materials and wastes are properly handled and disposed of.

5.2.1 DOCUMENTATION OF FIELD ACTIVITIES

Field activities, if any, that generate secondary material and waste (e.g., spent PPE and spent WWTP media) will be properly documented in order to establish the origins of such material and waste for proper disposal. The party who containerizes the material or waste is responsible for the initial documentation associated with generation of material or waste. At a minimum, the following information will be recorded when material or waste is generated and containerized:

- The date of generation;
- A description of the material or waste;
- Any pertinent observations about the material or waste;

- The approximate quantity of material or waste;
- The type of storage container used for the material or waste; and
- Where the material or waste shall be staged while awaiting characterization and disposal.

The containers and/or stockpiles used for on-site storage of material or waste will be appropriately dated and labeled to assist in proper tracking of material or waste.

5.2.2 DOCUMENTATION DURING TRANSPORTATION AND DISPOSAL

Transportation and disposal activities will be documented using the Waste Disposal Tracking Log presented in Appendix D to this plan. The information recorded on this log, when applicable, may include:

- The container identification number (truck #) for the material/waste;
- The material/waste disposal approval number;
- The quantity of the material/waste;
- The facility to which the material/waste was sent;
- The manifest number (or site ID#) for shipment off-site;
- The date the material/waste was shipped;
- The date on which it was received at the facility; and
- The date a certificate of acceptance or disposal was received from the facility (if applicable).

All waste will be shipped to the appropriate disposal facility under an approved Waste Disposal Profile for that facility. Sevenson will maintain copies of the Waste Profiles at the Site. After initial signature by USACE and approval by the disposal facility, any changes or updates to Waste Profiles will be prepared by Sevenson and submitted to USACE for review and signature

prior to submittal the disposal facility for approval/re-approval. A copy of the Waste Profiles and disposal facility approval letters are in Appendix A.

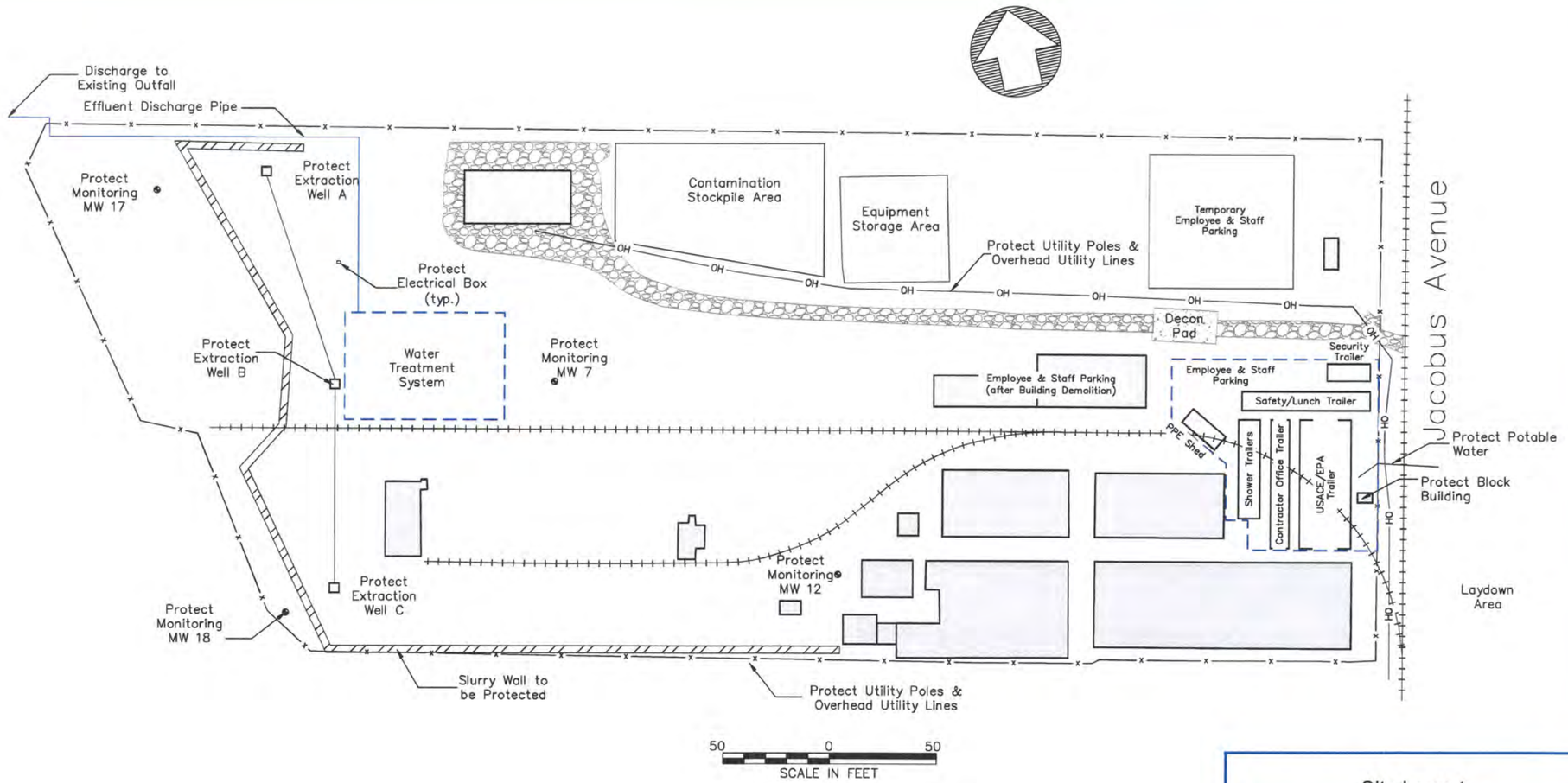
All trucks transporting the contaminated material will adhere to the designated site Haul Route that is detailed in the Traffic Control Plan. Once each truck is loaded, a manifest (or bill-of-lading) shipping form for each truck load will be generated. Copies of the signed manifest will be given to each individual truck driver.

Acceptance certifications and/or certificates of disposal will be obtained from the final disposal facility. These certificates will document that materials shipped off-site were sent to the approved and properly permitted facility. In addition, such certificates will document that the subject material or wastes were properly managed and handled at the facility, in accordance with applicable Local, State, and Federal hazardous waste management regulations.

If significant differences (> 10%) in quantities between recorded weights of material shipped versus weights of material received by the disposal facility is noted, Sevenson will prepare a Discrepancy Report for submittal to USACE. Each discrepancy shall be rectified within 15 days and a record of information regarding the discrepancy will be included in the Final Disposal Report.

Copies of returned disposal facility-signed manifests or bills-of-lading will be maintained at the Site. If a signed manifest or bill-of-lading is not received from the owner or operator of the designated disposal facility within 35 days of shipment, the generator (transportation coordinator) will contact the transporter and/or the designated disposal facility to determine the status of the waste.

At the completion of the project, copies of final site records including all waste approval profiles, waste characterization analysis, shipping logs, bills-of-lading and any correspondence regarding the shipment of waste offsite will be submitted to USACE as part of project close-out documentation.



Site Layout

Syncon Resins
Superfund Site
Operable Unit 2
South Kearny, New Jersey

SEVENSON ENVIRONMENTAL SERVICES, INC.

DRAWING

DATE:	7//16
DRAWN BY:	C. Bigelow
CHECKED BY:	A. LaGreca
CAD FILE:	Site Layout
SCALE:	As Shown

APPENDIX A

EPA Region 2 Offsite Rule Request Form, Landfill Permit Waste Profile Forms and Facility Acceptance Letter

Pending

APPENDIX B

TRANSPORTATION COORDINATOR RESUME

William Zambrana, Environmental Sampler

Education and Training: A.S., Radiation Health Physics, Central Florida College, Ocala, FL
OSHA 40 Hour HAZWOPER Training
OSHA 8 Hour HAZWOPER Refresher
Hazardous Waste Manifest Certificate
Radiation Worker I & II Certificate
Construction Quality Management for Contractors Certificate
First Aid / CPR / AED

Awards:
US Radium Superfund Site - Commander Certificate of Appreciation – Feb. 14, 2005
Federal Creosote Superfund Site - Certificate of appreciation – 500,000 Safe Man Hours – Feb. 9, 2007
Cornell-Dubilier Superfund Site - Citation of Merit Award - May 3, 2012

Years Experience: 26
Years with Sevenson: 24 years
HTRW Years Exp.: 18 Years
Radiological Years Exp.: 18 Years
USACE Years Exp.: 24 Years
EPA Years Exp.: 24 Years

Role and Responsibility:

- Collect all onsite samples and perform all field screening tests.
- Support and review through recording, processing, and tracking status of contaminated Materials.
- Maintain communications with engineering oversight to ensure proper execution of procedures, specifications, and standards.
- Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.
- Review material quantities, procedural submittals, and documentation.
- Create, update, and maintain computer log of various sampling documents.
- Formulate status reports and agenda, supply necessary logs and documentation.

Project Experience

***US Radium Superfund Site –Orange, NJ*: OU-1 Property Remediation Project (*2015 - 2016*)**
Contract Number Contract No. W912DQ-10-D-3006 T.O-0003

QC Manager/Environmental Sampler for the excavation, sampling, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Addresses the remedial action of residential property with contaminated basement, chimney, front yard, deck and backyard. The scope of work requires the excavation of over 859 cubic yards of radium

contaminated soil at concentrations greater than 5 pCi/g. Manifested soil that was transported to designated landfill facility, followed by backfilling of excavated areas with approved material. Support and review through recording, processing, and tracking status of submittals. Maintain communications with superintendent to ensure proper execution of procedures, specifications, and standards. Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.

Review material quantities, procedural submittals, and documentation. Create, update, and maintain computer log of various construction management documents. Prepare construction progress meetings. Formulate status reports and agenda, supply necessary logs and documentation, record and prepare minutes for distribution. Support project management through preparation of maintaining construction schedules. Procurement of equipment and materials. Coordination of subcontractors. Daily Safety Logs and QA/QC reports.

***Cornell Dubilier Superfund Site –South Plainfield, NJ*: OU-1 Property Remediation Project (*2012 - 2014*) Contract Contract Number W912DQ-10-D-3006 Task Order: 0002**

Operable Unit 1 addresses the remedial action of 15 residential property contaminated Yards and Streets. The scope of work requires the excavation of over 6,000 cubic yards of PCB contaminated soil at concentrations greater than 500 ppm and additional contaminated soils that exceed New Jersey's IGWSC criteria for contaminants other than PCBs. Excavated soil will be transported to designated landfill facility, followed by backfilling of excavated areas with approved material. Property restoration.

QA/QC Manager/*CQC Systems Manager/Engineer/ Environmental Sampler.*

- Support and review through recording, processing, and tracking status of submittals. Maintain communications with engineering oversight to ensure proper execution of procedures, specifications, and standards. Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.

Review material quantities, procedural submittals, and documentation. Create, update, and maintain computer log of various construction management documents. Attend construction progress meetings. Formulate status reports and agenda, supply necessary logs and documentation, record and prepare minutes for distribution. Sampled contaminated material for site characterization. Support project management through preparation of maintaining construction schedules.. Procurement of equipment and materials. Coordination of subcontractors. Daily Safety Logs and QA/QC reports.

***Cornell Dubilier Superfund Site – OU-2, Phase 1 and II South Plainfield, NJ*: , Soil Remedial (LTTD) Project (*2008 - 2012*)**
Contract Number W912DQ-04-D-00023 Task Order: 0011

Operable Unit 2 addresses the remedial action of contaminated facility site soils and buildings. The scope of work requires the excavation of over 100,000 cubic yards of PCB contaminated soil at concentrations greater than 500 ppm and additional contaminated soils that exceed New Jersey's IGWSC criteria for contaminants other than PCBs. Excavated soil will be treated by low temperature

thermal desorption (LTTD), followed by backfilling of excavated areas with treated soils. Contaminated soil and debris, including capacitors, will be transported offsite for disposal. Installation of a multi-layer cap and engineering controls. Property restoration.

QA/QC Manager/CQC Systems Manager/Engineer /Environmental Sampler.

- Support and review through recording, processing, and tracking status of submittals. Maintain communications with engineering oversight to ensure proper execution of procedures, specifications, and standards. Assist project management in duties relating to project correspondence, specifications and drawing interpretations and work history.

Review material quantities, procedural submittals, and documentation. Create, update, and maintain computer log of various construction management documents. Attend construction progress meetings. Formulate status reports and agenda, supply necessary logs and documentation, record and prepare minutes for distribution. Sampled contaminated material for site characterization. Support project management through preparation of maintaining construction schedules. Procurement of equipment and materials. Coordination of subcontractors. Daily Safety Logs and QA/QC reports.

***Cornel Dubilier superfund Site, South Plainfield, NJ*: OU-2 Remedial Action** (2006 - 2008) **Contract Number W912DQ-04-D-00023Task Order: 0005** Demolition, excavation, transportation, restoration and disposal of Lead, PCB's contaminated soil and debris from an Industrial site.

CQC Systems Manager/Engineer/Environmental Sampler

Responsibilities include: Managed fixed-price contract for the demolition of the industrial park. Work tasks include the demolition and environmental decommissioning of 18 industrial buildings, excavation, characterization, Sampling, transportation, and off-site disposal of both PCB contaminated soils and all debris generated from demolition operations; and rough grading the site upon completion of schedule work. Acquiring all permits form state and local levels. Extensive safety procedures are in place to protect the health of residents in and near the site.

***Federal Creosote Superfund Site, Lagoon A, Phase II, Manville, NJ*:** (2004 - 2006) Excavation, transportation, restoration and disposal contaminated soil and debris from residential housing.

Quality Control Manager/ Project Engineer: Responsibilities include: Managed for the excavation, characterization, transportation and disposal of 69,000 cy of creosote contaminated soils. 770 linear feet of soldier pile and lagging, and 590 lf of sheet pile installed as protective shoring for deep excavation (35' depths). Extraction well system installed to aid site dewatering and installation of O+M of portable WWTP. Odor control measures implemented with extensive site restoration.

US Radium Superfund Site Phase IV, V, VI and VII Orange NJ: (1998 - 2006) Excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Quality Control Manager/ Assistant Project Manager/ Project Manager: Responsibilities include: Job administration, coordinating site work with USACOE, monthly payment submittal, payroll, and project documentation, contract modification, scheduling, public relations. Also responsible for assuming Project Manager responsibilities when regular Project Manager is off-site.

Glen Ridge, Bloomfield Superfund Site Phase VII, VIII and IX Bloomfield NJ: (1998 - 2005) Excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Quality Control Manager/ Assistant Superintendent: Responsibilities include: Job administration, Coordinating with Superintendent on the different tasks on site, coordinating site work with USACOE, monthly payment submittal, payroll, and project documentation, contract modification, scheduling, public relations.

US Radium Superfund Site Phase III, Orange NJ: (1997 - 1999) Quality Control Manager/Project Manager for the excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Quality Control Manager: Responsibilities include: Daily reports, progress payment, payroll, submittal, project documentation, and general job administration.

Whitmoyer, PA: (1997) Hazardous material excavation and transportation of Arsenic and Aniline.

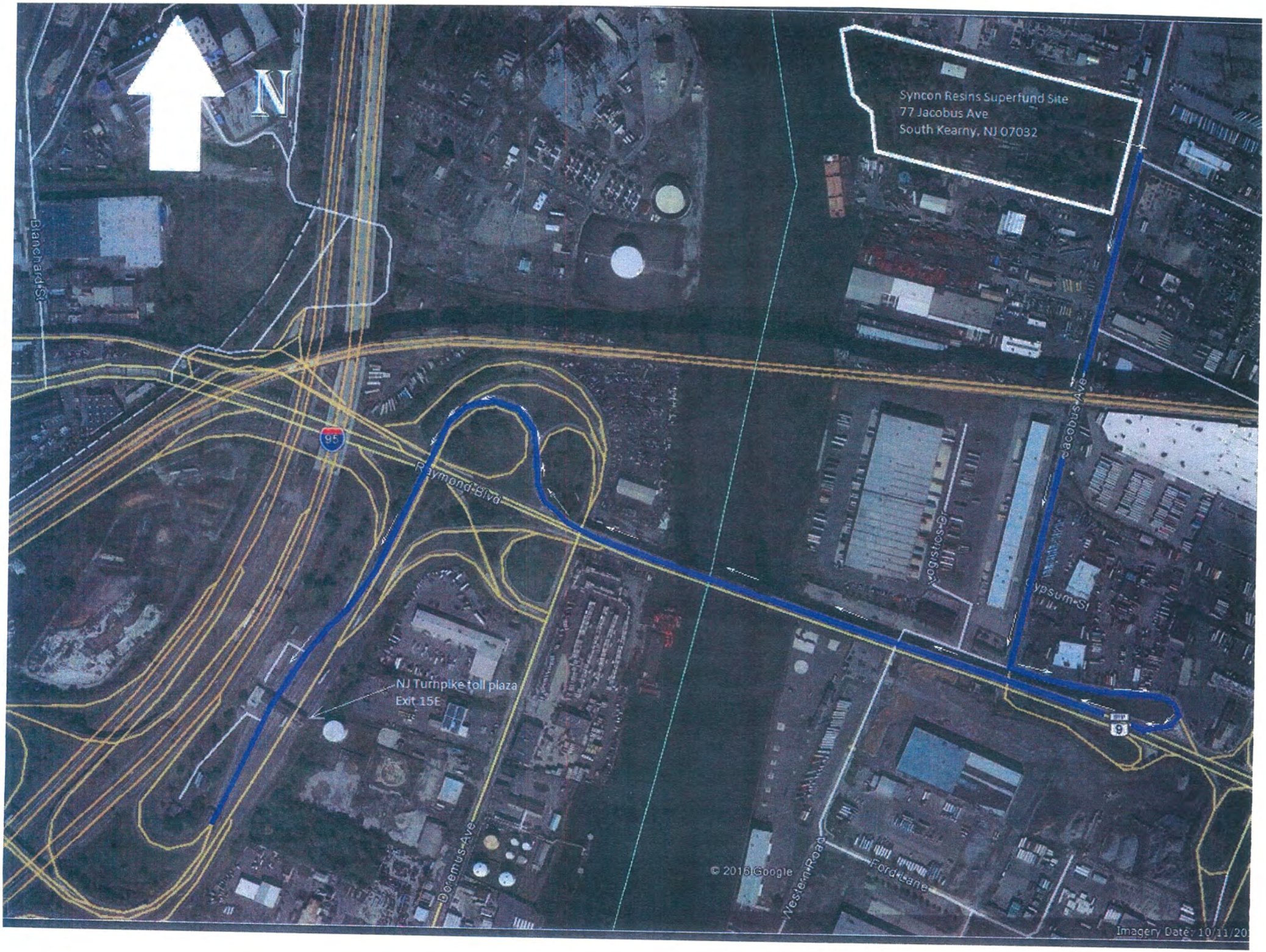
Quality Control Manager: Responsibilities include: Daily logging and placard control of the transportation of hazardous material. Level B protection.

Montclair Radium Superfund Site Phase IV/V and VI, Montclair NJ:(1994 - 1998) Excavation, transportation, restoration and disposal of low-level radium contaminated soil and debris from residential housing.

Health and Safety Officer, Radiological Safety Officer and Assistant Superintendent: Responsibilities include: Conduct initial site specific training, Develop, implement and enforce the site specific Safety and Health plan. Conduct air monitoring, radiological monitoring, Prepared, Wrote, designed and produced SSHP, CCRQC, QAPP, SAP, FSP. Site safety inspections and accident investigations, work operations, Daily reports.

Clevite, Cleveland, OH: (1995) Building decontamination and rehabilitation.

APPENDIX C
TRANSPORTER ROUTE


N
Syncon Resins Superfund Site
77 Jacobus Ave
South Kearny, NJ 07032
Blanchard St
95
Raymond Blvd
Jacobus Ave
Logistics Dr
Gypsum St
NJ Turnpike toll plaza
Exit 15E
Doremus Ave
Western Road
Ford Lane
© 2015 Google
Imagery Date: 10/11/20

APPENDIX D

MATERIAL AND WASTE DISPOSAL TRACKING LOG

Waste Tracking Log
Syncon Resins Superfund Site
Contract # W912 DQ-15-D-3002

Load No	Manifest ID #	Generation Date	Material Type	Material Source	Waste Classification Code	Waste Profile	Stockpile Area ID	Method of Shipment	Quantity	SES Est. Net Weight (Tons)	Actual Net Weight (Tons)	Transporter	Container ID	Date Shipped	Disposal Destination	Disposal Date	Certificate of Disposal No.
1																	
2																	
3																	
4																	
5																	
6																	
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Clean Earth of New Jersey

State of New Jersey
Department of Environmental Protection
Solid Waste Compliance & Enforcement
9 Ewing Street, Mail Code 09-01
P.O. Box 420
Trenton, NJ 08625-0420
(609) 292-7081

LICENSED HAZARDOUS WASTE
NJDEP Registered Transporter:

IWT TRANSPORT INC
306 RAMAPO VALLEY RD, STE 2
OAKLAND, NJ 07436

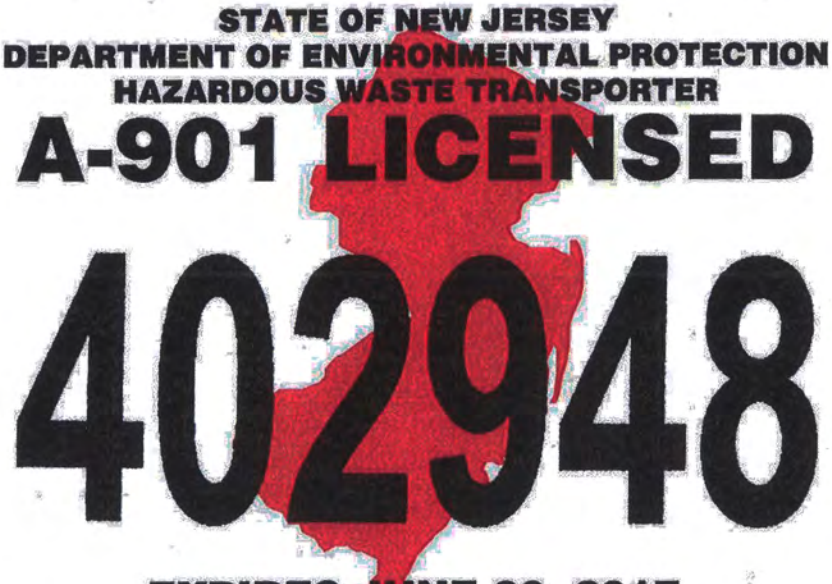
NJDEP Transporter Vehicle Registration Card

Expiration Date:	**6/30/2017**
Decal Number:	**HWL-17-402948**
Vin ID#:	**2NP3LN9X3BM124683 NJ**
License Plate #:	**AM842Y**
Vehicle Type:	**Single Unit Vehicle**
Vehicle leased?:	**Y**
If Yes, lessor's name:	**INDUSTRIAL WASTE TECHNOLOGIES INC**
NJDEP Registered Transporter:	**IWT TRANSPORT INC**
NJDEP #:	**0050277**

This card must be carried in the cab of the vehicle at all times.
This registration card & decal are valid for use only by the listed registrant.
Leased equipment can only be used to transport waste by the listed registrant.

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
HAZARDOUS WASTE TRANSPORTER

A-901 LICENSED



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EXPIRES JUNE 30, 2017

State of New Jersey
Department of Environmental Protection
Solid Waste Compliance & Enforcement
9 Ewing Street, Mail Code 09-01
P.O. Box 420
Trenton, NJ 08625-0420
(609) 292-7081

LICENSED SOLID WASTE
NJDEP Registered Transporter:

IWT TRANSPORT INC
306 RAMAPO VALLEY RD STE 2,
OAKLAND, NJ 07436

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-002777**
Vin ID#: **2NP3LN9X3BM124683** **NJ**
License Plate #: **AM842Y**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
INDUSTRIAL WASTE TECHNOLOGIES INC
NJDEP Registered Transporter:
IWT TRANSPORT INC
NJDEP #: **0034676**

This card must be carried in the cab of the vehicle at all times.
This registration card & decal are valid for use only by the listed registrant.
Leased equipment can only be used to transport waste by the listed registrant.

State of New Jersey
Department of Environmental Protection
Solid Waste Compliance & Enforcement
9 Ewing Street, Mail Code 09-01
P.O. Box 420
Trenton, NJ 08625-0420
(609) 292-7081

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-017463**
Vin ID#: **1NKDL70X1DJ366966** **NJ**
License Plate #: **AS857Z**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

LICENSED SOLID WASTE
NJDEP Registered Transporter:

AUCHTER INDUSTRIAL VAC SVS
4801 SOUTH WOOD AVE,
LINDEN, NJ 070360000

NJDEP Registered Transporter:
AUCHTER INDUSTRIAL VAC SVS
NJDEP #: **16648**

This card must be carried in the cab of the vehicle at all times.
This registration card & decal are valid for use only by the listed registrant.
Leased equipment can only be used to transport waste by the listed registrant.

#14

State of New Jersey
Department of Environmental Protection
Solid Waste Compliance & Enforcement
9 Ewing Street, Mail Code 09-01
P.O. Box 420
Trenton, NJ 08625-0420
(609) 292-7081

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **HWL-17-417130**
Vin ID#: **2NP3LJ0X3GM344080** **NJ**
License Plate #: **AS856Z**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

LICENSED HAZARDOUS WASTE
NJDEP Registered Transporter:

AUCHTER INDUSTRIAL VAC SERVICE INC
4801 S WOOD AVE,
LINDEN, NJ 07036

NJDEP Registered Transporter:
AUCHTER INDUSTRIAL VAC SERVICE INC
NJDEP #: **06993**

This card must be carried in the cab of the vehicle at all times.
This registration card & decal are valid for use only by the listed registrant.
Leased equipment can only be used to transport waste by the listed registrant.

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
HAZARDOUS WASTE TRANSPORTER

A-901 LICENSED

417130

EXPIRES JUNE 30, 2017

Heritage Waste Solutions, Inc.

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL MANAGEMENT
401 E. STATE STREET
2ND FLOOR, WEST WING
MAIL CODE 401-02C
TRENTON, NJ 08625-0420

CHRIS CHRISTIE
GOVERNOR

KIM GUADAGNO
LT. GOVERNOR

BOB MARTIN
COMMISSIONER

Heritage Waste Solutions Limited Liability Company
7903 NW Pleasant Ford Road
Weatherby Lake, MO 64152

NOV 0 8 2012

RE: **Hazardous Waste Transporter License**

Dear Applicants:

This is to advise you that the investigative report from the Attorney General required under N.J.S.A. 13:1E-126 et seq. had been received by the Department of Environmental Protection. Based on our review of the aforementioned investigative report, the Department issued a Solid Waste Transporter and Broker License on March 22, 2012 and is hereby issuing a **Hazardous Waste Transporter License** to:

HERITAGE WASTE SOLUTIONS LIMITED LIABILITY COMPANY

Please be advised that the license hereby issued is a **"conditional"** license and is modified by the terms and conditions as specified on the attached document as they have been put forth by the Attorney General's Office. Failure to meet the specified conditions will result in the revocation of this license.

This license must be renewed annually by filing the Annual License Update form and any other change of information concerning your company or its operation as required by the Department.

Any transportation equipment must be registered prior to commencing operations; and in accordance with the hazardous waste regulations, your company must undertake provisions for a training program in the safe management of hazardous waste for all employees who will handle such waste. Questions regarding equipment registration of the above license should be directed to (609) 292-7081.

Sincerely,

Deborah Pinto

Deborah Pinto, Chief
Economic Regulation & Licensing

Enclosure
c: Raghu Murthy, DAG
Suzanne Conway, NJDEP, SWUCA
Robert Gomez , NJDEP, TOU
004802

Heritage Waste Solutions Limited Liabililty Company

Condition of Hazardous Waste License:
Prohibition of Sale of License
pursuant to N.J.S.A. 13:1E-126 et seq.
N.J.A.C. 7:26-16.6 and N.J.A.C. 7:26H-1.9

Regardless of whether a licensee obtains or has obtained a certificate of public convenience and necessity, should the licensee fail to own or lease any solid waste vehicle registered with the Department capable of collecting and transporting hazardous waste from a generator, transfer station, or other source of waste to a hazardous waste facility; or have no customers, or only a nominal customer list, or reasonable substitute therefore, sale of more than 50% of the equity of the licensee shall not be consummated, and no such sale will be approved by the Department pursuant to the provisions of N.J.S.A. 13:1E-126 et seq., N.J.A.C. 7:26-16.6, N.J.S.A. 48:13A-1 et seq., and N.J.A.C. 7:26H-1.1 et seq., without the submission of administratively complete disclosure forms, with fingerprints, of all proposed new owners, directors, partners, officers or key employees, to the Attorney General, and A-901 approval of all proposed new owners, directors, partners, officers or key employees.

Condition of Hazardous Waste License:
Comply with all Federal and State
Transporting Regulation

Hazardous Waste is specifically identified and regulated by the United States Environmental Protection Agency (USEPA) by 40CFR, Part 262 and incorporated by reference into the regulations of NJDEP. Therefore, the licensee must comply with all governing State and Federal laws applicable to hazardous waste transportation in New Jersey prior to the transportation of hazardous waste and provide proof to the Department at the time of filing your registration statement with NJDEP's Licensing and Registration Unit to obtain decals. Specifically, but not limited to:

1. Obtain a USEPA Transporter Registration Number.
2. Proof of compliance with the minimum financial responsibility requirements covering public liabilities, property damage and environmental restoration set out at 49 C.F.R. Part 387 in a form approved by the Department; MCS-90
3. Proof of Hazmat Training conforming to 49 CFR 172.700 to 172.704
4. Proper registration with the U.S. Department of Transportation (USDOT) for any applicable transportation activities
5. Proof of current registration with the Pipeline Hazardous Material Safety Administration to transport hazardous material
6. If applicable, satisfactorily completion of NJ State Police - New Entrant Program, or are in good standing with NJ State Police Motor Vehicle Enforcement

Failure to comply with these conditions may result in formal enforcement actions or denial of NJDEP Transporter registration statement and decals.

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL MANAGEMENT
401 E. STATE STREET
2ND FLOOR, WEST WING
MAIL CODE 401-02C
TRENTON, NJ 08625-0420

CHRIS CHRISTIE
GOVERNOR

KIM GUADAGNO
LT. GOVERNOR

BOB MARTIN
COMMISSIONER

MAR 22 2012

John Dillow
Heritage Waste Solutions Limited Liability Company
7903 NW Pleasant Ford Road
Weatherby Lake, MO 64152

RE: **Solid Waste Transporter License**

Dear Mr. Dillow:

This is to advise you that the investigative report from the Attorney General required under N.J.S.A. 13:1E-126 et seq. has been received by the Department of Environmental Protection. Based on our review of the aforementioned investigative report, the Department is hereby issuing this **Solid Waste Transporter License to:**

HERITAGE WASTE SOLUTIONS LIMITED LIABILITY COMPANY

Please be advised that the license hereby issued is a "**conditional**" license and is modified by the terms and conditions as specified on the attached document as they have been put forth by the Attorney General's Office. Failure to meet the specified conditions will result in the revocation of this license.

This license must be renewed annually by filing the Annual License Update form and any other change of information concerning your company or its operation as required by the Department.

Please be aware that you are required to obtain a Certificate of Public Convenience and Necessity prior to commencing solid waste business operations. An application is enclosed. Questions regarding this certificate should be directed to (609) 984-2080. As you know, any transportation equipment must be registered prior to commencing operations. Questions regarding registration should be directed to (609) 292-7081.

Sincerely,

Deborah Pinto

Deborah Pinto, Chief
Economic Regulation & Licensing

Enclosure
c: Gwen Farley, DAG
Raghu Murthy, DAG
Suzanne Conway, NJDEP, SWUCA
Robert Gomez , NJDEP, TOU
#004802

Heritage Waste Solutions Limited Liability Company

Condition of Solid Waste License:
Prohibition of Sale of License
pursuant to N.J.S.A. 13:1E-126 et seq.
N.J.A.C. 7:26-16.6 and N.J.A.C. 7:26H-1.9

Regardless of whether a license obtains or has obtained a certificate of public convenience and necessity, should the licensee fail to own or lease any solid waste vehicle registered with the Department capable of collecting and transporting solid waste from a generator, transfer station, or other source of waste to a solid waste facility; or have no customers, or only a nominal customer list, or reasonable substitute therefore, sale of more than 50% of the equity of the licensee shall not be consummated, and no such sale will be approved by the Department pursuant to the provisions of N.J.S.A. 13:1E-126 et seq., N.J.A.C. 7:26-16.6, N.J.S.A. 48:13A-1 et seq., and N.J.A.C. 7:26H-1.1 et seq., without the submission of administratively complete disclosure forms, with fingerprints, of all proposed new owners, directors, partners, officers or key employees, to the Attorney General, and A-901 approval of all proposed new owners, directors, partners, officers or key employees.

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL MANAGEMENT
401 E. STATE STREET
2ND FLOOR, WEST WING
MAIL CODE 401-02C
TRENTON, NJ 08625-0420

CHRIS CHRISTIE
GOVERNOR

KIM GUADAGNO
LT. GOVERNOR

BOB MARTIN
COMMISSIONER

MAR 2 2 2012

John Dillow
Heritage Waste Solutions Limited Liability Company
7903 NW Pleasant Ford Road
Weatherby Lake, MO 64152

RE: Broker's A-901 Approval and Approved Registration Statement

Dear Mr. Dillow:

This is to advise you that the investigative report from the Attorney General required under N.J.S.A. 13:1E-126 et seq. has been received by the Department of Environmental Protection. Based on our review of the aforementioned investigative report, the Department is hereby authorizing the following to act as a solid and hazardous waste **Broker** engaged in the waste industry of New Jersey to:

HERITAGE WASTE SOLUTIONS LIMITED LIABILITY COMPANY

Please be advised that the license hereby issued is a **"conditional"** license and is modified by the terms and conditions as specified on the attached document as they have been put forth by the Attorney General's Office. Failure to meet the specified conditions will result in the revocation of this license.

This license and authority must be renewed annually by filing the Annual License Update form and any other change of information concerning your company or its operation as required by the Department.

Please be aware that you are required to obtain a Certificate of Public Convenience and Necessity prior to commencing solid waste business operations. An application is enclosed. Questions regarding this certificate should be directed to (609) 984-2080.

Sincerely,

Deborah Pinto

Deborah Pinto, Chief
Economic Regulation & Licensing

Enclosure
c: Gwen Farley, DAG
Raghu Murthy, DAG
Suzanne Conway, NJDEP, SWUCA
Robert Gomez, NJDEP, TOU
#004802

Heritage Waste Solutions Limited Liability Company

Condition of Solid Waste License:
Prohibition of Sale of License
pursuant to N.J.S.A. 13:1E-126 et seq.
N.J.A.C. 7:26-16.6 and N.J.A.C. 7:26H-1.9

Regardless of whether a license obtains or has obtained a certificate of public convenience and necessity, should the licensee fail to own or lease any solid waste vehicle registered with the Department capable of collecting and transporting solid waste from a generator, transfer station, or other source of waste to a solid waste facility; or have no customers, or only a nominal customer list, or reasonable substitute therefore, sale of more than 50% of the equity of the licensee shall not be consummated, and no such sale will be approved by the Department pursuant to the provisions of N.J.S.A. 13:1E-126 et seq., N.J.A.C. 7:26-16.6, N.J.S.A. 48:13A-1 et seq., and N.J.A.C. 7:26H-1.1 et seq., without the submission of administratively complete disclosure forms, with fingerprints, of all proposed new owners, directors, partners, officers or key employees, to the Attorney General, and A-901 approval of all proposed new owners, directors, partners, officers or key employees.

STATE OF MISSOURI

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

July 30, 2012

JOHN DILLOW
HERITAGE WASTE SOLUTIONS LLC
7903 NW PLEASANT FORD RD
WEATHERBY LAKE, MO 64152-1515

Re: Acknowledgment of ID Numbers

Dear Regulated Entity:

This is to acknowledge that you have filed a "Notification of Regulated Waste Activity" form for the site address shown below. The permanent identification numbers are shown below.

Installation Name.....	HERITAGE WASTE SOLUTIONS LLC
Site Address.....	7903 NW PLEASANT FORD RD
	WEATHERBY LAKE, MO 64152-1515
Missouri ID Number.	044620
EPA ID Number.....	MOR000544791

Because you have not registered as a hazardous waste generator, you may not use these numbers to generate and/or ship regulated quantities of hazardous waste. If you do generate and/or ship regulated quantities of hazardous waste in the future, you will need to complete an updated "Notification of Regulated Waste Activity" form as a hazardous waste generator and pay the $100 registration fee.

Should you have any questions, please contact me at (573) 751-3204. Written correspondence should be sent to the Hazardous Waste Program, P.O. Box 176, Jefferson City, MO. 65102.

Sincerely,

HAZARDOUS WASTE PROGRAM

David Green
Research Analyst
Budget Planning Section

DG:jr

Recycled Paper

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 9/9/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Encompass Risk Solutions, Inc. 2555 Kingston Road, Suite 260 York PA 17402	CONTACT NAME: Cert Dept PHONE (A/C, No, Ext): 717-600-0886 FAX (A/C, No): 717-600-0887 E-MAIL ADDRESS: certs@encompassrisk.com
INSURED HORWTRU-01 Horwith Trucks Inc, LV Company Inc, Penn Truck Leasing, Inc. PO BOX 7, Route 329 Northampton PA 18067	INSURER(S) AFFORDING COVERAGE / NAIC # INSURER A : Burlington Insurance Co 23620 INSURER B : Ace American Insurance Company 22667 INSURER C : Gemini Insurance Company 10833 INSURER D : Hallmark Insurance Co. 34037 INSURER E : Chubb Insurance Company INSURER F : Commerce & Industry Insurance Co 19410

COVERAGES **CERTIFICATE NUMBER:** 230275840 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY [ ] PRO-JECT [ ] LOC OTHER:	Y	Y	887BW33822	12/1/2015	12/1/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG $	$1,000,000 $100,000 $0 $1,000,000 $2,000,000 $2,000,000
B	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS / SCHEDULED AUTOS HIRED AUTOS / NON-OWNED AUTOS X MCS-90 X CA9948 Endt	Y	Y	MCCH0845825A 002	12/1/2015	12/1/2016	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$1,000,000 $ $ $ $
C D	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $			GVE100141101 77HX1533FB	12/1/2015 12/1/2015	12/1/2016 12/1/2016	EACH OCCURRENCE AGGREGATE $	$9,000,000 $9,000,000
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A					PER STATUTE / OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $
E F	Motor Truck Cargo Pollution Legal Liab			6704087 PLS13824486	12/1/2015 12/1/2015	12/1/2016 12/1/2018	$250,000 Limit $5,000,000 Limit	$5,000 Ded $15,000 Ded

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Physical Damage - Lloyds P#1525AP01668820160001 Effective 5/22/2016-17 - Deductibles are $5,000 Comp and $5,000 Collision. Includes Trailer Interchange $50,000 limit, $1,000 deductible

Certificate holder is included as additional insured and waiver of subrogation applies under the Auto Liability, General Liability & Umbrella policies as required by written contract.

CERTIFICATE HOLDER

Sevenson Envrironmental Services Inc.
2749 Lockport Road
Niagara Falls NY 14305

CANCELLATION 30 Days Notice of Cancellation

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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The ACORD name and logo are registered marks of ACORD

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 9/9/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Encompass Risk Solutions, Inc.
2555 Kingston Road, Ste 260
York PA 17402

CONTACT NAME: Cert Dept
PHONE (A/C, No, Ext): 717-600-0886 FAX (A/C, No): 717-600-0887
E-MAIL ADDRESS: certs@encompassrisk.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : PETRO Trust / Safety National	15105
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
HORWTRU-01
Penn Truck Leasing Inc.
a division of Horwith Trucks Inc.
PO BOX 7, Route 329
Northampton PA 18067

COVERAGES **CERTIFICATE NUMBER:** 1838546687 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY							
	☐ CLAIMS-MADE ☐ OCCUR						EACH OCCURRENCE	$
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						MED EXP (Any one person)	$
	☐ POLICY ☐ PRO-JECT ☐ LOC						PERSONAL & ADV INJURY	$
	OTHER:						GENERAL AGGREGATE	$
							PRODUCTS - COMP/OP AGG	$
								$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	☐ UMBRELLA LIAB ☐ OCCUR						EACH OCCURRENCE	$
	☐ EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N			SP4054098	1/1/2016	1/1/2017	X PER STATUTE ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ N/A (Mandatory in NH)						E.L. EACH ACCIDENT	$1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$1,000,000
							E.L. DISEASE - POLICY LIMIT	$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

The Pennsylvnaia Elite Transportation Risk Organization (PETRO Trust) is a self-insurer, approved by the Commonwealth of Pennsylvania Department of Labor & Industry (Bureau Code 5514).

CERTIFICATE HOLDER

Sevenson Envrironmental Services Inc.
2749 Lockport Road
Niagara Falls NY 14305

CANCELLATION 30 Days Notice of Cancellation

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

© 1988-2014 ACORD CORPORATION. All rights reserved.

The ACORD name and logo are registered marks of ACORD

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 9/9/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Encompass Risk Solutions, Inc.
2555 Kingston Road, Suite 260
York PA 17402

CONTACT NAME: Cert Dept
PHONE (A/C, No, Ext): 717-600-0886 FAX (A/C, No): 717-600-0887
E-MAIL ADDRESS: certs@encompassrisk.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Burlington Insurance Co	23620
INSURER B : Ace American Insurance Company	22667
INSURER C : Gemini Insurance Company	10833
INSURER D : Hallmark Insurance Co.	34037
INSURER E : Chubb Insurance Company	
INSURER F : Commerce & Industry Insurance Co	19410

INSURED HORWTRU-01
Horwith Trucks Inc, LV Company Inc, Penn Truck Leasing, Inc.
PO BOX 7, Route 329
Northampton PA 18067

COVERAGES **CERTIFICATE NUMBER:** 1899709183 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY [ ] PRO-JECT [ ] LOC OTHER:	Y		887BW33822	12/1/2015	12/1/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG $	$1,000,000 $100,000 $0 $1,000,000 $2,000,000 $2,000,000 $
B	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS / SCHEDULED AUTOS HIRED AUTOS / NON-OWNED AUTOS X MCS-90 X CA9948 Endt	Y		MCCH0845825A 002	12/1/2015	12/1/2016	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$1,000,000 $ $ $ $
C D	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $			GVE100141101 77HX1533FB	12/1/2015 12/1/2015	12/1/2016 12/1/2016	EACH OCCURRENCE AGGREGATE $	$9,000,000 $9,000,000 $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: N N/A If yes, describe under DESCRIPTION OF OPERATIONS below						PER STATUTE / OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ $ $
E F	Motor Truck Cargo Pollution Legal Liab			6704087 PLS13824486	12/1/2015 12/1/2015	12/1/2016 12/1/2018	$250,000 Limit $5,000,000 Limit	$5,000 Ded $15,000 Ded

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Physical Damage - Lloyds P#1525AP01668820160001 Effective 5/22/2016-17 - Deductibles are $5,000 Comp and $5,000 Collision. Includes Trailer Interchange $50,000 limit, $1,000 deductible

Certificate holder is included as additional insured under the Auto Liability, General Liability & Umbrella policies as required by written contract.

CERTIFICATE HOLDER

United States Army Corps of Engineers
Kansas City District
601 East 12th Street
Kansas City MO 64106

CANCELLATION 30 Days Notice of Cancellation

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 9/9/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Encompass Risk Solutions, Inc. 2555 Kingston Road, Ste 260 York PA 17402	CONTACT NAME: Cert Dept PHONE (A/C, No, Ext): 717-600-0886 FAX (A/C, No): 717-600-0887 E-MAIL ADDRESS: certs@encompassrisk.com
	INSURER(S) AFFORDING COVERAGE — NAIC #
INSURED HORWTRU-01 Penn Truck Leasing Inc. a division of Horwith Trucks Inc. PO BOX 7, Route 329 Northampton PA 18067	INSURER A : PETRO Trust / Safety National — 15105 INSURER B : INSURER C : INSURER D : INSURER E : INSURER F :

COVERAGES **CERTIFICATE NUMBER:** 1500091647 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ CLAIMS-MADE ☐ OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$
	☐ POLICY ☐ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG	$
	☐ OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	☐ UMBRELLA LIAB ☐ OCCUR						EACH OCCURRENCE	$
	☐ EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N ☐ N/A (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below			SP4054098	1/1/2016	1/1/2017	X PER STATUTE ☐ OTH-ER	
							E.L. EACH ACCIDENT	$1,000,000
							E.L. DISEASE - EA EMPLOYEE	$1,000,000
							E.L. DISEASE - POLICY LIMIT	$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

The Pennsylvnaia Elite Transportation Risk Organization (PETRO Trust) is a self-insurer, approved by the Commonwealth of Pennsylvania Department of Labor & Industry (Bureau Code 5514).

CERTIFICATE HOLDER

United States Army Corps of Engineers
Kansas City District
601 East 12th Street
Kansas City MO 64106

CANCELLATION 30 Days Notice of Cancellation

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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Beneficial Soil Solutions, Inc.

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Department of Environmental Protection
Solid Waste Compliance & Enforcement
9 Ewing Street, Mail Code 09-01
P.O. Box 420
Trenton, NJ 08625-0420
(609) 292-7081

LICENSED SOLID WASTE
NJDEP Registered Transporter:

J&D TRUCKING INC
3526 NW BLVD,
VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001378**
Vin ID#: **1NKDXUEX37J180569** **NJ**
License Plate #: **AK580T**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
MDM CONTRACTING LLC
NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

This card must be carried in the cab of the vehicle at all times.
This registration card & decal are valid for use only by the listed registrant.
Leased equipment can only be used to transport waste by the listed registrant.

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3526 NW BLVD,
VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-015702**
Vin ID#: **1NKZXPTX1GJ483294 NJ**
License Plate #: **AS381R**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-015703**
Vin ID#: **1NKZXPTX3GJ483295 NJ**
License Plate #: **AS382R**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001358**
Vin ID#: **1NKDX4EX0AJ270544 NJ**
License Plate #: **AM469H**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-003008**
Vin ID#: **1NKDX4TX9FJ472616 NJ**
License Plate #: **AJ137N**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001363**
Vin ID#: **1NKDX4EX6AJ270547 NJ**
License Plate #: **AM119B**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001382**
Vin ID#: **1NKDX4TX4CJ313255 NJ**
License Plate #: **AN570X**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-016994**
Vin ID#: **1NKZXPTX1GJ115648 NJ**
License Plate #: **AS337X**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-016995**
Vin ID#: **1NKZX4TX8GJ116469 NJ**
License Plate #: **AS338X**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001357**
Vin ID#: **1NKDX4EX2AJ270545 NJ**
License Plate #: **AM740D**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001383**
Vin ID#: **1NKKDX4TX6CJ31325** **NJ**
License Plate #: **AN569X**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-016996**
Vin ID#: **1NKZX4TX4GJ116470** **NJ**
License Plate #: **AS339X**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

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J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001380**
Vin ID#: **1NKWX4EX68J228401** **NJ**
License Plate #: **AN409B**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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LICENSED SOLID WASTE
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VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001381**
Vin ID#: **1NP5XBTX13N589470** **NJ**
License Plate #: **AJ504T**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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LICENSED SOLID WASTE
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J&D TRUCKING INC
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VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001364**
Vin ID#: **1NKDX4EX8AJ270548** **NJ**
License Plate #: **AJ201D**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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LICENSED SOLID WASTE
NJDEP Registered Transporter:

J&D TRUCKING INC
3526 NW BLVD,
VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001372**
Vin ID#: **4V5KC9GH57N483322** **NJ**
License Plate #: **AS340X**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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LICENSED SOLID WASTE
NJDEP Registered Transporter:

J&D TRUCKING INC
3526 NW BLVD,
VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001365**
Vin ID#: **1NKDX4EX9AJ265178 NJ**
License Plate #: **AP303S**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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LICENSED SOLID WASTE
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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-005105**
Vin ID#: **1NKZXPTX6FJ423445 NJ**
License Plate #: **AS675M**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001366**
Vin ID#: **1NKDX4EX0AJ265179 NJ**
License Plate #: **AN353U**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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(609) 292-7081

LICENSED SOLID WASTE
NJDEP Registered Transporter:

J&D TRUCKING INC
3526 NW BLVD,
VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001373**
Vin ID#: **4V5KC9GH27N483309** **NJ**
License Plate #: **AS341X**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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LICENSED SOLID WASTE
NJDEP Registered Transporter:

J&D TRUCKING INC
3526 NW BLVD,
VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001367**
Vin ID#: **1NP5LBTX97N634639** **NJ**
License Plate #: **AL487L**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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LICENSED SOLID WASTE
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J&D TRUCKING INC
3526 NW BLVD,
VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001377**
Vin ID#: **4V5KC9GH17N483317** **NJ**
License Plate #: **AS342X**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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3526 NW BLVD,
VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-005106**
Vin ID#: **1NKZXPT8FJ423446** **NJ**
License Plate #: **AS676M**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-005107**
Vin ID#: **1NKDX4TX4GJ474789** **NJ**
License Plate #: **AS677M**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-005108**
Vin ID#: **1NKDX4TX0GJ474790** **NJ**
License Plate #: **AS678M**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **N**
If Yes, lessor's name:

NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001379**
Vin ID#: **INKWXBTX6VJ833444 NJ**
License Plate #: **AF960R**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
DAVID CUCINOTTA INC
NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001394**
Vin ID#: **1NPXX4EX6FD268780** **NJ**
License Plate #: **AS864B**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
COSTA HAULERS LLC
NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001391**
Vin ID#: **1M2AG10C53M003209** **NJ**
License Plate #: **AN780W**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
COSTA HAULERS LLC
NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001392**
Vin ID#: **1NKDX4TX1EJ411730** **NJ**
License Plate #: **AP215Z**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
COSTA HAULERS LLC
NJDEP Registered Transporter:
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NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001393**
Vin ID#: **3ALMGNDV6EDFZ2638 NJ**
License Plate #: **AR528H**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
AIT EXPRESS LLCL
NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001396**
Vin ID#: **1NPXX4EX8FD274922 PA**
License Plate #: **AG34717**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
AIT EXPRESS LLCL
NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001385**
Vin ID#: **1NP5LU0X56D888353 NJ**
License Plate #: **AP579U**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
AIT EXPRESS LLCL
NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-005745**
Vin ID#: **1NPXX4EXXFD274923 PA**
License Plate #: **AG36041**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
J&D TRUCKING INC
NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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VINELAND, NJ 08360

NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001386**
Vin ID#: **1NPWX4E7DD178790** **NJ**
License Plate #: **AP736X**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
MERT TRUCKING INC
NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001362**
Vin ID#: **1NPXLBEX88N737588** **NJ**
License Plate #: **AR524B**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
MERT TRUCKING INC
NJDEP Registered Transporter:
J&D TRUCKING INC
NJDEP #: **20936**

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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001361**
Vin ID#: **1M2P270C8YM048261** **NJ**
License Plate #: **AM415P**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
MERT TRUCKING INC
NJDEP Registered Transporter:
J&D TRUCKING INC
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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001360**
Vin ID#: **1NP5XBTX85N850144** **NJ**
License Plate #: **AK488C**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
MERT TRUCKING INC
NJDEP Registered Transporter:
J&D TRUCKING INC
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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001359**
Vin ID#: **1NKDXBEX27J144747** **NJ**
License Plate #: **AK807E**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
MERT TRUCKING INC
NJDEP Registered Transporter:
J&D TRUCKING INC
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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001389**
Vin ID#: **1NPALU0X77N669095** **NJ**
License Plate #: **AK510J**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
YIGITER LLC
NJDEP Registered Transporter:
J&D TRUCKING INC
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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001390**
Vin ID#: **1NP5LBEX96N637570** **NJ**
License Plate #: **AN590Z**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
YIGITER LLC
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Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001395**
Vin ID#: **1NPXX4EX8FD254198 NJ**
License Plate #: **AR938F**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
YIGITER LLC
NJDEP Registered Transporter:
J&D TRUCKING INC
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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001387**
Vin ID#: **1NP5LU0X36D888352 NJ**
License Plate #: **AJ228S**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
YIGITER LLC
NJDEP Registered Transporter:
J&D TRUCKING INC
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NJDEP Transporter Vehicle Registration Card

Expiration Date: **6/30/2017**
Decal Number: **SWL-17-001388**
Vin ID#: **1NP5XBEX86N884857 NJ**
License Plate #: **AN373L**
Vehicle Type: **Single Unit Vehicle**
Vehicle leased?: **Y**
If Yes, lessor's name:
YIGITER LLC
NJDEP Registered Transporter:
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IESI Bethlehem Landfill/Progressive Waste

STATE OF NEW JERSEY
BUSINESS REGISTRATION CERTIFICATE

Taxpayer Name:	REBCO CONTRACTING CORPORATION
Trade Name:	
Address:	541 STUYVESANT LYNDHURST, NJ 07071-2627
Certificate Number:	1154937
Effective Date:	June 01, 2005
Date of Issuance:	May 03, 2016

For Office Use Only:

20160503114540396

OP ID: SLC

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 09/09/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER LCIA INC PO BOX 447 KEARNY, NJ 07032 Gus Campisano	CONTACT NAME: Gus Campisano PHONE (A/C, No, Ext): 201-997-0060 FAX (A/C, No): 201-997-3378 E-MAIL ADDRESS: gus@lciains.com PRODUCER CUSTOMER ID #: REBCO-1
INSURED Rebco Contracting Corp. Po Box 4238 Clifton, NJ 07012	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A : James River Insurance Company — 12203 INSURER B : Plaza Insurance Company — 30945 INSURER C : Hallmark Specialty Insurance — 26808 INSURER D : Old Republic Specialty Ins — 12262 INSURER E : Liberty Surplus Insurance Corp — 10725 INSURER F : Scottsdale Ins Co — 41297

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS		
A	GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR X Contractual Liab. X Primary GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT LOC	X	X	000510374	12/01/2015	12/01/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ $ $ $ $ $	1,000,000 100,000 5,000 1,000,000 2,000,000 2,000,000
B	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS	X	X	PALGMI000080-03 MCS 90 FORM ENDORSED CA9948 FORM ENDORSED	12/01/2015	12/01/2016	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (PER ACCIDENT) 1,000 1,000	$ $ $ $ $ $	1,000,000 Comp Ded Coll Ded
C	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DEDUCTIBLE RETENTION $	X	X	77HX153416	12/01/2015	12/01/2016	EACH OCCURRENCE AGGREGATE See limits	$ $ $ $	5,000,000 5,000,000 additional attached
D	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		201601-07-80-69-2 ALL STATES COVERAGE INCL.	06/16/2016	06/16/2017	X WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ $ $	 1,000,000 1,000,000 1,000,000
E	Pollution Liab BLANKET ADDITIONAL			TIENY104626116 INSURED ENDORSEMENT INCL.	06/12/2015	06/12/2017	Aggregate Each Occ.		20,000,000 10,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

United States Army Corps of Engineers & Sevenson Environmental Services, Inc., the project's Owner & Engineer, their respective subsidiaries & affiliated companies are named as additional insured on a primary & non-contributory basis the GL, Auto, & Excess policies. Waiver of subrogation applies. A 30 day written notice of cancellation applies.

CERTIFICATE HOLDER

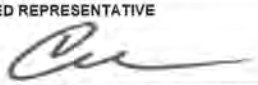
USARMYY

United States Army Corps
of Engineers
Kansas City District
601 East 12th Street
Kansas City, MO 64106

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE



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Syncon Resins
Superfund Site

Wastewater Treatment Plant
O & M Manual

January 2017
Revision 2

Sevenson Environmental Services, Inc.

Sevenson
Environmental
Services, Inc.

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CHAPTER 1—INTRODUCTION

The Syncon Resins wastewater treatment plant described in this manual is a temporary plant designed to treat anticipated contaminants from excavation sumps and other contact waters. The existing wastewater treatment plant is not the subject of this manual.

The influent flow to the treatment plant will be pumped from sumps located at the low spots of active excavation pads. As such these sumps will move as excavations are completed and others started. The influent will be pumped using electric submersible pumps placed in each sump and moved as necessary.

The contaminants of concern, identified in past studies, are:

- Volatile organic compounds (VOCs), particularly toluene
- Low levels of semi-volatile organic compounds (SVOCs), particularly naphthalene and phenols
- Low levels of pesticides, and
- Iron

Because of the nature of the project, and significant variation in the characteristics of the bottom material, considerable flexibility and conservatism is required in the design of the wastewater treatment system. The process flow train, shown in Figure 1, provides for variation in flow and pollutant concentrations within a certain range as specified below.

Process Flow Data

Table 1 contains the process flow data used in the selection and sizing of the wastewater treatment plant for Syncon Resins process. These values were used to size the unit processes to be employed on-site.

In the event that these pollutant concentrations are significantly different from those shown, additional processes or chemicals may be required to meet the prescribed limits discussed in the next section.

Basis Of Design

Table 2 in the next chapter contains effluent discharge criteria data for the key constituents of concern that serve as the basis of design for the Syncon Resins facilities.

These constituents are the basis for selecting the treatment process flow train. The process flow train or chemicals used may be modified in the event that the contaminant concentrations vary over the project life.

Toluene. While VOCs are present in the incoming groundwater, toluene in particular is at high concentrations. While most VOCs including toluene are effectively removed from liquid by air stripping, the stripped VOCs must be captured prior to discharge of the air to the environment. This is usually accomplished with vapor-phase activated carbon.

Sevenson opted to remove the toluene and other VOCs from the liquid phase rather than the vapor phase due to the additional cost of vapor-phase carbon and the permitting time and effort required for an air permit. The VOCs will be partially removed by passing the water through an organoclay process, with the remainder removed by granular activated carbon (GAC) vessels.

Iron. Iron been identified as a constituent of concern. Iron is generally found in two forms: ferrous iron (Fe^{+2}) and ferric iron (Fe^{+3}). The soluble ferrous form of iron is often the form found in sediments, and not effectively removed by settling, as is the ferric-iron form. It must first be oxidized using an oxidizing agent. In the case of Syncon Resins, Sevenson will use a 12.5% solution of sodium hypochlorite to achieve rapid oxidation of ferrous iron to ferric iron. The accompanying increase in pH will precipitate ferric hydroxide from the solution.

Table 1: Wastewater Influent Characteristics

INFLUENT CHARACTERISTICS--WATER	DESIGN	COMMENTS / ASSUMPTIONS
WASTEWATER FLOW, GPM	200	
, GPD MAXIMUM	120,000	10-Hr Operation; 5 Days/week;
WASTEWATER FLOW, GPM	150	
, GPD AVERAGE	90,000	10-Hr Operation; 5 Days/week;
TOTAL SUSPENDED SOLIDS		
, m g/L	50	Estimate
, LBS/DAY	38	@ Avg Day
TOTAL IRON		
, mg/L	61.0	From Spec Average
, LBS/DAY	45.8	@ Avg Day
TOTAL VOLATILE ORGANICS		
, mg/L	67.0	From Spec Average
, LBS/DAY	50.3	@ Avg Day
TOTAL NONVOLATILE ORGANICS		
, mg/L	0.90	From Spec Average
, LBS/DAY	0.68	@ Avg Day

Total Suspended Solids. Another area of special concern is removal of suspended solids, particularly those generated by oxidation of ferrous iron with sodium hypochlorite. Sevenson is first employing settling to remove incoming solids and oil, first using two-20,000-gallon frac tanks and following with an oil-water separator.

Oxidized iron solids will be removed in a single 18,000-gallon weir tank. Polymer will be added to enhance settling of the solids in the weir tank.

Following the weir tank, the flow will be pumped to the Greensand filters, the Organoclay filter and GAC vessels to remove additional solids remaining from the weir tank, and to remove VOCs and SVOCs before discharge to the Passaic River.

Treatment Process Description

Figure 1 shows the process flow diagram for the Syncon Resins Water Treatment Plant. Figure 2 shows the site plan for the plant.

As indicated previously, water from excavation sumps and other contact waters will be pumped to two weir tanks where settleable solids will be removed and floating oil removed. Sodium hypochlorite will be injected prior to these tanks to maximize the oxidation time and settling of ferric solids.

The flow will continue by gravity an oil-water separator to remove free product that may be present prior to downstream treatment.

Effluent from the oil-water separator is discharged by gravity to a pump tank. The Settling Tank feed pump will pump the flow to the Settling Tank. Polymer will be added and mixed in-line with a static mixer to sweep any remaining solids into a settleable floc for removal in the Settling Tank. The Settling Tank has a wet well from which the filter feed pump will pump the flow to the three Greensand filter units for iron oxidation and removal.

The precise polymer selection and dosage will be determined once water is generated at the site. Jar testing will be performed on water entering the Settling Tank during startup. This jar testing will be an integral part of continuing operations, as changes in the nature of the incoming water may dictate changes to polymer dosage and even polymer type. These jar tests will be conducted several times per operating shift to ensure optimal solids removal in the Settling Tank.

Additional sodium hypochlorite will be added as necessary prior to the Greensand units. Flow will continue under pressure to ta single Organoclay vessel that will serve as a toluene-removal step (as well as other organics) ahead of the GAC vessels. Organoclay is expected to remove 30-40% of the incoming organics depending upon the makeup of the organics. This lengthens the life of the GAC media.

Flow from the Organoclay Vessel continues under pressure to the two GAC units and then to the Effluent/Backwash Storage tank, a 20,000-gallon tank. Prior to the Effluent/Backwash Storage Tank, sulfuric acid may be injected into the flow to reduce the pH as necessary to the required pH range of 6.0—9.0.

From the Effluent/Backwash Storage Tank, the flow is measured and pumped to the effluent discharge point in the Passaic River. Backwashing capability is provided for the Greensand filters, Organoclay unit and GAC units.

Piping and Instrumentation

The piping and instrumentation diagram (P&ID) is shown in Figure 6 in Chapter 4. Three-inch pipe will be used on all main process runs to maintain high pipeline velocities to prevent solids settling in the lines. SDR17 HDPE pipe will be used.

The plant will be continuously staffed while processing water, this minimizing the need for extensive instrumentation.

A more detailed description of the treatment processes and their operation and maintenance is found in Chapter 3.

Site Health and Safety

Preserving the health and safety of plant personnel and plant assets are critical elements of daily operation. While the proper safety measures and equipment have been provided, it is important to recognize that potential hazards remain, among them:

- The potentially hazardous nature of the sediment and water
- Heavy construction equipment operation
- Pinch, slip, and crush hazards
- Corrosive chemicals in use

Sevenson has prepared a Site-Specific Health and Safety Plan (HASP) to address these and other hazards that may be present on site. All operations staff will read and heed the elements of the HASP. In addition, a safety officer will be assigned to the site. Tailgate safety meetings will be conducted at the beginning of each operating shift.

Figure 1: Syncon Resins Superfund Site Treatment Process Flow Diagram

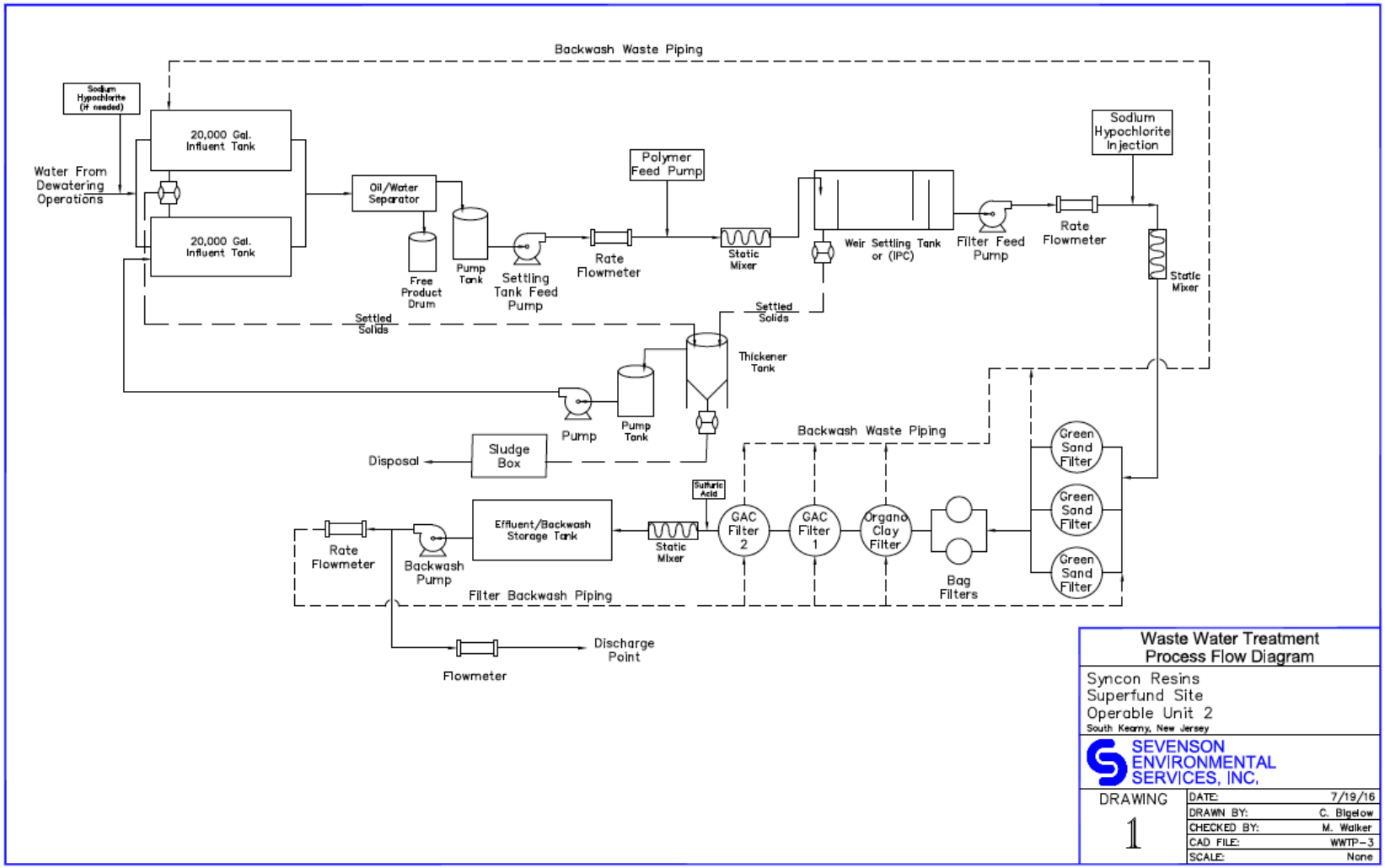
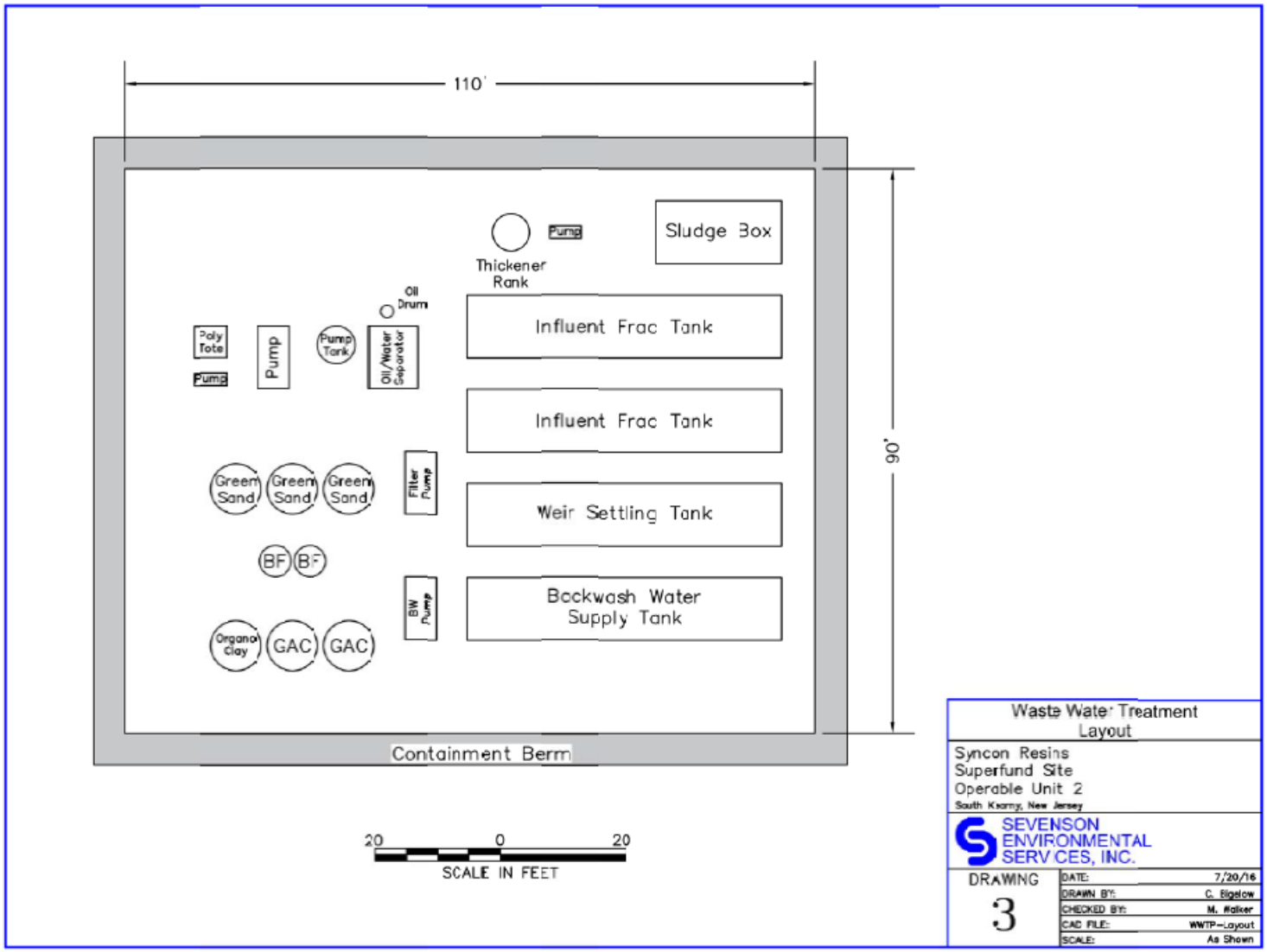


Figure 2: Syncon Resins Superfund Site Water Treatment Site Plan



CHAPTER 2—PERMITS AND SAMPLING

Sevenson will obtain the necessary Treatment Works Approval (TWA) permit application to the State of New Jersey Department of Environmental Protection. No discharge will take place prior to approval of the TWA application.

The TWA will incorporate the New Jersey Pollution Discharge Elimination Standards (NJPDES) NJDEP Effluent Standards for Site Remediation Projects, NJAC 7:14A-12, Appendix B of March, 1999, outlined in Table 13330-1 of the Contract Specifications, and as summarized in Table 2 in this chapter.

USEPA is currently in the process of obtaining the NJPDES/DSW permit equivalent. Once this permit equivalent is received, it is possible that the sampling parameters shown in Table 2 and frequency requirements will be revised.

Sampling Program

Treated water from the Syncon Resins Superfund Site shall be discharged to the Passaic River. Table 2 contains the effluent discharge criteria for the constituents of concern. All contaminants shown in Table 2 will be sampled as follows:

- Daily at startup
- Weekly once the process has been established.

Once the NJPDES/DSW permit equivalent is received, these frequencies may change.

Also, more frequent sampling may also be required if the plant experiences a process upset.

Reporting System

The NJPDES requires that monthly Discharge Monitoring Reports (DMRs) be transmitted to the designated representative of NJDEP showing. These reports will also be submitted to USACE through RMS/QCS when prepared and transmitted.

The legal requirement for reporting spills, plant breakdowns, bypasses, power failures, or other serious process interruptions means that all such incidents will be promptly reported to Sevenson's Site Superintendent or the Project Site Office number. The Spill Control Plan should be consulted and used to report any spills. They will also be reported immediately to the Sevenson Site Project Manager.

Table 2: Effluent Values (NJPDES Discharge Criteria) for Site Remediation Projects

Parameter	Average Monthly Value	Daily Maximum Value
Total Suspended Solids (TSS), mg/L	30	40
Total Organic Carbon (TOC), mg/L	30	45
Oil and Grease, mg/L	10	15
pH, units	6.0—9.0	6.0—9.0
Volatile Organic Compounds		
Benzene, ug/L	37	136
Chlorobenzene, ug/L	15	28
Ethylbenzene, ug/L	32	108
Toluene, ug/L	26	80
Semi-Volatile Compounds		
2,4 Dimethylphenol, ug/L	18	36
Naphthalene, ug/L	22	59
Phenol, ug/L	15	26
Pesticides		
4,4'-DDD, ug/L	NC[1]	0.04
Alpha-BHC, ug/L	NC[1]	0.02
Endrin, ug/L	NC[1]	0.04
Inorganics		
Iron, ug/L	1,000	2,000

[1] NC—No criteria

CHAPTER 3—OPERATION OF TREATMENT FACILITIES

Process Flows

All flows from the dewatering operations will drain by gravity to a sump located at the lowest point on the pad. In addition, any rainfall collected within the containment area will be collected and pumped to the plant. Filter logs will be used to retain as many solids as possible on the pad.

The Design Specification (Section 02111) require that the plant operate up to 24 hours per day as necessary to maintain acceptable groundwater elevations (2 feet below the excavation depth), and to handle rainfall on the pad. This requirement will be met when necessary. However, most of the time it is expected that the plant will be operated intermittently as needed. The average plant operation time is 10 hours per day.

Overall Process Goals

The water entering the treatment facilities will first pass through two 20-000-gallon Equalization Tanks where most solids will be retained. The incoming flows are expected to range from 150 to 200 gpm from the site. The equalization operation is expected to reduce peak flow rates, so that flow to the plant is expected to be 100-150 gpm.

It is anticipated that sodium hypochlorite will be added ahead of the Equalization Tanks to allow sufficient reaction time to oxidize ferrous iron to ferric iron that will allow for at least partial settling in the Equalization Tanks. The effluent from the Equalization Tanks will be pumped to the Oil-Water Separator where most free product will be removed.

Flow will be pumped to the Weir Settling Tank for additional settling and removal of iron solids. Polymer will be added in line and mixed prior to the Weir Settling Tank to maximize removal of iron and other solids.

Polymer jar testing should be performed on a daily basis to ensure that the influent suspended solids and iron solids are readily flocculated and removed in the Weir Settling Tank. Following the Weir Settling Tank, flow is pumped to the Greensand Plus Filters, designed to further remove iron solids. Additional sodium hypochlorite will be added as necessary to oxidize iron and re-generate the media.

The Greensand Filter effluent continues under pressure to Bag Filters for further iron and solids removal. Solids removal is important to optimize subsequent organics removal. Flow continues under pressure to the Organoclay Vessels for partial organics removal, particularly the high toluene concentrations. Final organics removal will take place in the granular activated carbon (GAC) Vessels before entering the Effluent/Backwash Storage Tank and final discharge. Sulfuric acid may be added to the flow prior to the Effluent/Backwash Storage Tank to reduce the pH if the pH exceeds 9.0, the maximum pH value allowed by the NJPDES permit.

Treatment Facility Daily Operating Report

In addition to the NJPDES sampling and reporting requirements, the proper operation of the Syncon Resins treatment plant also requires internal treatment process sampling on a regular basis to ensure that the individual treatment processes are functioning as intended and NJPDES parameters are met continuously.

Appendix C contains a sample daily treatment plant log that summarizes the treatment process-sampling schedule by location, parameter, and frequency. This schedule is designed to establish proper chemical dosages, verify treatment process targets, track the backwash frequency of Greensand Filters, and Organoclay and GAC vessels, and ensure consistent regulatory compliance.

The parameters in the daily report may be modified to suit the plant's operating needs, based upon changing flows and characteristics, as well as other operational factors.

The rationale for each parameter follows below.

Process Flows

The effluent plant flow rate must be measured and totalized on a daily basis as a requirement of the NJPDES permit. However, the influent flow is also used to calculate daily chemical dosages when combined with daily chemical usage.

Backwash flows are important to monitor to both the frequency of filter backwashes and the amount of water used, which has to be re-processed through the plant. Frequent backwashing (say more than once daily) may indicate poor settling-tank solids-removal performance. This may indicate the need to reduce peak flow rates, or to adjust the type and/or dosage of polymer.

pH

The pH values in the process are important for several reasons:

- The pH must be in the range of 6.0-9.0 to meet the NJPDES limits.
- The addition of sodium hypochlorite will tend to increase the pH above those values. Therefore, the sodium hypochlorite dosage is a balance between achieving iron and heavy metals limits while not raising the pH outside of the required discharge range of 6.0-9.0.

The three points shown: the Equalization Tank Effluent, the Weir Settling Tank Effluent and the final discharge point are sampled to verify optimum pH values for both iron and metals removal, and final discharge.

Chemical Usage

The daily usage of sodium hypochlorite and polymer must be noted to determine the actual dosage rates, and chemical usage rates. This information is important to determine the effectiveness the chemical dosage to achieve its desired effect.

Also, it is helpful in troubleshooting process issues including NJPDES exceedances,

process issues such as solids carryover and frequent backwashes, and lastly to determine when to re-order chemicals to ensure continuous operation.

Sludge Quantities

Although not a permit requirement, daily sludge production is a useful parameter because it must be managed: dried and blended with other site solids. Knowing the quantity of solids for disposal allows for planning. Further, maintaining proper sludge blanket levels in the Equalization and Settling Tanks maximizes sludge thickening and prevents excessive carryover of solids in the Weir Settling Tank effluent.

Greensand Filter and Organoclay and GAC Filter Operations

As mentioned, the Greensand Filter, Organoclay and GAC vessel operations should be continuously monitored, particularly influent and effluent pressures and filter run times. This is an indicator of proper coagulant and flocculent dosages and proper Settling Tank operation.

Frequent filter backwashing indicates excessive solids loading on the filters, which may be a resultant of improper chemical addition, improper Settling Tank operation, or both.

Initial Plant Clean Water Startup and Testing Procedures

Before starting on contaminated water, the entire facility will first start on potable water to ensure all units are leak-tight and functioning properly. The following sequence shall be used to test the plant and to prepare the plant for actual operation:

1. Fill Backwash Supply Tank (20,000-gallon frac tank) with potable water from a fire hydrant.
2. Check for leaks in the tanks and pipefittings and connections and correct as necessary.
3. Prime the Filter Backwash Pumps by opening the suction and discharge valves and releasing air through the small air-release valve located on the pump volute. Close the air-release when water squirts through the air-release valve.
4. Open backwash valves to the Greensand Filters.
5. Start a single Effluent/Backwash Pump and begin pumping water into the Greensand Filters. The backwashing procedure removes sand fines present in the sand media on delivery to the site.
6. Rotate both pumps through the backwash cycle, to ensure proper rotation and operation of the pumps.
7. Continue backwashing until all units have been thoroughly backwashed for 15-20 minutes.
8. There will likely be a need to refill the Effluent Tank periodically throughout this

process as the Greensand Filters are filled with water.

9. Repeat the same procedures for the Organoclay Vessels and the GAC Vessels.
10. Prime the Settling Tank Pumps by opening the suction and discharge valves and releasing air through the small air-release valve located on the pump volute. Close the air-release when water squirts through the air-release valve.
11. Start the Settling Tank Feed Pump to pump water to the Settling Tank and Settling Tank Effluent Tank, and all pipe and fittings. Check for leaks and correct as necessary.
12. Prime the Filter Feed Pump by opening the suction and discharge valves and releasing air through the small air-release valve located on the pump volute. Close the air-release when water squirts through the air-release valve.
13. Open all inlet valves and discharge valves on the Settling Tank units, and the Greensand Filters.
14. Start a single Filter Feed Pump to pump water from the Settling Tanks to the Greensand Filters, and all downstream tanks.
15. Continue to operate Filter Feed Pumps until flow from GAC Vessels begins to fill the Backwash Storage Tank.
16. Shut down all pumps.
17. After hydraulic testing of the major units is completed, test and calibrate pH meters, chemical feed pumps, and mag flow meters.
18. Empty the Backwash Storage Tank by returning to the head of the Treatment Process, specifically the Equalization Tanks.

Contaminated Water Startup and Testing Procedures

After the entire facility has been successfully tested on potable water to ensure all units are leak-tight and functioning properly, contaminated site water will be added. With the exception of the Backwash Storage Tank, the system will already have been filled with clean water that will be displaced by the site water. All pumps would already be primed.

Note: No water may be discharged to the Passaic River until approved by the Government.

Prior to the introduction of contaminated water take the following steps to prepare the plant for actual operation:

1. Close the plant discharge valve and open valve to Backwash Tank.
2. Start all chemical pumps.
3. Set sodium hypochlorite dosage to 10 mg/L to start the process. Adjust as necessary.

4. Ensure that inlet valves and discharge valves are open on all units.
5. Start Settling Tank Feed pump.
6. Start a single Filter Feed Pump to pump water from the Settling Tank to the Greensand Filters.
7. Take samples of the incoming flow from the Equalization Tanks and check proposed polymer dosage with jar tests. Adjust dosage as necessary.
8. Fill the Backwash Tank with effluent. Collect samples and test for NJPDES parameters.
9. Begin discharging and full operation once approval to discharge has been given.

Cold Weather Operation

Cold weather (more specifically cold water) operation is problematic in water treatment for several reasons:

1. The higher viscosity in cold water makes the settleability of solids much slower and therefore less likely to be removed;
2. Water expands when it freezes causing damage to enclosed areas such as pipes and tanks;
3. The higher viscosity of the water, when combined with the higher viscosity of the polymer, makes effective mixing of the polymer and water more difficult. As mentioned earlier, dilution water is used to dilute the polymer to 0.1-0.5% by weight;
4. Tanks or pipelines containing water may freeze and become damaged if not operated constantly.

Overnight Shutdown. The following is a general description of measures to reduce the impact of cold weather on wastewater operations during overnight shutdowns:

Pipelines and Gauges. The pipelines at Syncon Resins have been heat-traced to minimize freezing. Check the ambient operating specifications for gauges and other instrumentation and remove those gauges and instruments not designed to operate in cold temperatures.

Tanks. Try to keep process tanks flowing or recirculating continuously. Empty all unused tanks to prevent damage from freezing.

Pumps. Try to keep process pumps operating or recirculating continuously. Drain all unused pumps to prevent damage from freezing. Add propylene glycol (*not* toxic anti-freeze which is ethylene glycol) to the bottom of each pump casing to prevent freezing and damage to pump volutes and impellers.

Treatment Processes. The major treatment processes impacted by cold weather are

chemical addition, sedimentation, and filtration. Use a tote heater for neat polymer solutions.

Reduce the flow to the plant if possible, to minimize the effects of higher water viscosity.

Reduce the backwash rates as shown in Figures 3-5, to compensate for the higher viscosity of the cold water.

Prolonged Shutdown. In the event of a prolonged shutdown, residual water in the pipelines and pumps must be drained. After draining water back to the excavation, use the on-site air compressor to blow down the lines, including the effluent line, to empty the lines of water.

Planned Shutdown Procedure

Over the operating life of the plant, it may become necessary to shut the plant down for scheduled maintenance, shutdown of the excavation operations, or for some other reason. Notify the Engineer at least 48 hours in advance of such a shutdown.

In the event that an emergency shutdown is necessary, use the following procedure:

1. Shut down excavation operation.
2. Continue to operate the Settling Tank Feed Pumps to lower the level of the Influent Equalization Tanks to the low level cutoff position. The pumps will shut off at this point.
3. Continue to operate Filter Feed Pumps until the Settling Tank is empty. Use a submersible pump to completely dewater the tank.
4. Continue to operate Filter Feed Pumps until flow from GAC Vessels completely fills the Effluent/Backwash Storage Tank.
5. Operate the Effluent/Backwash Pumps until the Effluent/Backwash Storage Tank is empty.
6. In the event of a prolonged shutdown, residual water in the pipelines and pumps must be drained. After draining back to the excavation, use the on-site air compressor to blow down the lines, including the effluent line, to empty the lines of water.

Emergency Shutdown Procedure

Over the operating life of the plant, an emergency situation may arise that will necessitate an immediate shutdown of the plant. Such emergencies could include, but aren't limited to the following conditions: prolonged loss of power, flooding, lightning strikes, or other Acts of God.

In the event that a shutdown is necessary, use the following procedure:

1. Shut down site pumps.

2. Continue to operate the Settling Tank, Filter and Effluent/Backwash Pumps to lower the level of the Influent Equalization Tank, Settling Tanks, and Effluent/Backwash Tanks to the low level cutoff position. The pumps will be shut off at this point.

Note: A suitably sized generator may be necessary to complete the shutdown in the event of a power failure.

3. Use a portable pump to complete dewatering in these tanks.
4. Continue to operate Filter Feed Pumps until flow from GAC Vessels completely fills the Effluent/Backwash Storage Tank.
5. Close the GAC Vessel influent valves and effluent valves.
6. Operate the Effluent Pumps until the Effluent/Backwash Storage Tanks are empty.
7. Notify the Engineer immediately of the shutdown.
8. In the event of a prolonged shutdown, residual water in the pipelines and pumps must be drained. After draining back to the excavation, use an air compressor to blow down the lines, including the effluent line, to empty the lines of water.

Collection Pad Sump Pump—Standard Operating Procedure

Description

The collection pad contains a sump, located at the lowest spots on the pad. Site water will drain to the sump, to be pumped to the water treatment processes by the sump pump.

The Collection Pad Sump Pump is a 200-gpm electric centrifugal pump. This pump will be operated manually, based upon level in the collection sump. The flow rate will be adjusted by adjusting the variable-frequency drive to suit the conditions on the collection pad.

Startup

The pump is self-priming and requires no further adjustment upon starting up. The operator will start the pump as free water flows across the pad and begins to fill the collection sump.

Normal Operation

Under normal operation, the pump is operated manually off level in the collection sump. The operator will monitor level in the sump and throttle the engine accordingly. While the Collection Sump Pump would be stopped when the liquid level in the collection sump is low, they can be run dry without damaging the pump.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the unit may be switched off when the plant is shut down. In the event that freezing conditions are expected, the discharge line should be drained and the pump volute drained.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the pump will pump clean water from the sump to clean the pump prior to decommissioning.

The unit is washed down and decontaminated prior to removal from site.

Maintenance

The pump will be maintained in accordance with the manufacturer's instructions. Normal maintenance on the pump includes weekly greasing and periodic replacement of mechanical seals.

Sodium Hypochlorite Feed System—Standard Operating Procedure

Description

The sodium hypochlorite feed pumps will consist of two electrical metering pumps, each rated at a maximum flow of 2 gallons per hour. The pumps will be paced off the flow meter to feed the proper amount of 12.5% sodium hypochlorite to the waste stream.

Sodium hypochlorite is added to the waste stream ahead of the Flow Equalization Tanks as necessary, to precipitate heavy metals in a process known as iron co-precipitation. This precipitate binds up arsenic and heavy metals such as cadmium, lead, and chrome, and removes them in the settling process. Sevenson has found that a sodium hypochlorite dosage of 40 mg/L is sufficient to achieve effective iron oxidation and removal at the projected iron concentration entering the plant.

The primary point of addition of the sodium hypochlorite is ahead of the Greensand Filters. Sodium hypochlorite will oxidize soluble ferrous iron to the insoluble ferric state prior to removal in the filters.

Each sodium hypochlorite feed pump is equipped with a ball check valve, and an isolation valve. One pump will be operated, with one pump as standby.

Startup

The units will start when upstream process units are started. Prior to startup, the chemical feed pumps will be tested on water.

Normal Operating Parameters

Under normal operation, the pumps will be paced off flow.

At the design dosage (40 mg/L), the pump's speed will be approximately 50% of maximum speed. The dosage may be increased if metals are detected in the effluent.

Sodium hypochlorite will be injected immediately upstream of a 3-inch in-line static mixer.

Emergency Operation

None required.

Ensure that a proper eyewash station is nearby. Use a face shield, rubber gloves and proper personal protective equipment when handling caustic.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the units may simply be switched off when the plant is shut down.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the units will be shut down rinsed with water and the water pumped to the Equalization Tanks. The units will be decontaminated prior to removal from site.

Maintenance

The flow meters are calibrated from the factory but will be re-calibrated as required.

Influent Equalization Tanks—Standard Operating Procedure

Description

The Influent Equalization Tanks will receive backwash flow from the backwash of downstream Greensand Filter, Organoclay, and GAC units. The purpose of the tanks is to equalize or reduce flow variations to the plant and to settle oxidized iron solids. Two 20,000-gallon tanks are provided.

Startup

The units will be filled with backwash water as the process is started up. This will require approximately 5 hours at expected flows.

Normal Operation

Under normal operation, the units will require little attention. Accumulated sludge (settled suspended solids) will be manually removed by a diaphragm sludge pump on a daily, or as-needed basis.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the unit may be left when the plant is shut down.

Shutdown/Decommissioning/Decontamination

The units will be washed down and decontaminated prior to removal from the site.

Maintenance

Little or no maintenance is required.

Polymer System—Standard Operating Procedure

General

A polymer feed system is provided to enhance flocculation and removal of influent solids prior to settling in the Weir Settling Tank. The polymer feed system is used to feed diluted, liquid polymer to the wastewater to promote heavy flocs that settle readily.

Polymer is used for conditioning the solids-wastewater mixture to improve settling and removal. In order for solid particles in suspension to agglomerate, or "join together" to form large flocs, the following must occur when using a polymer:

- The electrical charges that surround the solid particles must be neutralized.
- The solid particle must readily adsorb the long chemical chain, high molecular weight polymer onto its surface.
- The polymer must bridge together adjacent solid particles using its long chemical chains.

The success of agglomeration, or floc formation, depends upon:

- The nature of the solids being treated;
- The molecular weight, electrical charge and the chemical structure of the polymer; and
- The injection point and the mixing intensity of the wastewater and polymer.

"Neat" (undiluted) polymer is extremely thick and viscous and must be diluted with plant water prior to use. Liquid polymers should be mixed with water to very low concentrations - around 0.1-0.5 percent (1,000-5,000 mg/L) - to achieve best mixing and to avoid "fisheyes." The higher end of the range (0.5%) is commonly used at water temperatures above 50 degrees F. Below 50 degrees F, use the lower concentration.

The precise polymer selection and dosage will be determined once water is generated at the site. Jar testing will be performed on water entering the Settling Tank during startup.

This jar testing will be an integral part of continuing operations, as changes in the nature of the incoming water may dictate changes to polymer dosage and even polymer type. These jar tests will be conducted several times per operating shift to ensure optimal solids removal in the Settling Tank.

Description

The polymer handling facilities consist of: a mixing water supply line for diluting liquid polymer; a 0-48 gallons-per-day polymer metering pump and a calibration cylinder; a water supply solenoid valve and 0-50 gallons-per-hour rotameter; and a polymer/water mixing chamber.

The ultimate purpose of the polymer handling facilities is to deliver the polymer/water solution to the wastewater flow.

WARNING: Spilled polymer can be extremely slippery. Any such spills should be immediately cleaned up by flushing with large amounts of water.

The polymer system works in this way:

1. Liquid polymer is drawn from its drum by an adjustable, diaphragm-type metering pump.
2. At the same time, dilution water (from the backwash water system) is admitted to the system through an electric solenoid valve.
3. The flow of dilution water is controlled by a valve/rotameter.
4. The polymer and water are injected together in the bottom of the mixing chamber, where a PVC mixer combines them and the polymer is "activated."
5. The blended polymer/water mixture flows to the top of the mixing chamber and out to the flash mix / flocculation chamber.

The polymer unit may be operated and controlled locally (at the unit), or remotely from the influent flow meter. To operate the polymer system locally, the INTERNAL/ EXTERNAL switch is set to INTERNAL. Pump stroke adjustment and speed may be adjusted locally.

In the normal mode, control of the polymer system is from the flow meter. To place the system in the normal remote control mode, the INTERNAL/EXTERNAL switch is set to EXTERNAL. The remote panel can then be used to control polymer pump output, using the SPEED dial, according to the needs of the flocculation process.

Operation and Control

Before supplying power or water to the polymer system, make sure that the controls are set as follows:

- Motor/pump switch -- in the OFF position

- Flow control knob -- rotated fully clockwise (zero setting)
- Stroke frequency 100% setting
- Stroke length 100% setting

Priming the Pump. Before starting up the polymer system, the polymer-metering pump should be primed using the Priming Accessory Kit provided and the following procedure:

1. Turn off power to the polymer unit.
2. Locate and remove the 1/4-inch PVC pipe plug in the clear plastic pump head. Wrap Teflon over the threads of the labcock valve (a part of the priming kit). Hand-tighten. Open valve.
3. Wrap Teflon tape over the threads of the barbed fitting and hand-tighten on the labcock valve.
4. Close the syringe. Insert the syringe tip into the barbed fitting.
5. Hold the tip in the fitting while opening the syringe (pull back the plunger). This literally "pulls" polymer into the pump.
6. Remove the syringe from the barbed fitting, push the syringe closed and repeat Steps 4 and 5 until the pump is primed (polymer will appear in the syringe).
7. Close the labcock after priming and remove the syringe.
8. Clean the syringe and keep near the unit for future use.

Calibrating the Pump. For the most efficient use of the polymer unit, you should periodically monitor the polymer input rate to determine the need for metering pump calibration. Follow this procedure:

1. Open the inlet valve to the calibration cylinder and run the metering pump until polymer exits the pump discharge.
2. Close the valve to the chemical supply.
3. Run pump for a minimum of 30 seconds.
4. Stop the pump and observe level in the cylinder.
5. Change in cylinder level divided by the time period is actual pump rate.
6. Pump cylinder dry and flush.
7. Close valve to cylinder and open valve to polymer supply to resume normal operation.

Startup Sequence

Following the priming and calibration of the polymer pump, start up the system according to the following procedure:

1. The polymer unit is plugged into an outlet that is energized when the Sedimentation Pump is running.
2. Start the polymer unit, as well as the submersible dilution water pump located in the Effluent/Backwash Holding Tank. Verify water pressure is 50-75 pounds-per-square-inch (psi).
3. Open the manual shut-off valve on the water supply line.
4. Turn on the switch on the back of the unit. This will open the solenoid valve, allowing water to flow to the polymer unit.
5. Slowly rotate the flow control knob counter-clockwise to achieve the desired flow rate. The rate of flow is read at the point of maximum width of the indicator float. Do not unscrew or withdraw the valve stem beyond the threaded section, except when performing maintenance.
6. Allow the mixing chamber to fill completely with water. Check all connections for leaks and tighten if necessary. Make sure that there is sufficient water pressure (read on discharge side of unit) to deliver the desired rate of flow.
7. Turn the motor/pump switch to AUTO. The impeller inside the mixing chamber should start rotating, and the pump should begin to make a clicking sound. This sound and the red "stroke indicator" light on the pump show that the pumping action is taking place. The water in the mixing chamber will rapidly turn "milky" or cloudy as the polymer is injected.

WARNING: Never operate the polymer unit without water flow.

WARNING: Do not turn mixer motor on until chamber is filled with water. Running dry will damage mechanical seal.

Once this initial start-up sequence (including priming) has been completed, it need not be repeated. The unit can merely be turned on and off by reconnecting or disconnecting the power supply.

Output Adjustment

Finding the most effective blended polymer output rate for a given situation is a matter of gradual adjustment and close observation. A procedure that has been used effectively in many installations is described below.

1. Set the flow control knob, the stroke length knob and the stroke frequency knob to provide the blended polymer output you have been using normally (see EXAMPLE). For optimum pump performance, keep stroke frequency as high as possible by shortening stroke length. However, if stroke length is too short, pump prime may be affected.
2. Observe the quality of the floc formed at these settings, and then increase the stroke length somewhat. Observe the floc quality at this setting.
3. If the floc quality continues to be good, keep "backing off" the stroke length a little at a time until the quality just begins to deteriorate. Increase the dosage back to the "good" range.
4. Move the knob only a little at a time, allowing time between each movement to observe changes in the floc. When no further improvement is seen, the knob may be left at that setting. Further adjustment should be needed only when sludge characteristics change and cause the floc quality to deteriorate.

NOTE: Do not exceed a polymer concentration of 1% maximum in the mixing chamber. A polymer concentration of 0.5% or less is recommended.

EXAMPLE: *An output of 0.15 gph (0.0025 gpm) of blended polymer is desired, with a polymer concentration of 0.5%. To achieve a 0.5% concentration with a flow of 0.15 gph:*

1. Open the flow meter to the 0.15 gph setting.
2. Determine the amount of neat (concentrated) polymer needed for a 0.5% (0.005) concentration at a 0.15 gph water flow rate (0.005 x 0.15 gallons = 0.00075 gallons).
3. Find the percentage of pump output that will deliver 0.15 gph of neat polymer. Since the installed pump capacity is 1.0 gph, an output of 0.15 gph would be 15% of the pump's "wide open" output.
4. Set the stroke frequency to 100% and the stroke length to the desired output

percentage (in this case, 15%).

Manual Flushing Procedure. If the polymer unit is to be out of operation for more than one week, use of the manual flushing procedure described below is recommended. It will prevent the formation of hardened polymer residues in the equipment. Normally, only the mixing chamber will have to be flushed, but the metering pump can be cleaned as well, if desired.

Mixing Chamber

1. Shut off the metering pump by turning the stroke frequency knob counter-clockwise as far as it will go. A definite "click" is felt at that position, and the green "stroke indicator" light will stop flashing.
2. Allow water to keep flowing through the mixing chamber until all traces of cloudiness disappear.
3. If the unit is to be shipped for repair, drain the mixing chamber. Remove the plug from the auxiliary port on the bottom cap of the mixing chamber and allow the water to drain. Replace the plug before shipping the unit.

Metering Pump

If the pump is to be flushed, do so before cleaning the mixing chamber. Merely move the suction tubing from the polymer drum to a container of clean water or common household bleach and let the unit run until only clear liquid is seen in the mixing chamber.

Normal Operating Parameters

Under normal operation, the pumps will be paced off flow.

At the design dosage (6 mg/L), the pump's speed will be approximately 25% of maximum speed. The dosage may be increased if excess solids are detected in the effluent.

Polymer will be injected immediately upstream of an in-line static mixer.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the neat polymer feed should be shut off and the dilution water continued through the mixing chamber until it is clear of polymer for at least 5 minutes. Then the units may simply be switched off and dilution water valve closed.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the units will be shut down rinsed with water and the water pumped to the Influent Equalization Tanks. The units will be decontaminated prior to its removal from site.

Maintenance

Flush the mixing chamber with water on a weekly basis during to ensure that neat polymer is not accumulating in the system.

Settling Tank Feed Pumps—Standard Operating Procedure

Description

Following the Equalization Tank are two 200-gpm electric centrifugal pumps. These pumps will primarily be operated manually, but may be controlled by level sensors. The flow rate will be adjusted with the use of a variable-frequency drive (VFD) and also with a valve on the output side of the pump.

The discharges from the two pumps are manifolded together to permit either unit to pump through the entire plant as necessary. The Settling Tank Feed pumps will pump through a static mixer to the Settling Tank.

One Settling Tank is provided with the capability of handling approximately 200 gpm.

Startup

The pumps are started as process water fills the two Equalization Tank wet wells. Normally only one pump will be used.

Normal Operation

Under normal operation, the pumps are operated manually off level in the Equalization Tanks. The operator will monitor level in the tanks and throttle the effluent butterfly valve to the Settling Tank. The Settling Tank Feed Pump should be stopped when the liquid level in the Equalization Tanks is lower than 2 feet.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the units may be switched off when the plant is shut down.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the pumps will pump clean water from the Equalization Tanks to clean the pumps prior to decommissioning.

The units are washed down and decontaminated prior to removal from site.

Maintenance

The pumps will be maintained in accordance with the manufacturer's instructions. Normal maintenance on the pumps includes weekly greasing and periodic replacement of mechanical seals.

Influent Magnetic Meter—Standard Operating Procedure

Description

One 3-inch insertion-type magnetic (mag) flow meter is provided on the influent line, in order to pace polymer feed to the Weir Settling Tank.

Startup

The flow meter will start with influent. No other steps are required.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the meter may simply be left full when the plant is shut down.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the pumps will pump clean water from the Effluent/Backwash Storage Tank to clean the flow meter prior to decommissioning. The flow meters will be cleaned prior to removal from the site.

Maintenance

The magnetic flow meter requires little or no maintenance. The flow meter was calibrated prior to first use and will be re-calibrated as necessary during the project life.

Weir Settling Tank—Standard Operating Procedure

Description

The Settling Tank Feed pumps will pump the flow through a 3-inch in-line static mixer. Polymer will be injected upstream of the static mixer.

The flocculated solids are conveyed by gravity to a Weir Settling Tank where settled solids will be removed using diaphragm pumps on a regular basis. The effluent from the Weir Settling Tank will be manifolded together to supply process water to the Filter Feed Pumps.

The Weir Settling Tank has a capacity of in excess of 200 gpm. Flow is introduced into the Settling Tank and flows over and under baffles in the tank. Solids settle to the bottom of the Weir Settling Tank while the flow continues up and over the effluent weir and into a 6,000-gallon wet well.

Startup

The unit will start when the Settling Tank Feed Pump(s) starts. Prior to startup, the unit is filled with water.

Normal Operation

Under normal operation, the unit will be monitored every 2 hours for proper operation to ensure that the polymer dosage is correct and that proper flocculation and settling are occurring.

If the floc appears to be very fine and not settling well, it is likely that the polymer dosage may need to be adjusted. Jar tests should be conducted at least once per shift to verify proper dosage.

The sludge pump should be operated to ensure that the sludge level in the bottom is less than 2 feet. If the sludge level is consistently above this value, remove sludge more frequently. Sludge removed from the tank will be discharged to a separate area and blended with excavated material.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the unit may be left full when the plant is shut down.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the unit will be shut down, be rinsed with water and the water pumped to the downstream units. The unit will be decontaminated prior to removal from site.

Maintenance

No other significant maintenance is required for the Weir Settling Tank unit besides sludge removal. No Operations and Maintenance Manual is available for this tank.

Filter Feed Pumps—Standard Operating Procedure

Description

Two 200-gpm electric centrifugal pumps will follow the Weir Settling Tank. These pumps will be controlled primarily in manual mode. The flow rate will be adjusted with a VFD and the use of a valve on the output side of the pump. The discharges from the two pumps will be manifolded to permit either unit to pump through the entire plant as necessary.

The Filter Feed pumps will pump through the downstream Greensand Filters, Bag Filters, the Organoclay Vessels and GAC Vessels to the Effluent/Backwash Storage Tank. Only one unit is normally in operation, with the second unit used as a standby.

Startup

The pumps will be started as process water fills the Weir Settling Tank wet well.

Normal Operation

Under normal operation, the selected pump will be operated manually off level in the Weir Settling Tank wet well. The operator should monitor level in the tank and throttle the effluent butterfly valve as necessary to the Greensand Filters to maintain a steady running condition.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the pumps may be switched off when the plant is shut down.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the pumps will pump clean water from the Weir Settling Tank to clean the pumps prior to decommissioning.

The units will be washed down and decontaminated prior to removal from site.

Maintenance

The pumps will be maintained in accordance with the manufacturer's instructions. Normal maintenance on the pumps includes weekly greasing and periodic replacement of mechanical seals.

Filter Feed Magnetic Meter—Standard Operating Procedure

Description

One 3-inch insertion-type magnetic (mag) flow meter is provided on the line to the downstream filters, in order to pace sodium hypochlorite feed to the Greensand Filters.

Startup

The flow meter will start with Filter Feed Pump. No other steps are required.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the meter may simply be left full when the plant is shut down.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the pumps will pump clean water from the Effluent/Backwash Storage Tank to clean the flow meter prior to decommissioning. The flow meters will be cleaned prior to removal from the site.

Maintenance

The magnetic flow meter requires little or no maintenance. The flow meter was calibrated prior to first use and will be re-calibrated as necessary during the project life.

Greensand Filters—Standard Operating Procedure

Description

Three Greensand Filters will be provided to oxidize and remove any remaining iron and suspended solids from the effluent from the Weir Settling Tank. Each filter is 3.8 feet in diameter and will be filled with filter gravel and three feet of Greensand Plus media.

All filters will be piped in parallel. Each filter will have backwash capability with the remaining filters sized to handle peak flow with one filter in backwash. All spent backwash flow will be piped to the Influent Equalization Tanks. The filter vessels have been fitted with inlet and outlet pressure gauges. The operator should commence backwashing at an appropriate pressure differential.

Startup

The units will start when downstream process units are started. Prior to startup, the Greensand Filters will be soaked with water and media fines will be removed.

Normal Operation

The Greensand Filter media requires regeneration, using sodium hypochlorite solution. This will be added prior to the Greensand Filters as required. The Greensand Filters will also require backwashing periodically to remove trapped iron and other suspended solids. The Effluent/Backwash Pump will draw water from the Effluent/Backwash Tank to backwash the units.

Each filter will be backwashed using effluent water from the two Effluent/Backwash Tanks. It is expected that the filters will require backwashing approximately every three days.

It is important to note that the backwash rate is very dependent upon the temperature of the backwash water. The viscosity of the backwash water is higher at lower water temperature, meaning that a lower backwash water rate is required to achieve the same expansion. In fact, if backwash rates aren't adjusted with temperature, loss of media may result from rates that are too high. Incomplete cleaning may result if rates are too low.

Figure 3 shows the backwash rates required to produce a 30% bed expansion for the Greensand Filter beds.

To backwash a Greensand Filter:

1. Close influent valve to filter to be backwashed.
2. Close effluent valve to filter to be backwashed.
3. Open influent backwash valve to the filter to be backwashed.
4. Open spent backwash valve to filter to be backwashed.
5. Start the Effluent/Backwash Pump at low flow and gradually "ramp up" to the desired rate to prevent surging in the media. Gradually open the valve until the desired backwash rate is achieved for the desired temperature.

6. Operate the Effluent/Backwash Pump as long as required, normally 10-15 minutes.

To restore filter to service:

1. Open filter effluent valve.
2. Close backwash valve at Effluent/Backwash Pump.
3. Close influent backwash valve to backwashed filter.
4. Close spent backwash valve to backwashed filter.
5. Open influent valve to backwashed filter.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the Greensand filters may be left full when the plant is shut down.

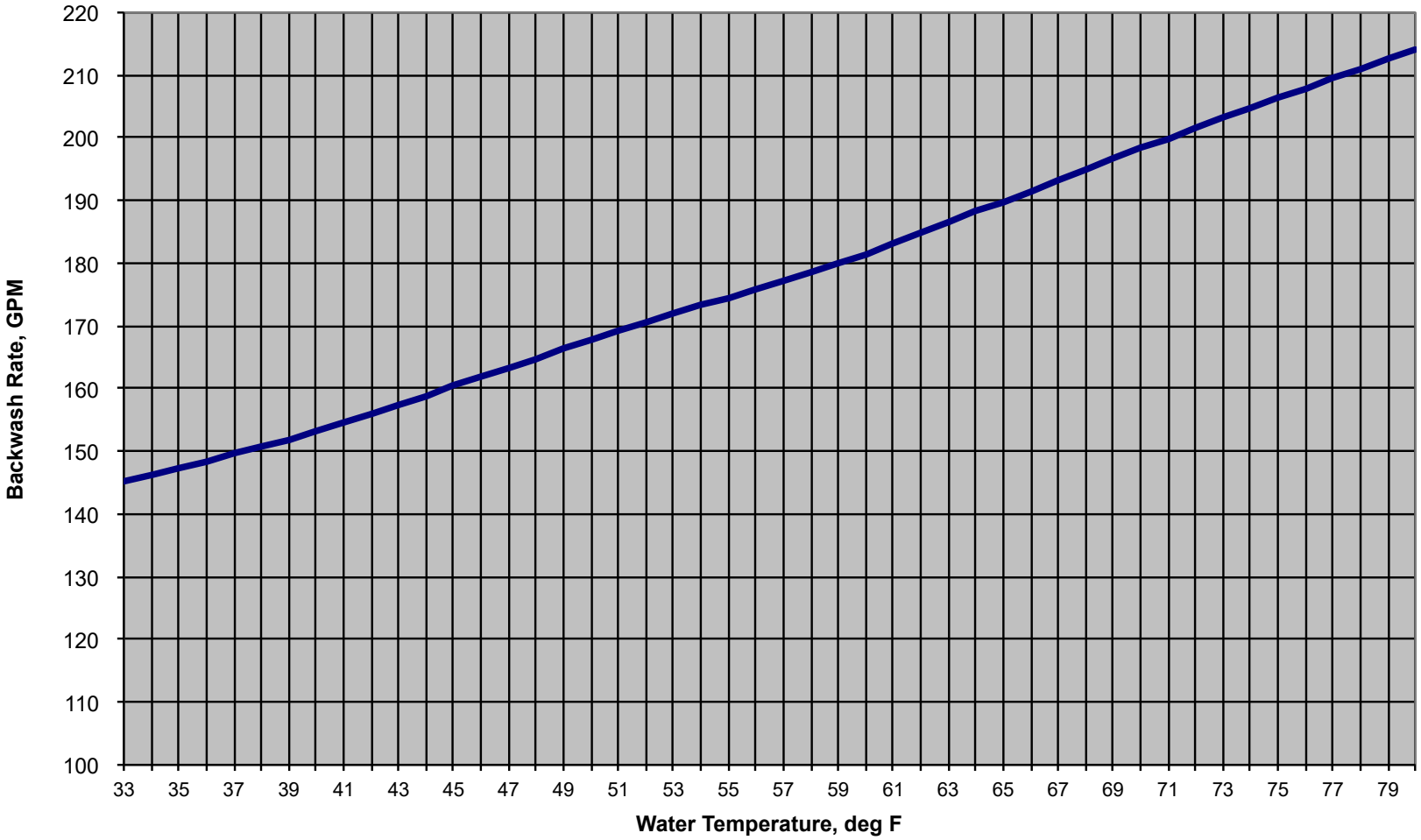
Shutdown/Decommissioning/Decontamination

At the completion of the project, the units will be shut down and all media removed. The units will be rinsed with water and the water pumped to the downstream units. The units will be decontaminated prior to their removal from site.

Maintenance

Other than periodic backwashing, no other significant maintenance is required. The filter media should be checked for biological growth every 6 months.

Figure 3: Greensand Filter Backwash Rate vs. Temperature—30% Expansion



Bag Filters—Standard Operating Procedure

Description

Two bag filter units are provided and are operated in parallel. The units are designed remove suspended solids and media that may escape the Greensand Filter units. The flow continues under pressure through the bag filters to the Organoclay Vessels.

Startup

The bag filter units will start when upstream process units are started. Five- micron bags will be inserted into the bag filter housings. Prior to startup, the units will be filled with water.

Normal Operation/Parameters

Under normal operation, the units will be monitored daily for pressure drop across the bags. The bags will be replaced as required. New bag filter operation is normally characterized by low differential head loss across the filter.

For example, if the initial (new bag) downstream reading is 20 pounds-per-square-inch (psi) and the upstream reading is 21 psi, the pressure differential is (21-20) or 1 psi. Differential pressure is also represented as ΔP.

Differential head is determined by subtracting the downstream pressure reading from the upstream reading. The downstream pressure reading will remain relatively constant. The upstream reading increases as the filter bag becomes clogged with solids.

A typical pressure loss across a "dirty" bag needing replacement is **30*ΔP**.

Thus, in the original example with a downstream pressure of 20 psi, and an initial clean bag ΔP of 1 psi, the bag would be changed when ΔP = 30 psi (30 * 1 psi), or when the upstream pressure reading is 50 psi.

To start the bag filters:

1. Open influent valves
2. Open effluent valves

To remove bag from filter:

1. Close effluent valve
2. Close influent valve
3. Open the filter housing and remove bag
4. Replace with new bag and close the filter housing
5. Open influent valve
6. Open effluent valve
7. Check ΔP and record.

Emergency Operation

None required.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the units will be shut down and all bags removed. The units will be rinsed with water and the water pumped to the Influent Equalization Tanks. The units will be decontaminated prior to removal from site.

Maintenance

The filter bags will be replaced periodically when the pressure drop becomes excessive, as a result of trapped suspended solids. Experience will determine this frequency, although 1-2 days would be a typical bag life. No other significant maintenance is required, besides bag replacement.

Organoclay Vessel—Standard Operating Procedure

Description

From the Bag Filter units, the waste stream then flows through an 8-foot diameter Organoclay Vessel. The purpose of the Organoclay unit is partial removal of toluene and semi-volatile organics in the effluent from the Bag Filter units. The vessel is provided with 10,000 pounds of organoclay media.

As with the filter units, the Organoclay Vessel will be provided with backwashing capability to allow continuous operation.

Startup

The Organoclay unit will start when upstream process units are started. Prior to startup, the Organoclay unit will be soaked with water and carbon fines will be removed.

Normal Operation/Parameters

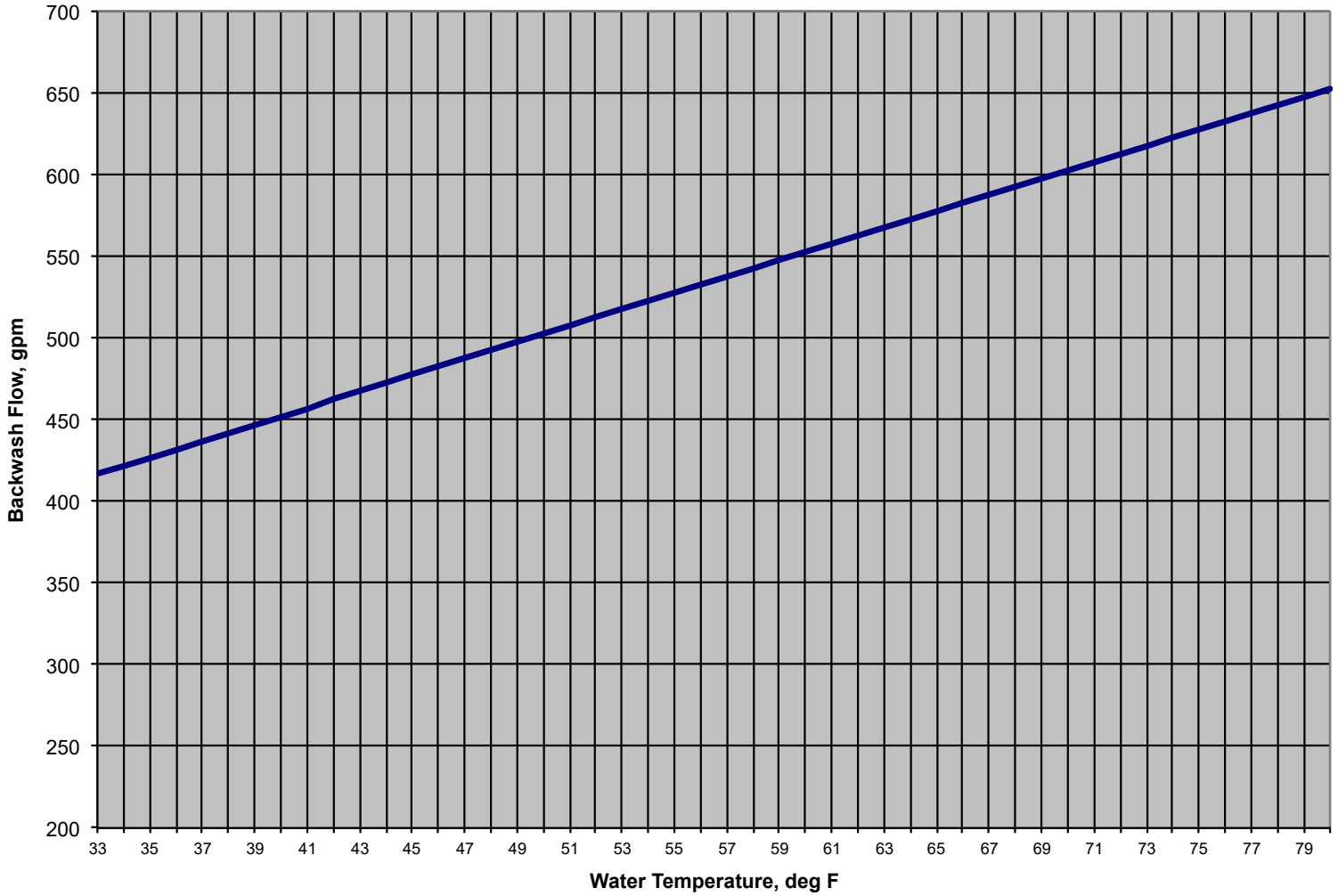
In spite of the upstream Greensand Filters and Bag Filters, the Organoclay Vessel will require backwashing periodically to remove trapped suspended solids. The Backwash Pump will draw water from the Effluent/Backwash Storage Tank to backwash the unit.

The unit will be backwashed using effluent water from the Effluent/Backwash Storage Tank. It is expected that the unit will require backwashing approximately once per week.

It is important to note that the backwash rate is very dependent upon the temperature of the backwash water. The viscosity of the backwash water is higher at lower water temperature, meaning that a lower backwash water rate is required to achieve the same expansion.

In fact, if backwash rates aren't adjusted with temperature, loss of media may result from rates that are too high. Incomplete cleaning may result if rates are too low. Figure 4 shows the backwash rates required to produce a 30% bed expansion for the Organoclay Vessel.

Figure 4: Organoclay Backwash Rates vs. Wastewater Temperature—30% Expansion



To backwash an Organoclay Vessel:

1. Close influent valve to vessel to be backwashed
2. Close effluent valve to vessel to be backwashed.
3. Open influent backwash valve to the vessel to be backwashed
4. Open spent backwash valve to vessel to be backwashed
5. Start the Backwash Pump against a closed backwash valve to prevent surging in the media. Gradually open the valve until the desired backwash rate is achieved for the desired temperature.
6. Operate the Backwash Pump as long as required, normally 10-15 minutes.

To restore filter to service:

1. Open vessel effluent valve
2. Close backwash valve at Backwash Pump.
3. Close influent backwash valve to backwashed Organoclay Vessel.
4. Close spent backwash valve to backwashed vessel.
5. Open influent valve to backwashed vessel.

Emergency Operation

None required.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the unit will be shut down and all organoclay removed. The unit will be rinsed with water and the water pumped to the Influent Equalization Tanks. The unit will be decontaminated prior to its removal from site.

Maintenance

In the event that breakthrough of oil and grease occurs, the organoclay media may need to be replaced. A vacuum truck is usually used for this purpose.

Other than periodic backwashing, no other significant maintenance is required. The organoclay media should be checked for biological growth every 6 months.

GAC Vessels—Standard Operating Procedure

Description

From the Organoclay Vessel, the waste stream then flows under pressure to two, 8-ft diameter Granular Activated Carbon (GAC) vessels, piped in series. The GAC units will remove remaining volatile organics and semi-volatile organics in the effluent from the Organoclay Vessel.

Approximately 10,000 pounds of GAC media will be placed in each vessel, for a total of 20,000 pounds. An empty-bed-contact time of 23 minutes is provided at the design average flow of 150 gpm.

As with the Organoclay unit, the GAC filters will be provided with backwashing capability to allow continuous operation.

Startup

The GAC units will start when upstream process units are started. Prior to startup, the GAC units will be soaked with water and carbon fines will be removed.

Normal Operation/Parameters

The carbon vessels are designed to be operated in series.

In spite of the upstream Greensand and Bag Filters, the GAC Vessels will require backwashing periodically to remove trapped suspended solids. The Backwash Pump will draw water from the Effluent/Backwash Storage Tank to backwash the units.

Each unit will be backwashed using effluent water from the Effluent/Backwash Storage Tank. It is expected that the units will require backwashing approximately once per week.

It is important to note that the backwash rate is very dependent upon the temperature of the backwash water. The viscosity of the backwash water is higher at lower water temperature, meaning that a lower backwash water rate is required to achieve the same expansion.

In fact, if backwash rates aren't adjusted with temperature, loss of media may result from rates that are too high. Incomplete cleaning may result if rates are too low. Figure 5 shows the backwash rates required to produce a 30% bed expansion for the GAC Vessels.

To backwash a GAC Vessel:

1. Close influent valve to vessel to be backwashed
2. Close effluent valve to vessel to be backwashed.
3. Open influent backwash valve to the vessel to be backwashed
4. Open spent backwash valve to vessel to be backwashed
5. Start the Backwash Pump against a closed backwash valve to prevent surging in

the media. Gradually open the valve until the desired backwash rate is achieved for the desired temperature.

6. Operate the Backwash Pump as long as required, normally 10-15 minutes.

To restore filter to service:

1. Open vessel effluent valve
2. Close backwash valve at Backwash Pump.
3. Close influent backwash valve to backwashed GAC Vessel.
4. Close spent backwash valve to backwashed vessel.
5. Open influent valve to backwashed vessel.

Emergency Operation

None required.

Shutdown/Decommissioning/Decontamination

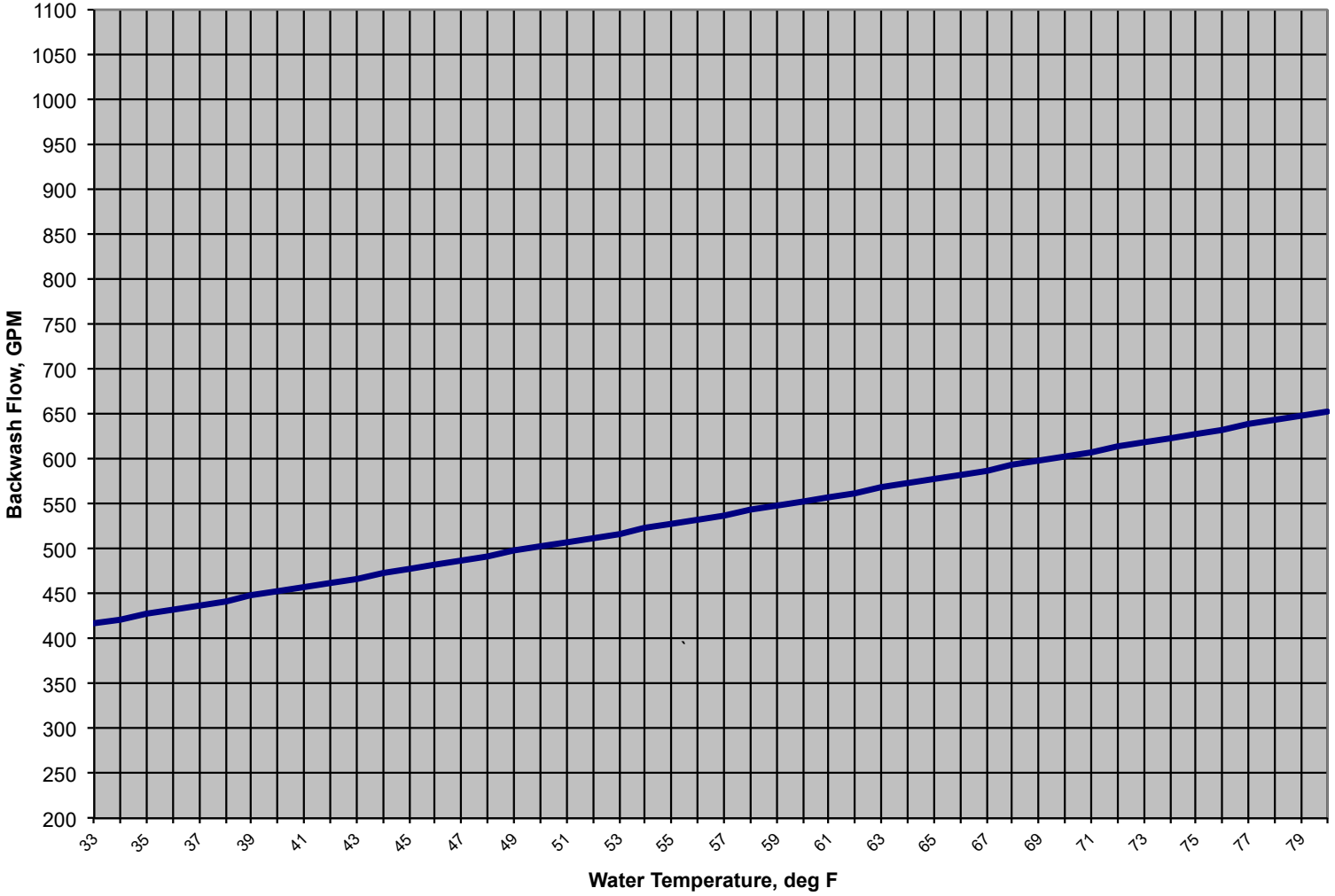
At the completion of the project, the units will be shut down and all carbon removed. The units will be rinsed with water and the water pumped to the Influent Equalization Tanks. The units will be decontaminated prior to its removal from site.

Maintenance

In the event that breakthrough of organics occurs, the carbon media may need to be replaced. A vacuum truck is usually used for this purpose.

Other than periodic backwashing, no other significant maintenance is required. The GAC media should be checked for biological growth every 6 months.

Figure 5: GAC Backwash Rate vs. Wastewater Temperature—30% Expansion



Sulfuric Acid Feed System—Standard Operating Procedure

Description

The sulfuric acid feed pumps will consist of two electrical metering pumps, each rated at a maximum flow of 2 gph. The pumps will be paced off the pH meter to feed the proper amount of 98% sulfuric acid to the waste stream.

Sulfuric acid is added to the waste stream to re-adjust the water pH to the acceptable range (6.0-9.0) prior to final discharge. The pH set point is approximately 7.5-8.0.

Each sulfuric acid feed pump is equipped with a ball check valve, and an isolation valve. One pump will be operated, with one pump as standby.

Startup

The pH adjustment units will start when upstream process units are started. Prior to startup, the chemical feed pumps will be tested on water.

Normal Operating Parameters

Under normal operation, the pumps will be paced off pH.

At the design dosage, the pump's speed will be approximately 40% of maximum speed. The dosage must be adjusted to produce an effluent pH in the range of 6.0-9.0.

Sulfuric acid will be injected immediately upstream of a 3-inch in-line static mixer.

Emergency Operation

None required.

Ensure that a proper eyewash station is nearby any caustic handling operation. Use a face shield, rubber gloves and proper personal protective equipment when handling sulfuric acid.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the units will be shut down rinsed with water and the water pumped to the Influent Equalization Tanks. The units will be decontaminated prior to its removal from site.

Maintenance

The pH meters will be calibrated initially, checked weekly, and recalibrated monthly or as required.

Effluent/Backwash Storage Tank—Standard Operating Procedure

Description

The Effluent/Backwash Storage Tank will receive incoming flow from the GAC Vessels. The purpose of the tank is store effluent water to be used for use in backwashing the Greensand Filters, Organoclay Vessel, and GAC Vessels. One 20,000-gallon tank is provided.

Startup

The unit will be filled with process water as the process is started up. This will require approximately 10-30 minutes at expected flows.

Normal Operation

Under normal operation, the unit will require little attention. Occasionally, accumulated sludge (settled suspended solids) will be manually removed.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the unit may simply be left when the plant is shut down.

Shutdown/Decommissioning/Decontamination

The unit will be washed down and decontaminated prior to its removal from the site.

Maintenance

Little or no maintenance is required.

Effluent Magnetic Meter and Totalizer—Standard Operating Procedure

Description

One 3-inch insertion-type magnetic (mag) flow meter/totalizers is provided on the discharge line.

Startup

The flow meter will start with effluent discharge. No other steps are required.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the meter may simply be left full when the plant is shut down.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the pumps will pump clean water from the Effluent/Backwash Storage Tank to clean the flow meter prior to decommissioning. The flow meters will be cleaned prior to removal from the site.

Maintenance

The magnetic flow meter requires little or no maintenance. The flow meter was calibrated prior to first use and will be re-calibrated as necessary during the project life.

Backwash/Discharge Pumps—Standard Operating Procedure

Description

The Backwash/Discharge Pumps are electrical centrifugal pumps; each rated at a maximum flow of 600 gpm. The pumps are used to pump effluent to the ultimate discharge point.

The pumps are also used to backwash the Greensand Filters, Organoclay Vessel, and GAC Vessels. The pumps will be manually operated and throttled by the pump's VFD and backwash flow valve to adjust the backwash flow rate to the various vessels, one at a time. Only one pump is necessary to be operated.

Startup

The operator manually starts the selected Effluent/Backwash Pump. Prior to starting, open the suction valve and ensure that the pump is primed by opening the air release valve on the pump. Verify that water flows, indicating that the pump is primed.

When operating as in the backwash mode, start the Effluent/Backwash Pump at low flow and gradually "ramp up" to avoid flow surges and media loss in the vessel to be backwashed.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the units may be switched off when the plant is shut down.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the pumps will pump clean water from the Effluent/Backwash Storage Tank to clean the pumps prior to decommissioning.

The units will be washed down and decontaminated prior to removal from site.

Maintenance

The pumps will be maintained in accordance with the manufacturer's instructions. Normal maintenance on the pumps includes weekly greasing and periodic replacement of mechanical seals.

Backwash Magnetic Meter and Totalizer—Standard Operating Procedure

Description

One 3-inch magnetic (mag) flow meter/totalizers is provided on the backwash line.

Startup

The flow meter will start with backwash discharge. No other steps are required.

Emergency Operation

None required.

When freezing conditions are not experienced or expected, the meter may be left full when the plant is shut down.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the pumps will pump clean water from the Effluent/Backwash Storage Tank to clean the flow meter prior to decommissioning. The flow meter will be cleaned prior to removal from the site.

Maintenance

The magnetic flow meter requires little or no maintenance. The flow meter will be calibrated prior to first use and periodically during the project life.

Gravity Thickener—Standard Operating Procedure

Description

A diaphragm pump draws settled solids from the Settling Tank and pumps the solids to a single Gravity Thickener. The purpose of the gravity thickener is to concentrate the solids to the maximum extent possible, prior to blending with solids from the pad.

The Gravity Thickener is an 8-foot-diameter tank has a capacity of 3,500 gallons. The Gravity Thickener allows for up to 11 days of storage of solids under normal conditions. The tank is equipped with a sloped bottom to facilitate thickening.

Startup

Once the Settling Tank begins to accumulate solids, those solids will be pumped intermittently to the Gravity Thickener.

Normal Operation

The Gravity Thickener is intended to be used in an intermittent mode. Solids will fed to the tank for up to 11 days. Allow the tank to remain in a settling mode overnight, or until a solids: water interface is visible.

Use a diaphragm pump to pump down the solids and discharge to a solids box that will ultimately be blended with sediment on the pad for disposal. Once the pump is observed to be pumping mostly water, divert this flow to the Equalization Tanks.

Emergency Operation

None required.

Standard Overnight Shutdown

When freezing conditions are not experienced or expected, the unit may remain in storage mode when the plant is shut down.

Shutdown/Decommissioning/Decontamination

At the completion of the project, the pumps will pump clean water from the Effluent/Backwash Storage Tank through the Gravity Thickener to clean the tank prior to decommissioning.

The unit will be washed down and decontaminated prior to removal from site.

Maintenance

Aside from regular sludge and water withdrawals, no maintenance is required.

CHAPTER 4—PROCESS FLOW AND INSTRUMENTATION

The Syncon Resins Treatment Plant will be manned continuously during operation. As a result, there is minimal automatic control installed in the plant. The Process Flow and Instrumentation Diagram (P&ID) is shown in Figure 6.

Table 3 is a summary of instrumentation provided for the plant and its function. Table 4 is a summary of plant alarms.

Table 3: Summary of Syncon Resins Plant Instrumentation

Area/Name	Instrument	Control Loop Description/Function
Chemical Feed	Flow switch	ON-OFF switch to initiate and stop sodium hypochlorite pump.
Influent Equalization Tank	Level Sensor	Local indication of tank level for manually controlling Settling Tank Feed Pumps
Influent Flow Meter	Insertion magnetic meter	Generates 4-20 ma flow signal controlling polymer feed rate
Settling Tank Pump Tank	Level Sensor	Local indication of tank level for manually controlling Filter Feed Pumps
Filter Feed Flow Meter	Insertion magnetic meter	Filter flow rate local indication
Greensand Filters, Organoclay and GAC Vessels	0-100 psi pressure gages	Differential pressure (calculated) to determine need for filter backwash
Effluent Flow Meter/Totalizer	Insertion paddle meter	Effluent flow rate local indication and totalizer
Backwash Water Supply Tank	Level Sensor	Local indication of tank level for manually controlling Filter Backwash Pumps
Backwash Supply Flow Meter	Insertion paddle meter	Filter backwash local flow rate indication for controlling Filter Backwash Pump

Area/Name	Alarm	Set Point	Type of Alarm
Influent Equalization Tank	High level	7 ft	Light
Settling Tank Pump Tank	High level	7 ft	Light
Effluent/Backwash Storage Tank	High level	7 ft	Light

Table 4: Summary of Syncon Resins Treatment Plant Alarms

Plant Operations

Except for large rainstorms or during expected freezing conditions, the water treatment plant will normally be manned only during site operations while the plant is operating. During times when large rainfall events are expected, with resulting high flows on the processing pad, the plant shall be staffed to ensure that no flow escapes the site. All rainfall striking the pad must be treated through the treatment plant.

In the event that extended freezing conditions are expected, with possible damage to piping, valves and pumps, the plant shall be manned to ensure that it is capable of running when necessary. Torpedo heaters, heat tracing, and other freezing protection measures must be employed to prevent freezing.

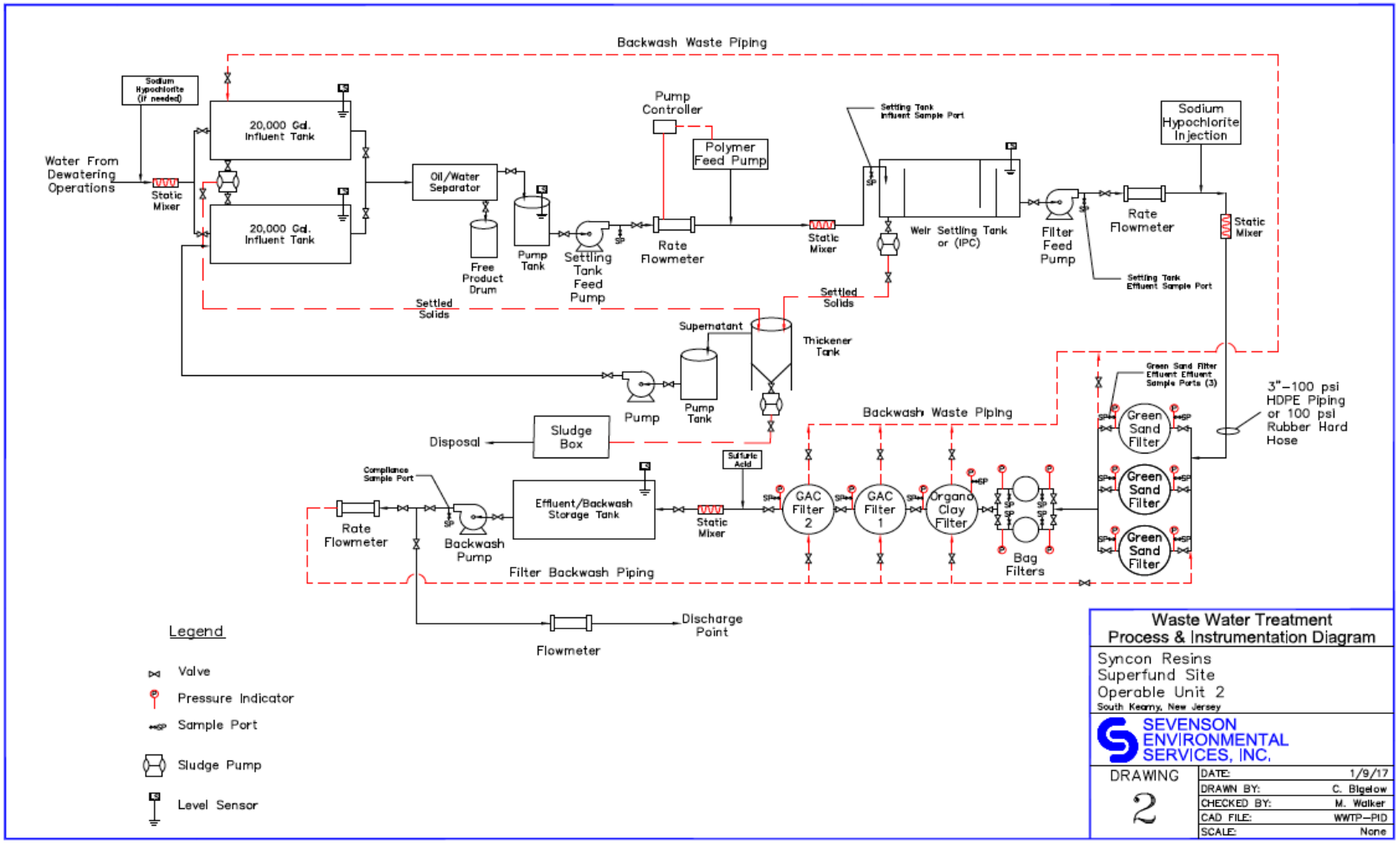


Figure 6: Syncon Resins Piping and Instrumentation (P&ID) Diagram

Chapter 5: Sampling and Monitoring Program

Sampling of the wastewater processes at the Syncon Resins Superfund Site should be performed on a regular basis in accordance to the approved UFP-QAPP to ensure compliance with the State of New Jersey water quality regulations, to optimize treatment plant performance and to anticipate and correct possible issues to ensure compliance.

Water Quality Certificate

The sampling and monitoring program must comply with the Water Quality Certificate issued by the NJ Department of Environmental Regulation and filed in the office trailer. In addition, all sampling and analysis must comply with the site QAPP. Review the plan prior to conducting any sampling on the Syncon site.

Initially sampling should be performed on a daily basis for the first week of operation to establish that the plant processes are optimized and meet the NJPDES permit equivalency requirements.

After permit compliance has been established, the sampling program will be performed in accordance with the permit requirements. The required and suggested sampling is performed at sample ports throughout the plant and summarized in Table 5.

Process and Compliance Sampling Schedule

Besides the required sampling, Table 5 also provides a suggested process-sampling schedule to establish and check for optimal plant operation and to anticipate possible changes to the influent water and/or possible process upset. Specific organics are included in Table 2.

Normally, sampling is conducted on a more frequent basis during initial operation until more operating experience is gained. After the plant has established a baseline, process sampling may be cut back somewhat. Compliance sampling remains as shown in Table 5 and Figure 6 throughout the operation of the plant.

Table 5: Sampling Locations, Frequency, and Parameters

Sample Location	Type	Frequency	Parameters	Reason
Settling Tank Influent	Process	Weekly-1st month then monthly	Total suspended solids	Influent characteristics
Settling Tank Effluent	Process	Weekly-1st month then monthly	Total suspended solids	Settling Tank performance
Greensand Filter Effluent	Process	Weekly-1st month then monthly	Total suspended solids	Settling Tank performance
Effluent Line	Compliance	As per NJPDES: Monthly	Flow pH Total suspended solids Total organic carbon Iron Organics (Refer to Table 2 for specific parameters)	Compliance

Table 6: Syncon Resins Surface Water DMR Limits and Monitoring Requirements

NOTE: THIS TABLE WILL BE PROVIDED WHEN NJDPES PERMIT IS ISSUED

Appendix A—Process Design Data and Materials Balance

SYNCON SUPERFUND SITE		
WATER TREATMENT PLANT		
DESIGN DATA AND CALCULATIONS		
INFLUENT CHARACTERISTICS--WATER	**DESIGN**	**COMMENTS / ASSUMPTIONS**
WASTEWATER FLOW, GPM	200	
, GPD MAXIMUM	120,000	10-Hr Operation; 5 Days/week;
WASTEWATER FLOW, GPM	150	
, GPD AVERAGE	90,000	10-Hr Operation; 5 Days/week;
TOTAL SUSPENDED SOLIDS		
, m g/L	50	Estimate
, LBS/DAY	38	@ Avg Day
TOTAL IRON		
, mg/L	61.0	From Spec Average
, LBS/DAY	45.8	@ Avg Day
TOTAL VOLATILE ORGANICS		
, mg/L	67.0	From Spec Average
, LBS/DAY	50.3	@ Avg Day
TOTAL NONVOLATILE ORGANICS		
, mg/L	0.90	From Spec Average
, LBS/DAY	0.68	@ Avg Day
REQUIRED EFFLUENT CHARACTERISTICS		
TOTAL SUSPENDED SOLIDS		
, mg/L	1.0	
, LBS/DAY	0.8	
, % REMOVAL REQU	98.0%	
TOTAL IRON		
, mg/L	0.5	
, LBS/DAY	0.38	
, % REMOVAL REQU	99.2%	
TOTAL VOLATILE ORGANICS		
, mg/L	0.05	
, LBS/DAY	0.04	
, % REMOVAL REQU	99.9%	
TOTAL NONVOLATILE ORGANICS		
, mg/L	0.10	
, LBS/DAY	0.075	
, % REMOVAL REQU	88.9%	
RECYCLE FLOWS, GALS/DAY		
GREENSAND BACKWASH	4,153	
ORGANOCLAY BACKWASH	4,974	
GAC BACKWASH	4,974	
TOTAL FLOW RETURN TO INFLUENT EQUALIZATION	14,100	

TOTAL FLOW TO SYSTEM		
AVERAGE FLOW	150	
RECYCLE FLOWS	19	
TOTAL AVERAGE FLOW TO WEIR TANKS	169	
TOTAL PEAK FLOW TO EQUALIZATION	219	
SODIUM HYPOCHLORITE FEED PUMPS	2-point Addition	Ferrous iron oxidation and removal
TYPE	Diaphragm	Also, regeneration dosage ahead of greensand
CONTROL		
NUMBER OF UNITS	2	
DOSAGE, mg/L	41	@ 1.0 Hypo :1 Fe
PROJECTED USAGE, GALS/DAY	8.4	@ 10 lbs/gal
PROJECTED USAGE, LBS/DAY	84	
, G ALS/HOUR	0.8	
UNIT PUMP CAPACITY, GALS/HR	0-2	
TOTAL PUMP CAPACITY, GALS/HR	0-4	
STORAGE PROVIDED, GALS	260	
STORAGE PROVIDED, DAYS	31	
INFLUENT TANKS	FRAC	
NO OF UNITS	2	Gross solids removal & equalization
UNIT VOLUME	20,000	
TOTAL VOLUME, GALS	40,000	
RETENTION TIME, HRS	3.9	At average flow
RETENTION TIME, HRS	3.0	At peak flow
INFLUENT SUSPENDED SOLIDS, LBS/DAY	38	From influent
ASSUMED SOLIDS REMOVAL, %	25%	
SOLIDS REMOVED, LBS/DAY	9	
SOLIDS TO DOWNSTREAM PROCESSES, LBS/DAY	28	
INFLUENT IRON, LBS/DAY	46	
ASSUMED IRON REMOVAL, %	10%	Assumed 10% ferric (settleable)
IRON REMOVED, LBS/DAY	5	
IRON TO DOWNSTREAM PROCESSES, LBS/DAY	41	
OIL-WATER SEPARATOR		
NO OF UNITS	1	
CAPACITY, GPM	200	
INFLUENT FEED PUMPS		
TYPE	CENTRIFUGAL	
NO OF UNITS	2	
UNIT CAPACITY, GPM	219	Max Day + Recycle Flows
TDH, FT	20	
HP	3	
INFLUENT FLOW MEASUREMENT		
TYPE	INSERTION MAG	
SIZE, INCHES	3	
POLYMER FEED PUMPS		Suspended solids and ferric iron removal
TYPE	Diaphragm	
CONTROL	Flow Controlled	
NUMBER OF UNITS	2	
PROJECTED DOSAGE, LBS/DAY	10.6	@ 5 mg/L @ avg flow
PROJECTED USAGE, GALS/DAY	1.2	
, G ALS/HOUR	0.05	
UNIT CAPACITY, GALS/HR	0-2	Peak flow
TOTAL CAPACITY, GALS/HOUR	0-4	
STORAGE PROVIDED, GALS	50	Drums
STORAGE PROVIDED, DAYS	41	

STATIC MIXER		
TYPE	IN LINE	
SIZE, IN	3	
CHEMICAL MIX TANK		
NO OF UNITS	1	
TOTAL VOLUME, GALS	2,500	
RETENTION TIME, MINS	15	At average flow
WEIR SETTLING TANK		
NO OF UNITS	1	Solids and iron removal
UNIT VOLUME	18,000	
TOTAL VOLUME, GALS	18,000	
RETENTION TIME, HRS	1.8	At average flow
RETENTION TIME, HRS	1.4	At peak flow
INFLUENT SUSPENDED SOLIDS, LBS/DAY	28	From Settling Tank
ASSUMED SOLIDS REMOVAL, %	75%	
SOLIDS REMOVED, LBS/DAY	21	
SOLIDS TO DOWNSTREAM PROCESSES, LBS/DAY	7	
INFLUENT IRON REMOVAL, LBS/DAY	41	From Settling Tank
ASSUMED IRON REMOVAL, %	75%	
IRON REMOVED, LBS/DAY	31	
IRON TO DOWNSTREAM PROCESSES, LBS/DAY	10	
, m g/L	5	
SLUDGE TO GRAVITY THICKENER		
SOLIDS REMOVED, LBS/DAY	21	
IRON SOLIDS REMOVED, LBS/DAY	31	
TOTAL SOLIDS REMOVED, LBS/DAY	52	
, G ALS/DAY @ 2%	312	
FILTER FEED PUMPS		
TYPE	CENTRIFUGAL	
NO OF UNITS	2	
UNIT CAPACITY, GPM	219	Max Day + Recycle Flows
TDH, FT	125	
HP	10	
FILTER FLOW MEASUREMENT		
TYPE	INSERTION MAG	
SIZE, INCHES	3	
STATIC MIXER		
TYPE	IN LINE	
SIZE, IN	3	
GREENSAND FILTERS		
TYPE OF UNITS	PRESSURE	For iron and solids polishing
NO OF UNITS	3	In parallel
UNIT DIAMETER, FT	3.8	
UNIT HEIGHT, FT	12	
GREENSAND DEPTH, FT	3.0	
TOTAL GREENSAND MEDIA, LBS @ 90 LBS/CU FT	9,343	
UNIT AREA, SQ FT	12	
TOTAL AREA, SQ FT	35	
HYDRAULIC LOADING, GPM/SQ FT	4.9	@ avg flow
HYDRAULIC LOADING, GPM/SQ FT, 1 IN BACKWASH	7.3	@ avg flow
BACKWASH RATE, GPM/SQ FT	12	To Influent Tank
BACKWASH RATE, GPM	138	
BACKWASH TIME, MINS	10	
TOTAL BACKWASH VOLUME, GALS/DAY	4,153	1 backwash/filter/day

INFLUENT SUSPENDED SOLIDS, LBS/DAY	7	From Weir Tank
ASSUMED SOLIDS REMOVAL, %	80%	
SOLIDS REMOVED, LBS/DAY	6	
SOLIDS TO DOWNSTREAM PROCESSES, LBS/DAY	1	
, m g/L	0.7	
INFLUENT IRON REMOVAL, LBS/DAY	10	From Weir Tank
ASSUMED IRON REMOVAL, %	85%	
IRON REMOVED, LBS/DAY	9	
IRON TO DOWNSTREAM PROCESSES, LBS/DAY	2	
, m g/L	0.8	
BAG FILTERS		
NO OF UNITS	2	
UNIT CAPACITY, GPM	200	
TOTAL CAPACITY, GPM	400	
FILTER BAG, MICRONS	5	
INFLUENT SUSPENDED SOLIDS, LBS/DAY	2	From Greensand Filters
ASSUMED SOLIDS REMOVAL, %	75%	
SOLIDS REMOVED, LBS/DAY	1	
SOLIDS TO DOWNSTREAM PROCESSES, LBS/DAY	0.4	
ORGANOCLAY VESSEL		
NO OF UNITS	1	
UNIT DIAMETER, FT	8.0	
UNIT HEIGHT, FT	12	
ORGANOCLAY DEPTH, FT	3.6	
UNIT AREA, SQ FT	50	
TOTAL EFFECTIVE AREA, SQ FT	50	In parallel
EFFECTIVE UNIT VOLUME, CU FT	181.9	
TOTAL EFFECTIVE VOLUME, CU FT	181.9	
LBS ORGANOCLAY/UNIT @ 55 LBS/CU FT	10,003	
TOTAL AVAILABLE ORGANOCLAY, LBS	10,003	
HYDRAULIC LOADING, GPM/SQ FT	3.4	@ Average Flow, All units on line
EMPTY BED CONTACT TIME, MINS	8.0	@ Average Flow, All units on line
TOTAL ORGANICS TO ORGANOCLAY, LBS/DAY	40.8	@ 20% Removal through pretreatment processes
% REMOVAL	40%	
EFFLUENT ORGANICS, LBS/DAY	24.5	
, m g/L	12.0	
UTILIZATION RATE, LBS TOCr/LB ORGANOCLAY	0.50	
UTILIZATION RATE, LBS/ORGANOCLAY/DAY	32.6	
, L BS/YEAR	11,906	
EFFECTIVE BED LIFE, DAYS	307	No changeout needed
ORGANOCLAY BACKWASH		
ORGANOCLAY BACKWASH RATE, GPM/SQ FT	10	
ORGANOCLAY BACKWASH RATE, GPM	502	
BACKWASH DURATION, MINS	15	
BACKWASHES/UNIT/DAY	0.33	Backwash Every 3 Days
TOTAL BACKWASH VOLUME, GALS/DAY	2,487	
INFLUENT SUSPENDED SOLIDS, LBS/DAY	0.4	From bag filters
ASSUMED SOLIDS REMOVAL, %	50%	
SOLIDS REMOVED, LBS/DAY	0.2	
SOLIDS TO DOWNSTREAM PROCESSES, LBS/DAY	0.2	
, m g/L	0.8	

INFLUENT IRON REMOVAL, LBS/DAY	2	From Greensand filters
ASSUMED IRON REMOVAL, %	75%	
ASSUMED IRON REMOVAL, LBS/DAY	1.2	
IRON TO DOWNSTREAM PROCESSES, LBS/DAY	0.4	
, m g/L	0.2	
GRANULAR ACTIVATED CARBON VESSELS		
NO OF UNITS	2	In series
UNIT DIAMETER, FT	8.0	
UNIT HEIGHT, FT	12	
CARBON DEPTH, FT	5.4	
UNIT AREA, SQ FT	50	
TOTAL EFFECTIVE AREA, SQ FT	100	
EFFECTIVE UNIT VOLUME, CU FT	269	
TOTAL EFFECTIVE VOLUME, CU FT	538	
LBS CARBON/UNIT @ 30 LBS/CU FT	8,064	
TOTAL AVAILABLE CARBON, LBS	16,127	
HYDRAULIC LOADING, GPM/SQ FT	1.7	@ Average Flow, All units on line
HYDRAULIC LOADING, GPM/SQ FT	3.4	@ Avg Flow, one unit in backwash
EMPTY BED CONTACT TIME, MINS	23.7	@ Average Flow, All units on line
TOTAL ORGANICS, LBS/DAY	24.5	From organoclay vessels
% REMOVAL	99.5%	
EFFLUENT ORGANICS TO DISCHARGE, LBS/DAY	0.122	
, m g/L	0.163	
UTILIZATION RATE, LBS TOCr/LB CARBON	0.15	
UTILIZATION RATE, LBS/CARBON/DAY	162.3	
, L BS/YEAR	59,230	
EFFECTIVE BED LIFE, DAYS	99	No changeout needed
GAC BACKWASH		
GAC BACKWASH RATE, GPM/SQ FT	10	
GAC BACKWASH RATE, GPM	502	
BACKWASH DURATION, MINS	15	
BACKWASHES/UNIT/DAY	0.33	Backwash Every 3 Days
TOTAL BACKWASH VOLUME, GALS/DAY	4,974	
INFLUENT SUSPENDED SOLIDS, LBS/DAY	0.35	From Organoclay Filter
ASSUMED SOLIDS REMOVAL, %	75%	
SOLIDS REMOVED, LBS/DAY	0.26	
SOLIDS TO DISCHARGE, LBS/DAY	0.09	
, m g/L	0.04	
INFLUENT IRON REMOVAL, LBS/DAY	0.39	From Organoclay Filter
ASSUMED IRON REMOVAL, %	75%	
IRON REMOVED, LBS/DAY	0.29	
IRON TO DISCHARGE, LBS/DAY	0.1	
, m g/L	0.05	

INFLUENT IRON REMOVAL, LBS/DAY	2	From bag filters
ASSUMED IRON REMOVAL, %	50%	
ASSUMED IRON REMOVAL, LBS/DAY	0.8	
IRON TO DOWNSTREAM PROCESSES, LBS/DAY	0.8	
, m g/L	0.4	
GRANULAR ACTIVATED CARBON VESSELS		
NO OF UNITS	2	In series
UNIT DIAMETER, FT	8.0	
UNIT HEIGHT, FT	12	
CARBON DEPTH, FT	5.4	
UNIT AREA, SQ FT	50	
TOTAL EFFECTIVE AREA, SQ FT	100	
EFFECTIVE UNIT VOLUME, CU FT	269	
TOTAL EFFECTIVE VOLUME, CU FT	538	
LBS CARBON/UNIT @ 30 LBS/CU FT	8,064	
TOTAL AVAILABLE CARBON, LBS	16,127	
HYDRAULIC LOADING, GPM/SQ FT	1.7	@ Average Flow, All units on line
HYDRAULIC LOADING, GPM/SQ FT	3.4	@ Avg Flow, one unit in backwash
EMPTY BED CONTACT TIME, MINS	23.7	@ Average Flow, All units on line
TOTAL ORGANICS, LBS/DAY	24.5	From organoclay vessels
% REMOVAL	99.5%	
EFFLUENT ORGANICS TO DISCHARGE, LBS/DAY	0.122	
, m g/L	0.163	
UTILIZATION RATE, LBS TOCr/LB CARBON	0.15	
UTILIZATION RATE, LBS/CARBON/DAY	162.3	
, L BS/YEAR	59,230	
EFFECTIVE BED LIFE, DAYS	99	No changeout needed
GAC BACKWASH		
GAC BACKWASH RATE, GPM/SQ FT	10	
GAC BACKWASH RATE, GPM	502	
BACKWASH DURATION, MINS	15	
BACKWASHES/UNIT/DAY	0.33	Backwash Every 3 Days
TOTAL BACKWASH VOLUME, GALS/DAY	4,974	
INFLUENT SUSPENDED SOLIDS, LBS/DAY	0.19	From Organoclay Filter
ASSUMED SOLIDS REMOVAL, %	75%	
SOLIDS REMOVED, LBS/DAY	0.14	
SOLIDS TO DISCHARGE, LBS/DAY	0.05	
, m g/L	0.02	
INFLUENT IRON REMOVAL, LBS/DAY	0.77	From Organoclay Filter
ASSUMED IRON REMOVAL, %	75%	
IRON REMOVED, LBS/DAY	0.58	
IRON TO DISCHARGE, LBS/DAY	0.2	
, m g/L	0.09	

SULFURIC ACID FEED PUMPS		
TYPE	Diaphragm	
CONTROL	Paced off pH	Re-adjust pH to 6.5-8.5
NUMBER OF UNITS	2.0	
PROJECTED USAGE @ 20 mg/L, LBS/DAY	36.1	
, G ALS/HOUR	0.3	
, G ALS/DAY	2.8	
UNIT CAPACITY, GALS/HOUR	0-1	
TOTAL CAPACITY, GALS/HOUR	0-2	
STORAGE PROVIDED, GALS	55.0	Drums
STORAGE PROVIDED, DAYS	19.8	
STATIC MIXER		
TYPE	IN LINE	
SIZE, IN	3	
EFFLUENT / BACKWASH PUMPS		
NO OF UNITS INSTALLED	2	
PUMPING RATE, GPM	650	
TDH, FT	50	
BHP	15	
EFFLUENT / BACKWASH STORAGE TANK		
TYPE	FRAC	
NO OF UNITS	1	
UNIT VOLUME, GALS	20,000	
TOTAL VOLUME, GALS	20,000	
BACKWASH FLOW MEASUREMENT		
TYPE	INSERTION MAG	
SIZE, INCHES	3	
EFFLUENT FLOW MEASUREMENT		
TYPE	INSERTION MAG	with totalizer
SIZE, INCHES	3	
GRAVITY THICKENER		
TYPE	CONE BOTTOM	
NO OF UNITS	1	
DIAMETER, FT	8	
HEIGHT, FT (WORKING)	8.8	
UNIT VOLUME, GALS	3,307	
INFLUENT SOLIDS, LBS/DAY	52	
, G ALS/DAY	312	
DETENTION TIME, DAYS	11	
THICKENED SOLIDS, LBS/DAY @ 95% CAPTURE	49	To Sludge Box
, G ALS/DAY @ 4%	148	
, CU YDS PER DAY	0.03	@ 1,700 LBS/CU YD
DECANT WATER SOLIDS, LBS/DAY	3	
, G ALS/DAY	164	
SLUDGE BOX		
TYPE	COVERED	With valved drains
NO OF UNITS	1	
CAPACITY, CU YDS	25	
DIMENSIONS, FT		
LENGTH	23	
WIDTH	8.5	
DEPTH	6.5	
SLUDGE STORAGE CAPACITY, DAYS	860	

Appendix B—Process Troubleshooting

Indicator/Observation	Probable Cause	Check or Monitor	Solutions
Iron exceedance	• Insufficient sodium hypochlorite dosage • Improper polymer type or dosage • Excess solids carryover to effluent	• Sodium hypochlorite dosage • Polymer type or dosage • Check TSS from Settling Tanks and differential filter pressure	• Increase sodium hypochlorite dosage • Conduct on site jar tests and adjust polymer as necessary • Polymer type/dosage or need to backwash filters more frequently
Wet well overflow	• Pump not pumping at sufficient capacity • Pipeline blockage	• Pump speed and pressure • Discharge pressure gage (should < 20 psi)	• Increase effluent pump speed • Correct blockage
Excess Settling Tank solids carryover	• Flow may exceed capacity • Polymer type or dosage incorrect	• Flow rate • Conduct jar tests to verify polymer process	• Reduce flow rate to unit(s) • Adjust polymer dosage

Indicator/Observation	Probable Cause	Check or Monitor	Solutions
Process pump failure	• Tripped breaker, faulty VFD, or other electrical fault	• Appropriate breaker or VFD messages	• Start backup process unit • Re-set breaker • Re-start VFD after correcting faults • Call electrician if prior steps unsuccessful
High differential pressure across Greensand filters, Organoclay Vessel or GAC Vessels	• Vessel(s) require backwashing	• Vessel run time • Discharge pressure gages	• Backwash affected vessels

Appendix C—Sample Daily Process Log

WASTEWATER DAILY TREATMENT REPORT--SYNCON RESINS SUPERFUND SITE

Sevenson Environmental Services, Inc.

Date: _____

Operator: _____

TOTAL DAILY FLOW REPORT

Shift Beginning:	Flow Meter Reading	
Shift Ending:	Flow Meter Reading	
	Daily Through Put, Gals	

PROCESS CHEMICALS REPORT

	POLYMER USAGE		**SODIUM HYPOCHLORITE USAGE**	
Day Beginning:	Polymer Tank Level, Inches	_____	Hypo Tank Level, Inches	_____
Day Ending:	Polymer Tank Level, Inches	_____	Hypo Tank Level, Inches	_____
	Daily Total Used, Gals	_____	Daily Total Used, Gals	_____
	Amount Remaining, Gals	_____	Amount Remaining, Gals	_____

Order new chemical when approximately 7 days usage remaining

PROCESS CHEMICALS REPORT

	SULFURIC ACID USAGE	
Day Beginning:	Sulfuric Tank Level, Inches	_____
Day Ending:	Sulfuric Tank Level, Inches	_____
	Daily Total Used, Gals	_____
	Amount Remaining, Gals	_____

Order new chemical when approximately 7 days usage remaining

PROCESS pH LEVELS

pH Levels (while operating)

TANK	**8:00 AM**	**12:00 PM**	**4:00 PM**	**8:00 PM**	**12:00 AM**	**4:00 AM**
Greensand Filter Influent						
Greensand Filter Effluent						
Effluent						

SLUDGE PRODUCTION

Sludge	**EQ Tank No. 1**	**EQ Tank No. 1**	**Settling Tank**
Beginning Sludge Level, Ft			
Ending Sludge Level, Ft			
Daily Sludge Pumped, Gals			
Total Daily Sludge Produced, Gals			

WASTEWATER DAILY TREATMENT REPORT--SYNCON RESINS SUPERFUND SITE

Sevenson Environmental Services, Inc.

Date: _____

Operator: _____

CHEMICAL DOSAGE

SODIUM HYPOCHLORITE		POLYMER		SULFURIC ACID	
Influent addition point	_____ mg/L	_____	mg/L	_____	mg/L
Greensand addition point	_____ mg/L				

GREENSAND FILTERS

	Differential Pressure, Inches					Backwash filters @ 15 psi differential
Filter No.	**8:00 AM**	**12:00 PM**	**4:00 PM**	**8:00 PM**	**12:00 AM 4:00 AM**	**COMMENTS**
1						
2						
3						

	Backwash Time, Mins				Check temperature curve in O&M for exact backwash rate
					--> Backwash Filters 15-20 Mins @ 140 Gals/Min
Filter No.	**Start**	**Finish**	**Mins**	**Est Gals**	**COMMENTS**
1					
2					
3					

BAG FILTERS

	Differential Pressure, Inches					Replace filter bags @ 20 psi differential
Filter No.	**8:00 AM**	**12:00 PM**	**4:00 PM**	**8:00 PM**	**12:00 AM 4:00 AM**	**COMMENTS**
1						
2						

ORGANOCLAY VESSEL

					Check temperature curve in O&M for exact backwash rate
	Differential Pressure, Inches					Backwash vessels @ 15 psi differential
Filter No.	**8:00 AM**	**12:00 PM**	**4:00 PM**	**8:00 PM**	**12:00 AM 4:00 AM**	**COMMENTS**
1						

	Backwash Time, Mins				--> Backwash vessels 15-20 Mins @ 500 Gals/Min
Filter No.	**Start**	**Finish**	**Mins**	**Est Gals**	**COMMENTS**
1					

GAC VESSELS

					Check temperature curve in O&M for exact backwash rate
	Differential Pressure, Inches					Backwash filters @ 15 psi differential
Filter No.	**8:00 AM**	**12:00 PM**	**4:00 PM**	**8:00 PM**	**12:00 AM 4:00 AM**	**COMMENTS**
1						
2						

	Backwash Time, Mins				--> Backwash vessels 15-20 Mins @ 500 Gals/Min
Filter No.	**Start**	**Finish**	**Mins**	**Est Gals**	**COMMENTS**
1					
2					

Appendix D: Equipment List

SYNCON RESINS WWTP EQUIPMENT LIST	MANUFACTURER, MODEL NUMBER	NUMBER OF UNITS	DIMENSIONS	CAPACITY	UTILITY REQUIREMENTS	MATERIALS OF CONSTRUCTION	COMMENTS
COLLECTION SUMP PUMPS	GODWIN GSP 20	2	3-inch discharge	70-110 GPM	110v	Steel	3600 rpm
SODIUM HYPOCHLORITE INJECTION PUMPS	LMI Diaphragm pump,	2		4 GPH	110v		4-20mA responsive
SULFURIC ACID PUMPS	LMI Diaphragm pump,	2		1 GPH			4-20mA responsive
STATIC MIXERS	KOFLO	4	3-INCH	200 gpm		PVC80	
20,000 GALLON EQUALIZATION TANKS (2)	Adler Tanks--FRAC	2	45' x 8.5'	20,000 gallon		Epoxy coated steel	
18,000 GALLON WEIR TANK	Rain for Rent	1	43.5' x 8'	18,000 gallon		Epoxy coated steel	
OIL WATER SEPARATOR	Rain for Rent	1	8.5' x 6.8'	200 gpm		Epoxy coated steel	
SETTLING TANK FEED PUMPS	Mission Magnum, 2 X 3, 5 hp	2	3' x 6'	200 gpm	460V, 3pH.	Steel	1800 rpm variable
FLOW METERS (FM-1,2)	Seametrics Insertion Magmeter,EX250	2	2" mtg thds.	0-7,000 gpm	12-25VDC	SS-316	4-20 mA capable
POLYBLEND , POLYMER MIX UNIT 1	Polyblend PB-600-2	1	1' x 3' x 3'	2 gph	110V	Alum/Steel	4-20mA responsive
IPC PUMP TANK	Sevenson Pump Tank	1	8' x 9.5'	3,600 gallons		Steel	
AIR OPERATED DIAPHRAM PUMPS	Warren Rupp PMP, S30B1A1EANS000	1	2' x 2'x 3'	239 gpm	100 PSI, Air	Aluminum	
FILTER FEED PUMPS	Mission Magnum, 2 X 3, 7.5 hp	2	3' x 7'	200 gpm	460V, 3pH.	Steel	800-1800 rpm
FLOWMETER (FM-5&6)	Seametrics IP-150, Insertion type	2	2" mtg thds.	0-10,000 gpm	5-24VDC	SS 316	4-20 mA capable
GREENSAND FILTER SKID	TIGG	3	22' x 9.5' x 16.3'	200 gpm		Epoxy coated steel	
ORGANOCLAY VESSEL SKID	TIGG	1	22' x 9.5' x 16.3'	200 gpm		Epoxy coated steel	
GAC VESSEL SKID	TIGG	1 w 2 VESSELS	22' x 9.5' x 16.3'	200 gpm		Epoxy coated steel	
BAG FILTERS	Filtrek, S4PLEA24-612-6F-D	1 w 2 VESSELS	5' x 5' x 5'	600 gpm		SS 304	
EFFLUENT/BACKWASH STORAGE TANK	Adler Tanks-FRAC	1	45' x 8.5'	20,000 gallon		Steel	
BACKWASH PUMP	Mission Magnum, 3 X4, 15 hp	1	3' x 7'	500 gpm	460V, 3Ph	Steel	800-1800 rpm
GRAVITY THICKENER	Plastic Mart	1	8' dia x 8.8 ft	3,300 gallons		Polyethylene	
SLUDGE BOX	Adler Tanks	1	23 ' x 8.5' x 6.5'	25 Cu yards		Steel	
LEVEL SENSORS	VEGASON 61, SN61.UXANHKNAX	4	6' x 6' x 6'		110V	PVC80	Ultrasonic Sensor
HDPE PIPING	Driscopipe 1000, SDR 17	--	Various	Various		HDPE	Fusion Welded
HOSES	Goodyear Versiflo,	--	Various	150 psi		Rubber/wire helix	

Job Safety – Execution Plan –Clearspan Structures

Contractor	Mahaffey Tent & Awning Co., Inc. DBA: Mahaffey Fabric Structures	Description of Work	Equipment / Facilities to be Mobilized
Address: **4161 Delp Street** **Memphis TN 38118** **Telephone: 901-363-5611** **Fax: 901-362-8700**	**www.mahaffeyusa.com**	Installation and dismantle of temporary to semi-permanent portable shelters. These structures are pre-fabricated buildings of various sizes either on aluminum or steel frame with fabric sidings and roofs. Our accessories include lighting packages, exhaust fans, personnel doors, rollup doors and insulated Guardian hard sides.	Our installation requires the use of all-terrain forklifts, man baskets, ladders, and various hand tools. These lifts are rented from National Equipment Rental providers and delivered to site via their delivery fleet. All building materials will arrive to the site via common carrier. Our installation crew will arrive prior to delivery to handle logistics and unloading of these carriers.

Supervisor/Worker Ratio	1:5 is normal ratio; varies upon the activity.

Equipment to be Used	Inspection Requirements	Training Requirements	Other resources
6K Reach Forklift Aerial Man Lift Ladders Lifting Hook & Strap System Jack Hammer Portable Generator Fire Extinguisher Battery powered hand tools Various hand tools Safety utility knives Top puller	**Each shift:** Site/ work area, hoses, hand tools, power cords/power tools, work area, PPEs **Daily:** Forklift, AWP, generator, ladders, rigging equipment, fuel cans, spill control-secondary containment (i.e. generator)	Competent Personnel Training per OSHA requirements Mahaffey in-house training Site specific training Mahaffey forklift/aerial platform inspections Mahaffey Safety Handbook	Mahaffey has preferred vendors nationally that provide our equipment that will be utilized on site.

Execution Plan /Activity Hazards

Mahaffey Tent & Awning Co, Inc./DBA Mahaffey Fabric Structures

MAHAFFEY
FABRIC STRUCTURES

Activity or DFOW:	
Project:	
Contractor Performing Work:	Mahaffey Fabric Structures
Date Prepared:	10/22/2013
Last Updated:	6/26/2017
EP Prepared By:	John Dale
EP Reviewed By:	Gary Moederndorfer
Signature:	
Notes:	

Overall Risk Assessment Code (RAC) (Use highest code)

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

PPE to be worn at all times during the job:

- Hard Hat
- Steel Toe Shoes
- Industrial Gloves
- Safety Vest (High Visibility)
- Safety Glasses with side protection
- Ear protection where applicable

This Execution Plan has been designed to ensure general compliance with all jobsite safety requirements. Its daily use and review, however, do not relieve or override the responsibility for compliance with all applicable safety laws, regulations, ordinances, and contractual requirements. The Mahaffey Field Supervisor is responsible for reviewing this Execution Plan with all personnel involved with each Definable Feature of Work (DFOW) on a regular basis and must notify the company Safety Director to adjust the Execution Plan as necessary whenever the plan for performing the DFOW is modified. Mahaffey Field Supervisor must provide justifiable cause for amendment and gain approval from Safety Director prior to altering processes.

Organization and Communication	**Toolbox Safety Meetings** Mahaffey supervisors regularly conduct toolbox safety meetings while on site. Supervisors review proper PPE usage, proper lifting techniques, hand tool safety and, ladder safety. The supervisor should take great care to assess the workday's activities and ensure that all crew personnel are aware of all safety issues. Supervisors use these meetings to review relevant safety practices applicable to the day's task, and they serve as another line of defense in Mahaffey's desire to prevent injury. **General Safety Requirements** · **Job Safety Analysis** Mahaffey has developed Job Safety Analysis (JSA) to be used as a guideline to plan and execute work. JSA's identify the work activity, hazards involved in performing the activity, and the actions to be taken to eliminate the hazard or the personal protective equipment required to perform the work safely. Additional JSA's shall be developed when site specific conditions change and Hazards are identified that need to be addressed and mitigated prior to the start of work activities. Some site specific items are considered high risk activities: elevated work, and forklift and man-lift utilization. In industrial situations this could include activities being conducted around operation of heavy equipment. · **Safety Task Assignments** Safety Task Assignments shall be used by each Supervisor and employee to identify site specific Safety Hazards and safety precautions that pertain to his or her job. The Supervisor shall give an explanation to all employees before they begin a task. Employees shall be instructed to report any unsafe conditions or act to Supervision in a timely manner so the act or condition can be corrected. · **Assessment and Monitoring program** The monitoring and inspection of equipment and tools is essential to the prevention of accidents. Tools and equipment shall be inspected on a monthly basis and prior to each use. Tools inspected on a monthly basis are not limited to extension cords, ladders, fire extinguishers, fall protection, power tools and rigging. All inspections shall be documented. **Project Safety Goal: Zero Accidents** Mahaffey has a corporate safety goal of Zero Accidents for all job sites. Incorporated within that goal are several sub goals to achieve overall project success. They are: • Walk-the-talk in our belief to promote Zero Accidents. • Promote Behavior Based Safety Principles on all projects. • Communicate to each employee that safety is a value and not a priority. • Achieve 0.00 Lost Time Incidence Rate (LTIR) and 0.00 Total Recordable Incidence Rate (TRIR) on Client Projects. • Achieve no Workers' Compensation Cases • Successful project completion to ensure a long-term relationship. • 100% Fall Protection Policy. • Continue to assure the field that safety is a consistent commitment from Mahaffey management.

Organization and Communication (continued)	**Mahaffey PPE Policy** Mahaffey believes that proper use of Personal Protective Equipment (PPE) reduces injuries for employees. We train all employees in the proper use of PPE pursuant to OSHA 1926 Subpart E - Personal Protective and Life Saving Equipment. Mahaffey stresses the following for all employees: · Be aware of when PPE is necessary · Know what kind of PPE is necessary · Understand the limitations of PPE in protecting workers from injury · Put on, adjust, wear, and take off PPE · Maintain PPE properly Below is a list of Mahaffey PPE that may be needed to complete jobs. Inspect PPE prior to each use. Do not use damaged PPE. Maintain and keep PPE clean. · **Safety Glasses** – must be worn at all times in designated areas. · **Hard Hats** – must be worn at all times in designated areas. · **Gloves** – industrial strength work gloves must be worn at all times when handling sharp or rough stock, welding, or performing other jobs, which could cause hand injuries. Synthetic gloves must be worn when handling chemicals. · **Respirators** – only employees trained and authorized to use respirators are allowed to do so. · **Hearing Protection** – is required in areas where noise exposure is more than 90dBA (85dBA if you already have experienced a hearing loss). · **Steel Toe Shoes/Boots** – required when installing, dismantling, or handling tent framing and/or similar materials, which could fall and cause foot injury. This PPE is standard in warehouse and on-site and is required at all times. · **Lifelines, safety belts and lanyards** – required when working in aerial lifts, tall ladders, or in other equipment when suspended above ground. Lifelines, safety belts, lanyards must be connected to a secure structural member. Full body harness with lanyards are required when working more than 6' off the ground. **Unsafe Conditions Reporting** If an employee has any questions about how a task should be done safely, he/she is under instruction not to begin the task until the situation is discussed with the supervisor. Together, they will determine the safest way to do the job. If, after discussing a safety situation with the supervisor, an employee still has questions or concerns, he/she along with the supervisor is required to contact the Safety Coordinator. No employee is ever required to perform work that he/she believes is unsafe, or that he/she thinks is likely to cause injury or a health risk to themselves or others.

Execution Plan /Activity Hazards

Mahaffey Tent & Awning Co, Inc./DBA Mahaffey Fabric Structures

MAHAFFEY
FABRIC STRUCTURES

Installation Activity	Potential Hazard	Action/Procedure	Tools / PPE	RAC
1. Client Site Specific Plan– Health, Safety, and Security Procedures. **Job Box Meeting:** Go over Execution Plan / AHA and discuss site specific orientation; badging; and objectives for the day.	Not being familiar with task - or site specific instructions/procedure, causing work stoppage and/or unsafe work environment.	JSA: execution plan for the project. (TRAINING on JSA and site specific) Attend Site Specific Orientation prior to starting work (obtain badge). Review steps involved in Tent set-up with all on-site personnel involved. Tools and cords in job box to be inspected before each use for defects. Defective tools and cords are not to be utilized.	Confirm Proper PPE is available and inspected – adequate supply for all personnel on site. Hard hat, safety glasses, steel-toe safety shoes or boots that comply with OSHA standards must be worn at all times on the site. Wear appropriate PPE. Adequate amount of first aid kits.	L
2. Task: unload truck (on-site) Receive delivery of frame, fabric, and HVAC units. Inspect delivery, sign for materials, and unload truck (Mahaffey tractor-trailer or contract carrier).	Exposure to equipment – forklift operation hazards, and potential risk of crushing and pinching. Fall protection over 6 ft. (when up on carriers, assisting with off-load).	OSHA Certified Forklift Operator training in ASME/ANSI B56.6 and B56.1 (Rough Terrain and Industrial Forklift).	Hard hats, gloves, safety shoes, and hi-visibility vest are to always be worn while loading and unloading trucks. A spotter will be provided to assist forklift operator in watching for pinch points, other hazards, and personnel.	L
3. Task: Layout base plates. Layout plates and measure spacing to prepare for staking.	Exposure to lifting and kneeling hazards, tripping hazard, pinching, and potential soft tissue damage if not performed appropriately.	Training on Proper Lifting Techniques Training on Slips and Falls Training on Housekeeping	Use appropriate gloves when handling base plates. Wear appropriate PPE. Keep area clear of personnel while running measurements to minimize tripping hazard. Move in a controlled manner when kneeling and standing and then kneeling again...maintain balance and posture.	L
4. Task: Check anchoring for appropriate holding power using the IFAI Thumb Test.	Exposure to lifting hazard, overhead hazard.	Training on IFAI Thumb Test	Observe proper lifting technique when maneuvering frame. Wear appropriate PPE.	L

5. Task: Install Stakes. Drive stakes into ground using sledgehammer and electric jack hammer.	Exposure to pinch, lifting hazards, hearing hazards, and potential soft tissue damage.	Training on Hand Tool Safety Training on Safety Rules for Power Tools Training on Proper Lifting Technique Training on Hearing Protection & Noise Control	Wear appropriate PPE and industrial work gloves. Wear proper ear protection to avoid long-term hearing loss. Observe proper technique when swinging the sledgehammer. Keep other individuals clear of swing path. Utilize proper technique for stabilizing stake until it is stable in the ground (stabilizing arm directly across from hammer path and 1 1/2 to 2 feet below stake head.) Observe proper lifting technique when raising jack hammer to stake head. Use of electric jack hammer with stake cup to lessen employee fatigue and injury risk. Maintain proper communication and teamwork to ensure fatigue does not lead to injury. Maintain posture while operating jack hammer...bending with knees and keeping movements slow and steady. For stakes longer than the normal 42" length (60" or 72") utilize the man lift basket to achieve a safe working elevation to start the stakes. Jackhammer operator should be in a harness and properly attached inside the man lift basket and utilize the door opening of the basket to drive the stakes. Basket should be raised/lowered with the progress of the stake being driven to maintain a safe working level throughout the process.	L

6. Task: Layout Frame Assemble all rafters or arches on the ground to prepare for lifting. Use blocking to support when necessary.	Exposure to lifting hazard, overhead hazard, ladder hazard, tripping hazard, forklift operation and man-lift operation hazards. Rigging equipment failure.	Training on proper lifting techniques Training on Head Protection – Proper PPE Training on Slips and Falls Training on Housekeeping Observe proper lifting technique when placing frame on ground. OSHA Certified Forklift Operator training in ASME/ANSI B56.6 and B56.1 (Rough Terrain and Industrial Forklift). Utilize forklift and lifting sling when moving larger profile frame. Use of forklift for distributing frame to increase productivity and lower employee fatigue.	Wear appropriate PPE. Observe proper lifting technique when maneuvering frame. Maintain two-man team when carrying, placing and connecting rafter beams. A spotter will be provided to assist forklift operator in watching for pinch points, other hazards, and personnel.	L
7. Task: Hook Up	Exposure to lifting hazard and pinch points.	Training on Hand Tool Safety Training on Proper Lifting Technique OSHA Certified Forklift Operator training in ASME/ANSI B56.6 and B56.1 (Rough Terrain and Industrial Forklift). Utilize forklift and lifting sling when assembling larger profile frame.	Wear industrial gloves to protect hands while connecting the uprights and rafters using locking pins. Make sure pin is correctly locked and foot pin is to the outside of the structures. A spotter will be provided to assist forklift operator in watching for pinch points, other hazards, and personnel.	L
8. Task: Inspect rigging for raising structure	Exposure to lifting hazard, overhead hazard.	Training on Proper rigging.	Wear appropriate PPE.	L

9. Task: Raise frame with forklift, lifting hook, and lifting sling. Connect with purlins. Install cables or braces in wall bays.	Exposure to lifting hazard, overhead hazard, ladder hazard, and tripping hazard. Exposure to fall hazards (working levels will exceed 10 ft. in height. 100% fall protection will be mandatory).	Training on proper lifting techniques Training on Head Protection – Proper PPE Training on Ladder Safety and Spotting Protocols when above 6' on ladder. Training on Slips and Falls Training on Housekeeping Observe proper lifting technique when unfolding fabric. Clear the area of unauthorized personnel to reduce tripping hazards while frame is laid out over footprint of structure. OSHA Certified Forklift Operator training in ASME/ANSI B56.6 and B56.1 (Rough Terrain and Industrial Forklift). OSHA training on Scissor-lifts and Aerial Work Platform Operator pursuant to ANSI A92.3, A92.5, A92.6 AWP Operator – Manually Propelled Boom, Scissor. Fall Protection Training Utilize forklift, rigging and/or, and lifting sling when assembling larger profile frame.	Wear appropriate PPE. Use proper ladder operation technique...using a spotter with two hands on the ladder at all times when at or above 6' in elevation. Maintain proper communication and teamwork to prevent pinch points from un-planned movements. Work as two-man team when carrying, placing, and connecting rafter beams. Provide spotter when utilizing forklift to assemble larger frame to assist forklift operator to watch for pinch points. Man-lift PPE – full body harness with shock absorbing lanyard – ensure that all personnel within man-lift are properly secured utilizing approved and inspected harness and lanyard. Lanyard is attached to approved anchor points. Ladder PPE if over 6 feet includes full body harness with shock absorbing lanyard attached to an approved anchor point. If utilized, ensure lifting strap is properly rated and in good condition (defective equipment is not to be used).	L
10. Task: Pull tops. Insert and pull tops over temporary structure	Exposure to pinch points, hand lacerations, and potential soft tissue damage (Muscle, ligament or tendon...strain, stress or pull), ladder and forklift hazard.	Training on Head Protection – Proper PPE Training on Ladder Safety and Spotting Protocols when above 6' on ladder. Observe proper lifting technique when handling fabric. OSHA training on Scissor-lifts and Aerial Work Platform Operator pursuant to ANSI A92.3, A92.5, A92.6 AWP Operator – Manually Propelled Boom, Scissor. Fall Protection Training Maintain proper communication and teamwork to prevent pinch points from un-planned movements.	Wear appropriate PPE. Industrial work gloves must be worn when pulling rope Man-lift PPE – full body harness with shock absorbing lanyard – ensure that all personnel within man-lift are properly secured utilizing approved and inspected harness and lanyard. Lanyard is attached to approved anchor points.	L

11. Task: Hang Sidewalls	Exposure to lifting hazard, Exposure to pinch points, hand lacerations, and potential soft tissue damage (Muscle, ligament or tendon...strain, stress or pull), and exposure to fall hazards.	Training on proper lifting techniques Maintain proper communication and teamwork to prevent pinch points from un-planned movements. Training on Ladder Safety and Spotting Protocols when above 6' on ladder. OSHA training on Scissor-lifts and Aerial Work Platform Operator pursuant to ANSI A92.3, A92.5, A92.6 AWP Operator – Manually Propelled Boom, Scissor. Fall Protection Training	Wear appropriate PPE (hard hats, gloves, safety glasses, and safety shoes). Man-lift PPE – full body harness with shock absorbing lanyard – ensure that all personnel within man-lift are properly secured utilizing approved and inspected harness and lanyard. Lanyard is attached to approved anchor points.	L
12. Task: Close Beam Covers	Exposure to lifting hazard, Exposure to fall hazards while walking atop the structure.	Training on use of Life-Line System Training on use of retractable lanyard Maintain proper communication and teamwork to prevent pinch points from un-planned movements. Training on Ladder Safety and Spotting Protocols when above 6' on ladder. OSHA training on Scissor-lifts and Aerial Work Platform Operator pursuant to ANSI A92.3, A92.5, A92.6 AWP Operator – Manually Propelled Boom, Scissor.	Wear appropriate PPE. Life-Line/PPE – Life-line system is attached to approved structural anchor points. Full body harness with shock-absorbing, yo-yo style retractable lanyard is attached to approved structural anchor points while moving around atop the structure (fabric) to open covers. Individual on the structure will move up and down directly over structural trusses only. Man lift operator to keep basket of the man lift in as close proximity to the individual working on the structure as is physically possible at all times to ensure optimum safety. Man-lift PPE – full body harness with shock absorbing lanyard – ensure that all personnel within man-lift are properly secured utilizing approved and inspected harness and lanyard. Lanyard is attached to approved anchor points.	L

13. Task: Install accessories as required (Lights, fans, personnel doors).	Exposure to lifting hazard, Exposure to pinch points, Exposure to fall hazards Exposure to overhead hazard. Exposure to Power Tools Exposure to Electrical Power	Training on proper lifting techniques Training on Head Protection – Proper PPE Fall Protection Training Maintain proper communication and teamwork to prevent pinch points from un-planned movements. Training on Ladder Safety and Spotting Protocols when above 6' on ladder. Training on Safety Rules for Power Tools Lockout- Tagout Training	Wear appropriate PPE. Ladder PPE if over 6 feet includes full body harness with shock absorbing lanyard attached to an approved anchor point. Ensure that all power sources are inactive during installation of all electrical accessories.	L

13A- 1. Move materials to designated work area.	Preparation of work area	Obtain all required site-issued permits, including Hot Work if cutting or creating sparks; complete pre-task inspections for all mobile equipment and document of required Fluor forms; establish requisite barricades (RED for working at height and YELLOW for other physical hazards);		L
		Wear ANSI 2 approved safety vest, make eye contact with operators to ensure they know your proximity, use spotters as needed.		
		Keep clear of all swinging/moving equipment, do not walk on haul roads, secure all loads prior to transport; under the fork attachments must be approved by the manufacturer of the forklift and shall be rated appropriately for the load; develop a Green Lift Checklist for all loads greater than 40% of the rated capacity for the forklift; operators inspect equipment before use to ensure all safety devices are functioning properly; maintain spill kits for all mobile equipment.		
		Use proper lifting techniques when moving materials by hand, use 2 workers for items weighing more than 40 lbs., maintain good housekeeping in work area at all times.		
		Use ANSI approved Cut Level 5 gloves when handling or working near sharp objects.		
		Ensure work areas are maintained in an orderly manner; materials are staged properly, housekeeping is observed at all times, clear paths/walkways are maintained, personnel will not walk on/over staged materials.		
		Field constructed ladders ARE NOT permitted; inspect ladders and mark with required monthly color code; ladders can only be used if the load markings are legible; use 1A type ladders.		
		Secure all loads while in transit, utilize spotter as needed if moving mobile equipment		
		Always use GFCIs; inspect all electrical leads by a competent person and mark with current color code; always maintain current (annual inspections) fire extinguishers in a ready position; never refuel portable generators when hot or when running		
		Maintain adequate lighting in all work and task areas.		
		Do not wear dark lens safety glasses inside the Canteen.		

Execution Plan /Activity Hazards

Mahaffey Tent & Awning Co, Inc./DBA Mahaffey Fabric Structures

MAHAFFEY
FABRIC STRUCTURES

13A-2. Unload and stage garage door components	2.1 Slips, trips, and falls	2.1 Good housekeeping, clean as you go, stage material so that employees are not forced to walk on/over materials, leave clear walkways	L
	2.2 Back/muscle injuries from manual handling of material	2.2 Employ appropriate lifting practices, team lift >40 lbs. to help avoid injuries; use proper lifting techniques	
	2.3 Pinch points and hand injuries	2.3 Appropriate hand protection, ANSI Cut Level 5 resistant gloves, hand and body positioning awareness	
13A- 3. Unpack material and stack door components in order	3.1 Back/muscle strain from manual handling of components	3.1 ANSI Cut Level 5 gloves for handling materials; use self-retractable knives	L
	3.2 Slips, trips, and falls from discarded cardboard/packaging material	3.2 Appropriate material handling practices; team lift for >40 lbs.; use proper lifting techniques	
		3.3 Good housekeeping. Dispose of packaging in designated trash receptacles; clean as you go; place all materials on dunnage.	
13A - 4. Prepare door components by attaching hardware	4.1 Pinch points, hand injuries, lacerations, bruises	4.1 Appropriate hand protection, hand placement, ANSI Cut Level 5 gloves	L
	4.2 Strains, muscle injuries	4.2 Appropriate material handling techniques and lifting practices. Utilize two workers to lift door segments	
	4.3 Hand and power tools	4.3 Inspect all hand and power tools prior to use; any defective tools are to be tagged 'out-of-service' immediately; all power tools shall be inspected by a competent person and marked with the current color code; power tools with auto- on switches are not permissible.	

13A- 5. Prepare door opening by installing side rails/track (self tapping screws to secure track to steel door frame)	5.1 Cuts, pinches, and bruises	5.1 Appropriate hand protection, body placement/positioning awareness at all times.	L
	5.2 Fall from height	5.2 Ensure all workers are trained in OSHA fall prevention training. Ensure all workers are trained in Personal Fall Arrest System (self-retractable lanyards). Ensure all workers inspect their PFAs system (harness, retractor, anchorage points, and D rings). Competent Person shall inspect all fall protection equipment and shall mark with current color code; rigging shall not be used as fall protection. All workers in the scissor lift must be certified to operate the lift, conduct a pre-use inspection & record, demarcate area with red barricade tape & tags; follow STOP THE DROP protocol by using tool lanyards and securing all loads & materials; practice safe operating practices. All workers in scissor lift must tie off.	
	5.3 Hit by dropped overhead objects	5.3 Use tool lanyards and secure screws in bag/box, demarcate work area with red barricade tape and tags	
13A- 6. Install drum and curtain	6.1 Cut and pinch injuries to hands/fingers	6.1 Appropriate hand protection/placement.	L
	6.2 Fall from heights	6.2 Refer to 5.2 and apply all safety protocols.	
	6.3 Hit by objects dropped from overhead work.	6.3 Refer to 5.3 and apply all safety protocols.	

13A- 7. Install overhead track and conduct final tightening of nuts to secure door track	7.1 Fall from heights	7.1 Refer to 5.2 above.	L
	7.2 Injuries from objects dropped	7.2 Refer to 5.3 above.	
	7.3 Injuries from line of fire using wrenches/hand tools	7.3 Safe working practices with hand tools, specifically wrenches. Never place yourself in the line-of-fire; always move to a better working position. Be sure to place socket fully on nut and tighten gradually.	
	7.4 Cut/pinch fingers	7.4 Appropriate hand protection and ensure that gloves are ANSI Cut Level 5 for handling sharp objects.	
13A- 8. Install door lifting mechanism, tension door, and check movement	8.1 Fall from height	8.1 Refer to 5.2 above.	L
	8.2 Injuries from objects dropped.	8.2 Refer to 5.3 above.	
	8.3 Cut and pinch from tightening assembly to structural framing using self-tapping screws.	8.3 All required PPE as above.	
	8.4 "Line-of-fire" injuries from tightening spring component of door lift assembly.	8.4 Only use the tool provided by the manufacturer to tighten spring tension. Follow the manufacturer's assembly and installation directions. Work from a safe position and only tighten a quarter turn at a time. Never place yourself in the line-of-fire.	

14. Task: Set HVAC Units in place.	Exposure to pinch points, hand lacerations, and potential soft tissue damage (Muscle, ligament or tendon...strain, stress or pull).	OSHA Certified Forklift Operator training in ASME/ANSI B56.6 and B56.1 (Rough Terrain and Industrial Forklift) Maintain proper communication and teamwork to prevent pinch points from un-planned movements.	Wear appropriate PPE. A spotter will be provided to assist forklift operator in watching for pinch points other hazards, and personnel.	L
15. Task: Install Mahaffey HVAC W	Exposure to lifting hazard, Exposure to pinch points, hand lacerations, and potential soft tissue damage (Muscle, ligament or tendon...strain, stress or pull), exposure to fall hazards.	Training on proper lifting techniques Maintain proper communication and teamwork to prevent pinch points from un-planned movements. Training on Ladder Safety and Spotting Protocols when above 6' on ladder. OSHA training on Scissor-lifts and Aerial Work Platform Operator pursuant to ANSI A92.3, A92.5, A92.6 AWP Operator – Manually Propelled Boom, Scissor.	Wear appropriate PPE. Man-lift PPE – full body harness with shock absorbing lanyard – ensure that all personnel within man-lift are properly secured utilizing approved and inspected harness and lanyard. Lanyard is attached to approved anchor points.	L
16. Task: Install Flex Duct between HVAC wall and Unit	Exposure to Power Tools. Exposure to pinch points, hand lacerations, and potential soft tissue damage (Muscle, ligament or tendon...strain, stress or pull)	Training on Safety Rules for Power Tools	Wear appropriate PPE.	L
17. Task: Clean Up. Load any tools and left over materials back into truck.	Potential exposure to tripping hazard.	Training on Slips and Falls Training on Housekeeping	Wear appropriate PPE and dispose of trash as regulated.	L