SDMS Document
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SAMPLING AND ANALYSIS PLAN – REVISION 2

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
OPERABLE UNIT 2 – BUILDING DEMOLITION
SOUTH PLAINFIELD, NEW JERSEY

CLUSTER 12

CONTRACT # W912DQ-04-D-0023
DELIVERY ORDER #0005

Prepared By:

SEVENSON ENVIRONMENTAL SERVICES, INC.
2749 Lockport Road
Niagara Falls, NY 14305

November 2006
Revision 1: December 5, 2006
Revision 2: December 14, 2006

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
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SAMPLING AND ANALYSIS PLAN

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FIELD SAMPLING PLAN

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- Field Change Request Form
- Corrective Action Form
- Laboratory/Analytical Deficiency Notification
- Data Evaluation Checklist

Appendix B: Analytical Laboratory Quality Assurance/Quality Control Plan

List of Abbreviations and Acronyms

CIH	Certified Industrial Hygienist
cm^2	Square Centimeters
COC	Chain-of-Custody
CQC	Contractor Quality Control
CQCSM	Contactor Quality Control Systems Manager
DCQCR	Daily Chemical Quality Control Report
DQO	Data Quality Objective
FCR	Field Change Request
FedEx	Federal Express
FSP	Field Sampling Plan
HNO_3	Nitric Acid
IDW	Investigation Derived Waste
µg	Microgram
mL	Milliliter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NCR	Non-Conformance Report
NJDEP	New Jersey Department of Environmental Protection
OU-2	Operable Unit 2
Oz	Ounce
PCB	Polychlorinated Biphenyl
pCi/g	Picocuries per gram
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCSR	Quality Control Summary Report
RDCSCC	Residential Direct Contact Soil Cleanup Criteria
SAP	Sampling and Analysis Plan
Sevenson	Sevenson Environmental Services, Inc.
SOP	Standard Operating Procedure
SSHO	Site Safety and Health Officer
SSHERP	Site Safety, Health, and Emergency Response Plan
SVOC	Semi-Volatile Organic Compound
TCLP	Toxicity Characteristic Leachate Procedure
TSCA	Toxic Substances Control Act
UPS	United Parcel Service
USACE	US Army Corps of Engineers
USDOT	US Department of Transportation
USEPA	US Environmental Protection Agency
VOC	Volatile Organic Compound
WST	Waste Stream Technology, Inc.

1.0 PROJECT DESCRIPTION

1.1 Introduction

This Field Sampling Plan (FSP) is part of the Sampling and Analysis Plan (SAP), which has been prepared by Sevenson Environmental Services, Inc. (Sevenson) to fulfill the requirements of Contract W912DQ-04-D-0023, Delivery Order 0005 for the U.S. Army Corps of Engineers (USACE) at the Cornell-Dubilier Electronics Superfund Site (site), located in South Plainfield, New Jersey. The purpose of the SAP is to ensure that all data obtained from sampling during the implementation of the remedial action at the Site are of known and acceptable quality, legally defensible, and meet the requirements of the contract specifications and USACE Engineering Manual EM 200-1-3 (Requirements for the Preparation of Sampling and Analysis Plans, February 2001). The FSP describes the field sampling activities that must be performed and defines the procedures and methods that must be used to collect field measurements and samples. The FSP focuses on the performance of all data quality management activities and specifies the procedures for sample collection, packaging, shipping, and analysis. Additionally, the FSP describes field-sampling deliverables. The overall objective of the FSP is to develop and ensure the implementation of procedures for field sampling, chain-of-custody, laboratory analysis, and reporting that will provide legally defensible data of known quality. The FSP provides a framework to ensure that all sampling and analytical data are of known and acceptable quality required for meeting the needs of the end use of data.

1.2 Site Description

The site is located at 333 Hamilton Boulevard in South Plainfield, New Jersey in what is now the Hamilton Industrial Park occupied by an estimated fifteen commercial businesses. Through the years, numerous companies have operated at the site as tenants. It is estimated that approximately 540 people reside within 0.25 miles of the site and the nearest residential homes are less than 200 feet from the site (USEPA, 2006). An unnamed tributary to the Bound Brook traverses the southeast corner of the site property. A site location map is included as Figure 1-1. Operable Unit 2 (OU-2) addresses the remediation of source materials, including contaminated facility soils and buildings. OU-2 has been divided into clusters; Figure 1-2 shows a site plan with the cluster designations.

1.3 Site History and Contaminants

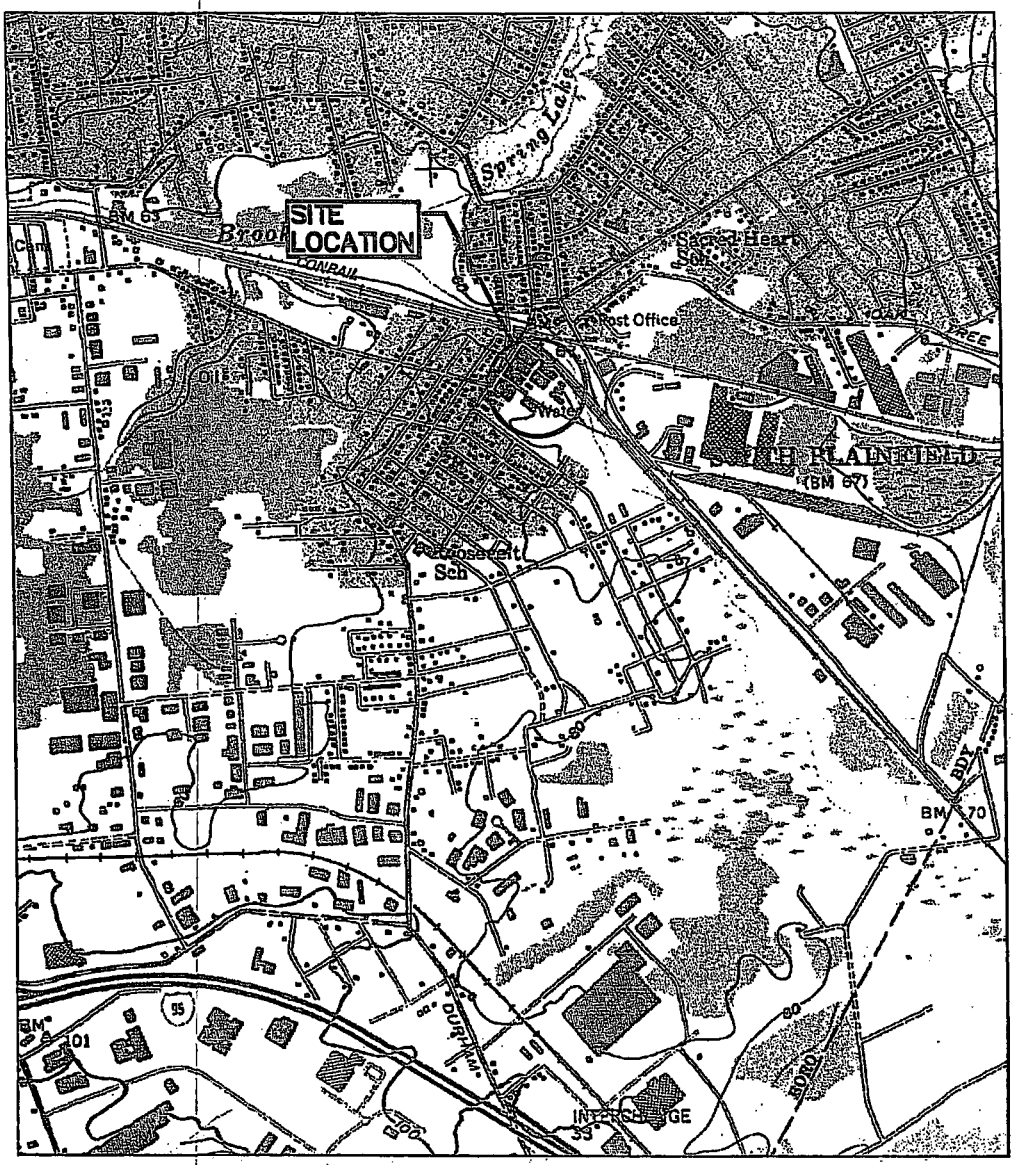
Cornell-Dubilier Electronics, Inc. manufactured electronic parts and components, including capacitors, from 1936 to 1962. Polychlorinated biphenyls (PCBs) and chlorinated organic degreasing solvents were used in the manufacturing process. It is alleged that during the period of operation, Cornell-Dubilier Electronics, Inc. dumped PCB-contaminated materials and other hazardous substances directly onto site soils. A former employee has claimed that the rear of the property was saturated with transformer oils and that capacitors were also buried behind the facility during the same time period (Foster Wheeler, 2002).

The soil at the site is contaminated with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), inorganic constituents, and PCBs. In addition, building interiors at the site have been found to contain elevated levels of PCBs and metals. Historical site data pertaining to OU-2 was collected between 1997 and 2002 and are summarized in the *Final Remedial Investigation Report for OU-2 Onsite Soils and Buildings* (Foster Wheeler, 2002). In addition, summary tables of historical data pertaining to OU-2 buildings are included in the *Data Summary Report, Operable Unit 2 – Building Demolition, 100% Completion Phase* (Malcolm Pirnie, 2006).

1.4 Site Specific Definition of the Problem

Work is being conducted at the Cornell-Dubilier Electronics Superfund Site due to contamination found in soil and building materials associated with past industrial operations conducted at the site. Sevenson will be responsible for demolition of structures; transportation of all waste and offsite disposal of all waste including demolition debris and soil resulting from demolition; site restoration with backfill and pavement; sampling and analysis of soil, water, air, and building material; and other activities necessary for complete and proper demolition of the site.

FIGURE 1-1: SITE LOCATION MAP



SOURCE: U.S.G.S. TOPOGRAPHIC MAP,
7.5 MINUTE SERIES, PLAINFIELD, NEW JERSEY
QUADRANGLE, 1955, PHOTOREVISED 1981

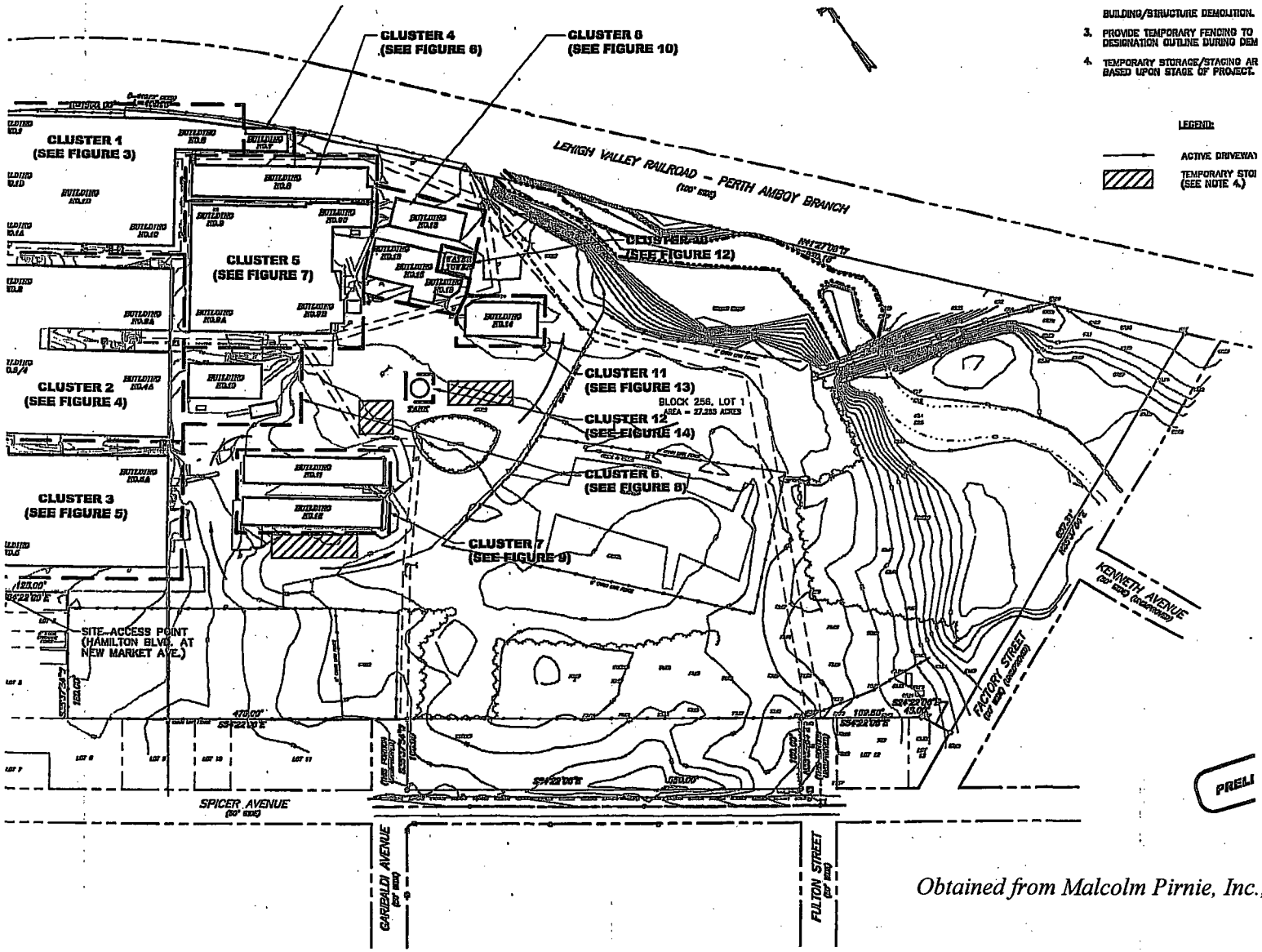
REF:

MALCOLM PIRNIE	U.S. ARMY CORPS OF ENGINEERS CORNELL–DUBILIER SUPERFUND SITE SOUTH PLAINFIELD, NJ CONTRACT No: W912DQ–06–D–006	SITE LOCATION MAP SCALE AS NOTED	MALCOLM PIRNIE, INC. JUNE 2006 FIGURE 1

User: WELSHANS Spec: PIRNIE STANDARD File: F:\Projects\4553023\CADD\Figures\SITE-LOCATION-4553023.DWG Scale: 1:1 Date: 06/19/2006 Time: 13:28 Layout: FIGURE 1

Obtained from Malcolm Pirnie, Inc., 2006

FIGURE 1-2: SITE PLAN WITH CLUSTER DESIGNATIONS



Obtained from Malcolm Pirnie, Inc., 2006

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

2.1 Site Organization

The successful completion of any project requires an effective organization skilled in management techniques and controls. Sevenson distinguishes itself by its ability to organize, schedule, staff, and manage projects. Sevenson's corporate policy is to perform a quality job and earn a client's satisfaction, respect and repeat business. Sevenson's entire staff, including the President, involves themselves in project operations with project needs taking first priority. This approach is key to Sevenson's unmatched record for completing projects on time, within budget and to the customer's satisfaction.

Prior to mobilization to a job site, Sevenson establishes the project schedule, cost control system, prepares project submittals, and develops the required work plans and related documentation necessary to begin work. These are typically discussed with the owner of the project and their engineer.

These documents are reviewed weekly during job-site meetings and plan and/or work adjusted as conditions warrant.

2.2 Resource Management

Sevenson organizes projects with only the most qualified and experienced personnel from a company resource "pool". A project management team is assembled from the pool and is comprised of individuals who have the necessary experience to execute the work safely and efficiently and have experience working together, as a team, on past projects. Once project responsibilities are assigned, the onsite project manager establishes the lines of communications and reporting protocol. Keys to a successful project include teamwork, the development of close communication channels on every level, and clearly assigning responsibilities to project team members. The onsite project manager works closely with the corporate project manager to foster teamwork and cooperation.

Sevenson's employee turnover rate is nearly zero. Sevenson has earned the loyalty of its personnel by providing a secure and positive workplace environment. As a result of their commitment to the company, Sevenson employees are provided training and the real opportunity for personal and professional growth within

the organization. Their personal growth translates into gaining remedial construction insight and experience. Experience and well-trained employees translate into a better project.

When Sevenson engages subcontractors, subcontractor scheduling is incorporated into the Sevenson project planning process; and typically subcontractors work within the firm's project planning process.

2.3 Project Organization

The management structure that will be used to implement the project is presented in Figure 2-1. All individuals may be contacted as specified in Table 2-1.

FIGURE 2-1: PROJECT ORGANIZATION

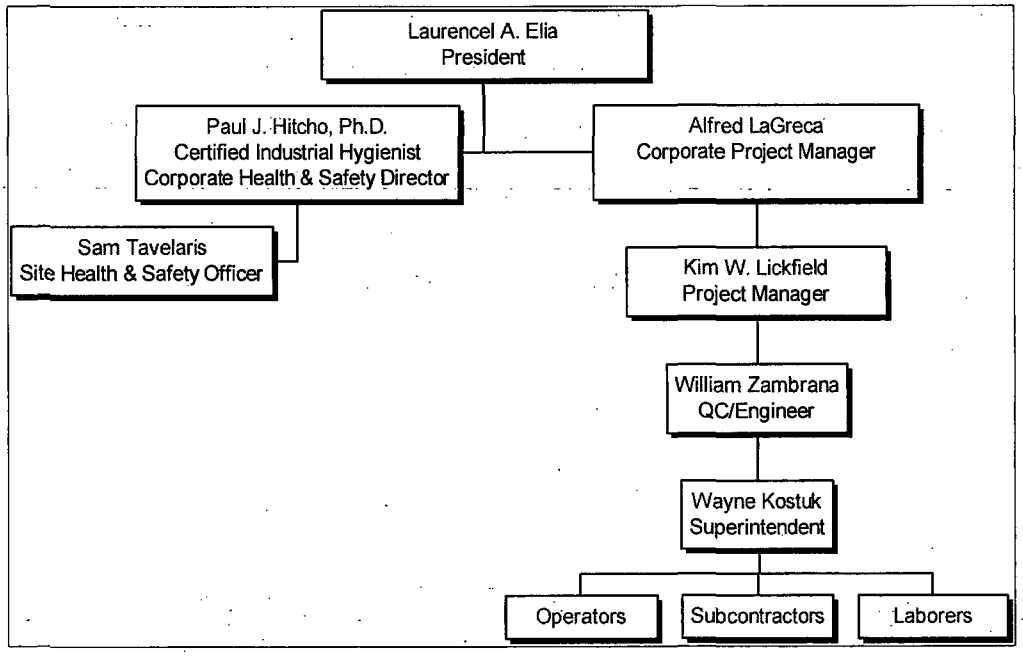


TABLE 2-1: POINTS OF CONTACT		
Name	**Address**	**Phone Number**
Laurence Elia (President)	Sevenson Environmental Services, Inc. 2749 Lockport Road Niagara Falls, NY 14305	Phone - 716-284-0431 Fax - 716-284-1796
Al LaGreca (Corporate Project Manager)	Sevenson Environmental Services, Inc. 2749 Lockport Road Niagara Falls, NY 14305	Phone - 716-284-0431 Fax - 716-284-1796
Paul Hitcho (Corporate Health and Safety Director)	Sevenson Environmental Services, Inc. 2749 Lockport Road Niagara Falls, NY 14305	Phone - 716-284-0431 Fax - 716-284-1796
Kenneth Paisley (Regulatory Specialist and Transportation Coordinator)	Sevenson Environmental Services, Inc. 2749 Lockport Road Niagara Falls, NY 14305	Phone - 716-284-0431 Fax - 716-285-4201
Kim Lickfield (Project Manager)	Sevenson Environmental Services, Inc. 2749 Lockport Road Niagara Falls, NY 14305	Phone - 716-284-0431 Fax - 716-284-1796
William Zambrana (CQCSM/Engineer)	Sevenson Environmental Services, Inc. South Plainfield, NJ 07080 (address TBD)	Phone - TBD Fax – TBD
Sam Tavelaris (Site Safety and Health Officer)	Sevenson Environmental Services, Inc. South Plainfield, NJ 07080 (address TBD)	Phone - TBD Fax – TBD
Wayne Kostuk (Superintendent)	Sevenson Environmental Services, Inc. South Plainfield, NJ 07080 (address TBD)	Phone - TBD Fax – TBD
Jennifer Singer (Project Chemist)	Sevenson Environmental Services, Inc. 2749 Lockport Road Niagara Falls, NY 14305	Phone - 716-284-0431 Fax - 716-285-4201
Dan Vollmer (Laboratory Project Manager)	Waste Stream Technology, Inc. 302 Grote Street Buffalo, NY 14207	Phone - 716-876-5290 Fax - 716-876-2412

Sevenson, on behalf of USACE, has overall responsibility for the remedial activities at the Site. Sevenson will perform the sampling activities described in the FSP. In addition, Sevenson will be responsible for evaluating resultant sampling data and preparing required deliverables. Project direction and field quality assurance (QA) oversight will be provided by USACE.

Sevenson has assigned staff to the following key Chemical Quality Management positions:

- Laurence A. Elia – President

- Al LaGreca – Corporate Project Manager
- Paul Hitcho – Corporate Health and Safety Director
- Ken Paisely – Regulatory Specialist
- Kim Lickfield – On-Site Project Manager
- William Zambrana – Contractor Quality Control Systems Manager (CQCSM)/Engineer
- Sam Tavelaris – Site Safety and Health Officer (SSHO)
- Jennifer Singer – Project Chemist
- Wayne Kostuk – Superintendent

2.3.1 Proposed Staffing Plan

The project management and field supervision team assigned to the site possess a broad range of remedial action and construction skills. All have numerous years experience in the proper handling of contaminated material at hazardous waste sites. All are intimately familiar with components of a project team to work safely and efficiently on a day-to-day basis.

Sevenson's Project Manager and General Superintendent will be the persons with whom the USACE or its designated representative will deal on a daily basis at the job site.

When problems arise that cannot easily be handled in the field, Sevenson field personnel may rely completely on home office support. The first person to be notified in such case will be the Corporate Project Manager, namely, Mr. Al LaGreca. Mr. LaGreca will remain personally involved until the problem is resolved.

The site General Superintendent will report to Mr. LaGreca at least once a day on the progress of the job. Mr. LaGreca will in fact be present on the jobsite as required to ensure that the project is progressing on schedule. At a minimum, Mr. LaGreca will be present on site once a week for the first two months of the project.

Sevenson's health and safety staff consists of a certified site health and safety officer. The program is managed in-house by Dr. Paul Hitcho, a Board-Certified Industrial Hygienist (CIH). Dr. Hitcho is responsible for the preparation, implementation, and enforcement of the site-specific health and safety plans, as well as the air monitoring programs. The SSHO, Mr. Sam Tavelaris, will report to Dr. Hitcho on a regular basis. All job records generated are analyzed completely by Dr. Hitcho.

2.3.2 Home Office Personnel

Laurence A. Elia – President. Mr. Elia will be responsible for the project's success. He will make available all Sevenson resources required to ensure that the project is executed successfully. He will be informed of the project's progress and whether or not the contract is meeting its goals. Mr. Elia will resolve problems that cannot be resolved by the Program Manager. He will periodically visit the Site and become acquainted with field personnel and procedures.

Paul Hitcho, PhD, CIH – Corporate Health and Safety Director. Dr. Hitcho is a CIH with over 20 years experience in managing health and safety issues for government and private remedial projects. Dr. Hitcho will be responsible for review and approval of the Site Safety, Health, and Emergency Response Plan (SSHERP). He will also provide SSHO supervision, present initial site-specific training to all Site personnel, perform the respirator qualitative fit tests, and develop the air-monitoring program. He will conduct quarterly safety audits/inspections.

Al LaGreca – Corporate Project Manager. Mr. LaGreca will be ultimately responsible for the project's success. He will make available all Sevenson resources required to complete the project successfully. He will be kept informed of the project's progress and whether or not the contract is meeting its goals. Mr. LaGreca will resolve problems that cannot be resolved by the Project Manager or the Site Superintendent. He will periodically visit the site and become acquainted with field personnel and other representatives. It is anticipated Mr. LaGreca will be on-site once a month.

Kenneth Paisley, CHMM – Regulatory Specialist/Transportation Coordinator. Mr. Paisley has 17 years experience in the chemistry and environmental field. Mr. Paisley is committed to overseeing all field sampling and data acquisition plans, as well as interfacing with offsite laboratory concerns. Mr. Paisley will review laboratory reports with the selected laboratory in order to ensure compliance with project specifications and all required protocols. He will coordinate offsite waste removal, including transport, disposal, manifesting, waste profiles, regulatory compliance, and disposal requirements.

Jennifer Singer – Project Chemist. The Project Chemist will support the CQCSM. Ms. Singer will review and perform a data review of all analytical data reports received from the laboratory prior to the submission of the data to the USACE and prior to preparation and completion of the chemical data reporting.

2.3.3 Field Personnel

Kim Lickfield – Onsite Project Manager. The responsibilities of the Project Manager will include:

- Subcontractor coordination and oversight.
- Acting as Site liaison between Sevenson, USACE, and U.S. Environmental Protection Agency (USEPA).
- Charge of all field operations.
- Hiring and termination/reassignment of personnel as necessary to support successful task order implementation.
- Management and coordination of all aspects of the project as defined in the Contract Specifications with an emphasis on adhering to the objectives of the remedial activities.
- Assuring corrective actions are taken for deficiencies cited during audits of sampling/analytical activities.
- Project coordination to implement and comply with the SAP in coordination with the USACE, CQCSM, and Environmental Samplers, including the coordination of field and laboratory schedules pertaining to relevant operation/sampling activities and allocation of resources and staffing to implement the QA and quality control (QC) program.
- Implementation of the SSHERP, including temporarily suspending field activities if the health and safety of personnel are endangered and/or temporarily suspending an individual for field activities for infractions of the SSHERP, pending further consideration by the Health and Safety Director.
- Review of all documents prepared by project personnel, including all relevant field records and logs.

William Zambrana – Contractor Quality Control Systems Manager/Engineer. As CQCSM, Mr. Zambrana will report directly to the Project Manager on matters concerning quality control. He will have both the authority and the duty to stop whatever operation 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.

Sam Tavelaris – Site Health and Safety Officer. As SSHO, Mr. Tavelaris will report directly to the Corporate Health and Safety Director and be responsible for the implementation of Sevenson's approved

SSHERP, including conducting required safety inspections, safety briefings, and reports of safety-related activities.

Wayne Kostuk –Superintendent. Mr. Kostuk will be in charge of all field operations. In conjunction with the Project Manager, he will arrange schedules for delivery of materials and equipment for the work and be responsible for equipment management. All foremen will report directly to Mr. Kostuk. He will also attend all meetings between Sevenson and the Engineer. His duties include supervision of equipment operators, truck drivers, laborers, and technical staff (e.g., survey crew).

3.0 SCOPE AND OBJECTIVES

The scope of the remedial action involves the removal and offsite disposal of site buildings and structures. Specific work items include:

- Verifying the location of and disconnecting all utilities to the individual buildings and structures.
- Acquiring all necessary permits and licenses.
- Implementing site monitoring and controls including temporary fencing and security.
- Removal, separation, and offsite disposal of trash, tires, and other wastes located within buildings to be demolished and throughout the site.
- Asbestos removal and disposal.
- Demolition of buildings and structures.
- Sampling, testing, removal, and disposal of hazardous materials and special wastes including PCB-containing materials and equipment, metals, transformers, and capacitors to an approved recycling or disposal facility.
- Foundation restoration.

Samples will be collected for characterization of debris, soil, concrete, and water to determine the offsite disposal requirements. In addition, samples will be collected to determine backfill and topsoil quality prior to bringing such materials to the site. Details of the sample collection procedures are included in Section 4.0 of this FSP.

3.1 Waste Characterization Samples

Debris, soil, concrete, and water samples will be collected for waste characterization and disposal facility approval. Samples for metal, VOC, SVOC, pesticide, and herbicide analyses will undergo toxicity characteristic leachate procedure (TCLP) extractions prior to laboratory analysis. Samples for PCB analysis will be analyzed for total PCBs. Waste characterization samples will be compared against the 40CFR261 *Characteristics of Hazardous Waste* and 40CFR761 *PCB Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions* to determine the disposal requirements. The regulatory criteria are summarized in Table 3-1. Any debris or soils containing concentrations of total PCBs greater than the regulatory standards will be disposed of as PCB remediation wastes.

TABLE 3-1: WASTE CHARACTERIZATION - MAXIMUM ALLOWABLE CONCENTRATIONS OF CONTAMINANTS		
Contaminant	**Regulatory Level**	**Laboratory Reporting Limit**
Metals (mg/L)		
Arsenic	5.00	0.045
Barium	100.00	0.025
Cadmium	1.00	0.025
Chromium	5.00	0.025
Lead	5.00	0.075
Mercury	0.20	0.001
Selenium	1.00	0.095
Silver	5.00	0.025
Volatile Organic Compounds (µg/L)		
Benzene	500	10.0
2-Butanone	200,000	100.0
Carbon Tetrachloride	500	10.0
Chlorobenzene	100,000	10.0
Chloroform	6,000	10.0
1,2-Dichloroethane	500	10.0
1,1-Dichloroethene	700	10.0
Tetrachloroethene	700	10.0
Trichloroethene	500	10.0
Vinyl Chloride	200	10.0
Semi-Volatile Organic Compounds (µg/L)		
Cresols (o, m, and p)	200,000	24.0
1,4-Dichlorobenzene	7,500	8.0
2,4-Dinitrotoluene	130	8.0
Hexachlorobenzene	130	8.0
Hexachlorobutadiene	500	8.0
Hexachloroethane	3,000	8.0
Nitrobenzene	2,000	8.0
Pentachlorophenol	100,000	16.0
Pyridine	5,000	8.0
2,4,5-Trichlorophenol	400,000	8.0
2,4,6-Trichlorophenol	2,000	16.0
Pesticides (µg/L)		
Chlordane	30	0.800
Endrin	20	0.040
Heptachlor	8	0.040
Lindane (gamma-BHC)	400	0.040
Methoxychlor	10,000	0.040
Toxaphene	500	1.00

TABLE 3-1: WASTE CHARACTERIZATION - MAXIMUM ALLOWABLE CONCENTRATIONS OF CONTAMINANTS		
Contaminant	**Regulatory Level**	**Laboratory Reporting Limit**
Herbicides (µg/L)		
2,4-D	10,000	20
2,4,5-TP (Silvex)	1,000	20
PCBs (mg/Kg)		
Total PCBs	50	0.0033 (per Aroclor)

3.2 Topsoil and Backfill Materials

Samples of topsoil and backfill materials 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 or the environment. Written approval from USACE will be received prior to bringing backfill or topsoil to the Site. New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Cleanup Criteria (RDCSCC) will be used to determine if borrow materials are free from contamination. A summary of the NJDEP RDCSCC are included in Table 3-2. Offsite source materials shall be analyzed for uranium and thorium decay chains. Analysis for the uranium and thorium decay chains will occur via gamma spectroscopy and use prominent nuclides such as radium-226 and radium-228 to assess the levels within these decay chains. The maximum acceptable levels for radiological testing of the off-Site source materials are the sum of radium-226 and radium-228 not to exceed 3 pico Curies per gram (pCi/g). With the exception of potassium-40, no other isotope shall exceed 5pCi/g. The radiological analytical method must be able to achieve a laboratory reporting limit of 1pCi/g.

TABLE 3-2: OFF-SITE SOURCE MATERIAL ACCEPTANCE CRITERIA		
Contaminant	**NJDEP RDCSCC**	**Laboratory Reporting Limit**
TCL VOCs (µg/Kg)		
Acetone	1,000,000	10.0
Acrylonitrile	1,000	10.0
Benzene	3,000	2.0
Bromodichloromethane	11,000	2.0
Bromoform	86,000	2.0
Bromomethane	79,000	10.0
2-Butanone	1,000,000	10.0
Carbon Tetrachloride	2,000	2.0
Chlorobenzene	37,000	2.0

TABLE 3-2: OFF-SITE SOURCE MATERIAL ACCEPTANCE CRITERIA		
Contaminant	**NJDEP RDCSCC**	**Laboratory Reporting Limit**
Chloroform	19,000	2.0
Chloromethane	520,000	10.0
Dibromochloromethane	110,000	2.0
1,1-Dichloroethane	570,000	2.0
1,2-Dichloroethane	6,000	2.0
1,1-Dichloroethene	8,000	2.0
cis-1,2-Dichloroethene	79,000	2.0
trans-1,2-Dichloroethene	1,000,000	2.0
1,2-Dichloropropane	10,000	2.0
cis&trans-1,3-Dichloropropene	4,000	2.0
Ethylbenzene	1,000,000	2.0
Methylene Chloride	49,000	2.0
4-Methyl-2-Pentanone	1,000,000	10.0
Styrene	23,000	2.0
1,1,1,2-Tetrachloroethane	170,000	2.0
1,1,2,2-Tetrachloroethane	34,000	2.0
Tetrachloroethene	4,000	2.0
Toluene	1,000,000	2.0
1,1,1-Trichloroethane	210,000	2.0
1,1,2-Trichloroethane	22,000	2.0
Trichloroethene	23,000	2.0
Vinyl Chloride	2,000	10.0
Xylenes (Total)	410,000	4.0
TCL SVOCs (µg/Kg)		
Acenaphthene	3,400,000	67
Anthracene	10,000,000	67
Benzo(a)anthracene	900	67
Benzo(a)pyrene	660	67
Benzo(b)fluoranthene	900	67
Benzo(k)fluoranthene	900	67
Benzyl Alcohol	10,000,000	67
Butylbenzylphthalate	1,100,000	67
di-n-Butylphthalate	5,700,000	67
4-Chloroaniline	230,000	67
bis(2-Chloroethyl)Ether	660	67
bis(2-Chloroisopropyl)Ether	2,300,000	67
4-Chloro-3-Methylphenol	10,000,000	133
2-Chlorophenol	280,000	130
Chrysene	9,000	67
Dibenzo(a,h)anthracene	660	67

TABLE 3-2: OFF-SITE SOURCE MATERIAL ACCEPTANCE CRITERIA		
Contaminant	**NJDEP RDCSCC**	**Laboratory Reporting Limit**
1,2-Dichlorobenzene	5,100,000	67
1,3-Dichlorobenzene	5,100,000	67
1,4-Dichlorobenzene	570,000	67
3,3'-Dichlorobenzidine	2,000	67
2,4-Dichlorophenol	170,000	130
Diethylphthalate	10,000,000	67
2,4-Dimethylphenol	1,100,000	130
Dimethylphthalate	10,000,000	67
2,4-Dinitrophenol	110,000	130
Dinitrotoluene (2,4-/2,6-mixture)	1,000	67
bis(2-Ethylhexyl)phthalate	49,000	67
Fluoranthene	2,300,000	67
Fluorene	2,300,000	67
Hexachlorobenzene	660	67
Hexachlorobutadiene	1,000	67
Hexachlorocyclopentadiene	400,000	130
Hexachloroethane	6,000	67
Indeno(1,2,3-cd)pyrene	900	67
Isophorone	1,100,000	67
2-Methylphenol	2,800,000	67
4-Methylphenol	2,800,000	67
Naphthalene	230,000	67
Nitrobenzene	28,000	67
N-Nitrosodiphenylamine	140,000	67
N-Nitroso-di-n-Propylamine	660	67
di-n-Octylphthalate	1,100,000	67
Pentachlorophenol	6,000	130
Phenol	10,000,000	130
Pyrene	1,700,000	67
1,2,4-Trichlorobenzene	68,000	67
2,4,5-Trichlorophenol	5,600,000	67
2,4,6-Trichlorophenol	62,000	130
TCL Pesticides (µg/Kg)		
Aldrin	40	0.400
4,4'-DDD	3,000	0.400
4,4'-DDE	2,000	0.400
4,4'-DDT	2,000	0.400
Dieldrin	42	0.400
Endosulfan	340,000	0.400
Endrin	17,000	0.400

TABLE 3-2: OFF-SITE SOURCE MATERIAL ACCEPTANCE CRITERIA		
Contaminant	**NJDEP RDCSCC**	**Laboratory Reporting Limit**
Gamma-BHC	520	0.400
Heptachlor	150	0.400
Methoxychlor	280,000	0.400
Toxaphene	100	8.30
PCBs (µg/Kg)		
PCBs	490	3.30
TAL Metals (mg/Kg)		
Antimony	14	1.40
Arsenic	20	1.70
Barium	700	1.00
Beryllium	2	0.50
Cadmium	39	1.00
Chromium – hexavalent (VI)	240	1.00
Chromium – trivalent (III)	120,000	1.00
Copper	600	1.00
Cyanide	1100	0.50
Lead	400	4.10
Mercury	14	0.014
Nickel	250	1.00
Selenium	63	1.40
Silver	110	0.50
Thallium	2	1.30
Vanadium	370	1.00
Zinc	1500	4.00
Contaminant	**Radiological Material Action Level (pCi/g)**	
Radium-226 + Radium-228	3	
Gamma Spec (isotopes in Uranium and Thorium decay	5	
Reference: NJDEP SRP Regulations and Guidance, Last Updated 5/12/99; http://www.state.nj.us/dep/srp/regs/scc/		

3.3 PCB Wipe Samples

Wipe samples will be collected from nonporous (i.e., metal) materials in order to determine offsite disposal requirements. Wipe samples with PCB concentrations greater than 10 micrograms (µg) per 100 centimeters square (cm^2) will require disposal at a Toxic Substances Control Act (TSCA) landfill.

4.0 FIELD ACTIVITIES

Field sampling activities in support of site remediation are presented in this section. The types of samples to be collected include: solid waste disposal characterization samples, concrete samples, wastewater (i.e., decontamination water) disposal characterization samples, PCB wipe samples, and backfill/topsoil samples. Specified sample collection and identification procedures, QA/QC requirements, and standard procedures necessary for obtaining data of acceptable quality are also presented in this and subsequent sections of the FSP. Qualified personnel experienced in the type of sampling being performed will conduct all sampling. Sampling personnel will adhere to health and safety requirements provided in the SSHERP. The following sections detail the methods of collection for each of the sampling matrixes listed above.

4.1 Solid Waste Characterization Samples

Prior to intrusive remediation activities, samples will be collected from building walls and floors based on pre-established construction drawings for each cluster. Samples will be collected for waste characterization and disposal facility approval. The waste characterization samples will be analyzed for corrosivity, ignitability, hydrogen cyanide reactivity, hydrogen sulfide reactivity, toxicity characteristic leachate procedure (TCLP) VOCs, TCLP SVOCs, TCLP pesticides, TCLP herbicides, TCLP metals, and total PCBs by the contract laboratory, as summarized in Table 4-1. The sample results and the completed waste profile will be sent to the offsite disposal facility for waste shipment approval.

Waste characterization samples will be collected as chip samples or core samples, depending upon site conditions and the material to be sampled.

Chip samples will be collected following the procedures included in the NJDEP *Field Sampling Procedures Manual* (NJDEP, 2005). To collect a chip sample, the following procedure will be followed:

- Place a new piece of polyethylene sheeting underneath the sampling location to catch any debris produced during collection of the chip samples.
- Wearing a new pair of disposable gloves and using a dedicated chisel or paint scraper and hammer, break up the surface to be sampled. The area should be chipped to less than one-quarter inch. Record how deep the chips were taken.

Table 4-1: Sampling and Analysis Matrix

Sample	*Location*	*Rationale*	*Parameter(s)*	*Sample Type*	*Type of Bottles*[1,2]	*Number of Bottles*[1,2]	*Methodology*	*Holding Time*[3]	*Preservative*
Solid Waste Characterization	Building walls and floors per construction drawings	Meet federal, state, and local regulations in accordance with the requirements of the disposal facility	Ignitability	Composite	32oz. CWM	1	SW-846 1010	7 days	Cool 4°C
			Corrosivity				SW-846 9045C	14 days	
			Reactive Cyanide				SW-846 Section 7.4.3.2/ Method 9014	14 days	
			Reactive Sulfide				SW-846 Section 7.4.4.2/ Method 9034	7 days	
			TCLP Metals				SW-846 1311/3015/6010B/ 7470A	180 days to TCLP extraction (Hg 28 days) 180 days to analysis (Hg 28 days)	
			TCLP SVOCs				SW-846 1311/3510C/8270C	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Pesticides				SW-846 1311/3510C/8081A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Herbicides				SW-846 1311/3510C/8151A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			Total PCBs	Composite	4 oz. CWM	1	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
			TCLP VOCs	Grab	4 oz. CWM	2	SW-846 1311/5030B/8260B	14 days to TCLP extraction 14 days to analysis	Cool 4°C
Concrete	Concrete pads	Meet federal, state, and local regulations in accordance with the requirements of the disposal facility	Total PCBs	Composite	2 oz. CWM	1	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
			TCLP Metals	Composite	2oz. CWM	2	SW-846 3050/6010B/7471A	180 days to TCLP extraction (Hg 28 days) 180 days to analysis (Hg 28 days)	Cool 4°C
Subsurface Soil and Concrete	Foundation walls and surrounding *soils*	Determine subsurface concentrations of total PCBs in *order to determine remediation* requirements	Total PCBs	Composite	2 oz. CWM	1	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
Wastewater[4]	Storage tank	Meet federal, state, and local regulations in accordance with the requirements of the disposal facility	Ignitability	Composite	1L AG	3	SW-846 1010	7 days	Cool 4°C
			Corrosivity				SW-846 9040C	Immediately	
			Reactive Cyanide				SW-846 Section 7.4.3.2/ Method 9014	14 days	
			Reactive Sulfide				SW-846 Section 7.4.4.2/ Method 9034	7 days	
			TCLP Metals				SW-846 1311/3015/6010B/ 7470A	180 days to TCLP extraction (Hg 28 days) 180 days to analysis (Hg 28 days)	

Sample	*Location*	*Rationale*	*Parameter(s)*	*Sample Type*	*Type of Bottles*[1,2]	*Number of Bottles*[1,2]	*Methodology*	*Holding Time*[3]	*Preservative*
			TCLP SVOCs				SW-846 1311/3510C/8270C	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Pesticides				SW-846 1311/3510C/8081A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Herbicides				SW-846 1311/3510C/8151A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP VOCs	Grab	40 mL G vial w/Teflon septa	4	SW-846 1311/5030C/8260B	14 days to TCLP extraction 14 days to analysis	Cool 4°C
			Total PCBs	Grab	1L AG	2	SW-846 8082	7 days to extraction 40 days to analysis	Cool 4°C
Backfill/ Topsoil	Off-Site Borrow Source(s)	Establish that backfill and topsoil material brought on-Site for restoration activities are not hazardous to human health or the environment.	VOCs	Grab	EnCore™ sampler	2	SW-846 5035/8260B	48 hours to preservation by laboratory 14 days to analysis	Cool 4°C
			TCL SVOCs	Composite	2oz. CWM	2	SW-846 3550C/8270C	14 days to extraction 40 days to analysis	Cool 4°C
			TCL Pesticides	Composite	2oz. CWM	2	SW-846 3550C/8081A	14 days to extraction 40 days to analysis	Cool 4°C
			Total PCBs	Composite	2oz. CWM	2	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
			Cyanide	Composite	2oz. CWM	2	SW-846 Section 7.4.3.2/ Method 9014	14 days	Cool 4°C
			TAL Metals	Composite	2oz. CWM	2	SW-846 3050/6010B/7471A	180 days to digestion 180 days to analysis (Hg 28 days)	Cool 4°C
Wipe	Non-porous surfaces	Establish disposal requirements	Total PCBs	Wipe	3"x3" gauze soaked with 1:4 acetone/hexane	1	SW-846 8082	14 days to extraction 40 days to analysis	Cool 4°C

Notes:
[1] Bottle types – AG: Amber Glass; HDPE: High Density Polyethylene Plastic; CWM: Clear wide mouth glass jar with Teflon lid
[2] All bottles should be filled completely with zero head space
[3] From Verified Time of Sample Collection
[4] For TCLP analysis on aqueous samples, the laboratory will filter the sample and the aqueous filtrate becomes the TCLP extract. If the aqueous sample contains visible solids, then a percent dry solids determination is performed. If the percent dry solids is >0.5% (about 50g of solids in 1L of aqueous sample), a TCLP extraction will be performed if there is at least 130g of solids present. The aqueous filtrate and TCLP extract are combined for analysis.

- Avoid scattering pieces outside of the sampling area boundary. Any pieces that fall outside of the sampling area should not be used.
- Collect the chipped pieces using a dedicated, decontaminated brush and dustpan lined with aluminum foil. Transfer the sample into the sample containers (Table 4-1).
- Each time a new sample is collected, a new pair of disposable gloves and a new sheet of aluminum foil will be used to prevent cross-contamination. In addition, if dedicated, disposable equipment is not used, the chisel and brush will be cleaned between each sample location.

Core samples will be collected as follows:

- At each sample location, a new pair of disposable gloves, safety glasses or goggles, and hearing protection will be donned.
- Place the coring device against the area to be sampled. Activate the coring device and advance the bit into the surface to the desired depth (i.e., at least one-third the depth of the concrete). Once the bit had advanced through the entire depth of the surface, the coring device will be removed and the core sample retrieved.
- The core will be placed into the sample containers (Table 4-1). If necessary, the cores will be crushed with a hammer or other appropriate means and sieved prior to filling the sample containers for submittal to the offsite laboratory.

4.2 Concrete Samples

Sampling of concrete pads will be performed in order to determine the disposal options for these materials. The concrete samples will be analyzed for TCLP metals and total PCBs by the contract laboratory, as summarized in Table 4-1. The sample results and the completed waste profile will be sent to the offsite disposal facility for waste shipment approval. Concrete samples will be collected as core samples, as follows:

- At each sample location, a new pair of disposable gloves, safety glasses or goggles, and hearing protection will be donned.
- Place the coring device against the area to be sampled. Activate the coring device and advance the bit into the surface to the desired depth (i.e., at least one-third the depth of the concrete). Once the bit had advanced through the entire depth of the surface, the coring device will be removed and the core sample retrieved.

- The core will be placed into the sample containers (Table 4-1). If necessary, the cores will be crushed with a hammer or other appropriate means and sieved prior to filling the sample containers for submittal to the offsite laboratory.

4.3 In-Situ Subsurface Soil and Concrete Samples

In-situ samples will be collected of the subsurface soil and concrete in the vicinity of known PCB-containing walls in order to determine remediation requirements. Samples will be analyzed for total PCBs by the contract laboratory, as summarized in Table 4-1. Building foundations will be exposed every 100-feet on known PCB-containing walls.

Concrete chip samples will be collected following the procedures included in the NJDEP *Field Sampling Procedures Manual* (NJDEP, 2005). To collect a chip sample, the following procedure will be followed:

- Wearing a new pair of disposable gloves and using a dedicated chisel or paint scraper and hammer, break up the surface to be sampled. The area should be chipped to less than one-quarter inch. Record how deep the chips were taken.
- Avoid scattering pieces outside of the sampling area boundary. Any pieces that fall outside of the sampling area should not be used.
- Collect the chipped pieces using a dedicated, decontaminated brush and dustpan lined with aluminum foil. Transfer the sample into the sample containers (Table 4-1).
- Each time a new sample is collected, a new pair of disposable gloves and a new sheet of aluminum foil will be used to prevent cross-contamination. In addition, if dedicated, disposable equipment is not used, the chisel and brush will be cleaned between each sample location.

Subsurface soil samples will be collected following the procedures included in the NJDEP *Field Sampling Procedures Manual* (NJDEP, 2005). The scoop/trowel method will be utilized to collected subsurface soil samples, as follows:

- Gloves will be donned immediately prior to sampling and a clean pair of new disposable gloves will be worn each time a different location is sampled.
- Insert trowel into soil to desired depth (e.g., six inches) and remove the sample.

- Place the sample into a new, clean ziplock-style bag or bowl to be homogenized. Samples will be homogenized by physically mixing the soil by hand from outside the bag or by mixing the soil by hand or with the trowel in the bowl. At no time will be bare hand come into contact with the sample.
- Transfer the sample to the appropriate container (Table 4-1). Ensure that the threads, lid, and outer edges of the sample container are free of soil particles. Use a clean paper towel to remove soil particles from the threads and sealing surface of the sample container. Make sure the container lid is firmly secure.

4.4 Wastewater Characterization Samples

Wastewaters generated during Site activities will include decontamination water and storm water which may accumulate in the remediation areas. Liquid wastes will be containerized in an aboveground storage tank. Aqueous samples will be collected to determine the waste management approach. The goal of sampling the wastewaters will be to meet Federal, state, and local regulations in accordance with the requirements of the disposal facility. Required analyses, sample container requirements, and sample analysis methods are presented in Table 4-1.

Samples will be collected using dedicated, disposable polyvinyl chloride or Teflon bailers. The following sample procedure is consistent with NJDEP sampling instructions (NJDEP, 2005):

- Prepare the work area by placing plastic sheeting on the ground to avoid cross-contamination.
- Attach a bailer to cable or line for lowering. Polyethylene or nylon rope is recommended.
- Lower the bailer slowly until it contacts the water surface.
- Allow the bailer to sink and fill.
- Slowly raise the bailer to the surface. Do not allow the bailer line or bailer to contact the ground surface.
- Fill sample bottles by tipping bailer to allow slow discharge from the top to flow gently down the side of the sample bottle with minimum turbulence. If a bottom drain is present on the bailer, achieve a slow steady flow.
- Repeat as necessary to acquire sufficient volume to fill all sample containers (Table 4-1).
- Secure all caps tightly and place the filled containers on ice immediately.
- Dispose of the bailer and line in accordance with Section 4.7. Decontaminate any non-dedicated sampling equipment.

4.5 Wipe Samples

Wipe samples will be collected in order to monitor surficial contamination on non-porous surfaces. Wipe samples will be collected following the procedures included in the NJDEP *Field Sampling Procedures Manual* (NJDEP, 2005). To collect a wipe sample, the following procedure will be followed:

- Place a clean, appropriately sized square template cutout over the area to be sampled (TSCA requires $100cm^2$). Secure the template to avoid any shifting during the sampling activity. Do not touch or walk on marked areas.
- Wearing a new pair of gloves, obtain a sterile wrapped gauze pad. The gauze should be 3 inches square. The use of filter paper is not recommended as it tends to rip and crumble if the surface is slightly rough. If filter paper is used, it should be four-inch diameter heavy gauge paper.
- Soak the gauze pad in appropriate solvent. For PCBs, the solvent of choice is a 1:4 acetone/hexane mixture. The gauze pad should be soaked and excess squeezed out immediately before the collection of each sample. Use of pre-soaked pads is not acceptable.
- Wipe the area framed by the template cutout with the moistened gauze, using 3 or more strokes in one direction covering the entire surface. Fold the exposed side of the pad in (i.e., fold in half).
- Using the once-folded pad, wipe the sample area at right angles to the first wipe. Fold the exposed side of the pad in.
- Using the twice-folded pad, wipe the sample area again in the original direction. Fold the exposed side of the pad or filter in.
- Place the pad in a laboratory-provided sample container (i.e., 2 ounce (oz) or 40 milliliter (mL) screw top container) and replace the container cap.
- If desired, place the sample containers on ice.

4.6 Offsite Topsoil/Backfill Sampling

Backfill and topsoil from offsite sources will be tested for physical suitability and chemical parameters prior to use. Samples of topsoil and backfill materials from each offsite source will be collected and analyzed to determine that these materials do not present a threat to human health and/or the environment.

For offsite borrow materials, a minimum of one set of laboratory analysis will be performed per 5,000 cubic yards of material used. No less than one set of analyses will be performed per borrow area. As quantities of

backfill/topsoil are brought onsite in excess of 5,000 cubic yards, one sample per additional 5,000 cubic yards of material will be analyzed. Documentation certifying that all criteria have been met for offsite backfill/topsoil (Table 3-2) will be forwarded to the USACE prior to bringing any material onsite.

VOC samples will be collected using 5-gram EnCore™ samplers and the spade and trowel method will be used for all other parameters. With the spade and trowel method, the top layer of the soil to desired sample depth is removed with a dedicated, pre-cleaned spade. A dedicated, pre-cleaned trowel is then used to collect samples from the desired depth. Soil samples for laboratory analysis will be collected into the appropriate containers identified in Table 4-1.

The following sampling procedure is consistent with USACE Sample Manipulation Instructions (USACE, 2001):

- The sample collection process should be completed in a minimal amount of time with the least amount of disruption as possible. Rough trimming of the sampling location surface layer should be considered if the material may have already lost VOCs (e.g., been exposed for more than a few minutes) or if other waste, different soil strata, or vegetation may have contaminated it. Surface layers can be removed by scraping the surface using a clean spade.
- Insert the clean coring tool into a fresh surface for sample collection. Take care not to trap air behind the sample. An undisturbed sample is collected by pushing the barrel of the coring tool into a freshly exposed surface and removing the corer once it is filled.
- The exterior of the barrel should be quickly wiped with a clean disposable towel to ensure a tight seal and the cap snapped on the open end.
- The sampler should be labeled, inserted into the sealable pouch, and immediately placed on ice.
- Collect samples for remaining analyses using a disposable sample trowel.
- Prepare the shipment to go to the laboratory. If samples are going to be shipped near the weekend or holiday, coordinate with the receiving laboratory to ensure that the 48-hour holding time for the EnCore™ sample is met.

The order of collection for analytical parameters will be organics and then metals. To maintain integrity of the collected samples, preservation techniques should include refrigeration and protection from light, and the sample jars should be closed immediately after filling. Gloves should be donned immediately prior to sampling and a clean pair of new disposable gloves will be worn each time a different location is sampled.

The sample trowels will be dedicated to the sample location, eliminating the need for equipment decontamination between locations and possible cross-contamination. The used sample trowels will be discarded as discussed in Section 4.7.1 of the FSP.

4.7 Investigative-Derived Wastes

Efforts will be made throughout the field program to minimize the volume of waste derived from sampling and decontamination procedures. Investigation-derived wastes (IDW) will be shipped to a commercial disposal facility, as necessary. IDW will be managed, stored, and disposed in accordance with USEPA and U.S. Department of Transportation (USDOT) regulation and requirements of the receiving facility.

4.7.1 Disposable Equipment and Debris

Disposable equipment and debris, such as health and safety equipment, plastic sheeting, sampling equipment, and other equipment or debris not reused during project operations will be collected in plastic bags during sampling and placed into appropriately labeled containers. The containers will be stored in a suitable location as determined by Site personnel. As possible, the debris will be consolidated with bulk solids for off-site disposal under an approved waste disposal profile that includes a percentage of site debris in the waste stream.

4.7.2 Wastewater

Field sampling equipment will be decontaminated following procedures specified in Section 4.9 of this FSP. Decontamination fluids and other aqueous wastes generated from sampling will be collected in the field in five gallon buckets, or other appropriate container, and returned to a designated storage area for transfer to the bulk storage tank, as appropriate. The wastewater will be sampled as described in Section 4.4 and tested as required for disposal at a permitted wastewater treatment facility.

4.7.3 General Office Trash/Debris

Any Site debris that is not generated during the collection of environmental samples will be considered municipal trash. This may include any paper or non-paper office wastes, non-contact sampling wastes (e.g., plastic wrapping, cardboard boxes), or other daily trash. All municipal trash will be deposited in a collection

container provided by and serviced for periodic removal by a commercial trash hauling and disposal company. No additional management, tracking, or testing of this waste will be conducted.

4.8 QA/QC Samples

QA/QC samples will be collected and analyzed as a check of field measurements and in order to verify the contract laboratory's performance on chemical samples. QA/QC samples will be collected at a frequency of 5% of field samples collected for offsite analysis per method per matrix and will include blind field replicates, matrix and matrix spike duplicates, and temperature blanks sent to the primary laboratory. All QA/QC samples shall be identified in the Field Logbook. Confirmation of the collection of the QA/QC samples at the required frequency will be initiated by the samplers in the field, and verified by the CQCSM during field audits and the offsite project chemist during analytical data review. A log of all samples obtained, including QA/QC samples, will be maintained at the Site.

4.8.1 Replicate Samples

A field QC duplicate sample is a second sample collected at the same location as the original sample used as an indicator of overall measurement (sampling and analytical) precision. Duplicate samples are collected using identical sampling techniques, and treated in an identical manner during storage, transportation, and analysis. QC samples will be collected as one sample, homogenized and split into two samples, separately containerized and shipped as two independent samples. Field QC samples will be collected at a rate of 5 percent of the total number of field samples that are collected for laboratory analysis per matrix. Field QC samples will be shipped to the contractor's primary analytical laboratory blindly, with notations made in the daily sample log as to which environmental sample the QC sample is associated. Replicate samples will be collected, containerized, preserved, and shipped in the same manner as environmental samples per Table 4-1.

4.8.2 Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples are environmental samples to which known concentrations of target analytes have been added by the laboratory. MS and MSD samples are analyzed to evaluate the effect of the sample matrix on the analytical methodology. MS and MSD samples are generated by taking a separate aliquot of an actual field sample and spiking it with the selected target analyte(s) prior to sample preparation or extraction. The MS and MSD samples then undergo the same extraction and analytical

procedures as the unfortified field sample. Additional sample volume will be collected at a rate of 5% (every 20 samples) for the analysis of MS/MSD duplicate pairs by the laboratory.

4.8.3 Temperature Blanks

Temperature blanks will accompany all sample coolers shipped from the Site. A temperature blank consists of potable water sealed in a small plastic bottle (e.g. a 40-mL polyethylene bottle). Use of these blanks enables the receiving laboratory to assess the temperature of the incoming sample shipment without disturbing any of the field samples.

4.8.4 Trip Blanks

Trip blanks will be included in all shipments containing aqueous VOC samples. A trip blank is an aliquot of analyte-free water that is sealed in a 40mL glass vial with a Teflon-lined septum cap prior to initiation of field work. These samples are kept with the field sample containers from the time they leave the laboratory until they are returned for analysis. The trip blank is used to determine whether samples are being contaminated during transit or sample collection. These sealed bottles will be prepared by the laboratory and included with each shipment of sample bottled for aqueous media to and from the laboratory and the site.

4.9 Sampling Equipment Decontamination

The following describes standard operating procedures for the decontamination of non-disposable sampling equipment and tools that may come into direct contact with a field sample intended for analytical analysis. This procedure only addresses the decontamination of equipment as it pertains to the chemical integrity of samples for analysis and is not intended for use in health and safety decontamination of personnel, materials, and equipment that may become contaminated during field operations.

4.9.1 Applicability

Decontamination of all analytical devices, sampling tools, and storage equipment that may come into direct contact with a field sample is necessary in order to achieve analytical results that are representative of true field conditions. To the extent practical, no sampling equipment will be decontaminated in the field and disposable sampling equipment will be utilized. Sufficient sampling equipment will be pre-cleaned, wrapped

in aluminum foil, and brought to the field. Sample containers will be pre-cleaned in accordance with USEPA protocols and will be supplied by the laboratory.

The decontamination procedures below may be modified, upon proper managerial approval, as long as the chemical integrity of the field sample is maintained and the sample source is not permanently compromised. Anticipated contaminants and concentrations, matrices (water, air, soil, etc.), surface area of possible cross contamination, method of sampling, and many other factors are considered when establishing a sampling equipment decontamination procedure. Any modifications of the procedures below will be carefully thought out, approved by Sevenson's CQCSM and the USACE Contracting Officer or a Designated Representative, and documented accordingly. Samples will be collected from locations with the lowest known concentrations of contaminants first, progressing toward the areas of highest known contaminations. This procedure will minimize the potential for cross contamination of samples.

4.9.2 Procedures

All equipment will be considered contaminated unless determined otherwise. In order to provide consistency to the decontamination procedure, a designated sampling team crewmember will be responsible for equipment decontamination. Similarly, it is desirable to decontaminate all the equipment necessary for a field task prior to mobilization. In this way, field decontamination will be limited. As an aid to field personnel and as part of the Site QC inspections, Sevenson Checklist Number 009, "Task Specific QC Checklist – Decontamination", is included in Appendix A.

4.9.2.1 Decontamination Equipment List

The following supplies are needed for equipment decontamination:

- Clean disposable nitrile gloves
- Wastewater container (drum, basin, or buckets)
- Clean water spraying devices (plastic squirt or spray bottles)
- Clean brushes
- Plastic garbage bags
- Non-phosphate detergent (e.g., Alconox®)

- Deionized/distilled water
- Clean plastic buckets and other containers, as needed (e.g., small plastic swimming pool)
- Plastic sheeting to cover ground at work station
- Aluminum foil
- Package labels, ink pens, and black markers
- Potable water, warm if available

4.9.2.2 General Equipment Decontamination Procedure

The following steps will be considered as Sevenson's general equipment decontamination procedure:

- Cover hands with disposable gloves.
- Wash and scrub, as necessary, with a solution of non-phosphate detergent (e.g., Alconox) and potable water.
- Rinse thoroughly with potable water.
- Rinse with deionized/distilled water.
- Air dry.

All waste liquids generated by the decontamination procedure will be containerized and tested for waste characterization. Any solid wastes generated, such as personal protective equipment, will be containerized, tested for waste characterization, and transported for disposal.

Decontaminated equipment not intended for immediate use will be wrapped in aluminum foil, placed in plastic bags, and sealed. All handling of decontaminated equipment will be performed using clean disposable gloves. Care will be exercised in the storage of decontaminated equipment, so as to not re-contaminate what has been cleaned. Sampling personnel will also avoid solvents, greases, oils, gasoline, water, dusts, and other potential sources that might contaminate the equipment before its use. Sampling personnel handling such materials shall wear protective gloves when doing so.

5.0 SAMPLE CHAIN OF CUSTODY/DOCUMENTATION

5.1 Field Log Book

Field logbooks are water resistant, bound notebooks that provide the means of recording data collecting activities. Sufficient information will be recorded in the logbooks to permit reconstruction of all site-sampling activities conducted. Information recorded on other project documents will not be repeated in the logbooks except in summary form where determined necessary. All field logbooks will be kept in the possession of field personnel responsible for completing the logbooks, or in a secure place when not being used during fieldwork. Upon completion of the field activities, all logbooks will be submitted to the USACE to become part of the final project file.

Entries into the logbook will be made in ink and will contain a variety of information, including:

- Date, start time, field observations, weather conditions, names of all sampling team members present, level of personal protection being used, and the signature of the person making the entry.
- Names of visitors to the Site and the purpose of their visit.
- Measurements made and samples collected, including the equipment used to make measurements, along with the date of calibration and record of results.
- Detailed description of the location of the sampling station.
- Time of sampling, sample description, depth or location at which the sample was collected, its type, volume, and number of containers.
- Field duplicate samples collected.
- Deviations from the approved procedures during collection, preparation, documentation, or transportation.
- Bottle lot numbers, reagent information, and any waste produced.

5.2 Sample Numbering System

A unique sample numbering scheme will be used to identify each sample designated for laboratory analysis. The purpose of this numbering scheme is to provide a tracking system for the retrieval of analytical and field data on each sample. Sample identification numbers will be used on all sample labels or tags, field data sheets or logbooks, chain of custody (COC) records, and all other applicable documentation used during the project.

A listing of all sample identification numbers will be maintained in the field logbook. The project database will be populated with sample numbers and information consistent with information found here and in the Quality Assurance Project Plan (QAPP). The sample identification scheme to be used is as follows:

Waste characterization samples will be labeled: CD-WC-cluster number-xx

- CD-WC — Project site and sample type (Cornell-Dubilier waste characterization sample)
- Cluster number — Specific cluster designation where samples were collected
- xx — Sequential sample number

Water samples will be labeled: CD-WW-cluster number-xx

- CD-WW — Project site and sample type (Cornell-Dubilier waste water sample)
- Cluster number — Specific cluster designation where samples were collected
- xx — Sequential sample number

Backfill and topsoil samples will be labeled: CD-BF-cluster number-xx or CD-TS-cluster number-xx

- CD-BF/CD-TS — Project site and sample type (Cornell-Dubilier backfill sample or Cornell-Dubilier topsoil sample)
- Cluster number — Specific cluster designation where sample was collected
- xx — Sequential sample number

Concrete samples will be labeled: CD-CON-cluster number-xx

- CD-CON — Project site and sample type (Cornell-Dubilier concrete sample)
- Cluster number — Specific cluster designation where sample was collected
- xx — Sequential sample number

Wipe samples will be labeled: CD-WIPE-cluster number-xx

- CD-WIPE — Project site and sample type (Cornell-Dubilier wipe sample)
- Cluster number — Specific cluster designation where sample was collected
- xx — Sequential sample number

5.3 Sample Documentation

5.3.1 Sample Labels and/or Tags

Immediately after a sample has been collected, a self-adhesive identification label will be completed in indelible ink and neatly affixed to the outside of the sample container. After completing the sample label, it will be covered with clear tape for protection. Appendix A of this SAP provides an example of a sample label. The following information will be legibly entered on all sample labels:

- Contractor name
- Sample type (grab or composite)
- Analysis/method to be performed
- Type of chemical preservative present in the container
- Site name
- Date and time of sample collection
- Sample identification number
- Sampler's name or initials

Sample logbooks and COC records will contain the same information as the labels affixed to the sample containers. These records will record all information related to the sampling effort and the process employed.

5.3.2 Chain of Custody Records

The primary objective of the COC procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses. Persons will have custody of samples when the samples are in their physical possession, in their view after being in their possession, or in their physical possession and secured so they cannot be tampered with. In addition, when samples are secured in a restricted area accessible only to authorized personnel, they are deemed to be in the custody of such authorized personnel.

Sample COC forms will be used for each packaged lot of samples. Appendix A of the SAP provides an example of a blank COC form that will be used at the Site. Each cooler sent to the laboratory will contain COC form(s) listing the samples contained therein. The purpose of these forms is to document the transfer of a

group of samples traveling together from the field to the laboratory. The original of the COC always travels with the samples and the sampler keeps a copy with the Site sampling records. The chain of custody record must be fully completed by the field technician or other member of the Contractor's Quality Control Organization Staff who has been designated as responsible for sample shipment to the laboratory for analysis. When transferring the samples, the individuals relinquishing and receiving them must sign, date, and note the time on the chain of custody record.

The following documentation procedures will be followed for completion and utilization of the chain of custody record sheets:

- The field technician will fill in all requested information on the COC from the sample label. This includes the unique sample number, time and date acquired, sampler's name, analysis to be performed, matrix type, and any special instructions. In addition, if samples are known to require rapid turnaround in the laboratory because of project time constraints or analytical concerns (e.g., extraction time or sample retention period limitations, etc.), the person completing the chain-of-custody record should note these constraints in the "Remarks" section of the custody record and the laboratory will be contacted in advance of the shipment of such samples. All samples shall be shipped from the site within 24 hours of collection.
- The sampler or a member of the Contractor's Quality Control Organization Staff will sign, date, and note the time in the "Relinquished by" box and will keep a copy of the chain-of-custody at the Site with the project records. The original chain-of-custody record will accompany the shipment of samples to the laboratory.
- In the instance where the sampler relinquishes custody to a common carrier such as Federal Express (FedEx) or United Parcel Service (UPS), the sampler will write FedEx or UPS in the "Received by" box. A copy of the accompanying shipment air bill will be retained as part of the permanent documentation and can be attached to the Site copy of the chain-of-custody.
- After delivery to the laboratory, the person receiving custody will sign and date in the "Received by" box. The person receiving custody will check the sample label against the custody record. He will also check sample condition and note anything unusual under "Remarks" on the chain of custody form. The receipt temperature of the temperature blank is immediately recorded and pertinent information as to shipment, pickup, and courier is entered in the "Remarks" section. Upon receipt of the sample containers, the person receiving custody will also complete the USACE Sample Receipt Form. A copy of this form is included in Appendix A. Any problems and/or discrepancies noted

during sample check-in will result in the laboratory project manager contacting the CQCSM. Any discrepancies noted during sample receipt (e.g., cooler received outside of the temperature requirements, samples improperly preserved, sample containers broken, etc.) that may affect sample integrity will result in the laboratory project manager contacting the Project Manager, CQCSM, and/or Project Chemist. The USACE will also be copied on all sample receipt problems for consultation regarding resolution (e.g., recollect samples, apply data qualifiers, analyze samples "as is", etc.), if necessary.

- The sample custodian then enters the sample identification number and other information into the laboratory sample tracking system. The custodian will then place each sample in the proper secure storage area. When a technician from sample preparation and/or analysis requests samples, the custodian will relinquish the samples to the technician using laboratory-stipulated logging out procedures. Upon return of the samples, laboratory-stipulated logging in procedures will be followed and the custodian will return the samples to the proper secure storage area.
- If for any reason the samples are left unattended or any personnel in the custody chain refuses to sign the chain-of-custody, this will be documented and explained on the COC.

5.3.3 Custody Seals

Shipping containers must be sealed with custody seals for shipment to the laboratory. An example of a sample cooler custody seal can be found in Appendix A of this SAP. When samples are shipped, two or more custody seals are to be placed on each shipping container, with at least one at the front and one on the side, located in a manner that would indicate if the container were opened in transit. Wide, clear packaging tape should be placed over the custody seals to ensure that the seals are not accidentally broken during shipment. Upon receipt of the sample coolers, the sample custodian must check and confirm that all custody seals on the coolers are intact.

5.4 Corrections to Documentation

All original data recorded in field notebooks and on sample identification labels, chain-of-custody records, and sample receipt forms are written in waterproof ink. These documents are not to be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document.

If an error is made on a document, the individual entering the information/data will make the corrections. A single solid line (in indelible ink, preferably) will be made through the errant entry. Under no circumstances shall a correcting fluid (e.g., White-Out®) be used or any erasures made. The erroneous information should not be obliterated. Each correction shall be dated and initialed by the individual making the correction.

Should any improper correction of returned paperwork (e.g., laboratory-signed COCs, analytical reports) be suspected, it should be brought to the attention of the Site Project Manager immediately for further action, as necessary.

5.5 Field Variance System

Procedures cannot fully encompass all conditions encountered during field activities. Variances from the operating procedures, SAP, and/or SSHERP may occur. All variances that occur during field activities will be documented on a field change request (FCR) form and will be noted in the appropriate field logbooks. A sample of a typical FCR is included in Appendix A. If a variance is anticipated (e.g., because of a change in field instrumentation), the applicable procedure will be modified and the change noted in the field logbook.

6.0 SAMPLE PACKAGING AND SHIPPING

6.1 Sample Packaging

This section describes the procedures for properly packaging and shipping the environmental samples collected from the Site. These procedures will be performed after samples have been collected and placed in the proper containers and correctly preserved. As an aid to field personnel and as part of the Site QC inspections, Sevenson Checklist Number 007, "Task Specific QC Checklist – Packing, Storing, and Shipment of Samples" and Sevenson Checklist Number 010, "Task Specific QC Checklist – Sample Cooler Shipment" are included in Appendix A.

Samples should be prepared for shipment as follows:

- Follow all appropriate instructions for collecting the sample in accordance with the project FSP outlined in Section 4.0 and immediately chill upon collection with ice. Sample labels are placed on samples immediately after sample collection as described in Section 5.3.1.
- Secure the lid of the sample jar tightly. A thin strip of duct tape may be place around the edge of the lid of liquid sample jars (except for VOC samples) to prevent leakage.
- Securely wrap the sample jar with bubble-wrap. Tape the bubble-wrap to the sample jar to ensure the sample jar does not slide out.
- Each wrapped sample bottle/jar is placed in a separate Ziplock plastic bag, which is then sealed.
- A picnic cooler will be used as the shipping container. Only hard plastic, impact resistant coolers in good condition should be used. If the sample cooler has a drain plug, tape it shut on the inside and outside of the cooler. Place a large, new, clean garbage bag inside the cooler as a secondary liner.
- Place the sample jars in an upright position inside the lined cooler in such a way that they do not touch and will not touch during shipment. Place bubble-wrap, or other suitable material that will retain its integrity if it gets wet, between each sample bag to take up any void space and to prevent the containers from touching. Place a temperature blank in close proximity to the samples.
- Samples should be shipped to the laboratory on ice and chilled to 4°C. Place ice inside a Ziplock bag. Place the bag of ice inside a second Ziplock bag. The field team will determine the number of bags of ice needed. Place the double-bagged ice around, among, and on top of the sample bottles to assure samples will arrive at the laboratory at 4°C. Secure the liner bag with a twist-tie or knot.

- The paperwork (e.g., original chain-of-custody) going to the laboratory is placed inside a Ziplock bag and taped to the inside lid of the cooler. The chain-of-custody form should indicate the overnight carrier and the associated air bill number. A copy of the chain-of-custody is retained with the project files.
- The cooler is closed and taped shut with fiber-reinforced tape (strapping tape) by running the tape around both ends of the cooler at least two times.
- Orientation arrows and "Handle with Care" stickers are placed on at least two sides of the cooler.
- A minimum of two signed custody seals will be applied across the lid opening, one on the front and one on the side, to maintain the integrity of the sample custody process.
- The cooler is handed over to the overnight carrier. A standard air bill is necessary for environmental samples. The address label should contain both the shipped from and ship to address. The air bill is placed on the top of the cooler. A copy of the air bill is retained with the project document files.
- A copy of the COC and the air bill should be faxed to the laboratory to assist in tracking of potentially misrouted coolers and for planning of analysis.

6.2 Sample Shipping

All shipments will be in compliance with applicable USDOT regulations for environmental samples. The shipment of samples on Fridays is discouraged unless it is absolutely necessary, and the laboratory has assured that personnel will be present to receive the shipment and implement any necessary processing within the analytical holding times.

6.2.1 Shipping Companies

All project samples will be shipped to the laboratory via overnight courier services to ensure timely receipt of the samples by the laboratory.

6.2.2 Shipping Destinations

Project samples will be shipped to Waste Stream Technology, Inc. (WST) for chemical analysis. Samples will be delivered within 24 hours of their collection (except those collected on Friday which will be held under

appropriate conditions for shipment on Monday, unless prior arrangements have been made with the laboratory for Saturday sample receipt) to the laboratory at the following address:

Waste Stream Technology, Inc.
Attn: Sample Receipt
302 Grote Street
Buffalo, New York 14207
Phone: (716) 876-5290

The chain of custody form and sample shipment documentation will be faxed to the laboratory when samples are shipped for package tracking and sample analysis planning purposes.

The laboratory will be responsible for maintaining proper sample receipt protocols or identifying any sample receipt abnormalities as per their appropriate laboratory standard operating procedure (SOP), as described in the QAPP.

7.0 CONTRACTOR QUALITY CONTROL

Contactor quality control (CQC) is the means by which the contractor ensures that the field activities comply with the requirements of the contract. Sevenson will ensure that the CQCSM maintains quality throughout all fieldwork by means of a three-phase process performed onsite for each definable work element. The three phases of control include the preparatory phase, the initial phase, and the follow-up phase. Examples of the inspection checklists for the three-phase procedures have been provided in Appendix A of this SAP. These activities are further defined below.

7.1 Preparatory Phase

The preparatory phase of the CQC program will be performed prior to the initiation of remedial activities or phases of remedial activities, after all required plans, documents, and materials are accepted and approved, and will consist of a meeting conducted by the Sevenson CQCSM. This meeting will have minutes recorded and will occur prior to the initiation of sampling activities or phases of remedial activities. The meeting may include:

- Review of the planned activities to assure field personnel and subcontractors are aware of overall data quality objectives, the specific type of data being collected, and specific sampling and data analysis requirements.
- Review of all required forms.
- Review of equipment decontamination procedures.
- Review of proper IDW management and storage.
- Review of proper sample collection, packaging, and documentation.
- Review of field equipment and support material checklists.
- Confirm any required preliminary tasks are complete.
- Review safety issues and analyze for any potential hazards.
- Review of other issues as deemed necessary by the Sevenson CQC Representative.

The USACE will be notified at least 48 hours in advance of the preparatory control phase. The results of the preparatory phase actions will be documented by minutes prepared by the CQCSM and attached to the Daily Quality Control Report.

7.2 Initial Phase

The Sevenson CQCSM shall oversee and confirm compliance with the SAP at the initiation of each definable work feature. The CQCSM will observe and document compliance and/or deviations from the approved FSP and QAPP. Minutes of this phase will be prepared and attached to the daily QC report. Activities will include:

- Oversight of sampling and field activities to assure compliance with contract terms.
- Oversight of sample acquisition, labeling, and shipping.
- Oversight of sampling equipment decontamination.
- Inspection of all required documentation, including field notebooks and chain of custody forms to assure completeness, consistency, and accuracy.
- Completion of QC Inspection Report and Task-Specific QC Checklists (copies included in Appendix A of this SAP).
- Verification that activities are conducted according to the SSHERP to assure worker and community safety.

The USACE will be notified at least 48 hours in advance of the beginning the initial phase. The initial phase will be repeated for each new work crew to work onsite, or at any time acceptable quality standards are not being met.

7.3 Follow-Up Phase

The Sevenson CQCSM will provide daily inspections to ensure compliance with the SAP until completion of each definable work element. This daily inspection will document deficiencies noted during the initial phase, communicate any such deficiencies to both field personnel and the project manager, provide appropriate methods to correct the deficiencies, and follow up with the affected personnel to assure corrective measures are implemented. This phase will include the completion of the daily chemical quality control report (DCQCR), a copy of which is included in Appendix A and further discussed in Section 8.1 of the FSP.

8.0 SITE REPORTING AND DAILY CHEMICAL QUALITY CONTROL REPORTS

8.1 Daily Chemical Quality Control Reports

Sevenson's CQCSM or appropriate designee will prepare and sign a DCQCR on days that chemical sampling is performed. A copy of the DCQCR form is provided in Appendix A. The reports will be sequentially numbered and submitted on a regular basis to the Contracting Officer or a Designated Representative attached to the Daily Quality Control Report. The following will be attached to the DCQCR for final hard-copy submittal to the USACE: copies of COC forms, sample shipment bills of lading, copies of applicable field logbook pages, and any other relevant project forms (e.g., corrective action forms, field change request forms).

The CQCSM will report any deviations that may affect data quality objectives (DQOs) immediately to the USACE. Any instructions given by the USACE will be recorded in the DCQCR along with the appropriate corrective actions, as applicable.

The DCQCR will contain the following elements:

- Job identification and site number.
- Chemical data acquisition performed in the field and in the laboratory.
- Chemical data QC activities implemented as part of the three-phase control system.
- Sample and measurement problems that may affect project DQO requirements.
- Corrective actions and/or deviations from the approved SAP, including approvals.
- A summary of the feedback procedure for any corrective actions taken.
- Confirmation that all deviations or actions jeopardizing project DQOs have been forwarded to project management.

8.2 Laboratory Analytical Data Reports

Each sample collected during sampling events for offsite chemical analysis will be sent to the appropriate analytical laboratory. Upon completion of analysis, the laboratory will prepare an analytical data report for each sample. Specifics of analytical report preparation and requirements can be found in Section 10.4.1 of the

QAPP. The chemistry data package will contain information to demonstrate that the project DQOs have been fulfilled.

8.3 Quality Control Summary Report

A Quality Control Summary Report (QCSR) will be prepared for each remedial area (i.e., cluster) once all applicable data has been received by the laboratory. The QCSR will include a summary of all chemical sampling activities and will include an evaluation of the achievement of chemical DQOs.

The QCSR will contain the following elements:

- Summary of project scope and description.
- Summary of DCQCRs
- Summary of deviations from the chemical sample specifications.
- Summary of chemical samples performed as contingent measurements.
- Summary discussion of resulting data including achieving minimum data reporting requirements.
- Summary of achievement of project DQOs.
- Presentation and evaluation of data, including overall assessment of data quality and usability.
- Internal QC data generated during the project, including summaries of QC information from blanks, matrix spikes, surrogates, duplicates, laboratory control samples, batch identifiers, and chemical yields.
- A list of affected sample results, including appropriate data qualifier flag, where such results are negatively affected by adverse QC criteria.
- A summary of field and laboratory oversight activities.
- Conclusions and recommendations.
- Attachments, including final data packages.

9.0 CORRECTIVE ACTIONS

Corrective actions will be implemented when a discrepancy is discovered by field or laboratory personnel or during field or desk audits. The Sevenson CQCSM will coordinate and facilitate corrective actions. If the problem is determined to be minor, the corrective action will be recorded in the field notes, with verbal notifications to other field teams or subcontractors about the deficiency and the corrective action. If the deficiency is severe and may affect the project DQOs, a formal written review and corrective action will be initiated, called a Non-Conformance Report (NCR). The NCR will identify the deficiency, identify how the deficiency might affect the work product, propose corrective action, and document that the corrective action has been taken. The Sevenson CQCSM will supervise this process. In addition, the CQCSM will maintain a log of all NCRs for the project and ensure that the NCRs and corrective actions are maintained with final project files. Details of non-conformances and corrective actions are provided below.

9.1 Non-Conformance

A nonconformance is an unauthorized deviation from documented sampling or analysis procedures, practices or standards, or a defect in an item that is sufficient to render the quality of a sample or datum unacceptable or indeterminate. Field non-conformances may include, but are not limited to, the following:

- Incorrect sampling procedures.
- Failure of field instrumentation.
- Improper instrument calibration.
- Incorrect sample preservation.
- Incorrect sample packaging.
- Inappropriate sample shipment resulting in exceeded holding times.
- Incorrectly identified samples.

If a non-conformance is suspected, the CQCSM for the project will be notified as soon after the situation is identified as possible. For field non-conformances, the project manager or field sampler will make the notification; for laboratory non-conformances, the laboratory QC Manager will make the notification. After evaluation of the potential non-conformance situation, the CQCSM will notify the USACE Contracting Officer or a Designated Representative.

9.2 Corrective Action

Corrective actions are required for two classes of problems: analytical and equipment problems and noncompliance (i.e., those which do not follow the written procedures stated in the Site plans). A sample corrective action form is included in Appendix A of this SAP. Corrective actions for field and analytical activities may include:

- Repeating the measurement to check for error.
- Recalibration of instruments using freshly prepared calibration standards.
- Check for adequate power supply or operation.
- Replacement of sampling or analytical equipment.
- Reanalysis of samples.
- Re-sampling.
- Additional training of field personnel in correct implementation of sample preparation, collection, or analytical methods.
- Reassignment of personnel, if necessary, to improve the overlap between operator skills and sampling requirements.
- Communication with the CQCSM to determine the appropriate action (e.g., insufficient sample remaining for reanalysis).

Prior to implementation, Sevenson's CQCSM will approve all corrective actions planned to address deviations from the SAP. The CQCSM will ideally submit a report within 48 hours of the non-conformance event to the Contracting Officer or a Designated Representative. The CQCSM is responsible for ensuring that all corrective actions are initiated by:

- Evaluating all reported non-conformances.
- Modifying or stopping additional work on non-conformance items.
- Determining action to be taken.
- Maintaining a log of non-conformances.
- Reviewing non-conformance reports and corrective action reports.
- Ensuring that any non-conformance is included in the DCQCR and that all reports are made part of the final Site document files.

10.0 REFERENCES

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QUALITY ASSURANCE PROJECT PLAN – REVISION 2

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
OPERABLE UNIT 2 – BUILDING DEMOLITION
SOUTH PLAINFIELD, NEW JERSEY

CLUSTER 12

CONTRACT # W912DQ-04-D-0023
DELIVERY ORDER #0005

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CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
OPERABLE UNIT 2 – BUILDING DEMOLITION
SOUTH PLAINFIELD, NEW JERSEY

QUALITY ASSURANCE PROJECT PLAN

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APPENDICES

Appendix A: Standard Sample Tracking and Documentation Forms, Review Forms, and Checklists

- Sample Label and Custody Seal
- Chain of Custody Form
- Army Corp of Engineers Sample Receipt Form
- Preparatory Phase Checklist
- Initial/Follow-Up Phase Inspection Checklist
- Daily Chemical Quality Control Report
- Site QC Inspection Report
- Task Specific QC Checklist – Work Task: Packing, Storing and Shipment of Samples
- Task Specific QC Checklist – Work Task: Field Documentation
- Task Specific QC Checklist – Work Task: Decontamination
- Task Specific QC Checklist – Work Task: Sample Cooler Shipment
- Field Change Request Form
- Corrective Action Form
- Laboratory/Analytical Deficiency Notification
- Data Evaluation Checklist

Appendix B: Analytical Laboratory Quality Assurance/Quality Control Plan

List of Abbreviations and Acronyms

COC	Chain of Custody
CQCSM	Contractor Quality Control Systems Manager
DNF	Deficiency Notification Form
DOD	Department of Defense
DQO	Data Quality Objective
FSP	Field Sampling Plan
ICP	Inductively Coupled Plasma
IDL	Instrument Detection Limit
LCS	Laboratory Control Samples
LCSD	Laboratory Control Sample Duplicate
LIMS	Laboratory Information Management System
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NCR	Non-Conformance Report
NELAP	National Environmental Laboratory Accreditation Program
NJDEP	New Jersey Department of Environmental Protection
PARCC	Precision, Accuracy, Representativeness, Comparability, and Completeness
PCB	Polychlorinated Biphenyls
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QA/QC Plan	*Analytical Laboratory Quality Assurance and Quality Control Plan* (WST, 2004)
QC	Quality Control
QCSR	Quality Control Summary Report
QSM	*Quality Systems Manual for Environmental Laboratories* (DOD, 2006)
RDCSCC	Residential Direct Contact Soil Cleanup Criteria
RF	Response Factor
RPD	Relevant Percent Difference
SAP	Sampling and Analysis Plan
Sevenson	Sevenson Environmental Services, Inc.
SOP	Standard Operating Procedure
SVOC	Semi-Volatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound
WST	Waste Stream Technology, Inc.

1.0 PROJECT DESCRIPTION

This portion of the Sampling and Analysis Plan (SAP) presents the Quality Assurance Project Plan (QAPP) for the activities to be performed during work at the Cornell-Dubilier Electronics Superfund Site (site), located in South Plainfield, New Jersey. The United States Army Corps of Engineers (USACE) and the United States Environmental Protection Agency (USEPA) require that all environmental monitoring and measurement efforts mandated or supported by these organizations participate in a centrally managed quality assurance (QA) program. Any party generating data for this project has the responsibility to implement minimum procedures to ensure that the precision, accuracy, representativeness, completeness, comparability, (PARCC) and sensitivity requirements outlined in this QAPP with respect to project data quality objectives are achieved. To ensure that these responsibilities are met uniformly, each party must adhere to the QAPP.

This QAPP presents the organization, objectives, functional activities, and specific QA and quality control (QC) activities associated with the SAP for the Site. It describes the specific protocols that will be followed for sampling, sample handling and storage, chain of custody, and laboratory analysis. This plan also presents details regarding data quality objectives (DQOs) for the project and laboratory analytical procedures for all media sampled. The QAPP provides necessary technical detail and direction such that laboratory and field personnel understand all project sample analyses, quality control and data reporting requirements. It also contains sufficient detail and direction such that analytical laboratory personnel understand analytical methods, required method detection limits, method QC requirements, data review, project data quality objectives, and reporting requirements. The Field Sampling Plan (FSP), which is also part of this SAP, sets forth the sampling procedures, preservation for the samples collected in the field, field documentation, and sample packaging and shipping. The FSP and QAPP are integrated and cross-referenced where applicable to avoid redundancy.

All QA/QC procedures will be in accordance with applicable professional technical standards, USEPA requirements, government regulations and guidelines, and specific project goals and requirements. This QAPP is prepared in accordance with USEPA and USACE guidance documents: *Requirements for the Preparation of Sampling and Analysis Plans* (USACE, 2001), *Chemical Quality Assurance for HTRW Projects* (USACE, 1997), and *Guidance Objectives for the Data Quality Objectives Process* (USEPA, 1994).

1.1 Site History and Contaminants

A complete site description and history is provided in Sections 1.2 and 1.3 of the Field Sampling Plan and is not repeated here for the sake of brevity. The site is contaminated with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), inorganic constituents, and polychlorinated biphenyls (PCBs).

1.2 Site-Specific Sampling and Analysis Problems

No site-specific sampling and analysis problems have been identified.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

Sevenson Environmental Services, Inc. (Sevenson) is the designated USACE contractor responsible for conducting the activities required by the current task order. The functional responsibilities of key personnel are described in the following parts of this section. The assignment of personnel to each project position will be based on a combination of (1) experience in the type of work to be performed, (2) experience working with USACE personnel and procedures, (3) a demonstrated commitment to high quality and timely job performance, and (4) staff availability.

2.1 Subcontracted Laboratory Support

Analytical laboratory support specific to Site sampling activities will be obtained from Waste Stream Technology, Inc. (WST) of Buffalo, New York. WST holds current New Jersey Department of Environmental Protection (NJDEP), National Environmental Laboratory Accreditation Program (NELAP), and USACE certification for the parameters of interest at the Site. WST will perform laboratory activities in accordance with the requirements of the Department of Defense (DOD) *Quality Systems Manual (QSM) for Environmental Laboratories* (DOD, 2006). WST's *Analytical Laboratory Quality Assurance and Quality Control Plan, Revision 12* (QA/QC Plan; WST, 2004) is included in Appendix B.

An organizational chart outlining key laboratory personnel and organization is included in the laboratory QA/QC Plan (Appendix B). Prior to the commencement of field activities for the project, a complete copy of the SAP, including this QAPP, will be sent to the laboratory. The responsibilities of key personnel are described in the following sections.

2.1.1 Laboratory Quality Assurance/Quality Control Manager

The QA/QC Officer for WST is Mr. Dan Vollmer. As the Laboratory QA/QC Manager, Mr. Vollmer is responsible for the laboratory QA/QC in accordance with the requirements of this QAPP in conjunction with the established laboratory QA Program. In coordination with the Project Laboratory Coordinator, Mr. Vollmer will be responsible for:

- Documenting that samples received by the laboratory are analyzed in accordance with required methodologies.
- Assuring that instrument calibration is performed properly and documented.
- Verifying that field and internal laboratory QC samples are analyzed and documented.
- Reporting both field and QC samples in the format required by the laboratory scope of work and the QAPP.
- Processing laboratory nonconformance reports (NCRs) and laboratory/analytical deficiency notification forms (DNF) in a timely manner.
- Implementing Corrective Action Report recommendations and requirements.

2.1.2 Laboratory Project Manager

Mr. Vollmer will also serve as the laboratory Project Manager for this project. The responsibilities of the laboratory Project Manager include the following:

- Initiation and maintenance of contact with the project on individual job tasks.
- Preparation of all laboratory-associated work plans, schedules, and manpower allocations.
- Initiation of laboratory associated procurement for the project.
- Provision of day-to-day direction of the laboratory project team including analytical department managers, supervisors, QA personnel, and data management personnel.
- Coordination of all laboratory related financial and contractual aspects of the project.
- Provision of formatting and technical review for all laboratory reports.
- Provision of final review and approval on all laboratory analytical reports to the project.
- Response to all post project inquiries.

2.1.3 Laboratory Manager

Dr. Brian Schepart is the WST Laboratory Manager. The responsibilities of the Laboratory Manager include the following:

- Coordination with all analytical production activities conducted within the analytical departments.
- Working with the Laboratory Project Manager to ensure all project objectives are met.

- Provision of guidance to analytical department managers.
- Facilitation of transfer of data produced by the analytical departments to the report preparation and review staff for final delivery to the client.

2.1.4 Laboratory Section Heads, Department Managers, and Technical Leads

The responsibilities of each laboratory section or department include the following:

- Coordination of all analytical functions related to specific analytical areas.
- Provision of technical information to and oversight of all analysis being performed.
- Review and approve all analytical results produced by their specific analytical area of expertise.
- Maintenance of all analytical records and information pertaining to the analysis being performed.

Analytical professionals exhibiting the qualifications defined in Section 6.0 of the DOD QSM (DOD, 2006) shall staff the laboratory.

2.2 Contact Information

Points of contact for personnel for Sevenson and WST are provided in Table 2-1 of the FSP. If it should become necessary at any time throughout the duration of this project to make any changes/additions to staff personnel, Sevenson will notify the USACE Contracting Officer or a Designated Representative prior to such changes and/or additions. In addition, the WST contact person will be notified if any of these personnel changes directly affect whom to contact for sample receipt problems, data reporting problems, guidance, and decision authority.

2.3 Personnel Qualification Requirements

Personnel performing the tasks and having the responsibilities identified under Section 2.0 shall have and maintain the qualifications as specified in the USACE contract documents, including ER 1110-1-263 (June 1993) and Section 5.2 of the QSM (DOD, 2006). Personnel operating specific equipment, performing environmental tests, evaluating results, and signing analytical reports shall be qualified on the basis of appropriate education, training, experience, and/or demonstrated skills, as required. Laboratory technical staff

will have the education and experience to demonstrate knowledge of their particular function and a general knowledge of laboratory operations, test methods, QA/QC procedures, and records management. New employees will be certified through the analysis of laboratory quality control samples (i.e., initial demonstration of performance studies) prior to being allowed to analyze project samples. The Sevenson Project Manager will maintain a record of requirements, training, and qualifications for each individual.

3.0 DATA QUALITY OBJECTIVES

DQOs are qualitative and quantitative statements that specify the quality of data required to support decisions made during remedial response activities and are based on the end use of the data being collected. To determine the project DQOs, a series of planning steps are used, as specified in the USEPA *Guidance for Data Quality Objectives Process* (USEPA, 1994) to identify the data needed to support project decisions and develop a data collection program. The process is intended to optimize data collection and meet the applicable decision criteria. The seven steps are detailed below.

STEP 1: STATE THE PROBLEM. The Cornell-Dubilier Superfund Site facility buildings may contain materials which may be regulated when disposed of. Debris, soil, concrete, and water need to be characterized to determine what materials require disposal as hazardous wastes and as regulated non-hazardous waste. In addition, backfill and topsoil materials brought onsite for restoration activities will have to be shown to be below the NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC).

STEP 2: IDENTIFY THE DECISION. To meet the objectives, the following decisions will need to be made during the remedial action:

- Determine whether or not there is any risk by assuming materials are either hazardous or non-hazardous for disposal.
- Determine whether offsite source materials pose a risk to human health or the environment prior to bringing such materials to the site.

STEP 3: IDENTIFY THE INPUTS TO THE DECISION. The following inputs are required to answer the questions identified in Step 2:

- Review the existing data for building materials, including information from field visits, common construction practices, building construction dates, contamination sources, and site history.
- Collect additional samples needed to confirm existing data in order to establish disposal requirements.
- Determine appropriate analytical methods, regulations, and action levels.

STEP 4: DEFINE THE STUDY BOUNDARIES. The physical boundaries of the remedial action are the perimeters of each of the facility buildings and associated structures. All facility buildings are located within the site boundaries.

STEP 5: DEVELOP A DECISION RULE. The purpose of this step is to integrate the outputs from the previous steps that define the conditions that would cause the decision-maker to close among alternative actions. The following primary decision rules will be used to answer the fundamental questions:

- For building demolition, if the maximum concentration for each sample at each homogeneous location for each parameter tested is below the regulatory action levels, then disposal of the homogeneous building material would not be concern.
- For backfill and topsoil, if the maximum concentration for each sample for each parameter tested is below the acceptance criteria, then the material may be used at the site and be considered not a hazard to human health or the environment.

STEP 6: SPECIFY LIMITS ON DECISION ERRORS. This step is to specify the decision-maker's acceptable limits on decision errors, which are used to establish appropriate performance goals for limiting uncertainty in environmental data. These acceptable limits on decision errors allow decision-makers to generate resource-effective sampling designs while limiting uncertainties in the collected data.

There are two types of decision errors applicable to estimating the true value of a population: (1) sampling design error, which occurs when the sampling design is unable to capture the complete state of natural variability over space and time, and (2) measurement error, which refers to a combination of random and systematic errors, known as the total error, can be controlled by hypothesis testing; that is, selecting the null hypothesis (H_o) and the alternative hypothesis (H_a) and testing to reject or accept H_o. The null hypothesis is the baseline condition that is presumed to be true in the absence of strong evidence to the contrary.

The null hypothesis and alternative hypothesis for demolition debris disposal are as follows:

- H_o: Demolition debris does not contain constituents which are regulated when disposed of when the buildings and structures are demolished.

- H_a: Building debris does contain constituents which are regulated when disposed of when the buildings and structures are demolished.

The null hypothesis and alternative hypothesis for backfill and topsoil materials are as follows:

- H_o: Backfill and topsoil do not contain constituents which are greater than the NJDEP RDCSCC.
- H_a: Backfill and topsoil do contain constituents which are greater than the NJDEP RDCSCC.

There are two types of decision errors: (1) the false rejection of the decision error (i.e., false positive), or Type I error, which occurs when the null hypothesis is rejected when it is true, and (2) the false acceptance decision error (i.e., false negative), or Type II error, which occurs when the null hypothesis is not rejected when it is false. In this case, the false rejection error is concluding that the demolition debris do contain constituents which are regulated when disposed of, when the debris actually does not contain such constituents. Likewise, the false rejection error for offsite source material is concluding that backfill and topsoil materials do contain constituents which are greater than the NJDEP RDCSCC, when the materials actually do not contain such constituents. The false acceptance error is concluding that the demolition debris does not contain constituents which are regulated when disposed of, when the debris actually does contain such constituents. Likewise, the false acceptance error for offsite source material is concluding that backfill and topsoil materials do not contain constituents which are greater than the NJDEP RDCSCC, when the materials actually do contain such constituents.

The consequence of the false rejection decision error will be the unnecessary expenditure of resources. The consequence of the false acceptance error is that the demolition debris and offsite source materials pose risk to human health or the environment. Because of the possible severity of the false acceptance decision error consequence, the false rejection error is more tolerable than the false acceptance decision error. The former will occur when the analytical results are biased high and the latter will occur when the analytical results are biased low.

STEP 7: OPTIMIZE THE DESIGN. This step involves identifying the most resource-effective sampling and analysis design for generating data that are expected to satisfy project DQO.

The consequence of the decision error will need to be balanced against the cost of limiting the possibility of these errors. These errors will be managed by the use of precise and accurate analytical methods and a relatively large number of samples along with duplicate samples. The large number of samples will need to be collected to minimize the false acceptance decision, and to minimize risk. The approach to overcome the large number of samples is to limit the number of samples for homogeneous materials and of materials that are known to contain constituents of concern. The approach to overcome the risk is to systematically perform sampling, even in areas where constituents of concern are not expected to be present.

The sampling design will consist of judgmental sampling backed up with simple random sampling. In the judgmental sampling methodology, the sampling locations are based on data from previous investigations of the site. Typically, this is useful to confirm the existence of contamination at specific locations, based on historical sampling results. To confirm areas that are not suspected to contain constituents of concern, a simple random sampling methodology will be performed in those areas. With simple random sampling, all areas that are not suspected of containing contaminants of concern have an equal probability of being selected and each sampling point is selected independently from all other sample points.

3.1 Data Quality Levels

Samples of Site media will be obtained and contaminant constituent parameters will be measured to generate data that supports Site data use requirements. Definitive data quality is anticipated for this project. A summary of data quality levels by sample type is included in Table 3-1.

A definitive level of data quality indicates that the analytical test will be performed by an offsite laboratory using instrumentation capable of giving a quantifiable data result. Data generated at this level is subject to quality assurance and control procedures that include the collection and analysis of QA/QC samples. Definitive quality data shall be acquired, documented, verified, and reported to ensure that the specified precision, accuracy, representativeness, comparability, completeness, and sensitivity requirements are met.

TABLE 3-1: DATA QUALITY LEVELS FOR CHEMICAL PARAMETERS		
CHEMICAL PARAMETER	ANALYTICAL METHOD	DQO LEVEL
Toxicity Characteristic Leachate Procedure (TCLP) VOCs (solid and aqueous)	SW-846 Method 1311/5030C/8260B	Definitive
TCLP SVOCs (solid and aqueous)	SW-846 Method 1311/3510C/8270C	Definitive
TCLP Pesticides (solid and aqueous)	SW-846 Method 1311/3510C/8081A	Definitive
TCLP Herbicides (solid and aqueous)	SW-846 Method 1311/3510C/8151A	Definitive
TCLP Metals (solid and aqueous)	SW-846 Method 1311/3015/6010B/7470A	Definitive
Ignitability (solid and aqueous)	SW-846 Method 1010	Definitive
Corrosivity (solid and aqueous)	SW-846 Method 9045C/9040C	Definitive
Reactive Cyanide (solid and aqueous)	SW-846 Section 7.4.3.2, Method 9014	Definitive
Reactive Sulfide (solid and aqueous)	SW-846 Section 7.4.4.2, Method 9034	Definitive
Target Compound List (TCL) VOCs (solid)	SW-846 Method 5030/8260B	Definitive
TCL SVOCs (solid)	SW-846 Method 3550C/8270C	Definitive
TCL Pesticides (solid)	SW-846 Method 3550C/8081A	Definitive
Total PCBs (solid, aqueous, and wipe)	SW-846 Method 3550C/8082	Definitive
Target Analyte List (TAL) Metals (solid)	SW-846 Method 3050/6010B/7471A	Definitive

3.2 Quality Assurance Program

All subcontracted analytical laboratories will have a written QA program that provides rules and guidelines to ensure the reliability and validity of work conducted at the laboratory. Compliance with the QA program is coordinated and monitored by the laboratory's QA department, which is independent of the operating departments. For these investigations, the selected support laboratory QA/QC Plan will be referenced and implemented in its entirety. In the field, a QA manager who is independent of the filed team has been assigned to the project.

The stated objectives of the laboratory QA program are to:

- Ensure that samples were properly preserved in the field, as necessary.
- Properly store all samples upon receipt from the field.

- Maintain adequate custody records from sample collection through reporting and archiving of results.
- Use properly trained analysts to analyze all samples by approved methods within holding times.
- Produce defensible data with associated documentation to show that each system was calibrated and operating within precision and accuracy control limits.
- Accurately calculate, check, report, and archive all data using the Laboratory Information Management System (LIMS).
- Document all of the above activities so that all data can be independently validated.

All laboratory procedures are documented in writing as Standard Operating Procedures (SOPs), which are edited and controlled by the laboratory's QA department. Internal QC measures for analysis will be conducted in accordance with their SOPs and the individual method requirements specified.

3.3 QA Objectives for Chemical Data Measurement

DQOs have been developed with reference to the PARCC goals (i.e. precision, accuracy, representativeness, comparability, and completeness), method sensitivity, documentation, data reporting, and data validation. These parameters are defined below.

- **Precision.** Precision is a measure of the degree of the agreement among individual measurements of the same property under similar conditions. Precision measures the random error component of the data collection process. Precision may be affected by the natural variation of the matrix or contamination within the matrix, as well as by errors made in the field and/or laboratory handling procedures. The degree of agreement, expressed as relative percent difference, is calculated using the formula included in Section 8.3.

  Matrix spike (MS) and matrix spike duplicate (MSD) pairs and laboratory duplicate samples are used to assess analytical precision. Field precision is assessed by measurement of field duplicate samples. The objective for laboratory precision is to recover relative percent difference (RPD) values within the established laboratory control limits for each method. The objective for field precision is to recover RPD values between field duplicate samples within the acceptance criteria presented in Table 3-2 for each method. If the RPD acceptance criteria for field duplicate samples are not achieved, field-sampling procedures, including homogenization, 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. The laboratory and field precision goals are included in Table 3-2.

- **Accuracy**. Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Accuracy measures the bias or systematic error of the entire data collection process. Sources of these errors include the sampling process, field and laboratory contamination, sample preparation and handling, sample matrix interferences, sample preparation methods, and calibration and analytical procedures. Accuracy is expressed as a percent recovery and is calculated using the formula found in Section 8.2 of this QAPP.

  Analytical accuracy is measured by the analysis of calibration checks, system blanks, quality control samples, surrogate spikes, matrix spikes, and other method-specific checks. Field accuracy is assessed by evaluating the results of field and trip blanks and is maintained by frequent and thorough review of field procedures. The objective for precision is to meet the established laboratory control limits for the methods. The accuracy goals are included in Table 3-2.

TABLE 3-2: PRECISION AND ACCURACY OBJECTIVES

Parameters	Precision (Relative Percent Difference)	Accuracy % of Spike Recovery		Field Duplicate RPD Acceptance Criteria
SOIL MATRICES				
TAL Metals		**LCS**	**MS/MSD**	
Aluminum	25	80-120	75-125	40
Antimony	25	80-120	75-125	40
Arsenic	25	80-120	75-125	40
Barium	25	80-120	75-125	40
Beryllium	25	80-120	75-125	40
Cadmium	25	80-120	75-125	40
Calcium	25	80-120	75-125	40
Chromium	25	80-120	75-125	40
Cobalt	25	80-120	75-125	40
Copper	25	80-120	75-125	40
Iron	25	80-120	75-125	40
Lead	25	80-120	75-125	40
Magnesium	25	80-120	75-125	40

TABLE 3-2: PRECISION AND ACCURACY OBJECTIVES				
Parameters	**Precision (Relative Percent Difference)**	**Accuracy % of Spike Recovery**		**Field Duplicate RPD Acceptance Criteria**
Manganese	25	80-120	75-125	40
Nickel	25	80-120	75-125	40
Potassium	25	80-120	75-125	40
Selenium	25	80-120	75-125	40
Silver	25	80-120	75-125	40
Sodium	25	80-120	75-125	40
Thallium	25	80-120	75-125	40
Vanadium	25	80-120	75-125	40
Zinc	25	80-120	75-125	40
Mercury	25	80-120	75-125	35
TCL VOCs		**LCS**	**MS/MSD**	
1,1,1,2-Tetrachloroethane	25	75-125	60-140	40
1,1,1-Trichloroethane	25	70-135	74-125	40
1,1,2,2-Tetrachloroethane	25	55-130	59-141	40
1,1,2-Trichloroethane	25	60-125	65-136	40
1,1-Dichloroethane	25	75-125	67-131	40
1,1-Dichloroethene	25	65-135	76-125	40
1,2-Dichloroethane	25	70-135	73-128	40
1,2-Dichloropropane	25	70-120	75-119	40
2-Butanone	25	30-160	26-219	40
2-Hexanone	25	45-145	33-184	40
4-Methyl-2-pentanone	25	45-145	32-184	40
Acetone	25	20-160	35-214	40
Acrylonitrile	25	70-130	60-140	40
Benzene	25	75-125	82-118	40
Bromodichloromethane	25	70-130	73-123	40
Bromoform	25	55-135	56-131	40
Bromomethane	25	30-160	17-156	40
Carbon Disulfide	25	45-160	64-116	40
Carbon Tetrachloride	25	65-135	69-118	40
Chlorobenzene	25	75-125	77-124	40
Chloroethane	25	40-155	63-151	40
Chloroform	25	70-125	78-125	40
Chloromethane	25	50-130	39-126	40
cis-1,2-Dichloroethene	25	65-125	75-129	40
cis-1,3-Dichloropropene	25	70-125	67-117	40
Dibromochloromethane	25	65-130	64-138	40

TABLE 3-2: PRECISION AND ACCURACY OBJECTIVES				
Parameters	**Precision (Relative Percent Difference)**	**Accuracy % of Spike Recovery**		**Field Duplicate RPD Acceptance Criteria**
Ethylbenzene	25	75-125	79-122	40
m,p-Xylene	25	80-125	78-127	40
Methylene Chloride	25	55-140	22-169	40
o-Xylene	25	75-125	77-128	40
Styrene	25	75-125	48-148	40
Tetrachloroethene	25	65-140	70-128	40
Toluene	25	70-125	72-132	40
trans-1,2-Dichloroethene	25	65-135	80-119	40
trans-1,3-Dichloropropene	25	65-125	68-137	40
Trichloroethene	25	75-125	55-140	40
Vinyl Acetate	25	38-106	10-112	40
Vinyl Chloride	25	60-125	58-144	40
TCL SVOCs		**LCS**	**MS/MSD**	
1,2,4-Trichlorobenzene	35	45-110	43-120	35
1,2-Dichlorobenzene	35	45-95	50-110	35
1,3-Dichlorobenzene	35	40-100	49-109	35
1,4-Dichlorobenzene	35	35-105	47-112	35
2,4,5-Trichlorophenol	35	50-110	49-127	35
2,4,6-Trichlorophenol	35	45-110	55-124	35
2,4-Dichlorophenol	35	45-110	49-123	35
2,4-Dimethylphenol	35	30-105	41-136	35
2,4-Dinitrophenol	35	15-130	10-174	35
2,4-Dinitrotoluene	35	50-115	67-126	35
2,6-Dinitrotoluene	35	50-110	66-126	35
2-Chloronaphthalene	35	45-105	55-121	35
2-Chlorophenol	35	45-105	48-115	35
2-Methyl-4,6-dinitrophenol	35	30-135	10-196	35
2-Methylnaphthalene	35	45-105	37-131	35
2-Methylphenol	35	40-105	52-121	35
2-Nitroaniline	35	45-120	69-120	35
2-Nitrophenol	35	40-110	53-114	35
3 & 4-Methylphenol	35	40-105	62-142	35
3,3'-Dichlorobenzidine	35	10-130	27-128	35
3-Nitroaniline	35	25-110	67-125	35
4-Bromophenyl-phenylether	35	45-115	53-118	35
4-Chloro-3-Methylphenol	35	45-115	63-118	35
4-Chloroaniline	35	10-95	49-123	35
4-Chlorophenyl-phenylether	35	45-110	58-125	35

TABLE 3-2: PRECISION AND ACCURACY OBJECTIVES				
Parameters	Precision (Relative Percent Difference)	Accuracy % of Spike Recovery		Field Duplicate RPD Acceptance Criteria
4-Nitroaniline	35	35-115	62-128	35
4-Nitrophenol	35	15-140	25-132	35
Acenaphthene	35	45-110	60-127	35
Acenaphthylene	35	45-105	68-124	35
Anthracene	35	55-105	67-127	35
Benzidine	35	5-63	5-47	35
Benzo(a)anthracene	35	50-110	68-120	35
Benzo(a)pyrene	35	50-110	69-121	35
Benzo(b)fluoranthene	35	45-115	59-134	35
Benzo(g,h,i)perylene	35	40-125	28-142	35
Benzo(k)fluoranthene	35	45-125	59-130	35
Benzoic Acid	35	0-110	10-138	35
Benzyl Alcohol	35	20-125	50-109	35
bis(2-Chloroethoxy)methane	35	45-110	53-122	35
bis(2-Chloroethyl)ether	35	40-105	44-120	35
bis(2-Chloroisopropyl)ether	35	20-115	53-120	35
bis(2-Ethylhexyl)phthalate	35	45-125	64-138	35
Butylbenzyl phthalate	35	50-125	65-141	35
Carbazole	35	45-115	68-122	35
Chrysene	35	55-110	59-136	35
Dibenzo(a,h)anthracene	35	40-125	46-134	35
Dibenzofuran	35	50-105	62-124	35
Diethyl phthalate	35	50-115	56-130	35
Dimethyl phthalate	35	50-110	60-126	35
di-n-Butylphthalate	35	55-110	66-129	35
di-n-Octylphthalate	35	40-130	49-170	35
Fluoranthene	35	55-115	65-124	35
Fluorene	35	50-110	64-121	35
Hexachlorobenzene	35	45-120	59-129	35
Hexachlorobutadiene	35	40-115	38-138	35
Hexachlorocyclopentadiene	35	35-151	10-141	35
Hexachloroethane	35	35-110	46-106	35
Indeno(1,2,3-cd)pyrene	35	40-120	36-138	35
Isophorone	35	45-110	57-118	35
Naphthalene	35	40-105	49-119	35
Nitrobenzene	35	40-115	41-118	35
n-Nitrosodimethylamine	35	20-115	30-112	35
n-Nitroso-di-n-propylamine	35	40-115	57-113	35

TABLE 3-2: PRECISION AND ACCURACY OBJECTIVES				
Parameters	**Precision (Relative Percent Difference)**	**Accuracy % of Spike Recovery**		**Field Duplicate RPD Acceptance Criteria**
n-Nitrosodiphenylamine	35	50-115	49-146	35
Pentachlorophenol	35	25-120	12-144	35
Phenanthrene	35	50-110	56-136	35
Phenol	35	40-100	35-126	35
Pyrene	35	45-125	64-140	35
TCL Pesticides and PCBs		**LCS**	**MS/MSD**	
4,4'-DDD	30	30-135	45-170	35
4,4'-DDE	30	70-125	51-133	35
4,4'-DDT	30	45-140	42-172	35
Aldrin	30	45-140	56-139	35
Alpha-BHC	30	60-125	75-124	35
Beta-BHC	30	60-125	55-134	35
Delta-BHC	30	55-130	63-141	35
Dieldrin	30	65-125	69-124	35
Endosulfan I	30	15-135	64-120	35
Endosulfan II	30	35-140	69-118	35
Endosulfan Sulfate	30	60-135	62-141	35
Endrin	30	60-135	61-147	35
Endrin Aldehyde	30	35-145	23-136	35
Endrin Ketone	30	65-135	58-153	35
Gamma-BHC (Lindane)	30	60-125	70-116	35
Heptachlor	30	50-140	73-123	35
Heptachlor Epoxide	30	65-130	58-128	35
Methoxychlor	30	55-145	45-169	35
Toxaphene	NA	60-150	NA	35
Chlordane	NA	60-150	NA	35
Aroclor 1016	30	40-140	69-126	35
Aroclor 1221	NA	NA	NA	35
Aroclor 1232	NA	NA	NA	35
Aroclor 1242	NA	NA	NA	35
Aroclor 1248	NA	NA	NA	35
Arclor 1254	NA	NA	NA	35
Aroclor 1260	30	60-130	62-152	35
TCLP ANALYSES				
TCLP Metals		**LCS**	**MS/MSD**	
Arsenic	25	80-120	75-125	40
Barium	25	80-120	75-125	40

TABLE 3-2: PRECISION AND ACCURACY OBJECTIVES				
Parameters	**Precision (Relative Percent Difference)**	**Accuracy % of Spike Recovery**		**Field Duplicate RPD Acceptance Criteria**
Cadmium	25	80-120	75-125	40
Chromium	25	80-120	75-125	40
Lead	25	80-120	75-125	40
Selenium	25	80-120	75-125	40
Silver	25	80-120	75-125	40
Mercury	25	80-120	75-125	40
TCLP VOCs	**LCS/LCSD**	**LCS**	**MS**	
Vinyl Chloride	20	57-127	54-125	40
1,1-Dichloroethene	20	70-123	70-123	40
Chloroform	20	71-130	71-124	40
2-Butanone	20	66-156	59-177	40
1,2-Dichloroethane	20	75-125	74-123	40
Carbon Tetrachloride	20	70-125	67-114	40
Trichloroethene	20	78-118	73-119	40
Benzene	20	78-119	81-114	40
Tetrachloroethene	20	71-119	72-116	40
Chlorobenzene	20	81-115	81-113	40
TCLP SVOCs	**LCS/LCSD**	**LCS**	**MS**	
Pyridine	30	7-52	5-66	35
1,4-Dichlorobenzene	30	46-95	51-110	35
Nitrobenzene	30	61-93	44-129	35
Hexachloroethane	30	44-101	42-107	35
Hexachlorobutadiene	30	51-114	54-116	35
2,4,6-Trichlorophenol	30	62-101	50-122	35
2,4,5-Trichlorophenol	30	60-105	47-128	35
2,4-Dinitrotoluene	30	72-113	48-133	35
Hexachlorobenzene	30	67-127	50-127	35
Pentachlorophenol	30	54-132	30-146	35
Total Cresols	30	37-76	26-114	35
TCLP Pesticides	**LCS/LCSD**	**LCS**	**MS**	
Endrin	25	80-151	58-148	35
Gamma-BHC	25	78-124	55-125	35
Heptachlor	25	71-139	55-134	35
Heptachlor Epoxide	25	75-124	35-132	35
Methoxychlor	25	64-142	43-165	35
TCLP Herbicides	**LCS/LCSD**	**LCS**	**MS**	
2,4,5-TP	30	70-144	78-146	35

TABLE 3-2: PRECISION AND ACCURACY OBJECTIVES				
Parameters	**Precision (Relative Percent Difference)**	**Accuracy % of Spike Recovery**		**Field Duplicate RPD Acceptance Criteria**
2,4-D	30	57-151	41-171	35
RCRA Characteristics		**LCS**	**MS**	
Ignitability	35	NA	NA	NA
Corrosivity	35	NA	NA	NA
Reactive Sulfide	35	66-109	66-109	NA
Reactive Cyanide	35	7-12	2-20	NA
WATER MATRICES				
Total PCBs		**LCS**	**MS/MSD**	
Aroclor 1016	30	25-145	25-145	35
Aroclor 1221	NA	NA	NA	35
Aroclor 1232	NA	NA	NA	35
Aroclor 1242	NA	NA	NA	35
Aroclor 1248	NA	NA	NA	35
Arclor 1254	NA	NA	NA	35
Aroclor 1260	30	30-145	30-145	35
WIPE SAMPLES				
Total PCBs		**LCS**	**MS/MSD**	
Aroclor 1016	NA	60-144	NA	NA
Aroclor 1221	NA	NA	NA	NA
Aroclor 1232	NA	NA	NA	NA
Aroclor 1242	NA	NA	NA	NA
Aroclor 1248	NA	NA	NA	NA
Arclor 1254	NA	NA	NA	NA
Aroclor 1260	NA	60-142	NA	NA
Note: Laboratory-specific precision and accuracy objectives are updated on an annual basis. Updated values will be provided when they become available.				

- **Representativeness.** Representativeness expresses the degree to which sample data accurately and precisely represent the characteristics of a population of samples, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter that is most concerned with the proper design of the sampling strategies and techniques. The sampling program was designed so that the samples collected are as representative as possible of the medium being sampled and that a sufficient number of samples are collected. It is the intent of the sampling effort to collected samples which meet the offsite disposal facility requirements. Typically, the offsite disposal

facilities require that one sample is collected for every 500yd^3 of material being disposed of. The determination of representativeness of the data will be performed by:

- Comparing actual sampling procedures to those described in Section 4.0 of the FSP.
- Identifying and eliminating non-representative data.
- Comparing analytical results of field duplicate samples.
- Evaluating holding times and condition of samples on arrival at the laboratory.
- Examining blanks for cross contamination.
- In the laboratory, making certain that all sub-samples taken from a given sample are representative of the entire sample.

The representativeness objective of this SAP is to eliminate all non-representative data. If, during the data evaluation, results indicate that a sample is not representative, Sevenson will notify the USACE and provide recommendations for an alternate location or sampling method.

- **Comparability.** Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. Sample data should be comparable with other measurement data for similar samples and sample conditions. This goal is achieved through employing narrowly defined sampling methodologies, site audits/surveillances, use of standard sampling devices, uniform training, documentation of sampling, standard analytical protocols/procedures, QC checks with standard control limits, and universally accepted data reporting units to ensure comparability to other data sets. Thus, this objective will be met by following techniques and methods set forth in the SAP.

- **Completeness.** Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected under normal conditions. The total number of samples required will be determined in the field based on the requirements of the offsite disposal facility. Completeness is determined as a percentage using the formula given in Section 8.4 of this QAPP. 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:

1. COMPLETENESS FOR SAMPLE COLLECTION. Completeness for sample collection is defined as the percentage of specified samples listed in the FSP that were actually collected. The completeness for sample collection will be 95%.

2. COMPLETENESS FOR ACCEPTABLE DATA. Completeness for acceptable data is defined as the percentage of acceptable data out of the total amount of data generated. This completeness will be 95% for each analytical method. Acceptable data includes data that has passed all QC criteria and data which may have not passed all criteria but which had appropriate corrective actions taken.

3. COMPLETENESS FOR QUALITY DATA. Completeness for quality data is defined as the percentage of quality data out of the total amount of data generated. The completeness shall be 95%. Quality data is that data that has passes all applicable quality control criteria specified in the QAPP.

- **Sensitivity.** Sensitivity is a measure of a method's detection limit and ability to distinguish between two values. The method detection limit (MDL) is the smallest reportable concentration in a sample within a specified level of confidence, while method quantitation limits (MQL) represent the sum of all of the uncertainties in the analytical procedure plus a risk factor. Hence, the method quantitation limit is based on the method detection limit. Additionally, the lowest calibration standard is typically set at the MQL. The laboratory MQLs for the samples generated through the FSP and the analytical methods that will be used to achieve the appropriate sensitivities are given in Table 3-3 on an analyte-by-analyte basis.

TABLE 3-3: METHOD QUANTIATION LIMITS	
Constituent	**MQL**
TAL Metals (mg/Kg)	
Aluminum	2.50
Antimony	1.40
Arsenic	1.70
Barium	1.00
Beryllium	0.50
Cadmium	1.00
Calcium	2.40

TABLE 3-3: METHOD QUANTIATION LIMITS	
Constituent	**MQL**
Chromium	1.00
Cobalt	1.00
Copper	1.00
Iron	8.30
Lead	4.10
Magnesium	12.0
Manganese	1.00
Nickel	1.00
Potassium	14.0
Selenium	1.40
Silver	0.50
Sodium	12.0
Thallium	1.30
Vanadium	1.00
Zinc	4.00
Mercury	0.014
TCL VOCs (µg/Kg)	
1,1,1,2-Tetrachloroethane	2.0
1,1,1-Trichloroethane	2.0
1,1,2,2-Tetrachloroethane	2.0
1,1,2-Trichloroethane	2.0
1,1-Dichloroethane	2.0
1,1-Dichloroethene	2.0
1,2-Dichloroethane	2.0
1,2-Dichloropropane	2.0
2-Butanone	10.0
2-Hexanone	10.0
4-Methyl-2-pentanone	10.0
Acetone	10.0
Acrylonitrile	10.0
Benzene	2.0
Bromodichloromethane	2.0
Bromoform	2.0
Bromomethane	10.0
Carbon Disulfide	2.0
Carbon Tetrachloride	2.0
Chlorobenzene	2.0
Chloroethane	10.0
Chloroform	2.0
Chloromethane	10.0
cis-1,2-Dichloroethene	2.0

TABLE 3-3: METHOD QUANTIATION LIMITS	
Constituent	**MQL**
cis-1,2-Dichloropropene	2.0
Dibromochloromethane	2.0
Ethylbenzene	2.0
m,p-Xylene	4.0
Methylene Chloride	2.0
o-Xylene	2.0
Styrene	2.0
Tetrachloroethene	2.0
Toluene	2.0
trans-1,2-Dichloroethene	2.0
trans-1,3-Dichloropropene	2.0
Trichloroethene	2.0
Vinyl Acetate	10.0
Vinyl Chloride	10.0
TCL SVOCs (µg/Kg)	
1,2,4-Trichlorobenzene	67
1,2-Dichlorobenzene	67
1,3-Dichlorobenzene	67
1,4-Dichlorobenzene	67
2,4,5-Trichlorophenol	67
2,4,6-Trichlorophenol	130
2,4-Dichlorophenol	130
2,4-Dimethylphenol	130
2,4-Dinitrophenol	130
2,4-Dinitrotoluene	67
2,6-Dinitrotoluene	67
2-Chloronaphthalene	67
2-Chlorophenol	130
2-Methyl-4,6-dinitrophenol	130
2-Methylnaphthalene	67
2-Methylphenol	67
2-Nitroaniline	67
2-Nitrophenol	130
3 & 4-Methylphenol	130
3;3'-Dichlorobenzidine	67
3-Nitroaniline	67
4-Bromophenyl-phenylether	67
4-Chloro-3-Methylphenol	133
4-Chloroaniline	67
4-Chlorophenyl-phenylether	67

TABLE 3-3: METHOD QUANTIATION LIMITS	
Constituent	**MQL**
4-Nitroaniline	67
4-Nitrophenol	130
Acenaphthene	67
Acenaphthylene	67
Anthracene	67
Benzidine	330
Benzo(a)anthracene	67
Benzo(a)pyrene	67
Benzo(b)fluoranthene	67
Benzo(g,h,i)perylene	67
Benzo(k)fluoranthene	67
Benzoic Acid	330
Benzyl Alcohol	67
bis(2-Chloroethoxy)methane	67
bis(2-Chloroethyl)ether	67
bis(2-Chloroisopropyl)ether	67
bis(2-ethylhexyl)phthalate	67
Butylbenzyl phthalate	67
Carbazole	67
Chrysene	67
Dibenzo(a,h)anthracene	67
Dibenzofuran	67
Diethyl phthalate	67
Dimethyl phthalate	67
di-n-Butyl phthalate	67
di-n-Octylphthalate	67
Fluoranthene	67
Fluorene	67
Hexachlorobenzene	67
Hexachlorobutadiene	67
Hexachlorocyclopentadiene	130
Hexachloroethane	67
Indeno(1,2,3-cd)pyrene	67
Isophorone	67
Naphthalene	67
Nitrobenzene	67
n-Nitrosodimethylamine	67
n-Nitroso-di-n-propylamine	67
n-Nitrosodiphenylamine	67

TABLE 3-3: METHOD QUANTIATION LIMITS	
Constituent	**MQL**
Pentachlorophenol	130
Phenanthrene	67
Phenol	130
Pyrene	67
TCL Pesticides and PCBs (µg/Kg)	
4,4'-DDD	0.4
4,4'-DDE	0.4
4,4'-DDT	0.4
Aldrin	0.4
Alpha-BHC	0.4
Beta-BHC	0.4
Chlordane	6.7
Delta-BHC	0.4
Dieldrin	0.4
Endosulfan I	0.4
Endosulfan II	0.4
Endosulfan Sulfate	0.4
Endrin	0.4
Endrin Aldehyde	0.4
Endrin Ketone	0.4
Gamma-BHC (Lindane)	0.4
Heptachlor	0.4
Heptachlor Epoxide	0.4
Methoxychlor	0.4
Toxaphene	8.3
Aroclor 1016	3.3
Aroclor 1221	3.3
Aroclor 1232	3.3
Aroclor 1242	3.3
Aroclor 1248	3.3
Arclor 1254	3.3
Aroclor 1260	3.3
Total PCBs (µg/L)	
Aroclor 1016	0.05
Aroclor 1221	0.1
Aroclor 1232	0.05
Aroclor 1242	0.05
Aroclor 1248	0.05
Arclor 1254	0.05

TABLE 3-3: METHOD QUANTIATION LIMITS	
Constituent	**MQL**
Aroclor 1260	0.05
TCLP Metals (mg/L)	
Arsenic	0.045
Barium	0.025
Cadmium	0.025
Chromium	0.025
Lead	0.075
Mercury	0.001
Selenium	0.095
Silver	0.025
TCLP VOCs (µg/L)	
Vinyl Chloride	10.0
1,1-Dichloroethene	10.0
2-Butanone	100.0
Chloroform	10.0
Carbon Tetrachloride	10.0
Benzene	10.0
1,2-Dichloroethane	10.0
Trichloroethene	10.0
Tetrachloroethene	10.0
Chlorobenzene	10.0
1,4-Dichlorobenzene	10.0
TCLP SVOCs (µg/L)	
Pyridine	2.0
1,4-Dichlorobenzene	2.0
2-Methylphenol	2.0
3&4-Methylphenol	4.0
Hexachloroethane	2.0
Nitrobenzene	2.0
Hexachlorobutadiene	2.0
2,4,6-Trichlorophenol	2.0
2,4,5-Trichlorophenol	2.0
2,4-Dinitrotoluene	2.0
Hexachlorobenzene	2.0
Pentachlorophenol	4.0
TCLP Pesticides (µg/L)	
gamma-BHC (Lindane)	0.010
Heptachlor	0.010
Heptachlor Epoxide	0.010

TABLE 3-3: METHOD QUANTIATION LIMITS	
Constituent	**MQL**
Endrin	0.010
Methoxychlor	0.010
Toxaphene	0.250
Chlordane	0.200
TCLP Herbicides (µg/L)	
2,4-D	20
2,4,5-TP	20
RCRA Characteristics	
Ignitability (°F)	NA
Corrosivity	NA
Reactive Sulfide (mg/Kg)	40
Reactive Cyanide (mg/Kg)	40
PCB Wipe Samples (µg/100cm^2)	
Aroclor 1016	0.10
Aroclor 1221	0.10
Aroclor 1232	0.10
Aroclor 1242	0.10
Aroclor 1248	0.10
Arclor 1254	0.10
Aroclor 1260	0.10
Note: Laboratory-specific MQLs are updated on an annual basis. Updated values will be provided when they become available.	

- **Documentation.** Documentation is a method of tracking site samples and chemical data. All samples and site conditions affecting chemical data shall be documented in sample collection logs, chain-of-custody forms, and sample receipt checklists. Documentation shall also include, but not be limited to, the completion of all forms or checklists (i.e. records of conversations, cooler receipt forms, corrective action forms, etc.). Any changes to the sampling, shipping or receiving information, analytical raw data, or chemical results shall be lined out, initialed, and dated by the person responsible for making the change. Also, all deviations from the accepted sampling procedures and analytical methods will be documented and communicated to the Contracting Office or a Designated Representative; if any corrective actions are necessary, they will be approved and documented as well. Finally, all reports and data packages shall be reviewed and approved by the Project Chemist before submittal to the USACE.

- **Data Reporting.** Data reporting will follow the requirements as prescribed in Chapter 2 of EM 200-1-6 (USACE 1997). Chemical data packages will contain, but not be limited to, the following: all applicable sample tracking information; a laboratory case narrative; all analytical results with detection limits, dilution factors, percent moisture for solid samples, and any laboratory qualifications or flags; results of any sample dilutions performed to bring the sample data within the appropriate calibration range; all internal and field-initiated quality control parameters including all associated laboratory blanks, surrogate and matrix spike/matrix spike duplicate percent recoveries with control limits, laboratory duplicates or matrix spike duplicate pair RPDs with control limits, laboratory control samples with control limits, and field blanks. In addition, all preparation and analytical methods shall be provided with the analytical results in the data package.

  Once completed, the laboratory will submit each finished data package to Sevenson's project chemist within 21 days of the validated time of sample receipt by the laboratory, unless otherwise specified. In addition to the hard copy of the data package, the laboratory will provide an electronic copy of the data in Staged Electronic Data Deliverable (SEDD) format. Laboratory data will be reviewed in accordance with *Kansas City District Data Quality Evaluation Guidance* (USACE, 2003). Following approval of the reviewed data package by Sevenson's project chemist and QC manager, a copy will be sent to the USACE Contracting Officer of a Designated Representative. Copies of data packages will also be included in the Quality Control Summary Report (QCSR). The content of the QCSR is discussed in Section 8.3 of the FSP.

  Sevenson and/or the contract laboratory will maintain all supporting data, documentation, and raw analytical data on file for a period of at least three years after the completion of the project.

- **Data Validation and Review.** Commensurate with the data reporting requirements, the data reporting packages will be reviewed and confirmed by the offsite laboratory as per the requirements of the particular analytical methodology prior to releasing the report to Sevenson. Sevenson will perform data review on all generated analytical data in accordance with the USACE guidelines referenced above and summarized in Section 10.5. Data review will be performed by Sevenson under the supervision of the Project Chemist.

3.4 Quality Control Checks

Implementation of quality control procedures during sample collection, analysis, and reporting ensures that the data obtained are consistent with its intended use. Both field QC and laboratory QC checks are performed throughout the work effort to generate data confidence. Field QC samples will be collected at the Site and submitted to the contract laboratory for analysis in order to evaluate the overall field sampling and laboratory analysis processes, as well as to determine the sample matrix effects on the data being generated. Laboratory QC samples will be prepared and analyzed by the contract laboratory in order to determine and assess analytical quality control and performance. Sample preservation and analytical holding time requirements play a key role in producing quality data. As these are method-specific, a basic guideline has been prepared for this project on an analysis-by-analysis basis, as represented in Tables 3-4. If further detail is required, the respective method(s) should be consulted.

3.4.1 Field Quality Control

The applicability and appropriateness of the field sampling protocol can be verified by the inclusion of a program of scheduled field control samples, such as field replicates, field blanks, and background samples. All field control samples should be handled exactly as the Site samples. The identity of the field control samples will be held blind to the laboratory until the data are reported.

- **Field Replicates.** A field replicate sample is a second sample collected at the same location as the original sample used as an indicator of overall measurement (sampling and analytical) precision. Replicate samples are collected using identical sampling techniques, and treated in an identical manner during storage, transportation, and analysis. QC samples will be collected as one sample, homogenized and split into two samples, separately containerized and shipped as two independent samples. Field QC samples will be collected at a rate of 5 percent of the total number of field samples that are collected for laboratory analysis per matrix. Due to the nature of the sampling activities (i.e., waste disposal characterization), replicate samples are not anticipated to be collected unless otherwise directed by the USACE, USEPA, or Sevenson QA Manager. If required, field QC samples will be shipped to the contractor's primary analytical laboratory blindly, with notations made in the daily sample log as to which environmental sample the QC sample is associated.

Table 3-4: Sampling and Analysis Matrix

Sample	*Location*	*Rationale*	*Parameter(s)*	*Sample Type*	*Type of Bottles*[1,2]	*Number of Bottles*[1,2]	*Methodology*	*Holding Time*[3]	*Preservative*
Solid Waste Characterization	Building walls and floors per construction drawings	Meet federal, state, and local regulations in accordance with the requirements of the disposal facility	Ignitability	Composite	32oz. CWM	1	SW-846 1010	7 days	Cool 4°C
			Corrosivity				SW-846 9045C	14 days	
			Reactive Cyanide				SW-846 Section 7.4.3.2/ Method 9014	14 days	
			Reactive Sulfide				SW-846 Section 7.4.4.2/ Method 9034	7 days	
			TCLP Metals				SW-846 1311/3015/6010B/ 7470A	180 days to TCLP extraction (Hg 28 days) 180 days to analysis (Hg 28 days)	
			TCLP SVOCs				SW-846 1311/3510C/8270C	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Pesticides				SW-846 1311/3510C/8081A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Herbicides				SW-846 1311/3510C/8151A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			Total PCBs	Composite	4 oz. CWM	1	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
			TCLP VOCs	Grab	4 oz. CWM	2	SW-846 1311/5030B/8260B	14 days to TCLP extraction 14 days to analysis	Cool 4°C
Concrete	Concrete pads	Meet federal, state, and local regulations in accordance with the requirements of the disposal facility	Total PCBs	Composite	2 oz. CWM	1	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
			TCLP Metals	Composite	2oz. CWM	2	SW-846 3050/6010B/7471A	180 days to TCLP extraction (Hg 28 days) 180 days to analysis (Hg 28 days)	Cool 4°C
Subsurface Soil and Concrete	Foundation walls and surrounding soils	Determine subsurface concentrations of total PCBs in order to determine remediation requirements	Total PCBs	Composite	2 oz. CWM	1	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
Wastewater[4]	Storage tank	Meet federal, state, and local regulations in accordance with the requirements of the disposal facility	Ignitability	Composite	1L AG	3	SW-846 1010	7 days	Cool 4°C
			Corrosivity				SW-846 9040C	Immediately	
			Reactive Cyanide				SW-846 Section 7.4.3.2/ Method 9014	14 days	
			Reactive Sulfide				SW-846 Section 7.4.4.2/ Method 9034	7 days	
			TCLP Metals				SW-846 1311/3015/6010B/ 7470A	180 days to TCLP extraction (Hg 28 days) 180 days to analysis (Hg 28 days)	

Sample	*Location*	*Rationale*	*Parameter(s)*	*Sample Type*	*Type of Bottles*[1,2]	*Number of Bottles*[1,2]	*Methodology*	*Holding Time*[3]	*Preservative*
			TCLP SVOCs				SW-846 1311/3510C/8270C	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Pesticides				SW-846 1311/3510C/8081A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP Herbicides				SW-846 1311/3510C/8151A	14 days to TCLP extraction 7 days to preparative extraction 40 days to analysis	
			TCLP VOCs	Grab	40 mL G vial w/Teflon septa	4	SW-846 1311/5030C/8260B	14 days to TCLP extraction 14 days to analysis	Cool 4°C
			Total PCBs	Grab	1L AG	2	SW-846 8082	7 days to extraction 40 days to analysis	Cool 4°C
Backfill/ Topsoil	Off-Site Borrow Source(s)	Establish that backfill and topsoil material brought on-Site for restoration activities are not hazardous to human health or the environment	VOCs	Grab	EnCore™ sampler	2	SW-846 5035/8260B	48 hours to preservation by laboratory 14 days to analysis	Cool 4°C
			TCL SVOCs	Composite	2oz. CWM	2	SW-846 3550C/8270C	14 days to extraction 40 days to analysis	Cool 4°C
			TCL Pesticides	Composite	2oz. CWM	2	SW-846 3550C/8081A	14 days to extraction 40 days to analysis	Cool 4°C
			Total PCBs	Composite	2oz. CWM	2	SW-846 3550C/8082	14 days to extraction 40 days to analysis	Cool 4°C
			Cyanide	Composite	2oz. CWM	2	SW-846 Section 7.4.3.2/ Method 9014	14 days	Cool 4°C
			TAL Metals	Composite	2oz. CWM	2	SW-846 3050/6010B/7471A	180 days to digestion 180 days to analysis (Hg 28 days)	Cool 4°C
Wipe	Non-porous surfaces	Establish disposal requirements	Total PCBs	Wipe	3"x3" gauze soaked with 1:4 acetone/hexane	1	SW-846 8082	14 days to extraction 40 days to analysis	Cool 4°C

Notes:
[1] Bottle types – AG: Amber Glass; HDPE: High Density Polyethylene Plastic; CWM: Clear wide mouth glass jar with Teflon lid
[2] All bottles should be filled completely with zero headspace
[3] From Verified Time of Sample Collection
[4] For TCLP analysis on aqueous samples, the laboratory will filter the sample and the aqueous filtrate becomes the TCLP extract. If the aqueous sample contains visible solids, then a percent dry solids determination is performed. If the percent dry solids is >0.5% (about 50g of solids in 1L of aqueous sample), a TCLP extraction will be performed if there is at least 130g of solids present. The aqueous filtrate and TCLP extract are combined for analysis.

Results of blind replicate QC samples will be submitted in the data packages and reports along with the results of the regular samples. The QCSR will include comparison and evaluation of the blind replicate QC sample results. Comparison of results between the QC replicates will be based on calculation of relative percent difference and comparison of the resultant RPD to the method-specific acceptance criteria included in Table 3-2.

- **Temperature Blanks.** A temperature blank is a container of water packaged in the shipping cooler, along with field samples, which will represent the temperature of the incoming cooler upon receipt at the laboratory. Use of these samples within a shipping container enables the receiving laboratory to assess the temperature of shipment without disturbing any project field samples.

- **Trip Blanks.** Trip blanks will be included in all shipments containing aqueous VOC samples. A trip blank is an aliquot of analyte-free water that is sealed in a 40mL glass vial with a Teflon-lined septum cap prior to initiation of field work. These samples are kept with the field sample containers from the time they leave the laboratory until they are returned for analysis. The trip blank is used to determine whether samples are being contaminated during transit or sample collection. These sealed bottles will be prepared by the laboratory and included with each shipment of sample bottled for aqueous media to and from the laboratory and the site.

3.4.2 Laboratory Quality Control

Laboratory quality control will occur as described below.

- **Method Blanks.** In order to assess the laboratory's ability to perform each analytical method, a method blank must be analyzed with each group of site samples. A method blank is a sample of a non-contaminated substance of the matrix of interest (usually distilled/deionized water or silica sand) that is then subjected to all of the sample preparation (digestion, distillation, extraction) and analytical methodology applied to the samples. The purpose of the method blank is to check for contamination from within the laboratory that might be introduced during sample preparation and analysis that would adversely affect analytical results. Ideally, all blanks should demonstrate freedom from contamination and interferences. If, however, laboratory contamination is suspected, the magnitude of the contamination can be evaluated, but the samples results will not be adjusted to compensate for the

blank concentrations. If the method blanks contain target analytes at concentrations greater than the reporting limits, the laboratory will exercise corrective actions as specified in Section 6.0 of the laboratory QA/QC Plan (Appendix B). This may entail re-preparing and reanalyzing the affected Site samples after the source of contamination has been identified and eliminated.

A method blank must be analyzed with each sample batch, where a sample batch is defined as a group of up to twenty (20) samples that are all processed simultaneously as a unit. After analysis, the method blanks may be compared to field and trip blanks in order to give an indication of where in the sampling/analysis process contamination may have been introduced.

- **Laboratory Control Samples.** Laboratory control samples (LCS) are intended to evaluate the accuracy of the analytical method, as performed by the contract laboratory, in the absence of matrix interference. The LCS contains known concentrations of analytes representative of the contaminants to be determined and is carried through the entire preparation and analysis process. The actual analyte concentration and percent recovery will be reported with the laboratory QC data. One LCS will be analyzed with each analytical sample batch.

- **Laboratory Duplicates.** Laboratory duplicates are separate aliquots of a single sample that are prepared and analyzed concurrently at the laboratory. The primary purpose of the laboratory duplicate is to check the precision of the laboratory analyst, the sample preparation methodology, and the analytical methodology. In contrast to field duplicate and QA samples, laboratory duplicate samples are originated in the laboratory and measure analytical precision only, while the field duplicates measure the precision of the sampling and analysis process as a whole. As such, they give some indication of the amount of matrix interference inherent in a sample.

- **Laboratory Matrix Spike/Matrix Spike Duplicates.** The primary purpose of matrix spike/matrix spike duplicate samples is to assess the effect of sample matrix on the accuracy and precision of the analyses. A MS is an aliquot of a sample spiked with known quantities of analytes and subjected to the entire analytical procedure. It is used to indicate the appropriateness of each method for the matrix by measuring recovery or accuracy (i.e., the nearness of a result to the true or accepted value). A MSD is a second aliquot of the same sample with known quantities of compounds added which is carried through the identical analytical process as the associated field samples. The purpose of the MSD,

when compared to the MS, is to determine method precision (i.e., measure of the reproducibility of a set of replicate results).

The contract laboratory will be required to run MS/MSD samples when analyzing all sample parameters. MS and MSD analyses are performed per 20 samples of similar matrix. To be executed properly, MS/MSD samples are prepared by homogenizing a sample and taking three (3) representative sample aliquots from the container. One of these will be analyzed as a normal sample; the remaining aliquots serve as the MS and MSD samples and are prepared as described above. After analysis, the percent recoveries of the matrix spike and the matrix spike duplicate samples will be calculated with respect to the original concentration in the sample and the relative percent difference between the two will be determined.

- **Surrogate Spiking Activity.** A surrogate spike is prepared by adding a pure compound to each and every organic sample before extraction. These surrogate standards will be different for each type of organic analysis, as each surrogate compound is closely related to the group of chemicals being analyzed. The primary function of the surrogate spiking activity is to determine the efficiency of recovery of analytes in the sample preparation and analysis and thus the degree to which the sample matrix plays a role in the organic analysis. This matrix interference will be measured as a percent recovery, which is then used to gauge the total accuracy of the analytical method for that sample. Table 3-5 shows a breakdown of the surrogate compounds related to each type of analysis and the associated acceptable percent recovery ranges of each.

TABLE 3-5: SURROGATE PERCENT RECOVERY CRITERIA FOR ORGANIC ANALYSES

Compounds	TCLP Percent Recovery Limits	Solid Percent Recovery Limits
VOCs		
4-Bromofluorobenzene	85-123	85-120
1,2-Dichloroethane-d4	66-123	NA
Toluene-d_8	81-118	85-115
SVOCs		
Phenol-d_5	10-35	40-100
2-Fluorophenol	14-53	35-105
2,4,6-Tribromophenol	45-124	35-125

TABLE 3-5: SURROGATE PERCENT RECOVERY CRITERIA FOR ORGANIC ANALYSES		
Compounds	**TCLP Percent Recovery Limits**	**Solid Percent Recovery Limits**
Nitrobenzene-d5	38-96	35-100
2-Fluorobiphenyl	41-95	45-105
Terphenyl-d_{14}	42-127	30-125
Pesticides and PCBs		
Tetrachloro-m-xylene	63-132	70-125
Decachlorobiphenyl	71-137	55-130
Herbicides		
DCAA	25-153	NA
Note: Laboratory-specific surrogate compound recovery limits are updated on an annual basis. Updated values will be provided when they become available.		

3.5 Assessment of Data Quality and Acceptability

QC samples will be continually evaluated and assessed to determine the usefulness of the data from sampling and analysis. The Project Chemist will review and/or verify data quality in accordance with the guidelines and evaluation criteria set forth in the whole of this section. Additionally, the laboratory will perform a review of its internal quality control checks per Section 5.0 of the QA/QC Plan.

4.0 LABORATORY CUSTODY AND HOLDING TIMES

Sample custody will begin in the field with proper and correct sample labeling, chain-of-custody documentation and seals, and air bills (if shipped by common carrier). Specifics of field related custody and holding time requirements are presented in Sections 4.0, 5.0, and 6.0 of the FSP.

4.1 Sample Receipt

When the samples arrive at the laboratory, custody is transferred to the Sample Custodian who will be the last person to sign the chain of custody (COC) form. The Sample Custodian will then open the shipping container under a fume hood, wearing appropriate gloves, and perform the following:

- Check each sample container to see if breakage, cracking, external corrosion, or leaking has occurred.
- A gamma radiation screen shall be performed on all samples to determine if special handling is required. Measure exposure rate at 3 ft. from package surface and record.
- Check the temperature of the temperature blank to assure that the samples were kept cool at 4°C ± 2°C.
- Check the pH of the non-volatile water samples for parameters which require preservation to ensure that they were properly preserved.
- Inventory the samples shipped to see if the number of samples received and the description on each sample label correspond to information on the COC.
- Complete the laboratory Cooler Receipt Form (Appendix A). Any discrepancies in the documentation of problems with sample condition are noted and immediately brought to the attention of the client. The project manager will then provide the sample custodian with instructions on the processing of samples that are incomplete or missing required information.

4.2 Custody in the Laboratory

After the samples are inventoried and the cooler receipt form is finalized, each sample is individually logged into the LIMS and a barcode label for each sample container is printed. The following information is recorded to tracking samples:

- A unique sequenced sample number assigned only to that sample (i.e., laboratory sample ID).
- Client/Site sample locations or description (i.e. client sample ID).
- Sample matrix.
- Storage location.

A project manager reviews all login information before a sample can be released for analysis.

4.3 Sample Security and Internal Chain-of-Custody

In order to maintain the integrity and validity of the sample(s) within the laboratory, all samples are maintained under locked storage or in limited access areas under the jurisdiction of the Sample Custodian. Samples are stored at temperatures that meet the specifications of the methodology, regulatory agencies, and client. Refrigerator temperatures are maintained at required temperatures (2-6°C) and monitored regularly. Sample storage facilities are located within the sample management area, which is secured by locked doors. Extracts and digestates are stored in designated freezer units or storage cabinets, respectively, in the laboratory analytical areas. Internal procedures and documentation pertaining to sample possession, removal from storage, and transfer are outlined in laboratory SOPs. Samples are returned to the sample management area after the required sample aliquot is removed for analysis.

5.0 LABORATORY ANALYTICAL PROCEDURES

Laboratories reviewed and validated by USACE will analyze all samples collected during the remediation activities. Laboratories will also be currently certified for environmental analyses by the NJDEP and NELAP. Each laboratory supporting this work shall provide statements of qualifications including organizational structure, QA Manual, and SOPs.

Samples collected during the project will be analyzed by USEPA SW-846 methods and other documented USEPA or nationally recognized methods. Laboratory standard operating procedures are based on the methods as published by USEPA in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846*, Third Edition (November 1986; Revision 1, July 1992; Revision 2, November 1992; and Updates 1, 2, and 3). Analytical parameters, methods, project reporting levels, and laboratory-specific precision and accuracy are listed in Tables 3-1 through 3-3 and 3-5.

Principal laboratory facilities will not subcontract or transfer any portion of this work to another facility, unless expressly permitted to do so in writing by the project and USACE Project Manager.

If contaminant concentrations are high, or for matrices other than normal soil and waters, standard analytical protocols may be inadequate. In these cases, sample analysis may require modifications to defined methodology. Any proposed changes to analytical methods specified require written approval from the project and USACE. All analytical method variations will be defined in investigation-specific addenda. These may be submitted for regulatory review and approval when directed by the USACE Project Manager.

SOPs for modified methods must be adopted from and reference standard USEPA SW-846 methods or appropriate national standard and thereby specify:

- Procedures for sample preparation.
- Instrument start-up and performance check.
- Procedures to establish the actual and required detection limits for each parameter.
- Initial and continuing calibration check requirements.
- Specific methods for each sample matrix type.
- Required analyses and QC requirements.

6.0 CALIBRATION PROCEDURES AND FREQUENCY

This section describes procedures for maintaining the accuracy of the instruments and measuring equipment that are used for conducting laboratory analyses. These instruments and equipment shall be calibrated prior to each use or on a scheduled, periodic basis according to manufacturer instructions.

Calibration of laboratory equipment will be based on approved written procedures. Records of calibration, repairs, or replacement will be filed and maintained by laboratory personnel performing QC activities. These records will be filed at the location where the work is performed and will be subject to QA audit. Procedures and records of calibration will follow USACE reviewed laboratory-specific QA Plans.

In all cases where analyses are conducted according to SW-846 protocols, the calibration procedures and frequencies specified in the applicable methods will be followed. For analyses governed by SOPs, refer to the appropriate SOP for the required calibration procedures and frequencies. All analytical calibrations and method QC will be consistent with the DOD *QSM* (DOD, 2006). Calibration requirements are summarized in Table 6-1 (DOD, 2006).

TABLE 6-1: CALIBRATION REQUIREMENTS

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Comments
Organic Analysis by Gas Chromatography/Mass Spectrometry (Methods 8260, 8270)				
Minimum 5-point initial calibration for all analytes	Initial calibration prior to sample analysis	Average response factor (RF): VOCs: ≥0.30 SVOCs: ≥0.050 Relative standard deviation (RSD): VOCs and SVOCs: ≤30% and one option below; (1) RSD for each analyte ≤15% (2) Linear least squares regression r≥0.995 (3) Non-linear regression – coefficient of determination $r^2 \geq 0.99$	Correct problem then repeat initial calibration	Problem must be corrected. No samples may be run until initial calibration has passed.

TABLE 6-1: CALIBRATION REQUIREMENTS				
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**	**Comments**
Second source calibration verification	Once after each initial calibration	Value of second source for all analytes within ±25% of expected value	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat initial calibration.	Problem must be corrected. No samples may be run until calibration has been verified.
Calibration Verification	Daily, before sample analysis, and every 12 hours of analysis time	Average RF: VOCs: ≥0.30 SVOCs: ≥0.050 % Difference/Drift: VOCs and SVOCs: ≤20% difference	Correct problem then rerun calibration verification. If that fails, repeat initial calibration.	
Organic Analysis by Gas Chromatography and High-Performance Liquid Chromatography (Methods 8015, 8081, 8082)				
Minimum 5-point initial calibration for all analytes	Initial calibration prior to sample analysis	One of the options below (Method 8082 may only use Option 1 or 2); (1) RSD for each analyte ≤20% (2) Linear least squares regression r≥0.995 (3) Non-linear regression – coefficient of determination r^2≥0.99	Correct problem then repeat initial calibration	Problem must be corrected. No samples may be run until initial calibration has passed. For PCB analysis, a mixture of Aroclors 1016 and 1260 is normally used to establish detector calibration linearity, unless project-specific data suggest the presence of another Aroclor. In addition, a mid-level or lower standard for each of the remaining Aroclors is analyzed for pattern recognition and response factor.
Second source calibration verification	Once after each initial calibration	Value of second source for all analytes within ±20% of expected value	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat initial calibration.	Problem must be corrected. No samples may be run until calibration has been verified.

TABLE 6-1: CALIBRATION REQUIREMENTS				
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**	**Comments**
Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV)	ICV: Daily, before sample analysis. CCV: After every 10 field samples and at the end of the analysis sequence.	All analytes within ±20% of expected value	ICV: Correct problem then rerun ICV. If that fails, repeat initial calibration. CCV: Correct problem then repeat CCV and reanalyze all samples since last successful calibration verification.	If %D for an individual analyte is >20%, no samples may be analyzed until the problem has been corrected.
Inorganic Analysis by Inductively Coupled Plasma (ICP) Atomic Emission Spectrometry and Atomic Absorption Spectrophotometry (AA) (Methods 6010 and 7000 Series)				
Initial calibration for all analytes	Daily initial calibration prior to sample analysis	ICP: No acceptance criteria unless more than one standard is used, in which case r≥0.995 AA: r≥0.995	Correct problem and repeat initial calibration	Problem must be corrected. No samples may be run until initial calibration has passed.
Second source calibration verification	Once after each initial calibration, prior to sample analysis	Value of second source for all analytes within ±10% of expected value	Correct problem and verify second source standard. Rerun calibration verification. If that fails, correct problem and repeat initial calibration.	Problem must be corrected. No samples may be run until calibration has been verified.
Continuing calibration verification	After every 10 samples and at the end of the analysis sequence	ICP: within ±10% of expected value AA: within ±20% of expected value	Correct problem, rerun calibration verification. If that fails, then repeat initial calibration. Reanalyze all samples since the last successful calibration verification.	Problem must be corrected. Results may not be reported without a valid continuing calibration verification.
Low-level calibration check standard (ICP only)	Daily, after one-point initial calibration	Within ±20% of expected value	Correct problem, then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the reporting limit.

Records of calibration will be kept as follows:

- Each instrument will have a record of calibration with an assigned record number.
- A written stepwise calibration procedure will be available for each piece of test and measurement equipment.
- Any instrument that is not calibrated to the manufacturer's original specification will display a warning tag to alert the analyst that the device should not be used.

7.0 INTERNAL QUALITY CONTROL CHECKS

Field and laboratory performance QC are required to ensure that laboratory systems (e.g., instrumentation, sample preparation, analysis, data reduction, etc.) are operating within acceptable QC guidelines in order to provide data to the degree of quality consistent with their intended use. Laboratory QC samples consist of method blanks, instrument blanks, laboratory control samples, surrogate compounds, and method-related calibration samples. In addition to laboratory performance QC, matrix-specific QC is utilized to determine the effect of the sample matrix on the data generated. Typically, this includes matrix spikes, matrix spike duplicates, and sample duplicates. To ensure the production of analytical data of known and documented quality, laboratories associated with these investigations will implement all method QA and QC checks.

7.1 QA Program

All subcontracted analytical laboratories will have a written QA program that provides rules and guidelines to ensure the reliability and validity of work conducted at the laboratory. Compliance with the QA program is coordinated and monitored by the laboratory's QA department, which is independent of the operating departments. For these investigations, selected support laboratory Quality Assurance Plans will be referenced and implemented in their entirety.

The stated objectives of the laboratory QA program are to:

- Properly collect, preserve, and store all samples.
- Maintain adequate custody records from sample collection through reporting and archiving of results.
- Use properly trained analysts to analyze all samples by approved methods within holding times.
- Produce defensible data with associated documentation to show that each system was calibrated and operating within precision and accuracy control limits.
- Accurately calculate, check, report, and archive all data using the Laboratory Information Management System.
- Document all of the above activities so that all data can be independently validated.

All laboratory procedures are documented in writing in the SOPs, which are edited and controlled by the QA department. Internal QC measures for analysis will be conducted with their SOPs and the individual method requirements specified.

7.2 QC Checks

Implementation of QC procedures during sample collection, analysis, and reporting ensures that the data obtained are consistent with its intended use. Both field QC and laboratory QC checks are performed throughout the work effort to generate data confidence. Analytical QC measures are used to determine if the analytical process is in control, as well as to determine the sample matrix effects on the data being generated.

Specifications include the types of QC required (duplicate, sample spikes, surrogate spikes, reference samples, controls, blanks, etc.), the frequency for implementation of each QC measure, compounds to be used for sample spikes and surrogate spikes, and the acceptance criteria for this QC.

Laboratories will provide documentation in each data package that both initial and ongoing instrument and analytical QC functions have been met. The laboratory will reanalyze any non-conforming analysis, if sufficient sample volume is available. It is expected that sufficient sample volumes will be collected to provide for reanalysis, if required.

7.3 Quality Control Batch

Samples will be extracted and analyzed in batches, not to exceed 20 samples, which are uniquely identified. Two types of batches are identified, the preparation batch and the analytical, or instrumental, batch. The preparation batch is defined as samples that are prepared together by the same person using the same equipment/glassware with the same method sequence and the same lots of reagents undergoing common manipulations for each sample within the same time period or in limited continuous sequential time periods. The analytical batch is defined as samples that are analyzed together within the same analytical run sequence, within the same time period, or in continuous time periods. Included in each batch will be a number of QC samples including a method blank, LCS, and MS/MSD. For some analyses, matrix specific QC samples require the collection of additional sample volume. If sufficient sample volume is not available for the analysis

of matrix spike and matrix spike duplicate samples, the laboratory may analyze duplicate laboratory control samples in order to assess laboratory precision.

7.4 Method Blank

Method blanks are analyzed to assess the level of background interference or contamination that exists in the analytical system and that might lead to the reporting of elevated concentration levels or false positive data. The method blank is a QC sample that consists of a blank matrix (e.g., deionized laboratory water, purified solid matrix) to which all reagents specific to the method are added and which is carried through every aspect of the procedure, including preparation, cleanup, and analysis. At least one method blank will be analyzed with every batch of samples processed. Results of the method blank analysis are evaluated, in conjunction with other QC information, to determine the acceptability of the data generated for that batch of samples. Potential sources of contamination include solvents, reagents, glassware, other sample processing hardware, or the laboratory environment. Corrective actions may include reanalysis of the blank and/or repreparation and reanalysis of the blank and all associated samples. Sample results will not be corrected for blank contamination.

7.5 Instrument Blank

The instrument blank is an unprocessed aliquot of reagent used to monitor the contamination of the analytical system at the instrument. System contamination may lead to the reporting of elevated analyte concentrations or false positive data. The instrument blank does not undergo the entire analytical process and generally consists of an aliquot of the same reagent(s) used for sample dilution. Instrument blanks, also referred to as continuing calibration blanks, are routinely applied in analyses for inorganic parameters.

7.6 Laboratory Control Sample

An LCS is a laboratory-generated sample beginning with a known and well-characterized matrix that is fortified with target analytes used to calculate precision and accuracy data. The standard solution used to prepare the LCS is separate from that used in establishing the calibration curve. The LCS is used to monitor the laboratory's day-to-day instrument performance as well as the ongoing performance of the analytical methods. Day-to-day instrument performance is characterized by the measure of the accuracy of the results.

Ongoing monitoring of the results provides evidence that the laboratory is performing the method within both acceptable accuracy and precision guidelines.

7.7 Matrix Spike/Matrix Spike Duplicate

A matrix spike is an environmental sample to which known concentrations of target analytes have been added. MS samples are analyzed to evaluate the effect of the sample matrix on the analytical methodology. MS samples are generated by taking a separate aliquot of an actual field sample and spiking it with the selected target analyte(s) prior to sample preparation or extraction. The MS sample then undergoes the same extraction and analytical procedures as the unfortified field sample. Due to the potential variability of the matrix of each sample, these results may have immediate bearing only on the specific sample spiked and not on all samples in the QC batch. The concentration(s) of the analyte(s) in the unfortified field sample may also affect the recovery of the spiked analyte(s), especially if the analyte concentration(s) are near or above the instrument calibration range.

A matrix spike duplicate is a second aliquot of a sample that is spiked with the selected target analyte(s) and analyzed with the associated sample and MS sample. The results of the MS and MSD are used together to determine the effect of a matrix on the precision of the analytical process. Due to the potential variability of the matrix of each sample, the MS/MSD results may have immediate bearing only on the specific sample spiked but not on all samples in the QC Batch.

When matrix spike recoveries are outside QC limits, associated matrix spike blank and surrogate recoveries (if applicable) will be evaluated to attempt to verify the reason for the deviation and determine if the effect on the reported sample results.

7.8 Laboratory Duplicates

Laboratory duplicates may be analyzed to assess laboratory precision. A laboratory duplicate is defined as a second aliquot of an environmental sample (taken from the same sample container when possible) that is processed identically with the first aliquot of that sample. That is, sample duplicates are processed as independent samples within the same QC batch. The results are compared to determine the effects of the matrix on the precision of the analytical process.

7.9 Internal Standards

Internal standard areas and retention times are monitored for organic analyses performed by GC/MS methods. An internal standard is a compound or element with similar chemical characteristics and behavior in the analysis process to the target analytes but is not normally found in environmental samples. The internal standard is usually added into all field samples, calibration standards, and QC samples after sample preparation and prior to analysis. The primary function of the internal standard is quantitative, however, it also provides a short-term indication of instrument performance. The response of each internal standard is plotted on a control chart. If internal standard areas in one or more samples exceed the specified tolerances, then the instrument will be recalibrated and all affected samples reanalyzed. The acceptability of internal standard performance will be determined using the guidance provided within the analytical methods.

7.10 Analytical Spike

It is not currently anticipated that the graphite furnace atomic absorption spectrometer will be used for analysis of samples during the current scope of work; however, it may be utilized as a backup for sample analysis should problems with the inductively coupled plasma atomic absorption spectrometer be encountered. If analysis of samples is required using the graphite furnace, analytical spikes/post-digestion spikes will be analyzed. An analytical spike is created by spiking target analytes into a prepared portion of a sample (extract or digestate) just prior to analysis. It provides information on matrix effects encountered during analysis such as suppression or enhancement of instrument signal levels. If the post digestion spike recovery is not within 85% to 115% of the expected concentration, the "method of standard additions" procedure will be used to analyze the sample.

7.11 ICP Serial Dilution and Post-Digestion Spike Analysis

For inductively coupled plasma (ICP) analyses by Method 6010B, two additional tests are performed on a new sample matrix to determine if matrix interferences are affecting the metals analysis. A serial dilution test is performed by dilution (1 volume to 4 volumes of acidified reagent water) and analysis the sample digestate. The results obtained from the dilution analysis must within10% of the results obtained for the undiluted sample analysis. Differences greater than 10% indicate that the sample matrix is interfering with the ICP analysis and that analysis of the sample using the method of standard additions procedure may be required. It should be

noted that the serial dilution test is only applicable to samples that have metals concentrations greater than 50 times the MQL so that the concentration of the metals in the 5 fold dilution analysis are at least 5 time MQL.

A post-digestion spike analysis is also performed on new sample matrices. The ICP post-digestion spike analysis is performed and must meet the same criteria for graphite furnace atomic absorption spectroscopy procedures. The method of standard additions procedure will be used to analyze the sample if the recovery of the spiked metals does not meet criteria.

8.0 CALCULATION OF DATA QUALITY INDICATORS

8.1 Method Detection Limits

To determine the MDL, seven replicates of the appropriate volume of extraction solvent or Type II water are spiked with a known amount of the analyte(s). The amount of the analyte(s) added is the same for all seven replicates and should be at least two-to-three times greater than the instrument detection limit (IDL). The replicates are subjected to the same extraction and analytical procedures as a sample would be and the concentrations of the analyte(s) of interest would be measured. The MDL is defined as the standard deviation of the seven readings multiplied by the student t-test at a 99%, single-sided confidence interval (i.e., t99) using n-1 degrees of freedom (df). The calculation of the MDL should be done in units of weight of the analyte.

The equation that applies to the calculation of the MDL is:

$$MDL = SD\ (t99[1\text{-sided}];df=6);\ \text{or}\ MDL = SD \times 3.143$$

Where: MDL =method detection limit in units of weight for those methods dependent upon absolute quantity, and in concentration units for those dependent on concentration

SD = the standard deviation of the seven readings from the mean, in units of weight or concentration

The method detection limit will be determined for all analytes associated with each method on at least an annual basis. The MDL will also be determined whenever the sample preparation method or extraction method is modified.

8.2 Accuracy

Analytical accuracy may be assessed through the use of known and unknown QC samples and spiked samples, such as matrix spikes or standard reference materials. Accuracy is most commonly presented as percent recovery or percent bias. Percent bias is the reciprocal of percent recovery. Accuracy determined by percent recovery is calculated as follows:

$$\%R = \frac{|SSR - SR|}{SA} \times 100$$

Where: SSR = measured value of the spiked sample

SR = measured value of the unspiked sample

SA = known amount of the spike in the sample

8.3 Precision

Precision is determined from duplicate sample analyses; thus, precision is usually expressed as RPD. Every batch of samples analyzed will include matrix duplicates and/or matrix spike duplicates to evaluate precision in this manner. Precision determined by RPD will be calculated as follows:

$$RPD = \left(\frac{|X_1 - X_2|}{\frac{(X_1 + X_2)}{2}} \right) \times 100$$

Where: X_1 = Concentration of spiked compound recovered from the MS sample or, for duplicate sample analysis, the concentration of the analyte in the original sample analysis

X_2 = Concentration of spiked compound recovered from the MSD sample or, for matrix duplicate samples, the result from the duplicate sample analysis

8.4 Completeness

Completeness is an overall gauge of field sampling and analytical laboratory performance. As discussed in Section 3.3, three types of completeness will be evaluated. "Completeness for Sample Collection" will be calculated for the project as follows:

$$Completeness = \frac{Number\ of\ samples\ collected}{Number\ of\ planned\ samples} \times 100$$

"Completeness for Acceptable Data" will be calculated for the project as follows:

$$Completeness = \frac{Number\ of\ usable\ results}{Number\ of\ reported\ results} \times 100$$

$$(Usable\ results\ are\ qualified\ but\ not\ rejected\ data)$$

"Completeness for Quality Data" will be calculated for the project as follows:

$$Completeness = \frac{Number\ of\ unqualified\ results}{Number\ of\ reported\ results} \times 100$$

9.0 CORRECTIVE ACTIONS

Field corrective action procedures are discussed in Section 9.0 of the FSP. This section discusses corrective actions as they relate to the analytical laboratory.

Corrective actions may be required for two major types of problems: analytical/equipment problems and noncompliance with criteria. Analytical and equipment problems may occur during sampling, sample handling, sample preparation, laboratory instrumental analysis, and data review.

Noncompliance with specified criteria and analytical/equipment problems will be documented through a formal corrective action program at the time the problem is identified. Laboratory deficiency and tracking notification will be implemented should any deviations or departures from the approved SAP or standard sampling and analysis methodologies which may affect the achievement of project DQOs or the usability of the data be identified throughout the performance of field-dependent (e.g., sample shipping, chain-of-custody) or laboratory activities. Sevenson will work closely with the laboratory to maintain open communication.

Deficiency and corrective action tracking will be implemented through the use of a DNF. A copy of the DNF is included in Appendix A. Any deficiency identified by laboratory personnel will be assigned a tracking number and all pertinent information recorded describing the deficiency and its associated corrective action. The completed DNF will be sent by the laboratory Project Manager via e-mail or facsimile to the Sevenson Project Chemist. Sevenson will notify the USACE Contracting Officer or a Designated Representative when an event requiring corrective action occurs and submit the required deficiency notification/corrective action report so that approval to follow through with the required corrective action may be obtained.

Sevenson personnel will confer with the laboratory as quickly after the notification as practical to discuss the ramifications of the deficiency with regard to project DQOs and potential effects on the reportability and validity of sample data. Deficiencies which may prevent meeting contractual DQOs or which preclude the use of data in final Site reporting may require reanalysis, reevaluation, or resampling. If corrective actions are deemed insufficient, work may be stopped through a stop-work order issued by the Sevenson Project Manager and the USACE Project Manager.

Within the laboratory, a high-level of communication is maintained between the operational and managerial staff in order to promptly address any quality assurance deficiencies that arise. No staff member will initiate corrective action without prior communication of findings through the proper channels. In the event of a non-conformance or analytical method deviation that impacts samples from the Site, the laboratory will notify Sevenson's Project Chemist immediately.

Deficiency notification and corrective actions are necessary if the following conditions exist:

- Any QC data are outside control limits for precision and accuracy.
- Blanks contain target analytes above acceptable levels and must be investigated.
- Undesirable trends are detected in spike or surrogate recoveries or RPD between duplicates.
- There are unusual changes in detection limits.
- The QA department detects deficiencies during internal audits, external audits, or from performance evaluation sample results.
- Inquiries concerning data quality are received from USACE.

9.1 Identification and Documentation of Problem

Corrective action procedures are often handled at the bench level by the analyst, who reviews the preparation procedures for possible errors, checks the instrument calibration, spike, surrogate, calibration solutions, instrument sensitivity, and so on. The laboratory supervisor, manager, and/or QA department will be advised if the problem persists or cannot be identified. Once resolved, full documentation of the deficiency/corrective action procedure will be submitted to the appropriate Sevenson personnel and filed with the project records. The deficiency and corrective action will also be summarized within the case narrative. If the problem encountered requires that a sample or group of samples be re-extracted and/or reanalyzed, the QA/QC Manager will initiate the corrective action by filling out a Sample Re-Extraction/Reanalysis Form.

Other corrective actions may be required that do not involve sample reanalysis. In these cases, the QA/QC Manager will notify the analyst or technician of a problem through a QC Memorandum. If the problem is significant enough to impact the quality of the data, the QA/QC Manager may stop the analysis of additional samples until the problem is resolved. The analyst or technician must record onto the memo a description of the corrective action(s) taken and the date it was performed. The memo will be returned to the QA/QC

Manager for review. If the corrective action has mitigated the problem, analysis of samples can be resumed. If not, the QA/QC Manager may issue another memo detailing the additional actions that need to be taken in order to resolve the problem.

If, upon repeated attempts, the QA/QC Manager feels that the actions taken have not satisfactorily corrected the problem, he/she will inform the appropriate corporate officer of the problem. The problem will then be resolved through a joint effort between the laboratory management, the QA/QC Manager, and the corporate officer. Any problems affecting the quality of the data from the analysis of samples from the Site will be detailed in the case narrative of the final analytical result report. If it appears that the problem will affect sample holding times or delay the timely reporting of analytical results, the QA/QC Manager will notify the Sevenson Project Manager, CQCSM, and/or Project Chemist.

9.2 Problems and Actions

9.2.1 Sample Receipt

Problems noted during sample receipt will be documented on the cooler receipt form. If irregularities are noted, the Sample Custodian will notify the laboratory Project Manager, who in turn, will initiate the DNF process and contact the Sevenson Project Manager, CQCSM, and/or Project Chemist. A decision concerning the disposition of the sample shipment in question will be made. USACE will also be contacted immediately for problem resolution (e.g., recollect samples, apply data qualifiers, analyze samples "as is", etc.), if necessary. All corrective actions taken will be thoroughly documented on the cooler receipt form. This written record will contain, at a minimum, the time and date of the conversation, the name of the Site contact, the names of any offsite individuals involved in the decision, and the resolution reached with respect to the irregularity. Some examples of irregularities encountered during sample receipt, which may require consultation to determine corrective action, include:

- Custody seal on cooler is broken or appears to have been tampered with.
- Temperature inside cooler is outside the acceptable temperature range.
- Broken sample container(s) or missing container(s).
- Unlabeled, mislabeled, or illegible sample container(s).
- Improperly preserved sample(s).

- VOC vials contain bubbles or air space.
- Chain-of-custody form incomplete, improperly completed, or illegible.

9.2.2 Sample Holding Times

If samples cannot or were not extracted/digested and/or analyzed within the appropriate method required holding times, the Sevenson Project Manager, CQCSM, and USACE Project Manager will be notified immediately for problem resolution. All corrective actions will be thoroughly documented on the DNF, and the case narrative to be included in the final laboratory analytical data report.

9.2.3 Instrument Calibration

Sample analysis will not be allowed until all initial calibrations meet the appropriate requirements. All calibrations must meet method time requirements or recalibration must be performed.

When the continuing calibration is outside the acceptable range, the problem should be identified by the analyst and corrected before any sample analysis is undertaken. If the non-acceptability of the continuing calibration is not determined by the analyst, the QA/QC Manager will notify the appropriate analyst that a new calibration curve must be prepared or the continuing calibration standard should be checked. All continuing calibrations that do not meet method requirements will result in a review of the calibration, rerun of the appropriate calibration standard(s), and, if necessary, reanalysis of all samples affected back to the previous acceptable calibration check.

9.2.4 Calibration Standards

Calibration standards will not be used beyond their permitted shelf life.

9.2.5 Practical Quantitation Limits

Appropriate sample cleanup procedures will be employed to attempt to achieve practical quantitation limits. If difficulties arise in achieving these limits due to a particular sample matrix, the contract laboratory will notify Sevenson's Project Manager, CQCSM, and/or Project Chemist of this problem via a DNF for resolution. Any

dilutions made will be documented in the case narrative along with the revised practical quantitation limits for those analytes directly affected. Analytes detected above the method detection limit, but below the practical quantitation limit will be reported as an estimated value.

9.2.6 Method QC

All method QC, including blanks, matrix duplicates, matrix spikes, matrix spike duplicates, surrogate recoveries, laboratory control samples, and other method-specified QC samples will meet the requirements as specified within the analytical method. Failure of method-required QC will result in the review of all affected data. If no errors can be noted, the affected sample(s) will be reanalyzed and/or re-extracted/redigested, then reanalyzed within method-required holding times to verify the presence or absence of matrix effects. In order to confirm matrix effects, QC results must observe the same direction and magnitude bias. If matrix effect is confirmed, the corresponding data will be flagged. If matrix effect is not confirmed, then the entire batch of samples may have to be reanalyzed and/or re-extracted/redigested, then reanalyzed. Sevenson's Project Manager, CQCSM, and/or Project Chemist and the USACE Project Manager will be notified as soon as possible via a DNF to discuss possible corrective actions should unusually difficult sample matrices be encountered.

9.2.6.1 Laboratory Method Blanks Exceed Method Detection but are Below Quantitation Limits

When laboratory blanks exhibit the presence of target analytes at a level exceeding the method detection limit, but still below the quantitation limit, the QA/QC Officer will notify the responsible analyst, who will check the reagent blanks that have been retained at the time the reagents were first used in order to determine if contamination or interferences are due to impurities in the reagents. If this is the case, the reagent batch will be discarded and new reagents from fresh containers will be used. If the reagents appear to be sufficiently pure, the cleanliness in the laboratory will be inspected and reinforced to establish if the source of the problem may have been contamination of the apparatus. The data associated with the blank will be reviewed. If the analytes detected in the method blank are detected in the samples, the results reported for that analyte will be flagged.

9.2.6.2 Laboratory Method Blank Exceeds Quantitation Limit

When the laboratory method blank exceeds the quantitation limit, the QA/QC Officer will immediately notify the responsible analyst. Once again, the analyst will check the reagents and apparatus for potential contamination. If reagents are contaminated, the existing batch will be rejected and a fresh batch from a new container will be prepared. If the problem arose from the apparatus, whether glassware or instrumental, the problem will be corrected by the analyst and/or extraction technician. The corrective action will be documented before further analyses can be undertaken. The analyst will then notify the QA/QC Officer of the corrective action. The Sevenson Project Manager, CQCSM, and/or Project Chemist will be kept abreast of the situation via DNF.

The data associated with the failed method blank will be rejected. The samples will be re-extracted and reanalyzed to produce acceptable data. However, in instances where the analyte found in the blank is not detected or detected below the quantitation limit in the samples associated with the blank, the data may be accepted. If re-extraction or reanalysis of the sample is not an option (e.g., sample holding time is exceeded or not enough sample available), the sample data will be flagged using the "B" data qualifier, which indicates that the analyte was found in the associated blank sample as well as in the Site sample.

9.2.6.3 Laboratory Control Sample Exhibits Recoveries Outside the Acceptable Limits

The laboratory will utilize the following steps to determine the corrective action requirements for LCS recoveries outside of the acceptance limits as follows:

- If the laboratory control sample recoveries do not meet the acceptance criteria and the sample results are reported as not detected (i.e., below the method quantitation limit), the laboratory will not perform further corrective actions if the number of sporadic marginal failures allowed by the *QSM* (DOD, 2006) are not exceeded.
- If the laboratory control sample recoveries do not meet the acceptance criteria and the sample results are reported as not detected (i.e., below the method quantitation limit), the laboratory will perform further corrective actions if the number of sporadic marginal failures allowed by the *QSM* (DOD, 2006) is exceeded. The Sevenson Project Manager, CQCSM, and/or Project Chemist will be notified of the problem by a DNF.

- If the laboratory control sample recoveries do not meet the acceptance criteria and the sample results are detected above the method quantitation limit, the laboratory will perform corrective actions even if the number of sporadic marginal failures allowed by the *QSM* (DOD, 2006) is not exceeded. The Sevenson Project Manager, CQCSM, and/or Project Chemist will be notified of the problem by a DNF.

Corrective actions performed by the laboratory for the scenarios outlined above include re-preparation and reanalysis of the LCS sample and the associated field samples. Before repeating the re-preparation of the samples, the calibration of the instrument will be checked by analyzing a continuing calibration check standard. If the instrument is within calibration, the samples will be re-prepared and reanalyzed. If the instrument calibration has drifted, recalibration will be performed and the samples will be reanalyzed.

9.2.6.4 Surrogate Compound Recoveries Outside the Acceptance Limits

When the recoveries of the surrogate compounds are outside the acceptance limits, but the laboratory spiked blank is within acceptable limits, the apparent poor or enhanced recovery may be due to matrix effect. The sample exhibiting the unacceptable recovery may be re-prepared or reanalyzed within appropriate holding times. If the same phenomenon is observed, it will be assumed that the failure to meet recovery criteria was in fact a matrix effect. This information will be included in the analytical results report and the original data will be reported. The unacceptable surrogate recovery will be flagged using the "#" qualifier.

If, upon reanalysis, the recovery of the surrogate falls within acceptable limits, the results of the reanalysis will be reported and the original analysis results rejected due to a potential procedural problem.

In some instances, it may be obvious from the data produced or from the observations made during the preparation process that the sample matrix is causing the unacceptable recoveries. In these cases, the sample will not be re-prepared or reanalyzed. The observations made will be included in the case narrative of analytical result report and the unacceptable surrogate recovery will be flagged using the "#" qualifier.

If the surrogate recovery in a method blank or reference sample is outside the acceptance limits, but the analytes in the reference sample are within acceptable limits, the analyst may need to analyze the surrogate standard solution to check for degradation or contamination. If the standard solution is determined to be the

problem, the analyst will immediately prepare a new standard and the affected samples will be re-extracted and reanalyzed. It is also possible that the calibration of the surrogate compound has drifted, in which case the analyst should re-calibrate the system, and reanalyze the affected samples.

Sevenson's Project Manager, CQCSM, and/or Project Chemist will be notified of any surrogate compound recovery problems via DNF.

9.2.6.5 Matrix Spikes Exhibit Recoveries Outside the Acceptable Limits

When recoveries of spiked analytes from a matrix spike sample analysis are outside the acceptance limits, the apparent poor or enhanced recovery may be due to matrix effects. The matrix spike sample will be re-prepared and reanalyzed to assess this possibility. If the same phenomenon is observed with the re-prepared sample, it will be assumed that the failure to meet recovery criteria was in fact a matrix effect. This information will be included in the case narrative of the analytical result report and the results of both the original and re-prepared sample will be reported. The unacceptable matrix spike sample recoveries will be flagged with the "G" qualifier if the recovery is greater than the upper quality control recovery limit, or the "L" qualifier if the recovery is less than the lower quality control recovery limit.

If upon reanalysis the recovery of the spiked analytes falls within acceptable limits, the results of the reanalysis will be reported and the original analysis results rejected due to a potential procedural problem.

In some instances, it may be obvious from the data produced or from observations made during the preparation process that the samples matrix is causing the unacceptable recoveries. In these cases, the sample will not be re-prepared or reanalyzed and the observations made will be included in the case narrative of the analytical result report. Again, the unacceptable recoveries will be flagged with the "G" qualifier if the recovery is greater than the upper quality control recovery limit, or the "L" qualifier if the recovery is less than the lower quality control recovery limit.

Notifications of matrix spike recoveries outside of the acceptable recovery limits will be made to the Sevenson Project Manager, CQCSM, and/or Project Chemist via a DNF.

9.2.6.6 Relative Percent Differences from MS/MSD Samples or Duplicate Samples Analysis Outside the Acceptance Limits

When the RPD of an analyte from matrix spike/matrix spike duplicate sample analysis is outside the acceptance limits, the MS/MSD or duplicate samples will be re-prepared and reanalyzed to determine if the unacceptable RPD is due to sample matrix. If the RPD for the analyte is again observed to be outside the acceptance limit of the re-prepared samples, it will be assumed that the failure to meet RPD criteria was due to matrix effects. This information will be forwarded to Sevenson personnel via a DNF and included in the case narrative of the analytical result report and the results of both the original and re-prepared sample analyses will be reported. The unacceptable RPD will be flagged with the "#" qualifier.

If upon reanalysis, the RPD of the analytes fall within acceptable limits, the results of the reanalysis will be reported and the original analysis results rejected due to a potential procedural problem.

9.2.6.7 Sample Analyte Concentration Exceeds Calibration Range

If the concentration of analyte exceeds the calibration range for a particular analysis, the sample or sample extract will be reanalyzed at an appropriate dilution so that the analyte concentration in the diluted analysis is within calibration range. The results of both the undiluted analysis and the dilution analysis will be reported for the sample. The detection limit(s) reported for the affected sample(s) will be increase according to the required dilution.

9.2.7 Calculation Errors

Reports will be reissued if calculation and/or reporting errors are noted with any data package. The case narrative will clearly state the reason(s) for reissuance of a report.

10.0 DATA REDUCTION, VALIDATION, AND REPORTING

Data review procedures are a set of computerized and manual checks applied at appropriate levels of the measurement process. Data review begins with the reduction (processing) of data, continues through verification of the data, and reporting of analytical results. Calculations are checked from the raw data to the final value prior to reporting results for each group of samples. The analyst who obtained the data can perform data reduction. Data verification starts with the analyst to assure the work is done correctly the first time. Data verification continues with review by a second reviewer who verifies that data reduction has been correctly performed and that the reported analytical results correspond to the data acquired and processed.

10.1 Data Reduction and Initial Verification

More than one analyst, depending upon the analytical method employed or laboratory policy, can perform data reduction and initial verification. Different analysts can review the preparation and analytical data independently. In these instances, each item may not be applicable to the subset of the data verified or an item may be applicable in both instances. It is the responsibility of the analyst to ensure that the verification of data in his or her area is complete. The data reduction and initial verification process must ensure that:

- Sample preparation information is correct and complete including documentation of standard identification, solvent lot numbers, sample amounts, etc.
- Analysis information is correct and complete including proper identification of analysis output (charts, chromatograms, mass spectra, etc.).
- Analytical results are correct and complete including calculation or verification of instrument calibration, QC results, and qualitative and quantitative sample results.
- The appropriate SOP has been followed and is identified in the project records.
- Proper documentation procedures have been followed.
- All non-conformances have been documented and reported.
- Internal COC is complete and documented, if applicable.
- Special sample preparation and analytical requirements have been met.

An analyst will process data in one of the following ways:

- Direct acquisition and processing of raw data by a computer.
- Manual computation of results directly on the data sheet or on calculation pages attached to the data sheets.
- Input of raw data for computer processing.

If an analyst manually processes data, all steps in the computation shall be provided including equations used and the source of input parameters such as response factors, dilution factors, and calibration constants. If calculations are not performed directly on the data sheet, they may be attached to the data sheets.

For data input by an analyst and processed using a computer, a copy of the input shall be kept and uniquely identified with the project number and other information as needed. The samples analyzed must be clearly identified.

If data is directly acquired from instrumentation and processed, the analyst must verify that the following are correct:

- Project and sample numbers.
- Calibration constants and response factors (RF).
- Units.
- Numerical values used for reporting limits.

Analysis-specific calculations for methods are provided in the method SOP. In cases where computers perform the calculations, software must be validated or verified before it is used to process data.

The data reduction is documented, signed and dated by the analyst completing the process. Initial verification of the data reduction by the same analyst is documented on a data validation checklist, signed and dated by the analyst.

10.2 Data Verification

Following the completion of the initial verification by the analyst performing the data reduction, an experienced peer, technical person, or supervisor performs a systematic second-level verification of the data.

The second level reviewer examines the data signed by the analyst. This review includes an evaluation of all items required in the raw data package. Any exceptions noted by the analyst must be reviewed. Included in this review is an assessment of the acceptability of the data with respect to:

- Adherences of the procedure used to the requested analytical method SOP.
- Correctness of numerical input when computer programs are used (checked randomly).
- Numerical correctness of calculations and formulas (checked randomly).
- Correct interpretation of chromatograms, mass spectra, etc.
- Acceptability of QC data.
- Documentation that instrument was operating according to method specifications (calibrations, performance checks, etc.).
- Documentation of dilution factors, standard concentrations, etc.

This review also serves as verification that the process the analyst has followed is correct in regard to the following:

- The analytical procedure follows the methods and specific instructions given on the project file.
- Non-conforming events have been addressed by corrective action as defined on a non-conformance memo.
- Relevant comments about sample or analysis problems are clearly stated.
- Valid interpretations have been made during the examination of the data and the review comments of the initial reviewer are correct.
- The package contains all of the necessary documentation for data review and report production, and results are reported in a manner consistent with the method used for preparation of data reports.

The specific items covered in the second stage of data verification may vary according to the analytical method, but this review of the data must be a documented list with the signature of the person performing the review.

10.3 Completeness Verification

The Laboratory Project Manager performs a third-level review. This review is required before results are submitted. This review serves to verify the completeness of the data report and to ensure that client project requirements are met for the analyses performed. The items to be reviewed are:

- Analysis results are present for every sample in the analytical batch or sample delivery group.
- Every parameter of target compound requested is reported with either a value or reporting limit.
- The correct units and correct number of significant figures are utilized.
- If specific data reporting forms were requested, all forms are present and are completed correctly.
- All non-conformances and data evaluation statements that impact the data quality are accompanied by clearly expressed comments from the laboratory.
- The final report is legible, contains all the supporting documentation required by the project, and is in either the standard format or in the client-required format.

A case narrative to accompany the final report will be prepared by laboratory project management. This narrative will include relevant comments from the earlier reviews as determined by the laboratory Project Manager.

10.4 Data Reports

10.4.1 Laboratory Analytical Data Reports

Data packages for off-site analysis shall be performed at USEPA Level III. Data packages at USEPA Level III shall be prepared in accordance to the requirements of EM 200-1-6 (October 1997) and include the following:

- **Cover Sheet.** The cover sheet should specify the name and address of the laboratory, contract number, project name, site location, statement of authenticity, and official signature of release.

- **Case Narrative.** A case narrative should 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 times should 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 (e.g., air bubbles in VOC sample vials; inappropriate sample temperature, pH, container type, or volume; etc.) should be discussed.

- **Analytical Results.** The results for each sample should contain the following information at a minimum:

  1. Project name and unique ID number.
  2. Field sample ID number as written on custody form.
  3. Laboratory name and location (city and state).
  4. Laboratory sample ID number.
  5. Date sample collected.
  6. Date sample received.
  7. Date sample extracted or prepared.
  8. Date sample analyzed.
  9. Analysis time when holding time limit is less than 48 hours.
  10. Method number for all preparation and cleanup procedures.
  11. Analysis procedure including method numbers.
  12. Analyte or parameter.
  13. Detection limits adjusted for sample-specific factors (e.g., aliquot size, dilution or concentration factors).
  14. Method quantitation limits.
  15. Analytical results with the correct number of significant figures.
  16. Concentration units.
  17. Dilution factor.
  18. Matrix (water, soil, oil, etc.).

- **Lower Reporting Limit.** The laboratory may use a reporting limit expressed in terms of method detection limit, method quantitation limit, regulatory action level, or project-specific threshold limit. If

the non-detect "ND", "U", "<", or other lower limit reporting convention is used, then these terms must also be defined.

- **Sample Documentation.** Original chain of custody record, shipping documents, and sample cooler receipt forms should be attached to each data package.

- **QA/QC Information.** The minimum data package must include internal laboratory QA/QC data with their respective acceptance criteria. The data package should also include the laboratory's method quantitation limits. Method QC data include all spike recoveries, including surrogate spike recoveries; all measures of precision, including relative percent difference; and all control limits for accuracy and precision. This would include laboratory performance information such as results for method blanks, recoveries for laboratory control sample and laboratory control sample duplicate (LCSD), RPD for LCS/LCSD pairs, and recoveries for QC sample surrogate; and matrix-specific information such as sample duplicate RPDs, MS and MSD recoveries, MS/MSD RPDs, and field sample surrogate recoveries. Any deviations from the control limits should be noted.

Any analytical results communicated verbally or by facsimile must be reviewed and approved prior to the communication. These results must be of the same quality as the hard copy report.

It is the responsibility of the laboratory to provide a reporting system that ensures that any problems associated with an analysis are properly documented on a non-conformance memo, communicated to the appropriate off-site laboratory associates, and addressed appropriately in the data report.

Raw data will be available for later inspection, and maintained in the job file. Results will be sent by facsimile and/or electronically to the site the day that the sample results are due and hard copy results will be mailed to the Sevenson Project Chemist for data review within 21 days of the validated time of sample receipt by the laboratory.

10.4.2 Quality Control Summary Report

A QCSR will be completed for each remedial area (i.e., cluster) once all applicable data has been received from the laboratory. Section 8.3 of the FSP contains specifics concerning the contents of the QCSR.

10.4.3 Analytical Services Tracking (ANSET)

Per the requirements of the Superfund program, analytical samples will be tracked using the Analytical Services Tracking (ANSET) system. Sevenson will complete the form provided by USEPA Region II on a monthly basis. The form will be completed by the 5th of the month following the month that sampled were collected (e.g., the report for samples collected during January is required to be submitted by the 5th of February). The submission will be sent to USEPA Region II (Michael.adly@epamail.epa.gov). USEPA Region II will complete the submission of the information to USEPA Headquarters.

10.5 Data Quality Assessment

A systematic process for data assessment and review will be performed to ensure that the precision and accuracy of the analytical data are adequate for their intended use. The greatest uncertainty in a measurement is often the result of the sampling process and inherent variability in the environmental media rather than the analytical measurement. Therefore, analytical data review will be performed to minimize the potential of using false positive or false negative results in the decision-making process (i.e., to ensure accurate identification of detected versus non-detected compounds). This approach is consistent with the data quality objectives for this project, with the analytical methods, and for determining contaminants of concern and calculating risk.

Data review will be accomplished by comparing the contents of the laboratory data package and QA/QC results to requirements contained in the analytical methods. The Sevenson Project Chemist will be responsible for overseeing these activities. The review will be performed by reviewing the reported sample and QA/QC results in comparison to the requirements provided in *Kansas City District Data Quality Evaluation Guidance* (USACE, 2003). Sevenson will conduct a systematic review of the analytical data and QA/QC sample results for compliance with the established guidance based on the following criteria:

- Chain-of-custody.

- Preservation.
- Requested analyses.
- Holding time.
- Blanks.
- LCS/LCSD percent recoveries and RPDs.
- Blind field QC duplicates.
- Surrogate results.
- MS/MSD percent recoveries and RPDs.
- Sample quantitation limits.

All project data will be evaluated on these categories and qualified as per the outcome of the review. The Project Chemist may use professional judgment during the review process whereby data qualifiers may be assigned differently from those required following a literal interpretation of the Guidance. Such circumstances will be clearly and completely documented in the QCSR. Information gathered during this evaluation process will be summarized on a Data Evaluation Checklist. A copy of this checklist is included in Appendix A and the completed checklist will be included with the laboratory data report(s) included as an appendix to the QCSR.

This data review will indicate that data are: (1) usable as a quantitative concentration, (2) usable with caution as an estimated concentration, or (3) unusable due to out-of-control QC results.

Each data assessment category and associated qualification requirements are summarized below:

- **Chain-of-Custody.** Determine if the chain-of-custody form is present, properly completed, and properly signed. In addition, inspect the sample receipt checklists to determine if the laboratory noted any problems upon receipt of the sample cooler. Sample results may be rejected if the identity of any samples is in doubt.

- **Preservation.** Determine if sample integrity has been maintained from the time of sample collection through analysis. Samples that were improperly preserved or received outside of the required temperature range may be rejected.

- **Requested Analyses.** Determine if the chain-of-custody-requested analyses were performed by the requested methods.

- **Holding Times.** Evaluation of holding times ascertains the validity of results based on the length of time from sample collection to sample preparation or sample analysis. The evaluation of holding time is essential for establishing sample integrity and representativeness. Concerns regarding chemical, physical, or biochemical alteration of analyte concentrations can be eliminated through this evaluation. If a holding time is missed, associated sample results will be rejected.

- **Blanks.** The assessment of blank data is performed to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply to any blank associated with the samples, including rinsate blanks, trip blanks, and method blanks. Field sample results will be qualified as undetected ("U" code) if the concentration in the sample is less than five times in any associated blank, reported with the same detection limit. For common laboratory compounds such as methylene chloride, acetone, 2-butanone, and common phthalate esters, results will be qualified as undetected if the sample concentration is less than ten times the concentration in any associated blank, reported with the same detection limit. Other than assigning qualifiers, analytical results will not be altered due to blank contamination.

- **Laboratory Control Samples.** The LCS serves as a monitor of the overall performance of the analytical process, including sample preparation, for a given set of samples. Evaluation of this standard provides confidence in or allows qualification of results based on a measurement of process control during each sample analysis. Sample results will be qualified per the requirements set forth in the USACE guidance (USACE, 2003).

- **Blind Quality Control Duplicate Samples.** The degree of agreement between field duplicate samples is to be used in conjunction with other QC results as an aid in determining the overall quality of the data. For all analyses in water matrices, data will be considered in agreement if the results are within a factor of two of each other. Data between a factor of two and three of each other will be considered a minor discrepancy and data greater than a factor of three should be considered a major discrepancy.

- **Surrogate Recovery.** System compounds are added to every sample, blank, matrix spike, matrix spike duplicate, and standard. They are used to evaluate extraction, cleanup, and analytical efficiency by measuring recovery on a sample-specific basis. For surrogate recoveries outside of the laboratory limits, sample results will be qualified per the requirements set forth in the USACE guidance (USACE, 2003).

- **Matrix Spike/Matrix Spike Duplicates.** Sample results will be qualified per the requirements set forth in the USACE guidance (USACE, 2003).

- **Sample Quantitation Limits.** The laboratory must supply a reason for any quantitation limits reported outside of the required limits. No further action is necessary if the cause is uncorrectable. Resample and reanalysis may be required if the cause can be corrected.

11.0 PREVENTATIVE MAINTENANCE

In order to ensure that project-specific analytical requirements and analysis deadlines are met for this project, the laboratory has instituted a preventative maintenance program. This program consists of a set of procedures that have been implemented on an ongoing basis to prevent instrument malfunction and minimize downtime, as well as to optimize instrument capabilities. These procedures include:

- Maintaining service contracts for all major analytical instruments.
- Performing routine maintenance on all analytical instruments.
- Maintaining an inventory of replacement parts for all analytical instrumentation.
- Keeping current instrument-specific logbooks to record instrument problems, maintenance activities, and calibrations.

In the unlikely event that the laboratory may be unable to perform a set of required sample analyses due to unforeseen circumstances and situations, the laboratory will subcontract the work to an approved laboratory, providing that appropriate certification requirements are satisfied. Note, however, that work will only be subcontracted after approval is obtained from the USACE Contracting Officer or a Designated Representative through the proper non-conformance/corrective action channels described previously in Section 9.0 of the FSP and Section 9.0 of this QAPP.

12.0 PERFORMANCE AND SYSTEM AUDITS

Field audits are discussed in Section 7.0 of the FSP and are not repeated here. Sevenson will utilize the three-phase process to assess performance for each definable work element.

Performance/system audits will be conducted at fixed intervals to independently assess the laboratory's ability to produce accurate quantitative analytical data within acceptable control limits. Two mechanisms will be employed to conduct these audits: external and internal performance/system audits.

12.1 External Performance/System Audits

Performance audit samples, supplied by the USACE, NJDEP, and NELAP will be routinely analyzed by the laboratory. The results of these analyses will be reported to the respective agencies and will provide the basis for ongoing laboratory certification. Moreover, onsite system audits may be conducted by any of these government agencies at their discretion. The laboratory will be responsible for scheduling and coordinating external system audits and also for reviewing data from performance audit samples, so that corrective actions, if any, may be implemented as soon as possible.

The Sevenson Chemical Quality Control Manager will also perform system audits via data review. In addition, he may conduct quarterly, onsite system audits of the overall chemical data quality activities; this audit will consist of a review of sample collection, decontamination, and documentation procedures. Summary reports will then be prepared; any deficiencies and/or deviations will be documented and addressed on a formal basis. Checklists to be used during onsite system audits are included in Appendix A.

12.2 Internal Performance/System Audits

The laboratory's quality assurance personnel will conduct performance and system audits regularly. The purpose of this routine monitoring is to ensure that quality data is produced, and if not, to supply the impetus for internal corrective actions. This monitoring will take place in two phases: system audits and performance audits.

The laboratory will conduct periodic in-house system or surveillance audits on a bimonthly basis during which overall laboratory practices, adherence to laboratory standard operating procedures and project specifications, and completeness of analytical data packages will be evaluated. Any deficiencies and/or deviations identified during these system audit activities will be documented and rectified. In addition, the laboratory will maintain records of these procedural audits.

The laboratory will also initiate internal performance evaluation samples. These will be introduced into the laboratory system as blind samples. In this way, the laboratory may monitor the success of their analytical performance of all project analytical methods on a quantitative basis. Once again, the laboratory will address any analytical method nonconformances.

13.0 REFERENCES

Chemical Quality Assurance for HTRW Projects (EM 200-1-6), USACE, October 1997.

Guidance for the Data Quality Objectives Process, QA/G-4, EPA/600/R-96-005, USEPA, August 2000.

Kansas City District Data Quality Evaluation Guidance, USACE, August 2003.

Project Specifications for Cornell-Dubilier Electronics Superfund Site – OU2, USACE, June 2006.

Quality Systems Manual for Environmental Laboratories, DOD, January 2006.

Requirements for the Preparation of Sampling and Analysis Plans (EM 200-1-3), USACE, February 2001.

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA SW-846, Final Update III, December 1996.

APPENDIX A

STANDARD SAMPLE TRACKING AND DOCUMENTATION FORMS, REVIEW FORMS AND CHECKLISTS

SAMPLE LABELS

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc.
302 Grote Street
Buffalo, NY 14207 (716) 876-5290

	DATE:
	TIME:
CLIENT/SITE NAME	
SAMPLE LOCATION	COMP
SAMPLED BY	GRAB

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc.
302 Grote Street
Buffalo, NY 14207 (716) 876-5290

	DATE:	LAB USE ONLY
	TIME:	LOG DATE:
CLIENT/SITE NAME		☐ TR ☐ PC
		☐ ST ☐ OG
SAMPLE LOCATION	COMP	☐ PD ☐ AN
SAMPLED BY	GRAB	☐ RETURN TO SITE

CUSTODY SEAL

SECURITY SEAL DATE _____

DO NOT TAMPER INITIALS _____

CHAIN OF CUSTODY

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc.
302 Grote Street, Buffalo, NY 14207
(716) 876-5290 • FAX (716) 876-2412

OFFICE USE ONLY
GROUP # _____
DUE DATE _____

PAGE _____ OF _____

REPORT TO:

CONTACT

PH. # ( )

FAX # ( )

BILL TO:

PO#

PROJECT DESCRIPTION

SAMPLER SIGNATURE

DW DRINKING WATER
GW GROUND WATER
SW SURFACE WATER
WW WASTE WATER
O OIL
SL SLUDGE
SO SOIL
S SOLID
W WIPE
OTHER

TURN AROUND TIME: _____

QUOTATION NUMBER: _____

ARE SPECIAL DETECTION LIMITS REQUIRED:
YES NO
If yes please attach requirements.

Is a QC Package required:
YES NO
If yes please attach requirements

ANALYSES TO BE PERFORMED

	SAMPLE I.D.	DATE SAMPLED	TIME OF SAMPLING	SAMPLE TYPE	TOTAL NO. OF CONTAINERS												TYPE OF CONTAINER/ COMMENTS:	OFFICE USE ONLY WST. I.D.
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

REMARKS:

RELINQUISHED BY:	DATE: / /	TIME:	RECEIVED BY:	DATE: / /	TIME:
RELINQUISHED BY:	DATE: / /	TIME:	RECEIVED BY:	DATE: / /	TIME:

Army Corp. of Engineers Sample Receipt Form

LIMS # _____ No. of Coolers _____

MRD Cooler # _____ Contract Cooler _____

PROJECT: _____ Date Received: _____

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened:
by (sign): _____ (print): _____

1. Did cooler come with shipping slip (airbill ect): YES NO
   If yes enter carrier name & airbill number here: _____
2. Were custody seals on outside of cooler? YES NO
   How many, where, date, time: _____
3. Were custody seals unbroken and intact at the date and time of arrival? YES NO
4. Did you screen samples for radioactivity using a Geiger counter? YES NO
5. Were custody papers sealed in a plastic bag & taped inside to the lid? YES NO
6. Were custody papers filled out properly (ink, signed, ect)? YES NO
7. Did you sign the custody papers in the appropriate places? YES NO
8. Was project identifiable from the custody forms? YES NO
   If YES, enter project name at the top of this form.
9. If required, was enough ice used? Type: YES NO
10. Have designated person initial here to acknowledge receipt of cooler: _____ (date) _____

B. LOG-IN PHASE: Date samples were logged-in:
by (sign): _____ (print): _____

11. Describe type of packing in cooler: _____
12. Were all bottles sealed in separate plastic bags? YES NO
13. Did all bottles arrive unbroken and were labels in good condition? YES NO
14. Were all labels complete(ID, date, time, signature, preservation)? YES NO
15. Did all bottle labels agree with custody papers? YES NO
16. Were correct containers used for the tests indicated? YES NO
17. Were correct preservatives added to samples? YES NO
18. Was a sufficient amount of sample sent for tests indicated? YES NO
19. Were bubbles absent in VOA samples? If NO, list by sample #: YES NO
20. Was the project manager called and status discussed? YES NO
    If YES, give details on the back of this form.
21. Who was called? _____ Date: _____

By whom? _____

WASTE STREAM TECHNOLOGY

Preparatory Phase Checklist

Contract:	Date Preparatory Held:
Spec. Section & Paragraph:	Definable Feature of Work:
Drawing Sheet Numbers:	Major Definable Feature:

A. Personnel Present

Name	Position	Company

B. Has each spec. paragraph, drawing, and shop drawing detail been studied? Yes ___ No ___

C. Transmittals Involved

Number and Item	Code	Contractor/Government Approval

Have all items involved been approved? Yes _____ No_____

D. Are all materials on-hand? Yes ____ No_____

Are the materials on the job-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:

Items not on-hand or not in compliance with transmittals:

E. Tests required in accordance with contract requirements:

Test	Paragraph

F. Accident Prevention Planning - Hazard Control Measures:

Activity Hazard Analysis

Activity	Hazard(s)	Controls

Operational Equipment Checklist

Attached For:

On File For:

G. Have procedures for accomplishing work been reviewed with appropriate people?

Yes ___ No

Scope of Work/Method of Construction:

Safety Issues:

Spill Prevention Issues:

H. Has all preliminary work been accomplished in accord with contract requirements and is this segment of work ready to start? Yes ___ No

Explain any problems:

I. Remarks:

USACE Comments:

Sevenson Comments:

CQC Systems Manager

Project Engineer

Initial/Follow-Up Phase Inspection Checklist

Inspection Type: ☐ Initial Phase ☐ Follow-Up Phase

Date: _____ Specifications Paragraph: _____

Description and location of work inspected: _____

_____

Reference contract drawings: _____

A. Personnel Present

Name	Position	Company

B. Materials being used are in strict compliance with the Contract Plans and Specifications?
YES _____ NO _____
If not, explain: _____

_____

C. Procedures and/or work methods witnessed are in strict compliance with the requirements of the Contract Specifications? YES _____ NO _____
If not, explain: _____

_____

D. Workmanship is acceptable? YES _____ NO _____
State areas where improvement is needed: _____

_____

E. Safety violations and corrective actions taken: _____

_____

F. Remarks: _____

_____

_____

_____ _____

Quality Control Representative Project Engineer

DAILY CHEMICAL QUALITY CONTROL REPORT

Date: _____

Job Identification and Site Numbers: _____

_____

Weather: _____

_____

Subcontractors Present Onsite: _____

_____

Health and Safety Measures Necessary for Planned Activities: _____

_____

Health and Safety Violations and Corrective Actions: _____

_____

_____

Planned Daily Activities: _____

_____

_____

Description of Chemical Data Acquisition Work Performed: _____

_____

_____

Sample Shipments and Problems Regarding Sampling and Sample Shipments: _____

_____

Chemical Parameter Measurement Problems: _____

_____

_____

Contingency Sampling: _____

_____

_____

Non-conformance Problems: _____

_____

_____

Corrective Actions (including approvals): _____

_____

_____

Initials of Personnel Performing Corrective Actions: _____

Implemented Chemical Quality Control Activities (including summary of feedback resulting from corrective actions taken): _____

_____

_____

CERTIFICATION: As Chemical Quality Control Manager, I certify that the above report is complete and correct and that I, or my authorized representative, have inspected all work performed this day by key staff and have determined that all materials, equipment and workmanship are in strict compliance with the plans and specifications, except as my be noted above.

_____ _____

Signature Date

SITE QC INSPECTION REPORT

Project Name _____ Client/Generator _____

Sevenson Job # _____ Contract # _____

Project Location _____ Task Order # _____

Inspection Date _____ Inspection Time _____

Inspected By _____

Sevenson Project Manager _____ Client/Generator Project Manager _____

Site Telephone # _____ Contact Telephone # _____

Site Facsimile # _____ Contact Facsimile # _____

Site Email Address _____

Site Plans/Activities

Construction Management Plan/Work Plan

Original Approval Date _____

Revision Approval Date (if applicable) _____

YES	NO	
☐	☐	Current Plan Copy Available Onsite
☐	☐	Spill Response equipment/materials available?
☐	☐	Soil erosion/sediment controls in-place?
☐	☐	Work zones (EZ, CRZ, SZ) clearly delineated?
☐	☐	All equipment inspections being documents (in and out)?

COMMENTS: _____

_____

_____

_____

_____

Health and Safety

Original Plan Approval Date _____
Revision Approval Date (if applicable) _____

YES	NO	
☐	☐	Current Plan Copy Available Onsite
☐	☐	Activity Hazard Analysis Complete and Updated
☐	☐	Daily Safety Meetings Conducted and Documented
☐	☐	Emergency Response Information Posted
☐	☐	Medical and Training Documentation Current
☐	☐	Daily Safety Logs Completed
☐	☐	Chemical Inventory Updated
☐	☐	Inspections Completed and Documented
☐	☐	Map to hospital prominently displayed?
☐	☐	Is work being conducted safely?

COMMENTS: _____

_____

_____

Sampling and Analysis

Original Plan Approval Date _____
Revision Approval Date (if applicable) _____

YES	NO	
☐	☐	Is a current plan copy available onsite?
☐	☐	Has a review of the Plan and all relevant SOPs with all site sampling been conducted?
☐	☐	Are field logbooks and other site documentation maintained properly and in a secure area?
☐	☐	Are Preparatory Inspections being conducted prior to each sampling event?
☐	☐	Are Initial and Follow-up Inspections being conducted for each sampling event?
☐	☐	Is the site Sampling Manager performing periodic field audits of all sampling activities?
☐	☐	Is field documentation being reviewed by the site Sampling Manager prior to the completion of each days' sampling events?
☐	☐	Is the Sampling Manager performing field audits of sample labeling, chain-of-custody, packing and shipping activities?
☐	☐	Are Daily Chemical Quality Control Reports (DCQCR) being completed each day and properly?
☐	☐	Are DCQCR, instrument maintenance and calibration, nonconformance/corrective action reports and sampling logs current?

COMMENTS: _____

_____

_____

Project Work Tasks	Sevenson Checklist #
(Check all that apply and attach completed QC Report)	
☐ Monitoring Well Installation, Development, and/or Abandonment	SES 001
☐ Groundwater Monitoring Well Sampling	SES 002
☐ Surface Water Sampling	SES 003
☐ Subsurface Soil Sampling	SES 004
☐ Drum/Tank Sampling	SES 005
☐ Mobile Laboratory	SES 006
☐ Packing, Storing, and Shipment of Samples	SES 007
☐ Field Documentation	SES 008
☐ Decontamination	SES 009
☐ Sample Cooler Shipment	SES 010
☐ Onsite Waste Storage	SES 011
☐ Offsite waste Transport/Disposal	SES 012

COMMENTS: _____

_____

_____

_____

Sevenson Project Manager _____

Name Signature Date

QC Reviewer _____

Name Signature Date

CQC Systems Manager _____

Name Signature Date

TASK SPECIFIC QC CHECKLIST
Work Task: Packing, Storing, and Shipment of Samples
Sevenson Checklist #007

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
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 sample containers prepared for shipment (bubble-wrap, Zip-Lock™ bags, etc) per SAP procedures?				
Was a trip blank (for VOC samples only) and a temperature blank included in each cooler?				
Was loose ice double Zip-Lock™- bagged prior to placement in cooler?				
Was ice placed in equal proximity to all sample containers and the temperature blank to ensure samples arrive at lab at 4°C?				
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?				
Were COCs and shipping tracking labels faxed to lab?				

Notes/Comments

_____
_____
_____

QC Inspector Name and Signature

_____

_____

Date

_____

TASK SPECIFIC QC CHECKLIST
Work Task: Field Documentation
Sevenson Checklist #008

Project Name/Job Number: _____
Inspection Date: _____

Complete this form for each day samples are taken. 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/A
Was all original field data recorded in black indelible ink?			
Were logbooks filled out properly, accurately recounting the day's events?			
Were all field forms completed and information accurately recorded?			
• Field Sampling Forms			
• Chain of Custody Forms			
• Field Log Books			
• Field Change Request Forms			
• Additional Forms (list below)			
Was field documentation forwarded to Sevenson office for peer/QC review?			
Were deficiencies reported to the Field Sampling Manager?			

Notes/Comments

_____
_____
_____

QC Inspector Name and Signature

_____

_____

Date

_____

TASK SPECIFIC QC CHECKLIST
Work Task: Decontamination
Sevenson Checklist #009

Project Name/Job Number: _____
Inspection Date: _____

Complete this form for each day samples are taken. 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
Was all sampling equipment decontaminated properly prior to use and between sample intervals?				
Was each decontamination event recorded in the logbook?				
Was investigation derived waste (IDW) (e.g., decontamination water, personal protective equipment (PPE), etc.) handled properly?				
Were the location, type, number and source of containers of IDW recorded in the logbook?				
Was Sevenson Technical Services notified if IDW requires offsite disposal?				

Notes/Comments

_____
_____
_____

QC Inspector Name and Signature

_____

_____

Date

_____

TASK SPECIFIC QC CHECKLIST
Work Task: Sample Cooler Shipment
Sevenson Checklist #010

Project Name/Job Number: _____

Inspection Date: _____

☐ **PREPARATORY PHASE**

Yes	*No*	*N/A*		*Comment*
☐	☐	☐	Have sample shipment procedures in the SAP 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 SAP?	
☐	☐	☐	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 SAP?	_____
☐	☐	☐	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

Field Change Request Form

PROJECT MANAGER:_____
PROJECT:_____
JOB NUMBER:_____
CONTRACT NUMBER:_____
DATE:_____
FIELD CHANGE REQUEST NUMBER:_____

Weather

	Bright Sun	Clear	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85	85 up
Wind	Calm	Moderate	High		
Humidity	Dry	Moderate	Humid		

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 _____ of _____

PROJECT _____ REPORT NO. _____

JOB NO. _____ DATE _____

ACTION TO BE TAKEN:

HEALTH AND SAFETY LEVEL CHANGES: _____No _____ Yes (explain)

HSO NAME/DATE:

PROBLEM RESOLUTION:

SPECIAL NOTES:

FOLLOW-UP TO BE FILED? _____ No _____ Yes (explain/attach)

FIELD CHANGE APPROVED: _____ No _____ Yes Initials: _____

Sheet _____ of _____

BY: _____ TITLE:

CORRECTIVE ACTION FORM

Corrective Action No. _____ Date _____

To: _____ cc: Task Manager

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (A) to resolve the noted condition and (B) to prevent it from reoccurring. Your written response is to be returned to the Project Manager.

Condition: _____

_____

Reference Documents: _____

_____

Recommended Corrective Actions: _____

_____

Originator _____ Date _____ QAM Approval Date _____

PM Approval Date _____

Response: _____

_____

Corrective Action: _____

_____

A. Resolution: _____

B. Pretension: _____

C. Affected Documents: _____

Signature _____ Date _____

Follow Up _____

Corrective Action Verified:

By: _____ Date _____

LABORATORY/ANALYTICAL DEFICIENCY NOTIFICATION

g # : _____ Date: _____ Client: _____

Site: _____ SDG: _____

Lab ID No.(s): _____

Client ID (s): _____

Deficiency: _____

Explanation: _____

Corrective Action: _____

Comments: _____

Client Contact: _____ Date Sent: _____

Telephone: _____

Reported By: _____ Date: _____

DATA EVALUATION CHECKLIST

Project Name/Sevenson Job Number: _____
Laboratory: _____
Laboratory Report Number: _____
Laboratory Sample IDs: _____
Sample Collection Date(s): _____
Sample Type/Matrix: _____
Analyses Performed: _____
Reviewed By: _____ Date Initiated: _____ Date Completed: _____

ATTACHMENTS:
_____ Sample ID Table
_____ Laboratory/Analytical Deficiency Notification (DNF)
_____ RPD Summary Table

REPORT CONTENTS: The following items should be included in the complete laboratory analytical data report. If any of the items are missing, contact the laboratory to obtain the missing items.

ITEM	PRESENT	MISSING	NOT APPLICABLE	COMMENTS
Field sample identifiers and corresponding laboratory ID numbers (also prepare a table that matches field sample IDs, laboratory IDs, rinsate blanks, trip blanks, duplicate samples, laboratory QC samples, and QA laboratory split samples)				
Case narrative				
Chain-of-custody form(s)				
Laboratory Sample Receipt Checklist and USACE Cooler Receipt Form				
Shipping papers and custody seals				
Data Qualifier Sheet that defines the data qualifiers used by the laboratory to report the analytical results				
Summary of methodologies, receipt dates, analysis dates, etc.				

DETAILED ASSESSMENT AND VALIDATION: Complete the assessment and validation for each laboratory data report by checking the appropriate column (yes "Y", no "N", or not applicable "NA"). If the answer to any of the questions is "no", an explanation of the non-compliance/deficiency and associated corrective action should be included in the case narrative and on a Laboratory/Analytical Deficiency Notification Form (DNF). If a DNF is available, attach to the Data Evaluation Checklist.

	Y	N	NA	COMMENTS/QUALIFIERS
CHAIN-OF-CUSTODY				
Was the chain-of-custody form properly completed and signed by the field personnel when relinquished and by the laboratory when received?				
Was the chain-of-custody form free of errors and discrepancies?				
SAMPLE PRESERVATION				
Are the Laboratory Sample Receipt Checklist and USACE Cooler Receipt Forms present and properly signed?				
Do the Laboratory Sample Receipt Checklist and USACE Cooler Receipt Forms indicate that the samples were received within proper temperature and in good condition?				
Were samples that required preservation properly preserved?				

	Y	N	NA	COMMENTS/QUALIFIERS
REQUESTED ANALYSES				
Were all chain-of-custody-requested analyses performed?				
Are analytical results reports present for all samples and for all analyses?				
Do the result reports for each analytical parameter for each sample list all of the required site-specific compounds or metals as specified in the QAPP?				
HOLDING TIMES				
Were extraction (when applicable) and analysis holding times for sample met?				
METHOD BLANKS				
Does the report contain method blank results for each analytical parameter performed?				
Were the method blanks free of target compounds?				
Were the site samples free of compounds detected in the method blank?				
If the site samples were not free of compounds detected in the method blank, did the laboratory flag the site samples with a "B" qualifier?				
FIELD BLANKS				
If the report contains results for aqueous volatile organic samples, does the report contain trip blank results?				
If the report contains results for samples collected using non-dedicated equipment, does the report contain rinsate blank results?				
Were the site samples free of compounds detected in the trip and/or rinsate blank?				
LCS RESULTS				
Does the report contain the results of LCS analyses with the corresponding control limits reported?				
Are the recoveries from the LCS analyses within the corresponding control limits?				
If NO, does the case narrative detail the reason and the corrective action taken? (Also, attach the applicable DNF, is available.)				
FIELD DUPLICATES				
Does the report contain a field replicate sample?				
Calculate the relative percent differences between the replicate sample results and attach the RPD Summary Table.				
Are the field duplicate sample results in agreement based on the acceptance criteria included in CENWK-EC-EF.				
SURROGATE RESULTS				
For the applicable organic compound analyses, are the surrogate compound recoveries and the corresponding control limits reported?				
Are the surrogate compound recoveries within the control limits?				
If NO, does the case narrative detail the reason and the corrective action taken? (Also, attach the applicable DNF, is available.)				
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS				
Does the report contain, for each applicable analytical parameter, the results of matrix spike sample analyses including the recoveries and corresponding control limits?				
Does the report contain, for each applicable analytical parameter, the results of matrix spike duplicate and/or laboratory duplicate pairs, including the relative percent differences and corresponding control limits?				
Are the recoveries from the matrix spike, matrix spike duplicate, and/or laboratory duplicate pairs, including the relative percent differences, within the control limits?				
If NO, does the case narrative detail the reason and the corrective action taken? (Also, attach the applicable DNF, is available.)				

	Y	N	NA	COMMENTS/QUALIFIERS
QUANTITATION LIMITS				
Do the analytical results reports list the sample quantitation limits for each compound?				
Are the project-required quantitation limits included in the QAPP met?				
If the quantitation limits are out of range, does the case narrative document the cause(s) as to why the limits are above criteria?				
For the organic analysis parameters, are the results that are greater than the MDL but below the MQL properly flagged by the laboratory with the "J" qualifier?				
For the organic parameter results that have compounds that are flagged with the "D" qualifiers, does the result report state the dilution factor that was used to obtain the result and the date on which the dilution was analyzed?				

Additional Notes/Comments: _____

_____

_____

Data Assessment/Validation by: _____

Name Signature Date

CQC Systems Review by: _____

Name Signature Date

APPENDIX B

ANALYTICAL LABORATORY QUALITY ASSURANCE/QUALITY CONTROL PLAN

WASTE STREAM TECHNOLOGY INC.
ANALYTICAL LABORATORY
QUALITY ASSURANCE
AND
QUALITY CONTROL PLAN

Revision Number: 12
Effective Date: 08/01/04
Serial Number: QA-126

Prepared by:

Waste Stream Technology Inc.
302 Grote Street
Buffalo, NY 14207
(716)876-5290

Laboratory Director: Brian S. Schepart, Ph.,D. _____ Signature

QA/QC Director: Daniel W. Vollmer _____ Signature

Radiochemistry Manager: Brian S. Schepart, Ph.,D. _____ Signature

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POLICY STATEMENT

The goal of the analytical laboratory of Waste Stream Technology (WST) is to provide reliable data to our clients in a manner that will facilitate the problem solving and decision making processes. Because we are aware that this data must be of the highest quality, we are committed to an intensive and comprehensive program for quality assurance and quality control.

In order to provide reliable data of the highest quality on a continuing and consistent basis, WST has implemented an internal Quality Assurance and Quality Control Program. The quality assurance guidelines of WST incorporate the requirements of the National Environmental Laboratory Accreditation Conference (NELAC) standards, The U.S. Army Corps of Engineers Shell Document, U.S. EPA SW-846, "Test Methods for Evaluating Solid Wastes" and US EPA Manual, "Handbook for Analytical Quality Control for Water and Wastewater Laboratories."

This Quality Assurance and Quality Control establishes and documents the procedures and practices that are routinely implemented to ensure the integrity and validity of the data generated by WST. The main objectives of this program are to:

1. Establish protocols for measuring the quality of each system through the use of internal audits.
2. Recognize and define deficiencies that affect the quality of data.
3. Provide a system of checks and balances to correct and document out-of-control conditions in a timely manner.
4. Define and document the limitations on the quality of the data to further enhance its utility for problem solving, decision making and reporting.
5. Provide a rational, well-defined format with credible, traceable documentation to assist in the internal and external evaluation of the overall program.

The purpose of this Quality Assurance/Quality Control Plan is to establish internal protocols, procedures and guidelines to define and document the validity of the data produced. In this way we engender a system dedicated to excellence, in which we and our clients can have the utmost confidence.

James B. Hyzy, Ph.D.
Operations Manager
Waste Stream Technology Inc.

Brian S. Schepart, Ph.D.
Laboratory Director
Waste Stream Technology Inc.

INTRODUCTION

1.1 General Description

Waste Stream Technology Inc. (WST) was founded in 1986 as a bioremediation company to address the need for alternative technologies to remediate water and soils contaminated with petroleum hydrocarbon products. In 1987, WST established its analytical laboratory to support its bioremediation processes and in July 1989, WST became a wholly owned subsidiary of Sevenson Environmental Services Inc. (SES) of Niagara Falls, New York. Since that time, the WST analytical laboratory has expanded and it soon became apparent that a certified public environmental laboratory could substantially benefit both WST's and SES's clients, as wells as the Western New York area.

1.2 Objectives

The objective of this manual is to present the Quality Assurance and Quality Control Plan used within WST's analytical laboratory to maintain the production of the highest quality data at all times. Specifically, this manual will address the areas of:

- Organization and responsibilities of WST's personnel
- Sample custody and tracking
- Analytical procedures and the associated quality assurance and quality control
- Data handling
- Corrective actions

1.3 Implementation

All WST laboratory employees, and those whose job functions relate to the laboratory, will have access to copies of this manual for reference. Copies of the referenced SOP's will also be available for reference and guidance. It is the joint responsibility of the Laboratory Director, Assistant Laboratory Director, and the QA/QC Department to see that the operating criteria set forth are carried out to their satisfaction. Employees who, either willfully or through negligence, attempt to circumvent the QA/QC procedures will be reprimanded. Persistent violations may result in termination. Upper management levels will be routinely advised of the status, accomplishments, and success of the program through executive summaries.

1.4 Ethics and Integrity

All WST employees that generate and report analytical data are instructed on the importance of data integrity and are required to sign an Ethics and Integrity Agreement (Figure 1-1). Employees are encouraged to discuss any questionable data with the laboratory management prior to reporting the result and to notify the laboratory management of any accidental reporting of non-authentic data in a timely manner.

1.5 Confidentiality Procedures

To ensure the protection of the clients' confidentiality information and proprietary rights, the results of analytical testing will be mailed and transmitted by facsimile only to the person who's name appears on the chain-of-custody form received with the samples. Copies of the analytical results will be faxed or mailed to other parties but only with the permission of the client. Analytical results that are transmitted via facsimile will include a cover sheet that contains the following confidentiality notice:

"This transmission is intended for the use of the individual or entity to which it is addressed and may contain confidential information that is privileged and exempt from disclosure under applicable law. Please call the number listed above if you have received this transmission in error. Destroy the original transmission without reading or saving in any manner."

1.6 Amendments and Revisions

Amendments and/or revisions to this manual will be made in a timely fashion dependent on the urgency and impact of any changes. Changes in procedures or protocols by regulatory agencies at the federal, state, or local level that affect the content of this manual will be made immediately. In addition, changes in methodology or instrumentation that affect Quality Control (QC) limits will be made as soon as the effects of these changes can be measured, documented, and verified. The incorporation of new or additional analytical capabilities into the laboratory program will also be dealt with immediately.

The QC limits will be reviewed at least annually and updated should the data indicate a change. Editorial revisions will be made annually.

Responsibility for changes will be shared by the QA/QC Department, Laboratory Director, Assistant Laboratory Director, and any other technical/professional employees as they deem necessary to the process.

Figure 1-1

Waste Stream Technology Inc.
(Laboratory)

Ethics and Data Integrity Agreement

I. I, _____ (Name), state that I understand the high standards of integrity required of me with regard to the duties I perform and the data that I report in connection with my employment at Waste Stream Technology Inc. (Laboratory);

II. I agree that in the performance of my duties at Waste Stream Technology Inc. (Laboratory);

A. I shall not intentionally report data values that are not the actual values obtained;

B. I shall not intentionally report dates and times of data analyses that are not the actual dates and time of data analyses, and

C. I shall not intentionally represent another individual's work as my own.

III. I agree to inform Waste Stream Technology Inc. (Laboratory) of any accidental reporting of non-authentic data by myself in a timely manner.

IV. I agree to inform Waste Stream Technology Inc.(Laboratory) of any accidental or intentional reporting of non-authentic data by other employees.

_____
(Signature)

_____
(Date)

ORGANIZATION AND RESPONSIBILITIES

2.1 Organizational Chart

The organizational chart of Waste Stream Technology's analytical laboratory is depicted in Figure 2-2. Although WST has a small staff, it is logically arranged and the high degree of quality assurance can be maintained due to the ability and experience of each staff member (See Section 7.0 for Biographies of Laboratory Personnel. Figure 2-1 shows the corporate organizational chart for WST.

2.2 Responsibilities

The responsibilities of each position within WST's analytical laboratory are clearly defined and understood by each individual staff member. Each person is constantly aware that each task is performed carefully and attentively during the work day so that the highest quality data can be generated.

The specific responsibilities of each staff member are as follows:

The Laboratory Director has the overall responsibility for the performance of the laboratory staff and the quality of the data generated. He/she must also be sure that all laboratory personnel meet the requisite qualifications for their position in the laboratory. The Laboratory Director, or a designee, must also review and approve all outgoing reports and serve as a link for communication and liaison with clients. The Assistant Lab Director (Sidney Tyrrell, refer to Section 7) acts as delegate for the Laboratory Director in his/her absence.

The Assistant Laboratory Director, in conjunction with the laboratory staff, is responsible for the day-to-day operation of the laboratory, including, but not limited to: the scheduling of sample extraction and analysis; reviewing analytic data; assuring that all staff members are familiar with the Quality Assurance and Quality Control Plan (QA/QC); training of new staff; reviewing and approving outgoing reports as a designee of the Laboratory Director; evaluation of analytic procedures, both current and new; the review of new incoming work to ensure that WST's facilities and resources are appropriate to perform the work prior to commencing with this work; the inventory and ordering of supplies, chemicals, and standards; and preventive maintenance contracts and the performance of scheduled preventive maintenance.

The QA/QC Officer coordinates all quality assurance responsibilities. The QA/QC Officer reports to the Laboratory Director for daily activities but is responsible to the Vice-President for reporting non-conformance with the QA/QC criteria if corrective actions are not undertaken in a timely manner. In order to maintain the integrity, independence and objectivity of the QA/QC program, the QA/QC Officer is independent of the analytical process. The primary responsibilities of the QA/QC Officer are to review data and reports submitted by the Analyst prior to release, to carry out system audits, initiate corrective actions, and ensure compliance with the QA/QC manual and Standard Operating Procedures (SOP). The QA/QC Officer has the authority to perform audits, submit blind control samples, access data files and notebooks, and reject data/reports for non-compliance with accepted standards. A QA Officer (Oliver Levi, refer to Section 7) acts as delegate for the QA/QC Director in his/her absence.

The Radiochemistry Lab Manager is responsible for the implementation of the Quality Control and Quality Assurance Plan at it applies to radiochemical analyses. The responsibilities include but are not limited to the following:

1. General surveillance over all activities involving radioactive material (RAM), including the monitoring, storage, control, and use of RAM.
2. Ensuring compliance with rules, regulations, license conditions, and industry standards as they relate to Radiochemistry lab procedures and operations.
3. Monitoring and maintaining the Radiochemistry lab as well as the balance of the facility free of radioactive contamination and radiation exposure levels below regulatory concern.
4. Furnishing consulting services on all aspects of radiochemistry and health physics to clients and personnel at all levels of responsibility.
5. Ensuring all RAM shipments are received and sent to Waste Stream in accordance with controlling regulations.
6. Ensuring all personnel who are assigned to work with RAM are properly trained and qualified as Radiation Workers, and are monitored accordingly for exposure to radiation and RAM.
7. Instructing and training of personnel, who perform radiochemistry or handle RAM.
8. Ensuring the quality control and quality assurance objectives of the radioanalytical analysis are clearly defined and recognized by those individuals performing analyses, calculating data, entering data, and reviewing data form the Radiochemistry lab.
9. The authority to terminate any activity involving RAM or radiochemistry, or any action in the lab that is deemed unsafe or can pose a health and safety concern.

The Analyst is responsible for the operation and maintenance of their instrument. Each of the analysts has a specific analytical area and is familiar with the full range of duties in his/her respective area. Therefore, each analyst serves as his/her own area supervisor. Under this particular circumstance, each analyst, in conjunction with the Assistant Lab Director and Lab Director, is able to organize his/her own time and schedule each analysis independently. As area supervisors, they are also responsible for: implementing data verification procedures, initially through method detection limit and initial demonstration of performance studies, and then daily through analysis and review of tuning standard criteria (for the GC/MS), continuing calibration check standards, method and, if necessary, reagent blanks, and other QC samples; preparing data packages for review by the QA/QC Officer; evaluation and documentation of instrument performance; and correcting problems which result in a decline in data quality.

The Data Coordinators are responsible for the generation of final result reports for review by the Lab Director or his/her designee; the filing and storage of chain-of-custody forms, hard copies of organic and inorganic analysis data, and hard copies of final result reports sent to the client; and distribution of signed off analytical reports to the client via facsimile, next day air or by mail.

The Extraction Supervisor is responsible for the supervision of the Extraction Technicians and, in conjunction with the Assistant Lab Director and Lab Director, scheduling of samples to be extracted, exclusive of radiological samples. Supervision of reagent preparation, cleaning of glassware, and monitoring of consumable supplies, as well as the maintenance of the QC plan for all sample extraction procedures, exclusive of radiological procedures, are also the responsibilities of the Extraction Supervisor.

The Wet Chemistry Supervisor is responsible for the supervision of the Wet Chemistry Technicians and, in conjunction with the Assistant Lab Director and Lab Director, the scheduling of sample analysis. Supervision of reagent preparation, cleaning of glassware, and monitoring of consumable supplies, as well as the maintenance of the QC plan for all wet chemistry procedures are also the responsibilities of the Wet Chemistry Supervisor.

The Samples Custodian is responsible for receiving the samples, excluding radiological samples, upon their arrival at the laboratory. Detailed responsibilities of the Sample Custodian are described in Section 3.0, Sample Custody.

2.3 Training of Laboratory Personnel

The training of personnel is covered in a separate SOP. This SOP includes guidelines that define the positions within the laboratory and the minimum required qualifications for each position. It also identifies the appropriate SOP's to be read and understood by the new employee as well as the hands-on procedures used in the laboratory during training. Certification of the trainee is provided through the analysis of laboratory quality control samples (Initial Demonstration of Performance studies). The SOP outlines the documentation required to prove the employee was properly trained and the documentation required to show that current laboratory personnel are qualified for the position they hold. Figure 2-3 shows the Demonstration of Capability Certification Statement used to document employee training.

Figure 2-1

WASTE STREAM TECHNOLOGY INC.
ABBREVIATED ORGANIZATION CHART

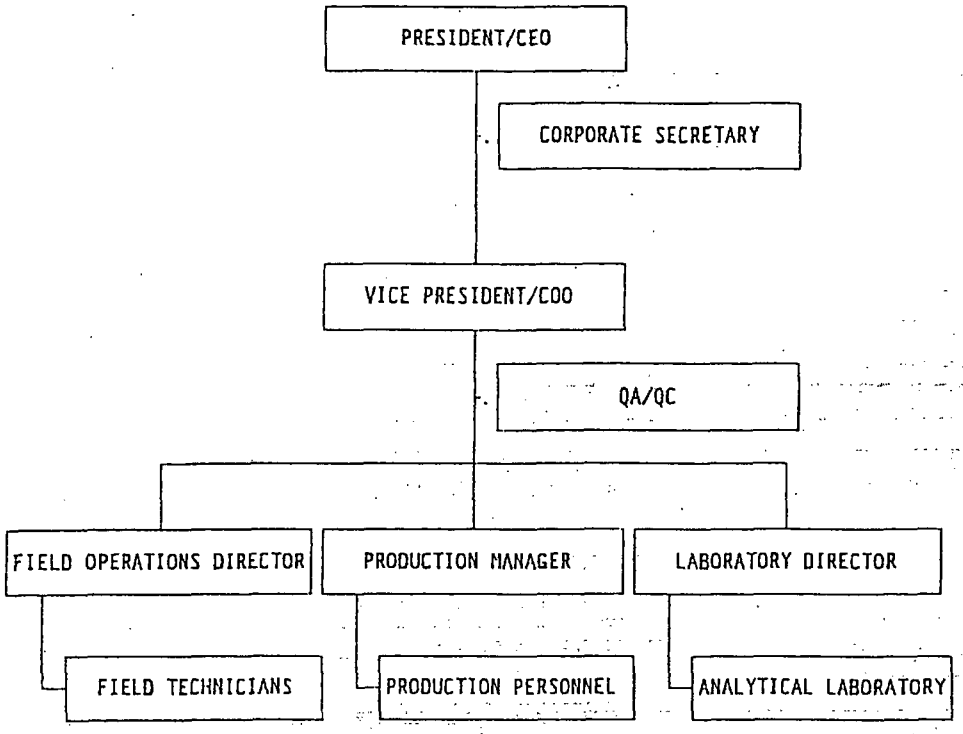


Figure 2-2
WASTE STREAM TECHNOLOGY INC.
ANALYTICAL LABORATORY
ORGANIZATIONAL CHART

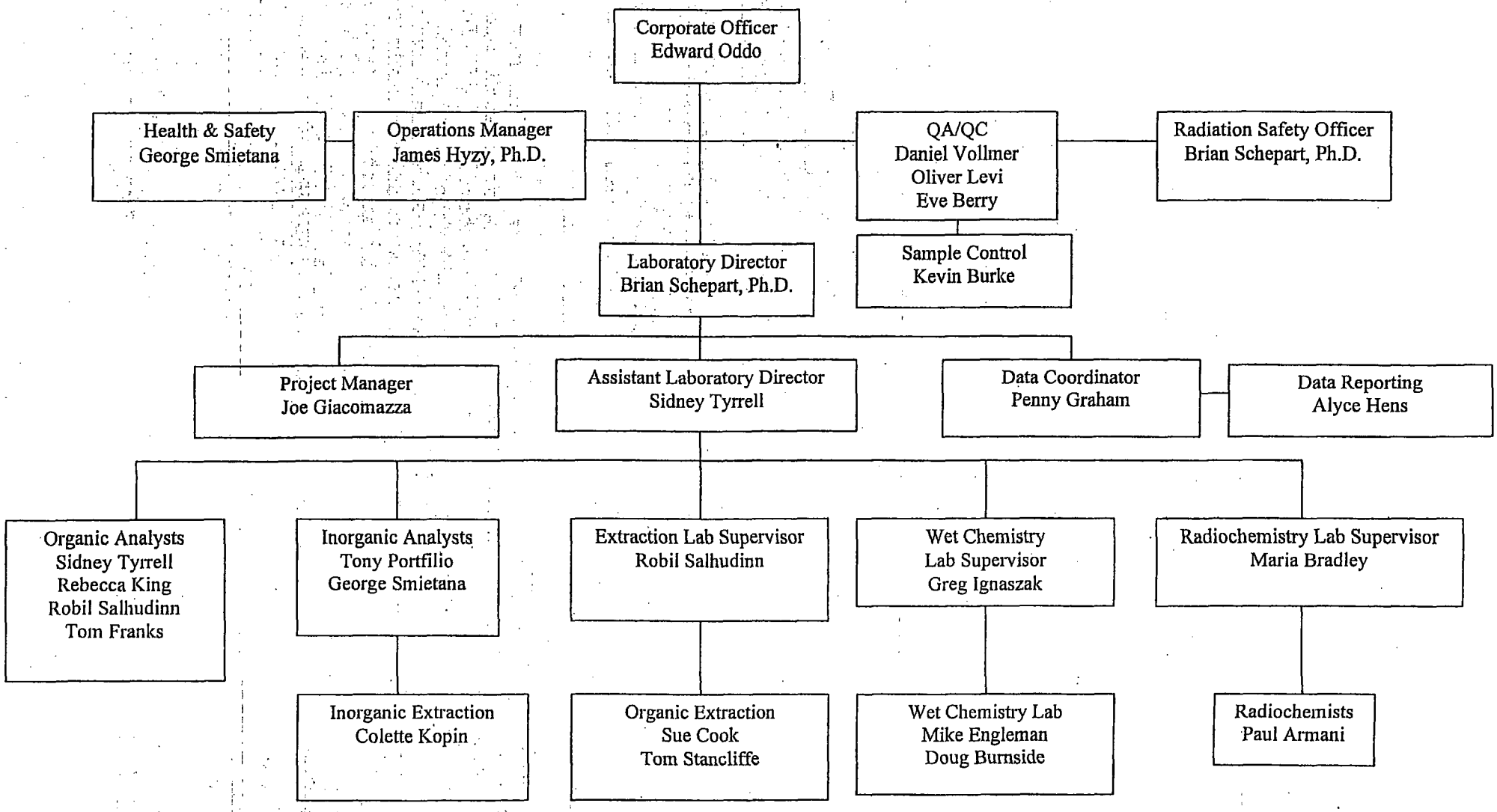


Figure 2-3

Demonstration of Capability
Certification Statement

Date: _____ Page__ of __

Analyst(s) Name(s): _____

Matrix: _____

Method/Analysis: _____

We, the undersigned, CERTIFY that:

1. The analysts identified above, using the cited test method, which is in use at this facility for the analyses of samples under the National Environmental Laboratory Accreditation Program, have met the Demonstration of Capability.

2. The test method was performed by the analyst(s) identified on this certification.

3. A copy of the test method and the laboratory-specific SOPs are available for all personnel on-site, and the person identified in this form had read the following pertinent SOP and method reference:

   Name of SOP:_____ Date Read:_____

   Method Reference:_____ Date Read:_____

4. The data associated with the demonstration capability are true, accurate, complete and self-explanatory (1).

5. All raw data (including a copy of his certification form) necessary to reconstruct and validate these analyses have been retained at the facility, and that the associated information is well organized and available for review by authorized assessors.

_____	_____	_____
Technical Director's Name & Title	Signature	Date
_____	_____	_____
Quality Assurance Officer's Name	Signature	Date

This certification form must be completed each time a demonstration of capability is completed.

(1) Definitions

True:	Consistent with supporting data.
Accurate:	Based on good laboratory practices consistent with sound scientific principles/practices.
Complete:	Includes the results of all supporting performance testing.
Self-explanatory:	Data Properly labeled and stored so that the results are clear and require no additional explanation.

SAMPLE CUSTODY

It is essential that documentation is provided for all samples received at WST's laboratory which traces each sample, in a legally defensible manner, from sample collection, to the laboratory, and through the analytical procedures to disposal. Samples enter the WST analytical process in one of two ways; either from collection by WST Field Technicians or from collection by the client or agency other than WST. This section will address the chain of custody procedures used both outside and inside the laboratory. (Detailed procedures can be found in the Sample Custody SOP).

3.1 Field Collection by WST Field Personnel

When WST is contracted by a client to collect samples for analytic testing, and the types of analyses required are determined, the Sample Custodian will assemble the appropriate sample and shipping containers, and add the appropriate preservatives, if necessary. Table 3-1 lists the appropriate containers, preservatives, sample sizes, and holding times for the various analytical parameters tested by WST's laboratory. For all samples, the containers used will be new and pre-cleaned, from an approved vendor.

After the sample is collected, the Field Technician will label the sample containers with the following information:

1. Site name and Client name
2. Location from where the sample was taken
3. Date and time of sampling
4. Whether the sample is a composite or a grab
5. Preservatives added, if appropriate
6. Name of the sampler

When all the appropriate samples have been taken and the sample containers have been properly labeled, the Sample Technician will complete a Chain of Custody Form (See Figure 3-1) by filling in all of the information listed in 1 through 6 above as well as the types of analyses to be performed. The samples will then be packed securely to prevent breakage and with cold packs when required to keep samples cold during shipment or delivery to the WST laboratory. The sampler will then sign the Chain of Custody (COC) Form and retain the pink copy for his/her records. The white, yellow and blue copies will accompany the samples throughout transportation. Each person handling the samples will sign the COC Form and record the time and date of transfer, both when receiving and relinquishing custody of the samples.

3.2 Collection from an Outside Agency

When a client or agency contacts WST to perform analytical testing, and the types of analyses to be performed are decided, the Assistant Lab Director and/or Laboratory Project Manager will be the contact person at WST that will: 1) enter the information concerning the client into the Element DataSystem (DataElement), 2) enter information concerning the pricing and project analyses into DataElement, 3) review the project information for scheduling with the extraction manager and analysts, and 4) establish that the turn around time requested by the client can be met by the laboratory. In those situations in which there are additional analyses or changes in the established Work Order, the Project Manager will fill out an Analytical Services Request Form (See Figure 3-2) and submit it to the Assistant Lab Director for review and scheduling. The Assistant Lab Director will then submit the form to the Sample Custodian who will update the appropriate work order.

The Assistant Director or Project Manager will then inform the Sample Custodian of the samples' impending arrival. If WST is to provide the sample containers, the WST contact person will also complete a Sample Container Request Form (See Figure 3-3) and submit it to the Sample Custodian. After comparing the Sample Container Request Form with the Project information, the Sample Custodian will then collect the appropriate type and size containers, and, if required, add preservatives. The containers will then be securely packed into a cooler with a COC Form. The cooler will then be picked up by the client or shipped to the location requested by the client. If requested, a trip blank and/or temperature blank will also be added to the cooler.

3.3 Sample Receipt

When non-radiological samples arrive at WST, custody is transferred to the lab via the Lab Custodian. Sample coolers or packages are taken to the Sample Control Room for receipt processing. When radiological samples (as identified by the client, originating location, labeling, or prior notification of Sample Receipt) arrive at WST, custody is transferred to the Radiochemistry Lab for receipt processing. The receipt processing for these sample coolers or packages must be performed in the Radiochemistry Lab.

Non-radiological samples, arriving from a US Army Corps of Engineers remediation site, require a radiological survey of the package or cooler with a Geiger-Mueller radiation detector prior to opening and upon initial opening. The Sample Receipt Custodian will survey the package or cooler. If the level is 100 counts per minute above background as indicated by the meter or if the meter alarms a second time, the Custodian will do the following:

1. Notify the Radiochemistry Lab immediately
2. Proceed no further in handling the package or cooler.
3. Limit movement and contact with objects inside the Sample Control Room to limit the spread of contamination.
4. Secure access to Sample Control Room to minimize the spread of possible contamination.

Radiochemistry Lab supervisor is responsible for surveying the Sample Control Room, the cooler or package, and any personnel in the Sample Control Room for release. If the material indicates radioactivity above acceptable levels, it will be placed under the control of the Radiochemistry Lab. Evaluation of the radiological problem will be performed by the Radiochemistry Lab Manager (RLM). The client is to be immediately notified of the problem and the problem documented as prescribed by the RLM.

Radiological samples are surveyed in the Radiochemistry Lab within three hours of receipt to ensure that radiation and contamination levels are within acceptable limits of transport. The Radioactive Material Shipment Receipt Inspection Form (Figure 3-6) is completed to document the receipt of radiological samples.

Using the Work Order from DataElement (Figure 3-4) and US Army Corps of Engineers Sample Receipt Form (Figure 3-5), all sample shipments will be inspected and findings reported on the appropriate forms for the following items:

1. Check the cooler/package for integrity, dents, crush points, soaked material. A damaged package can indicate possible damage to the samples within.
2. Look for a custody seal or tamper indicators on the cooler/package, identifying, if present, if the seal has been tampered with.
3. Open the sample cooler/package, and verify the Chain of Custody (COC) is present and in a sealed plastic bag. (Applicable for shipments not delivered by the client. In those cases where the client personally delivers samples, the client generally will hand deliver the COC).
4. Review the Chain of Custody to determine the quantity and types of samples sent.
   a. Review the sample analysis requirements for possible sample holding time and/or preservation requirements.
   b. Review the sample matrix for required temperature ranges.

5. Check and record the temperature inside the cooler as required dependent on the samples sent. If thermal preservation requirements are not met, the project manager will be notified, and the client immediately informed (see 5a below).

   a. As determined by the client, new samples will be provided, or analyses will be allowed to occur. In the latter situation, the Case Narrative will include the following statement: *Data is considered as estimated, due to samples received outside thermal preservation requirement.*

Check each sample for the following:

a. The sample container is not cracked, broken, corroded, or leaking.
b. Check the pH of samples requiring preservation. If the pH did not meet the preservation requirement, the sample custodian is authorized to add preservative to a corrected pH value. The addition is to be recorded in the Work Order.
c. Observe samples sent for VOA analysis, checking for air bubbles or headspace.
d. Note if sufficient sample quantity was sent.
e. Confirm the label on each sample corresponds to the information listed on the COC.
f. For aqueous samples submitted for cyanide analysis, interference checks for residual chlorine and sulfides must be performed. If found, it must be noted in the work order.

Any discrepancies noted are documented in the Work Order by checking the appropriate condition box. For sample shipments that are received from US Army Corps of Engineers sites, the USACE Sample Receipt Form also needs to be completed. If an irregularity is noted during receipt inspection, the Sample Custodian is to immediately notify the QA/QC Manager for non-radiological samples, or the Radiochemistry Lab Manager for radiological samples. The QA/QC Manager, Laboratory Project Manager, or the Radiochemistry Lab Manager will contact the client and discuss the irregularity for resolution. The conversation time, date, and contacted person will be recorded on the Work Order printout or USACE Sample Receipt Form.

3.4 Custody in the Laboratory

After the samples are inventoried, the Work Order is finalized as each Work Order and its samples are individually logged into DataElement with the following information:

1. A unique sequenced WST sample Work Order number is assigned by DataElement to each Work Order, with each sample and each container having a specific label demarcated alphabetically (e.g. 4C03016-01-A; where, 4 = Year, C = 3rd Month, 03 = Day, 016 = Work Order Sequence, 01 = sample #1, A = Container A);
2. Name of client or name of agency representing the client;
3. Project Number or Site name;
4. Date and time received ;
5. Temperature of Cooler or samples and Turnaround time for the Work Order;
6. Analytical tests to be performed;
7. Shipping method and tracking number if applicable
8. Any comments/notes regarding the Work Order and any irregularities included in conditions are checked;
9. Each sample in the Work Order is assigned its own Work Order sample ID # by DataElement which is used to track the sample discretely;
10. Each individual sample will be assigned a sample ID number which is the Work Order number (see 1. above) followed by a consecutive number, separated by a hyphen (e.g. ---01, -02, etc.);
11. Sample description, matrix, date and time sampled, number and size of containers along with any preservation if applicable are noted; *Sampled by* and *analysis required* are entered along with any sample comments that are only applicable to that individual sample or container.

Labels are then printed for each container for each sample in the Work Order and the labels are affixed to the appropriate container associated with each of the samples. The sample containers are then placed into a sample storage refrigerator or room temperature storage area until the time of analysis. Radiochemistry samples not requiring cooling are stored in the Radiochemistry Lab Sample Storage Area. The Work Order number is then recorded onto the COC and the sample numbers are also recorded on the COC adjacent to the corresponding client or site sample location or description for tracking purposes. The COC is then scanned and incorporated into the Work Order. It can then be reviewed by all laboratory personnel in the COC field of DataElement. The Work Order is printed and the printout is then attached to the white copy of the COC.

NOTE: For radiochemistry samples, only personnel designated by the RSO are allowed to handle the samples. This includes sample inventory, labeling and storage. The Sample Custodian will only receive the COC for logging the samples into the LIMS database.

The COC and Work Order printout are then submitted to the Data Coordinator for reporting and filing.

The Element DataSystem LIMS system will be used to track the samples and all the data generated from the analytical tests performed on these samples throughout the analytical process. Each analytical section has access to the LIMS system and, on a daily basis, they generate a backlog report that shows them which samples require what analyses, when the results are due and when the sample holding time expires. The backlog report is then used by the technicians and/or analysts, in conjunction with the Extraction Lab Supervisor, Radiochemistry Analyst and/or RLM, and/or Assistant Lab Director to prioritize sample extraction and analysis.

When an analysis on a sample has been completed, the analyst will enter the results, either manually or by automatic computer file transfer using DataTool, into the LIMS system under the appropriate batch, sequence or Work Order number for that sample. The data is then submitted to the QA/QC Department for review.

3.5 Sample Disposal

Unless specifically requested by the client, samples are usually held for 30 days after the issuance of the final report. The prospect of additional analyses on a sample must be viewed in the context of the recommended holding times.

Sample disposal occurs in one of two ways. The samples will either be sent back to the point of origination (i.e.,client or site) or eliminated as waste. Samples that are returned to the point of origin will be packed securely in a cooler. A list of Work Order numbers contained within the cooler will be generated, signed and dated by the Sample Custodian or RLM. A photocopy of the signed and dated list will be placed in the cooler and the cooler shipped back to the site. The original copy will be placed into the Sample Custodian's or RLM's disposal file. The date of return will be noted for each sample in the Sample Disposal Logbook

Samples which are eliminated as waste will be disposed of in appropriate, clearly labeled waste containers, based on the samples' matrix and the characteristics and properties of the waste. These characteristics and properties will be determined by a review of the analytical data and history of the samples. Care must be exercised in sample disposal so chemically incompatible wastes are not mixed together. Each disposal container is labeled to identify, in general terms, the type of material that was placed in each container. When disposal is complete, the person disposing of the containers will sign and date the drum labels. Samples that were found to be innocuous will be disposed of as either non-hazardous waste, or if aqueous, by pouring down the

drain. When a sample is disposed the date of laboratory disposal will be recorded in the Sample Disposal Log Book.

3.6 Sample Security

In order to maintain the integrity and validity of the sample(s) within the laboratory, all samples are maintained under locked storage or in limited access areas under the jurisdiction of the Sample Custodian and/or Radiochemistry Lab Manager. Release of samples to laboratory personnel necessitates internal chain of custody procedures. Internal chain-of-custody is tracked by the Sample Custodian via a notebook. Entered into the notebook is WST sample ID number, the date and time the sample is relinquished, the name of the person to whom the sample was given(responsible party), the date and time the sample is returned, and the Sample Custodian's initials. The responsible party is required to maintain the sample(s) in their physical possession or view at all times. The Sample Custodian, Assistant Lab Director, or QA/QC Officer may confiscate unattended samples, return them to storage, notify the appropriate supervisor, and reprimand the responsible party. Since radiological samples are stored in the Radiochemistry Lab Storage Area, they do not need to be logged in and out, but are required to be stored in the same designated area when not being manipulated or used.

CHAIN OF CUSTODY

REPORT TO

CONTACT

PH. # ( )

FAX # ( )

BILL TO:

PO#

PROJECT DESCRIPTION

SAMPLER SIGNATURE

TECHNOLOGY

Waste Stream Technology Inc.
302 Grote Street, Buffalo, NY 14207
(716) 876-5290 • FAX (716) 876-2412

GROUP # _____

DUE DATE _____

TURN AROUND TIME: _____

QUOTATION NUMBER: _____

ARE SPECIAL DETECTION LIMITS REQUIRED:
YES NO
If yes please attach requirements.

Is a QC Package required:
YES NO
If yes please attach requirements

DW DRINKING WATER
GW GROUND WATER
SW SURFACE WATER
WW WASTE WATER
O OIL
SL SLUDGE
SO SOIL
S SOLID
W WIPE
OTHER

ANALYSES TO BE PERFORMED

	SAMPLE I.D.	DATE SAMPLED	TIME OF SAMPLING	SAMPLE TYPE	TOTAL NO. OF CONTAINERS											TYPE OF CONTAINER/ COMMENTS:	OFFICE USE ONLY WST. I.D.
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

REMARKS:

RELINQUISHED BY:	DATE: / /	TIME:	RECEIVED BY:	DATE: / /	TIME:
RELINQUISHED BY:	DATE: / /	TIME:	RECEIVED BY:	DATE: / /	TIME:

Figure 3-1

Figure 3-2

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc.
302 Grote Street
Buffalo, NY 14207

ANALYTICAL SERVICES REQUEST FORM

Request Taken By _____ Date Requested _____

Client _____ Telephone _____

Client Contact _____ Fax _____

Address _____

_____

Start Date _____ P.O. # _____

Lab/P.O. #	Number of Samples	Matrix	Analytical Parameters	Turnaround Time (Days)	Quoted Price

Sample Containers Required?

_____ NO _____ YES (Please Complete Sample Container Request Form)

Special Instructions _____

Laboratory Use Only: Sample Group # _____

Figure 3-3

WASTE STREAM TECHNOLOGY INC.
SAMPLE CONTAINER REQUEST FORM

Requested by: _____ Date requested: _____

Job number: _____

Shipping address: _____

_____

_____

Attention to: _____

Date needed by: _____

Amount	Type	Size	Preservation	Analytic Test	Expected Sampling date

Type: Glass or HDPE

WST received: _____

Date sent/initials: _____

Courier/Shipping No.: _____

Figure 3-4

WORK ORDER

Printed: 10/20/2004 8:45:48

4J20001

Waste Stream Technology Inc.

Client: [redacted]
Project: Daily Samples

Project Manager: Dan Vollmer
Project Number: [redacted]

Report To:
[redacted]
Phone: [redacted]
Fax: [redacted]

Invoice To:
[redacted]
Phone : [redacted]
Fax: [redacted]

Date Due:	10/25/04 17:00 (3 day TAT)	Date Received:	10/20/04 07:50
Received By:	Kevin Burke	Date Logged In:	10/20/04 08:41
Logged In By:	Kevin Burke	Tracking No.:	
Shipped By:	Lab Pick-up	Samples Received at:	17°C

Temp > 6.0	No	Sample container received broken	No
Preserved sample volume pH out of ran	No	Sample label incomplete/did not match COC	No
Number of containers did not match CC	No	Geiger counter detected radioactivity	No
Cyanide interference check positive	No	Insufficient volume received to run all analyse	No
Bubbles present in VOA container	No	COC not signed/filled out properly/sealed & t	No
Custody seals not present/intact/signed	No		

Analysis	Due	TAT	Expires	Comments
4J20001-01 UO 28462-5 [Oil] Sampled 10/19/04 00:00 Eastern				
PCBs by 8082	10/20/04 16:00	0	11/02/04 00:00	
4J20001-02 UO 28462-8 [Oil] Sampled 10/19/04 00:00 Eastern				
PCBs by 8082	10/20/04 16:00	0	11/02/04 00:00	
4J20001-03 SE 28594 [Oil] Sampled 10/19/04 00:00 Eastern				
PCBs by 8082	10/20/04 16:00	0	11/02/04 00:00	
4J20001-04 SE 28595 [Oil] Sampled 10/19/04 00:00 Eastern				
PCBs by 8082	10/20/04 16:00	0	11/02/04 00:00	
4J20001-05 SE 28596 [Oil] Sampled 10/19/04 00:00 Eastern				
PCBs by 8082	10/20/04 16:00	0	11/02/04 00:00	
4J20001-06 CO 28587 [Oil] Sampled 10/19/04 00:00 Eastern				
PCBs by 8082	10/25/04 15:00	3	11/02/04 00:00	

pH Check:

K. Burke — Review 1 By
10/20/04 — Date
AH — Review 2 By

FIGURE 3-5

Army Corp. of Engineers Sample Receipt Form

LIMS # _____ No. of Coolers _____

MRD Cooler # _____ Contract Cooler _____

PROJECT: _____ Date Received: _____

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened:
by (sign): _____ (print): _____

1. Did cooler come with shipping slip (airbill ect): YES NO
   If yes enter carrier name & airbill number here: _____
2. Were custody seals on outside of cooler? YES NO
   How many, where, date, time: _____
3. Were custody seals unbroken and intact at the date and time of arrival? YES NO
4. Did you screen samples for radioactivity using a Geiger counter? YES NO
5. Were custody papers sealed in a plastic bag & taped inside to the lid? YES NO
6. Were custody papers filled out properly (ink, signed, act)? YES NO
7. Did you sign the custody papers in the appropriate places? YES NO
8. Was project identifiable from the custody forms? YES NO
   If YES, enter project name at the top of this form.
9. If required, was enough ice used? Type: YES NO
10. Have designated person initial here to acknowledge receipt of cooler: _____ (date) _____

B. *LOG-IN PHASE: Date samples were logged-in:*
by (sign): _____ (print): _____

11. Describe type of packing in cooler: _____
12. Were all bottles sealed in separate plastic bags? YES NO
13. Did all bottles arrive unbroken and were labels in good condition? YES NO
14. Were all labels complete(ID, date, time, signature, preservation)? YES NO
15. Did all bottle labels agree with custody papers? YES NO
16. Were correct containers used for the tests indicated? YES NO
17. Were correct preservatives added to samples? YES NO
18. Was a sufficient amount of sample sent for tests indicated? YES NO
19. Were bubbles absent in VOA samples? If NO, list by sample #: YES NO
20. Was the project manager called and status discussed? YES NO
    If YES, give details on the back of this form.
21. Who was called? _____ Date: _____
    By whom? _____

WASTE STREAM TECHNOLOGY

Radioactive Material Shipment Receipt Inspection Form

Receipt	Print Name	Initial	Date Time	Reviewed & Approved
Shipper Site and Sender Name				
Shipping Papers Carrier, Method, and ID	Carrier	Method	ID	
Label on Package		Isotope(s) and Activity		
Inspection Outer	Acceptable	Yes	No	Damage Noted
Type of Package Identify type used		Type of Packaging Identify materials used		
Inspection Inner	Acceptable	Yes	No	Damage Noted

Contents (Number per Matrix)	SO	AF	BA	GW	DW	S	Other

Radiation Survey
Survey to be done within 3 hrs of receipt

Survey meter	E600	E600	ASP2		XLB5	GA/GB- STF and Batch No.	
Serial No.	1698	1699	0526				
Calibration √ OK							
Daily √ OK							

Shipment and Packing Materials Survey Results
Attach Survey Map and/or Activity Report as needed

Record Actual Reading OR α <220, βγ <1000, <0.05mR		Outer Shipping Package Survey Results Record the highest reading. ANY result above stated limits requires documentation with a survey map.				Inner Shipping Package Survey Results Record the highest reading. ANY result above stated limits requires documentation with a survey map. Highest Readings off ANY ONE inner Package			
Results	BKGD.	@ 1 m	TOP	SIDE	BOTTOM	Results	TOP	SIDE	BOTTOM
mR/hr						mR/hr			
dpm α / 100cm²						dpm α / 100cm²			
dpm βγ / 100cm²						dpm βγ / 100cm²			

Material	mR/hr	dpm α / 100cm²	dpm βγ / 100cm²	Disposition
Package Container				
Plastic Bag (COC bag)				
Packing Material				

Notifications

CRITERIA: Radiation level @ 1 meter ≥10 mRem/hr; Radiation level on contact ≥ 200 mRem/hr; Removable Alpha/Uranium series contamination ≥ 220 dpm /100 cm²; Removable Beta/Gamma contamination ≥ 2200 dpm /100 cm²	IF Yes to ANY notification CRITERIA, THEN Contact NYSDOL RHU – (518) 457-1202 and as directed US DOT (800) 424-8802 Contact appropriate Carrier FedEx (800/ 463-3339) UPS (800/744-7877)]
CRITERIA: Radiation or contamination levels exceed DOT labeling requirements.	IF Yes to ANY notification CRITERIA, THEN Contact Site Shipping Coordinator

Notification Required	Y / N	Notification By	Contact Person /Organization / Date and Time
Remarks			

Table 3-1.1

RECOMMENDATION FOR SAMPLING AND PRESERVATION OF SAMPLES ACCORDING TO MEASUREMENT[1]

Measurement	Vol. Req. (ml)	Container[2]	Preservative[3,4]	Holding Time[5]
100 Physical Properties				
Color	50	P,G	Cool, 4°C	48 Hrs.
Conductance	100	P,G	Cool, 4°C	28 Days
Hardness	100	P,G	HNO_3 to pH < 2	6 Mos.
Odor	200	G only	Cool, 4°C	24 Hrs.
pH	25	P,G	None Req.	Analyze Immediately
Residue				
Filterable	100	P,G	Cool, 4°C	7 Days
Non-Filterable	100	P,G	Cool, 4°C	7 Days
Total	100	P,G	Cool, 4°C	7 Days
Volatile	100	P,G	Cool, 4°C	7 Days
Settleable Matter	1000	P,G	Cool, 4°C	48 Hrs.
Temperature	1000	P,G	None Req.	Analyze Immediately
Turbidity	100	P,G	Cool, 4°C	48 Hrs.
200 Metals				
Dissolved	200	P,G	Filter on site HNO_3 to pH < 2	6 Mos.
Suspended	200		Filter on site	6 Mos.[18]
Total	100	P,G	HNO_3 to pH < 2	6 Mos.

Table 3-1.2

Measurement	Vol. Req. (ml)	Container[2]	Preservative[3,4]	Holding Time[5]
Chromium^{+6}	200	P,G	Cool, 4°C	24 Hrs.
Mercury Dissolved	100	P,G	Filter HNO_3 to pH < 2	28 Days
Total	100	P,G	HNO_3 to pH < 2	28 Days
300 Inorganics, Non-Metallics				
Acidity	100	P,G	Cool, 4°C	14 Days
Alkalinity	100	P,G	Cool, 4°C	14 Days
Bromide	100	P,G	None Req.	28 Days
Chloride	50	P,G	None Req.	28 Days
Chlorine	200	P,G	None Req.	Analyze Immediately
Cyanides	500	P,G	Cool, 4°C NaOH to pH >12 0.6g ascorbic acid[6]	14 Days[7]
Fluoride	300	P,G	None Req.	28 Days
Iodide	100	P,G	Cool, 4°C	24 Hrs.
Nitrogen				
Ammonia	400	P,G	Cool, 4°C H_2SO_4 to pH < 2	28 Days
Kjeldahl, Total	500	P,G	Cool, 4°C H_2SO_4 to pH < 2	28 Days
Nitrate plus Nitrite	100	P,G	Cool, 4°C H_2SO_4 to pH < 2	28 Days
Nitrate[9]	100	P,G	Cool, 4°C	48 Hrs.
Nitrite	50	P,G	Cool, 4°C	48 Hrs.

Table 3-1.3

Measurement	Vol. Req. (ml)	Container[2]	Preservative[3,4]	Holding Time[5]
Dissolved Oxygen				
Probe	300	G bottle and top	None Req.	Analyze Immediately
Winkler	300	G bottle and top	Fix on site and store in dark	8 Hours
Phosphorus				
Ortho-phosphate, Dissolved	50	P,G	Filter on site Cool, 4°C	48 Hrs.
Hydrolyzable	50	P,G	Cool, 4°C H_2SO_4 to pH < 2	28 Days
Total	50	P,G	Cool, 4°C H_2SO_4 to pH < 2	28 Days
Total, Dissolved	50	P,G	Filter on site Cool, 4°C H_2SO_4 to pH < 2	24 Hrs.
Silica	50	P only	Cool, 4°C	28 Days
Sulfate	50	P,G	Cool, 4°C	28 Days
Sulfide	500	P,G	Cool, 4°C add 2 ml zinc acetate plus NaOH to pH >9	7 Days
Sulfite	50	P,G	None Req.	Analyze Immediately
400 Organics				
BOD	1000	P,G	Cool, 4°C	48 Hrs.
COD	50	P,G	Cool, 4°C H_2SO_4 to pH < 2	28 Days
Oil & Grease	1000	G only	Cool, 4°C H_2SO_4 to pH < 2	28 Days
Organic carbon	25	P,G	Cool, 4°C H_2SO_4 or HCl to pH < 2	28 Days
Phenolics	500	G only	Cool, 4°C H_2SO_4 to pH <2	28 Days

Table 1

SAMPLE CONTAINERS / PRESERVATIVES / HOLDING TIMES FOR WATER & SOLID / WASTE SAMPLES

ANALYSIS	SAMPLE VOLUME/CONTAINER	HOLDING TIME	PRESERVATIVE
VOCs			
water	2, 40 mL GT	14 days (d) to Analysis	Cool 4° C. Aqueous samples for Aromatic compounds, HCl to pH < 2. Aqueous samples for 524.2, 0.25mg ascorbic acid, then HCl to pH < 2.
soil	2, 2 oz GT or 2, 5g Encore Sampler	14 d, 48 hours for Encore transfers	
soil	2, 5g in 40 mL w/Sodium Bisulfate*	14 d to Analysis	
TCLP	2, 4 oz GT	14 d to TCLP Extraction; 14 d to Analysis	
SVOCs			
water	1, 1 L AG	7d Extraction; 40d to Analysis	Cool 4° C. (10% thiosulfate for water samples with residual cholrine)
soil	1, 8 oz G	14d Extaction; 40d to Analysis	
TCLP	1, 16 oz G	14d to TCLP; 7d to prep Extraction; 40d to Analysis	
Metals			
water	1, 500 mL P	180d to Extraction	Cool 4° C. (HNO_3 pH < 2 for Aqueous)
soil	1, 16 oz P,G	180d to Extraction	
TCLP	1, 16 oz P,G	180d to Extraction; 180d to Analysis	
Mercury - Water	1, 500 mL P,G	28d to Analysis	Cool 4° C. (HNO_3 pH < 2 for Aqueous)
Mercury - Soil	1, 16 oz P,G	28d to Analysis	
Mercury - TCLP		28d to Extraction; 28d to Analysis	
Chromium VI - Water	500 mL P	24 hours	Cool 4° C.
Chromium VI - Soil	1, 16 oz P,G	14d to Alkaline Digestion, 24 hours to Anal	
PCBs			
water	1, 1 L AG	7d to Extraction; 40d to Analysis	Cool 4° C (water & soil only)
soil; oil; wipes	1, 8 oz G; 1, 1oz; 1, wipe	14d to Extraction; 40d to Analysis	
Pesticides			
water	1, 1 L AG	7d Extraction; 40d Anal	Cool 4° C. pH 5-9, (0.008% $Na_2S_2O_3$ for Aqueous samples with residual chlorine)
soil	1, 8 oz G	14d Extraction; 40d Anal	
TCLP	1, 16 oz G	14d TCLP; 7d prep Extraction; 40d to Anal	
Herbicides			
water	1, 1 L AG	7d Extraction; 40d Anal	Cool 4° C. (0.008% $Na_2S_2O_3$ for Aqueous samples with residual chlorine)
soil	1, 8 oz G	14d Extraction; 40d Anal	
TCLP	1, 16 oz G	14 TCLP; 7d prep Extraction; 40d to Anal	
RCRA Char			
Ignitability	1, 16 oz P,G	7 d	
Corrosivity, pH	1, 16 oz P,G	14 d	Cool 4° C.
Reactivity	1, 8 oz P,G	7 d	

G = Clear Glass; AG = Amber Glass; P = Plastic; T = Teflon Lined Lid/SEPTA

*For soil VOCs collected in Encore samplers or preserved vials, two additional 2 oz jars should be collected for dry weight determination and in case the sample requires methanol extraction.

ANALYTICAL PROCEDURES

4.1 Statement of Procedures

All analyses performed at Waste Stream Technology Inc. are approved methods taken from the following sources: (A complete listing of reference methods is found in Table 4-4).

EPA-600/4-79-020, "Method for Chemical Analyses of Water and Wastes", Revised March 1983.

Federal Register, EPA 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act", Revised July, 1991.

Federal Register, EPA 40 CFR Part 268, Appendix I, Revised June 1990.

EPA SW-846, "Test Methods for Evaluating Solid Wastes", 3rd Edition, through Update III, December, 1996.

Standard Methods for the Examination of Water and Wastewater, 20th edition.

HASL-300, 28th Edition, Feb. 97, Environmental Measurements Laboratory, US Department of Energy

Radiochemical Analytical Procedures for Analysis of Environmental Samples, EMSL LV053917, Mar. 97, Environmental Monitoring and Support Laboratory, US Environmental Protection Agency

Prescribed Procedures for Measurement of Radioactivity in Drinking Water, EPA-600 4-80-032, Aug. 80, Environmental Monitoring and Support Laboratory, US Environmental Protection Agency

Radiochemistry Procedures Manual, EPA 520/5-84-006, Jun. 84, Eastern Environmental Radiation Facility, US Environmental Protection Agency

Appendix 5 contains copies of the certifications currently held by the laboratory along with the list of methods under which the laboratory performs its accredited testing.

4.2 Quality Assurance Objectives

The objective of the Quality Assurance and Quality Control plan at the WST laboratory is to generate analytical data of known, documented quality that is in compliance with established regulatory guidelines and protocols. This is accomplished through

a system of statistical measurement and documentation of accuracy, precision, and comparability of each analytical assay performed. These three parameters are established through a Quality Control (QC) program, a system of operations undertaken in the laboratory to ensure that the data produced is generated within known probability limits of accuracy and precision, and a Quality Assurance (QA) program, a system whereby the laboratory can assure clients, government agencies, and accrediting bodies, that the laboratory is generating data of proven and known quality. The latter system is accomplished through the QC program, by the analysis of external quality control and proficiency test samples, through the use of accepted analytical testing procedures and through external laboratory audits.

4.2.1 Accuracy

By definition, accuracy measures the ability of an analytical procedure to determine the true concentration of one or more constituents in a sample matrix. Initially, accuracy is determined by the analysis of a minimum of four laboratory control samples, blank samples which have been spiked with a known concentration of a reference standard. This standard contains all the analytes appropriate to the analytical procedure and will be prepared from a source which is independent from the source used to prepare the calibration standards. The four laboratory control samples are taken through each step of the entire analytical procedure. The spiked analytes are then recovered during analysis and the mean and standard deviation of the four recoveries for each analyte are calculated and compared to the accuracy limits published in the associated U.S. Environmental Protection Agency (EPA) method.

When the accuracy of the recoveries of each constituent of the analytical procedure have met the EPA criteria, accuracy will continue to be assessed by the analysis of one laboratory control sample for every ten samples analyzed. When a total of twenty laboratory control samples have been analyzed, the mean (X) and standard deviation (SD) of the percent recoveries of each analyte will be calculated and the upper and lower warning and control limits determined by:

Upper Warning Limit = X + 2SD
Upper Control Limit = X + 3SD

Lower Warning Limit = X - 2SD
Lower Control Limit = X - 3SD

All subsequent laboratory control sample analyses of will then be compared to the upper and lower control limits to track the accuracy of the procedure (See Figure 4-1 for Accuracy Control Chart).

4.2.2 Precision

By definition, precision is a measure of the ability of an analytical procedure to reproduce data. Precision differs from accuracy in that an analytical procedure can generate reproducible data yet still be inaccurate. Therefore, both accuracy and precision need to be assessed as singular entities. The precision of a procedure is determined by comparison of results from duplicate sample analyses (or matrix spike and matrix spike duplicate sample analyses). One sample per every ten samples (or for MS and MSD samples one per twenty) will be analyzed in duplicate and the relative percent difference (RPD) from the duplicate analyses will be calculated for each analyte measured by the procedure. When twenty RPD's for each analyte have been calculated, the mean of the twenty RPD's will be used to develop the precision limits for each analyte. The precision warning and control limits are calculated using the average RPD times 2.456 and 3.270, respectively. Subsequent duplicate analyses will then be assessed for acceptability based on these precision warning and control limits. (Figure 4-2; Precision Control Chart).

It should be noted that accuracy and precision are determined using the entire analytical procedure including extraction of the analytes from the sample matrix. Many methods use the same mode of analysis but have multiple extraction procedures depending on the matrix and/or the concentration of the analytes expected to be found in the matrix. In these cases, accuracy and precision must be established for each type of extraction procedure.

4.2.3 Comparability

Analytical results of the tests on a given compound must be comparable to test results performed by a different laboratory on like compounds. To obtain this goal, precision and accuracy of each analytical procedure must be compared to and fall within the acceptable limits prescribed by the EPA in their methodologies and protocols.

Comparability is also accomplished through that analysis of external QC samples and proficiency test samples, since the results from the analyses of these samples are assessed through inter-laboratory comparison.

4.2.4 Completeness

Completeness is a measure of the amount of data obtained from an analytical system compared to the total amount expected to be obtained under normal conditions. A ninety-five percent completeness figure is usually required for a particular analysis and overall project objective.

4.2.5 Reagents, Solvents, Water Glassware, and Gases

All reagents used within the laboratory for sample and standard preparation meet the American Chemical Society (analytical reagent grade) standards or better, if the procedure requires a higher grade of purity. Solvents used for sample extraction and standard preparation are of gas chromatographic quality. All chemicals, when received by the laboratory, will be labeled with the date of receipt, the date the container was opened and the initials of who opened it. A chemical logbook is maintained which lists the reagent, source, lot number, and date in service.

Reagents, when prepared, will be logged into the Element DataSystem (DataElement) which will assign an ID number to the reagent. The reagent bottle will then be labeled as to the date of preparation and expiration, the composition and concentration of the reagent, the reagent ID number and the initials of the preparer. In addition to analyzing reagent and method blanks to check for reagent and solvent contamination, reagents and solvents are continuously observed for signs of degradation such as change of color, precipitation, or mold formation.

All water used in the laboratory for preparation of reagents and rinsing of glassware is ASTM Type II water. This is produced by passing tap water through two mixed bed deionization tanks and then passing the deionized water upward through a high capacity activated carbon filter. In addition, 18 megaohm water is produced through a Milli-Q high purity water system. The conductivity of this system is measured and recorded daily.

Disposable glassware will be used whenever possible within an analytical procedure to reduce the possibility of sample cross-contamination. When non-disposable glassware is used, it will be thoroughly cleaned and baked using a cleaning protocol established by WST (refer to WST Standard Operating Procedure M-CLEAN-01-XX).

Gases which are used in sample concentration and gas chromatography analyses are of high and ultrahigh purity and they are further purified by the use of in-line gas filtration units.

4.3 Quality Assurance and Quality Control

4.3.1 Standard Preparation

Every assay will require, at a minimum, a calibration standard or a quality control check standard. Other analyses will require initial calibration, continuing calibration and laboratory control sample standards, and still others will also require matrix spike, surrogate and internal standards.

A calibration standard is made by the appropriate dilution of a pure substance, the purity of which is traceable to a primary standard. Because of the high sensitivity of many analytical instruments, the calibration standard is an extremely dilute version of the pure compound. Because of the high dilution required, in order to be within the linear range of the instrument, the preparation of the calibration standard is frequently made by serial dilution rather than in a single step. In order to provide standard solutions at sufficiently low concentrations, a minuscule amount of the pure substance will be required, the measurement of which is subject to extreme error. Thus, it is preferable to deal with dilution errors, rather than with the large error associated with the measurement of a small amount of pure substance.

The initial pure standard is usually obtained as either a pure material or already in solution prepared as a certified solution of a given concentration of the pure compound or compounds. In preparing stock solutions and working solutions of the calibration standard, great care must be exercised in measuring weights and volumes as accurately as possible, since all analyses following the calibration will be based on the accuracy of the calibration, and the accuracy of any subsequent data ultimately cannot be any better than that of the calibration curve.

Each standard also has a definite lifetime in which it can be used. Standard holding times are listed in Table 4-1 and it is the responsibility of the analyst to assure that all standards used are within the standard solution holding time. It should be noted, however, that the holding times for stock standard solutions should only be used as a guide and that in preparing or using working standard solutions, the analyst must compare each standard run with the previous standard runs to assure that response factors fall within the historically accepted range.

For each standard solution that is received or prepared, accurate records will be kept in DataElement so that traceability can be maintained. DataElement will assign an ID number to each standard that is entered. For vendor prepared solutions the following information will be entered into DataElement:

1. Description of Standard
2. Date of preparation
3. Date of expiration (See holding time guide)
4. The name of each compound in the standard and the concentration of each compound in the standard
5. The solvent the standard is in
6. The volume of the standard received and, if multiple containers of the same lot are received, the number of containers (# of vials)
7. The concentration units of the standard
8. For vendor prepared standards, the lot number and catalog number of the standard should be entered into the comment section along with the name of the vendor.
9. Each container should then be labeled with the DataElement assigned ID number.

When preparing secondary stock or working solutions (e.g., calibration, continuing calibration, matrix spike, and surrogate standards) it will be the analyst's responsibility to make sure the Primary Stock solution is still viable (DataElement will automatically flag expired standards). The preparation of these standards will also be entered into DataElement. DataElement will assign an ID number to each standard that is entered. The following information will be recorded:

1. Description of the standard
2. Date of preparation
3. Date of expiration
4. Standard identification number of the primary or secondary stock standard used to prepare the working standard and the volume of standard used.
5. Final volume of the diluted standard
6. Name and lot number of the solvent used to prepare the diluted standard
7. Final concentration of each compound in the diluted standard (automatically calculated by DataElement)
8. Name of the analyst preparing the standard.

The standard container must then be labeled with the assigned ID number, the standard description, the preparation date, expiration date and the name of the preparation solvent.

All standards and standard solutions will be maintained in appropriate containers as stated in the method SOP.

Standards and standard solutions will typically be stored in the refrigerator at 4°C, or freezer at -10°C. However, specific storage details will be listed in the SOP for the analysis in which the standard is to be used (e.g. standards for metal analysis, including radioisotopes, are stored at room

temperature). Standards and standard solutions will also be stored in an area not used for storage of samples and sample extracts to prevent any possibility of cross-contamination.

4.3.2 Determination of Detection and Quantitation Limits

Most of the assays employed by WST require knowledge of detection limits in order to be able to bracket analytical results that are obtained. Several such limits exist, and since these limits can be defined in various ways, the definition and determination which we will use is given below.

4.3.2.1 Instrument Detection Limit

In simple terms, the instrument detection limit (IDL) is the smallest quantity of material the instrument can reliably detect. The manner in which the IDL is determined is instrument dependent. For GC and GC/MS analyses, the IDL is determined by the analysis of seven replicate standards at a concentration of 3 times to 5 times a concentration that yields a definitive, measurable signal. The IDL is calculated by multiplying by 3, the standard deviation obtained from the seven replicate measurements.

For ICP analysis, the IDL is the concentration equivalent to the analyte signal which is equal to 3 times the standard deviation of a series of ten replicate measurements of the calibration blank signal at the same wavelength. The calculation for standard deviation is shown below:

$$SD = \text{Square Root of } \frac{\Sigma\,[\,x\,(i) - X\,(m)]^2}{(n-1)}$$

where, x (i) = The value of the i'th reading of the set of replicate measurements

X (m) = The mean value of the replicates

n = The number of replicate measurements

The mean, X (m), is determined as follows:

$$X\,(m) = \frac{\Sigma\,x\,(i)}{n}$$

For radiochemical parameters, detection limits will be determined according to EPA Method 600/4-80-032 (NIPDWR). Detection limits may also be conducted according to the Nuclear Regulatory Commission (NRC) Method 4.14 or American National Standard

Institute (ANSI) 13.30.

In order for the results to be useful, the standard chosen to obtain the detection limit should be such that the mean of its reading, X (m), is slightly greater than 3SD. This may require some trial and error initially when an IDL is determined for the first time on an instrument.

Although the determination of IDLs in not a requirement, IDL determinations may be desirable when the instrument is initially set up for analysis or if the instrument has undergone extensive maintenance. Records of performing the IDL will be maintained in the analysis notebook.

4.3.2.2 Method Detection Limit

The method detection limit is obtained in a manner very similar to that of the IDL. The principle difference is that in determining the method detection limit (MDL), the analyte(s) is subjected to the entire analytical protocol for the specific method that is being employed. This includes every step, from extraction to final analysis.

To determine the MDL, seven replicates of the appropriate volume of Type II water or, for soils, a clean solid matrix are spiked with a known amount of the analyte(s). The amount that is being added is the same for all seven replicates, and should be at least one to five times the estimated MDL for reagent water matrix and one to ten times the estimated MDL for clean solid sample matrices. The seven replicates are subject to the same extraction and analytical procedures as a sample would be, and the concentrations of the analytes of interest are measured. The MDL is defined as the standard deviation of seven readings multiplied by the student t-test at a 99%, single-sided confidence interval (t99) using n-1 degrees of freedom (df). The calculation of the MDL should be done using the same units as would be reported for a sample.

The equation that applies to the calculation of the MDL is:

$$MDL = SD\ (t99[1\text{-sided}]; df=6);\ \text{or}\ SD \times 3.143$$

where;

MDL = Method detection limit, in units of weight/volume or weight/weight (i.e., µg/L or µg/kg). Refer to 40 CFR, Part 136, Appendix B.

SD = The standard deviation of the seven readings from the mean, in units of weight or concentration

The validity of the MDL determination is verified per CFR

Requirements by comparing the analyte values to the calculated MDL. If the analyte values are below the calculated MDL or greater than ten (10) times the calculated MDL, an unacceptable bias may be introduced and the MDL cannot be reported.

The method detection limit will be determined for all analytes associated with the method prior to the analyses of samples by the method and again on an annual basis. Alternatively, the MDLs can then be verified on a quarterly basis through the analysis of a 2 time MDL check sample. This sample is taken through the same process as the initial MDL samples. If the analytes in the 2 times MDL check sample are detected, the MDLs are considered verified. The MDL study will need to be repeated if the analytes in the 2 times MDL check sample are not detected. A 2 times MDL check sample should also be analyzed immediately after an instrument undergoes a major repair or modification. If the analytes in the 2 times MDL check sample are detected, there is no need to perform a new MDL study.

However, if the sample preparation or extraction method is modified, the method detection limits must be determined through a complete MDL study.

4.3.2.3 Method Reporting (Quantitation) Limits

The method reporting (quantitation) limit (MRL) is defined as the concentration of the lowest initial calibration standard. The low standard concentration should be three to five times the MDL for water matrices or five to ten times the MDL for solid matrices.

4.3.2.4 Documentation of Detection Limits

Whenever IDLs, and MDLs are determined, the results will be maintained by the analyst based on the method used for determining the analytes of interest. The detection limit spreadsheet must include the analysis and preparation method references, the name of the associated laboratory SOP, preparation and analysis dates, the applicable matrix, the concentration used for the MDL study, the type of detection limit (IDL or MDL), the result obtained for each analyte in terms of

concentration units for each of the seven MDL samples, the average, standard deviation, and calculated MDL, the student t value used, and the name of the analyst who performed the determination.

A copy of all detection limit determinations will also be submitted to the QA/QC Department for review and approval.

4.3.2.5 Minimum Detectable Activity (Radiochemistry Analyses)

Minimum Detectable Activity (MDA) is the lowest amount of activity/specific activity within a given confidence level that can be assuredly measured by the counting system based on the parameters of background count rate, sample count rate, length of counting time, chemical yield, and mass of the sample. The applied MDA for each analysis is set at 10% of the action level of the analysis at a minimum. This is an internally applied level. Guidelines from the US DOE and US NRC set MDA at a range of 10% to 50% of determined measurement objectives. Essentially, the longer the counting time the lower the MDA, with diminishing returns. As deemed necessary the client, after discussion with the RLM, may set the MDA applied.

The operating programs of the counting systems employed perform the required calculation of the MDA. The technician/analyst enters the sample size (mass). Yield is applied as detected from the pre-identified Region of Interest for an internal tracer for Thorium and Uranium analyses. Yield is applied to the MDA by spreadsheet calculation for Ra226/228. The applied MDA conforms to the general guidelines set by the Nuclear Regulatory Commission (US NRC). In gamma spectrometry analyses, compensation is made for moisture content, soil density, and Z-number of soil samples.

4.3.3 Instrument Calibration

Instrument and equipment calibration must be rigorously and routinely performed in order to provide reasonable assurances that the data generated is valid and acceptable.

Three principle types of calibration are performed. The first is initial calibration, which determines the linear range of the instrument and its response factor. The second is initial calibration verification which verifies the initial calibration response factors through the analysis of a standard prepared from an independent source. The third is continuing calibration, which serves, during the course of running samples, to ascertain that the instrument calibration has not drifted unacceptably. The frequencies of performing the initial and continuing calibrations

are listed in Table 4-2. The calibration verification only needs to be performed after an initial calibration is performed. In addition, laboratory control samples, or reference samples, are run on a routine basis for additional verification as indicated in Table 4-5.

4.3.3.1 Initial Calibration

All instrumental methods of analysis are subjected to an initial calibration, consisting of the measurement a minimum of 5 different standard solutions of the analytes of interest. The standard solution of the lowest concentration should have a concentration of the analytes of interest at 3 to 5 times the concentration that corresponds to the MDL; and the standard solution of the highest concentration should have a concentration of the analytes of interest at or near the upper end of the linear range of the detector.

In performing the analyses of standards to determine the response factor and linear range, the standard solutions are prepared as mentioned in Section 4.3.1, and the surrogates and internal standards are added to them when appropriate. This information must be documented in the analysis records and placed in the method file for future reference. Listed should be working standard ID numbers used for calibration, the date the calibration was performed, and the name of the analyst performing the calibration.

When the standard analyses are completed, the calibration curve of each analyte is generated either one of two ways. For GC/MS analyses, the response factor (RF) for each calibration level is determined as follows;

$$RF = (A_x C_{is}) / (A_{is} C_x)$$

where:
A_x = area of compound being measured
A_{is} = area of specific internal standard
C_x = concentration of compound being measured
C_{is} = concentration of specific internal standard

The average response factor (RF_{avg}) and the standard deviation of the response factors is then calculated and the percent relative standard deviation (%RSD) is determined by:

$$\%RSD = \frac{SD}{RF_{avg}} \times 100$$

If the %RSD falls within the criteria specified in the method, then the curve is considered linear and the average response factor can be used to quantitate results.

All other instrument calibration curves are generated using a straight line linear regression equation in the form: $y = mx + b$ (or, for ICP of graphite furnace analyses, $y = ax$, and the line is forced through zero), where y = the measured response (area units, absorbance etc.); x = the known concentration of analyte; m = the slope of the curve, and b = the y intercept.

In addition to determining the values of m and b, the correlation coefficient is determined as a measure of how closely the five points are to a straight line. The correlation coefficient is determined by the equation:

$$r = \frac{n \Sigma (x\,y) - \Sigma (x)\, \Sigma (y)}{\textbf{Sq. Root}\ [n \Sigma x^2 - (\Sigma x)^2]\ [n \Sigma y^2 - (\Sigma y^2)]}$$

where, r = Correlation coefficient, x = The known amount of analyte, y = The measured response, and n = The number of standards run to obtain the calibration curve.

In order for the curve to be valid, r must be 0.995 or higher, and the absolute ratio b/m should be no greater than the method detection limit. If r is <0.995 it usually implies that either the lowest or highest concentration of standard is outside the linear range. To correct this, the analyst should rerun the highest standard and also another high standard which has a slightly lower concentration than the initially used high standard. Then r can be calculated again using the response from the lower of the two standards. Similarly, the effect of slightly increasing the concentration of the lowest standard should be examined. However, this concentration should still be within 3 to 5 times the determined MDL.

If the ratio b/m criterion is not met, the problem may be with contamination in the system, a change in linear range or a change in noise level of the instrument. The system should be checked for contamination through the analysis of reagent or method blanks. The linear range can be checked by dropping the highest calibration standard, performing the linear regression and re-calculating the b/m ratio. If noise level of the instrument has in fact changed, instrument maintenance may be required to correct the problem.

Certifiable standards are used in the preparation of solutions for calibration as much as possible. However, it is always possible that the manufacturer made a mistake. To circumvent this possibility of error due to a mistake in the manufactured primary standard, a calibration verification check standard or quality control (QC) check standard will be analyzed whenever an initial calibration curve is constructed. The QC

check standard will contain all of the analytes of interest, and at a known concentration, but will be prepared using a different source than the calibration standards. When the analyte concentrations in the check standard are calculated, they should meet the continuing calibration criteria set forth by the method(e.g. GC within 15%, GC/MS within 20%, and ICP within 10% of the known concentration). If the criteria is not met, a determination of the source of inaccuracy will be performed.

After the calibration curve has been validated, a dated and initialized hard copy of the calibration table listing the response factors for each calibration level, the average response factor, the SD, and the %RSD for each analyte is placed in the method file for future reference. If the curve was generated using linear regression then a hard copy of the curve listing the x values used, the corresponding y values generated, the slope and intercept of the curve and the correlation coefficient for each analyte will be placed in the analysis file for future reference.

4.3.3.2 Continuing Calibration

Continuing calibrations serve to ensure that the instrument, during the course of running samples, is remaining sufficiently stable so the response factor calculated in the initial calibration remains valid

In performing a continuing calibration, a midrange standard containing the all of the analytes of interest, and internal and surrogate compounds, if applicable, is analyzed. For GC/MS analysis, the response factor for each analyte is determined from the continuing calibration analysis (Some methods specify that the RFs be determined for specific continuing calibration check compounds). The percent difference (%D) of the continuing calibration response factor from the average response factor of the calibration curve is then calculated by:

$$\%D = \frac{(RF_{avg} - RF_{ccc}) \times 100}{RF_{avg}}$$

If the percent differences from the continuing calibration analysis are within the acceptable criteria, as specified in the method, the instrument is considered to be within calibration, and analysis may continue using the curve. If the response factor is determined to be outside the acceptance range, the instrument must be recalibrated by using the initial calibration process. Samples that have been analyzed since the last acceptable calibration will also need to be reanalyzed after the instrument has been recalibrated. Generally, the acceptable criteria for

GC/MS is between 20% to 30%.

For linear regression curves, the concentration of each analyte in the midrange standard analysis, which has been calculated from the current calibration curve, is compared with the expected value of each analyte in the standard and a percent true value (%TV) is determined by dividing the value found by the expected value times 100%. The %TV must be within the method criteria for the calibration curve to still be considered acceptable (e.g. GC 85-115%; ICP 90-110%).

Each time a continuing calibration analysis is performed, it must be documented and placed in the method files to track the validity of the calibration curve over time. Recorded will be the analytes, the average response factor, the response factor from the continuing calibration analysis, and the percent difference of the response. For the liner regression curves, the analytes, the concentration found, the expected concentration and the %TV will be recorded. Frequencies for continuing calibration can be found in Table 4-2.

In performing continuing daily calibrations for ICP, the high level standard is analyzed immediately after the initial calibration is performed and the results of the analyses must be within 5% of the true value. Also, a midrange continuing calibration verification standard (CCV) will be analyzed after every ten samples analyzed and at the end of the analysis sequence. The results must be within 10% or 20% of true value depending on the method being performed. Re-calibration must be performed if the CCV results do not met criteria.

4.3.4 Analysis of Quality Control Samples

Routine quality control samples are analyzed to assure that the operation is within control as established for the laboratory on the basis of historical data. The routine quality control consists of blanks, spiked blanks or laboratory control samples, spiked samples, duplicate samples, and in some cases, external check samples analyses. These are discussed in the following sections.

4.3.4.1 Blanks

There are two types of blanks associated with internal quality control. They are the reagent blank and method blank.

4.3.4.1.1 Reagent Blank

The reagent blank is the reagent(s) and/or solvent(s) that are normally used for sample preparation, but without going

through any of the preparation steps. The reagent blank is normally not analyzed unless the method blank (See section 4.3.4.1.2 below) shows the presence of contamination which may have arisen from the reagent(s) and/or solvent(s).

4.3.4.1.2 Method Blank

The method blank is a known amount of the reagent or solvent which is carried through the all of the preparatory steps of a method prior to its analysis, adding internal and surrogate standards if appropriate for the method. The method blank is prepared with every batch of samples that is being prepared at the same time, provided the batch is no greater than twenty samples. For batches which are greater than twenty samples, a method blank will be prepared for every sub-batch of twenty samples.

The instrument background count for radiological analyses, a count of a planchet or vial containing no sample, is another form of laboratory blank. The instrument blank confirms that the counting instrument is contamination-free. The instrument blank may be used as a background correction factor subtracted from the sample count in the calculation of radiological concentration. For most analyses, an instrument background count is collected for each day that radiological samples are counted. They are run at a frequency of 10% for radiochemical parameters, corresponding to analytic batches of 10 or less samples.

In addition, a method blank is prepared whenever the lot number of any reagent is changed. The preparation log will then indicate which samples are associated with the new lot number of reagent(s). The method blank is analyzed and the data is reviewed prior to the analysis of samples.

4.3.4.2 Spiked Blank (Laboratory Control Sample)

The spiked blank, or laboratory control sample (LCS), serves as a measure of accuracy of the analytical procedure independent of matrix effects. The spiked blank is prepared by adding known amounts of specific analytes to the appropriate volume of reagent grade water or clean solid matrix and subjecting the spiked sample to the entire extraction procedure. For radiologic analyses, NIST traceable standards or equivalent will be used.

One spiked blank is prepared for every ten samples of the same matrix that are subjected to sample preparation at the same time. The spike contains all the analytes which are specified in the method of analysis to be performed.

Preparation of the spiking mixture is done in the same manner as the preparation of standard solutions for calibration except that it will be prepared from a source independent of that used for the calibration standard preparation. The preparation of the mix will be recorded in the Standard Preparation Logbook and assigned a standard ID number (per Section 4.3.1).

The spiked blank is then carried throughout the entire extraction and analytical procedure, and the concentrations of the spiked analytes determined. These results will be compared to pre-established acceptance criteria (See Section 4.2) to determine the degree of accuracy of the data in the laboratory. If the spiked blank does not meet the established criteria, it is assumed that the sample preparation or analysis have been faulty, and the batch of samples associated with the spiked blank will be re-prepared and/or re-analyzed after the reason for failure has been determined.

4.3.4.3 Spiked Sample

Spiked samples, or matrix spike samples, serve to identify whether the sample matrix provides certain effects which preclude the ability to recover analytes through the prescribed method. Thus the spiked sample is used to determine the accuracy of a method based on the matrix being analyzed.

One sample per every twenty samples of the same matrix will be selected at random and two aliquots of this sample will be extracted and analyzed, one spiked with the appropriate spiking solution and one without. The recovery of the spiked analytes will then be determined. After the analysis of twenty spiked samples of each matrix and/or each extraction method has been performed, the upper and lower control limits of recovery for each of the spiked analytes will be calculated. All subsequent analyses of spiked samples will then be compared to the control limits appropriate for the matrix and/or extraction method.

4.3.4.4 Duplicate Sample

One sample for every twenty samples of the same matrix will be selected at random, and two aliquots of this sample will be extracted and analyzed to track the precision of the analytical procedure. The results of the two analyses will be compared and the relative percent difference (RPD) between each analyte detected in the duplicate analyses will be calculated and compared to the previously established acceptance criteria (See Section 4.2.2), or per the duplicate error ratio (DER) for low-level radiological results (Science Applications International Corporation (SAIC). December 1992. Laboratory Data Validation Guidelines for Evaluating Radionuclide Analyses. U.S. Department

of Energy. November 1990. Environmental Measurements Laboratory Procedures Manual, 27th ed. HASL-300). For some wet chemistry

procedures, where spiking the sample matrix is not applicable, duplicate sample analyses will be performed for every 10 samples of the same matrix.

4.3.4.5 Matrix Spike Duplicate Sample

In some instances, a matrix spike duplicate sample (e.g. for GC and GC/MS analyses) is analyzed as opposed to a duplicate sample (e.g. for various wet chemistry analyses). Typically the matrix spike (MS) and matrix spike duplicate (MSD) are extracted and/or analyzed as a set, one set for every twenty samples of the same matrix. The recovery of the spiked analytes from both the MS and MSD are determined and used to assess the method accuracy as it relates to the specific matrix. Also, the RPDs between the concentration found for each spiked analyte in the MS and MSD analyses will be calculated to assess the precision of the method based on the matrix being tested. Control limits will be calculated after a minimum of 20 analyses for recovery and RPDs for the MS and MSD analyses.

It should be noted that in some instances, as in GC/MS methods, where there are a large number of compounds being analyzed, it is not always practical to produce recoveries and RPDs for every analyte. In these cases, the recoveries and RPDs of selected analytes, usually project or site-specific target compounds will be used to assess accuracy and precision.

4.3.4.6 Documentation of Quality Control Analyses

The analysis of quality control samples must be recorded and submitted with the sample data for review. The results are compared to the established acceptance criteria so as to document that the extraction and analysis scheme was in control when the site samples were analyzed. This is necessary for final approval and release of the analytic results of any site sample.

4.3.4.7 Normalized Absolute Difference

Normalized Absolute Difference (NAD) is the latest statistical tool applied to data to determine precision and bias. Formerly, the use of Relative Percent Difference (RPD) or Duplicate Error Ratio (DER) was applied to radiochemistry data. Currently, NAD is the applied measurement tool. This tool is also referred to as the *t* test. NAD is used to statistically determine the number of units of standard error of difference between means and the measure results differ from zero. This analytic tool accounts for a 95% confidence level or a 2σ acceptance.

To ensure that contamination is not introduced, the NAD between the sample and blank is tracked. The difference should be higher than 2.58 or the equivalent of a 99% confidence level. This difference decreases, however, when the sample approaches background activity. Therefore, blank levels must be tracked to determine if contamination is the cause.

The NAD is also applied to the sample and sample duplicate for determination in variation of results. The NAD between the two samples should be less than 1.96. This indicates that the two data points along with their associates errors are within a 2σ confidence of acceptance.

4.3.5 Establishment of Acceptance Criteria

The establishment of acceptance criteria is necessary in order to be able to determine regularly whether or not quantitative data generated by the laboratory is within control limits. The following section discusses the parameters for which acceptance criteria must be established.

4.3.5.1 Method Blanks

Method blanks are used to establish a known baseline level of contamination which may be contributed from four principal sources, namely:

1. The environment the analysis is performed in;
2. The reagents used in the analysis;
3. The apparatus used;
4. The analyst performing the analysis.

The following criteria shall be used to evaluate the acceptability of the method blank data if project DQOs do not specify otherwise: The concentration of all target analytes shall be below approximately two times MDL concentration for each target analyte, or less than 5 percent of the regulatory limit associated with that analyte, or less than 5 percent of the sample result for the same analyte, whichever is greater for the MB to be acceptable. When this criterion is exceeded, corrective action should be taken to find/reduce/eliminate the source of this contamination in the method blank. However, sample corrective action may be limited to qualification for blank contamination (i.e., B-flag). When the concentrations of any target analytes within the MB are above the MDL check sample for the majority of target analytes or above the MQL for target analytes known to be common laboratory contaminants, assess the effect this may have had on the samples. If an analyte is found only in the method blank, but not in any batch samples, no further corrective action may be necessary. Steps shall be taken

to find/reduce/eliminate the source of this contamination in the method blank. The case narrative should also discuss the situation. If an analyte is found in the method blank and some, or all, of the other batch samples, additional corrective action is required to reanalyze the method blank, and any samples containing the same contaminant. If the contamination remains, the contaminated samples of the batch would be reprepared and re-analyzed with a new method blank and batch specific QC samples. Sporadic cases of contamination may be difficult to control, however, daily contamination would not be acceptable.

4.3.5.2 Recovery of Spiked Blank Samples

Spiked blank samples are used to establish the accuracy of the method as previously discussed in Section 4.2.1. Initially four replicate spiked blank samples are prepared. They are then extracted and analyzed following precisely the appropriate protocol, and the concentrations of the analytes are determined. From these values, the mean and standard deviation for the recovery of each analyte are determined. The deviation of the mean from the known spiked amount is a measure of accuracy of the method and is expressed as percent recovery of the analyte. The percent recovery is calculated as follows:

$$R = 100 \times \frac{C(m) - C(b)}{C(s)}$$

Where, R = Percent recovery of the analyte

C (m) = The measured concentration of the analyte

C (b) = The background concentration of the analyte in the sample (For spiked blank samples C (b) = 0)

C (s) = The actual concentration of analyte spiked into the sample

The mean and standard deviations of the recoveries of each analyte are then calculated and compared to the criteria found in the appropriate EPA method. Upon meeting EPA criteria, control limits for each analyte will be calculated from the recoveries of twenty spiked blank sample analyses.

For gas chromatography methods, the appropriate internal and surrogate spike standards should be added to all spiked reagent blanks and samples. Again, acceptable recovery limits should be compared to the recoveries listed in the QA/QC section of the appropriate EPA method.

4.3.5.3 Duplicate Analyses

Non-spiked samples or matrix spike samples will be extracted in duplicate and the resultant concentrations for each analyte will be used to establish the precision of the method. Once again, precision is defined as a measure of the differences from the mean of repetitive measurements. Thus the standard deviation will be used as a measure of precision. More frequently, the relative percent difference will be used because at best, measurements are performed in duplicate. The relative percent difference is determined by the equation:

$$\% \text{ RPD} = 100 \times \frac{x(1) - x(2)}{x(m)}$$

where, x (1) = High value for the analyte

x (2) = Low value for the analyte

$$x(m) = \text{Mean value for the analyte} = \frac{x(1) + x(2)}{2}$$

The results of the determinations of 20 relative percent differences will be used to calculate the upper warning (2.456 x Average RPD) and control limits (3.27 x Average RPD). Future data will be considered acceptable if the relative percent differences of duplicates fall within the acceptance criteria.

4.3.5.4 Spiked Sample Analyses

Samples will be spiked with a known amount of the appropriate analytes. The resultant recoveries of each analyte will be used to establish the accuracy of the method based on the matrix being analyzed. From these values the mean and standard deviation for the recovery of each analyte added to the sample matrix will be determined. The recoveries will be calculated using the same equation used for spiked blank samples (Section 4.3.5.2). When the recoveries of twenty spiked samples of the same matrix have been determined, the mean and standard deviation will be used to calculate control limits for each of the spiked analytes. Future data will be considered acceptable if the recoveries of the spiked analytes fall within the acceptance criteria.

4.3.5.5 Use of Surrogates

Surrogates are compounds that are expected to behave analytically in a manner similar to target analytes, but are not

naturally found in the environment. The surrogates are added into the sample prior to extraction and their recoveries are a measure of the efficiency of the extraction.

The use of surrogates in organic analysis serves as an additional measure of the acceptability of the results. The significant advantage of the use of surrogates is in measuring recovery against the historically established acceptance range in the performance of each analysis. Thus, data does not depend solely on the spiked blank sample to assess the quality of each analytical run.

The acceptable ranges of surrogate recoveries are established based on the recoveries of thirty sample analyses. The mean and standard deviations from these thirty surrogate recoveries are used to determine the upper and lower acceptable limits of surrogate recoveries as previously discussed (See Section 4.2.1). Surrogate recoveries also need to be established based on the type of matrix and the method of extraction. All subsequent surrogate recoveries will be considered acceptable if the recoveries fall within these established acceptance ranges (i.e. defined by method limits).

NOTE: Acceptance criteria must be established for each method of extraction and for each matrix type. Recoveries from soil are not expected to be within the acceptance limits as determined for water, and recoveries from sonication extraction may not show the same recovery as would a soxhlet extraction. Thus, acceptance criteria must be determined matrix by matrix and method by method.

4.3.5.6 Retention Times in Gas Chromatography Methods

While accuracy and precision form the backbone of quantitative data, qualitative identification in GC methods is more difficult to translate into quantitative measures. The principle criterion for chromatographic analysis is the retention time, or relative retention time. Relative retention time is used in those methods employing internal standards. It is a more reliable measure because it is less dependent on such physical parameters as the length of the column. In all cases, the relative retention time for each analyte will be based on the data obtained from the nearest standard.

To determine the acceptance window for retention times, the continuing calibration data will be employed. For each compound, the retention times obtained in performing the continuing calibrations over a 72 hour (minimum) period will be averaged and their standard deviations determined (See Figure 4-3). The acceptance window will consist of three standard deviations from

the mean retention time for each compound. The retention time acceptance windows will be redetermined whenever the chromatographic column is changed or the chromatographic conditions are altered. It is the responsibility of the analyst to maintain the records for retention time criteria. These records are kept in the method file for future reference. In mass spectrometric analysis, in addition to retention time, the mass spectral match of the compound to the standard will be used to verify its identity.

4.3.6 Standard Operating Procedures

All standard laboratory and analytical procedures will be written as Standard Operating Procedures (SOP's). SOPs will be available in the laboratory for the analysts and will serve as a comprehensive source of reference. General laboratory procedures covered by SOP's will include:

1. Writing, Control and Revision of SOPs
2. Laboratory Notebook Control, Use, Review and Approval
3. Standards Preparation, Traceability, and Storage
4. Nonconformances and Corrective Action
5. Sample Receipt, Login, Custody and Storage
6. Internal Quality Assurance (QA) Audits
7. Reagent Water Generation and Monitoring
8. Balance Calibration, Use and Maintenance
9. Data Reduction, Review and Validation
10. Storage Temperature Monitoring
11. Thermometer Calibration
12. Reagent Control
13. Technical Training
14. Significant Figures
15. Records Storage, Tracking and Disposal
16. MDLs, MQLs and Laboratory Reporting Limits
17. Trip Blank Preparation
18. Subsampling of Containers
19. Method Equivalency Demonstration
20. Data Reporting, Data Package Assembly and Shipment
21. Compressed Gas Quality and Traceability
22. Syringe, Pipet and Autosampler Vial Calibration Procedures

Analytical SOP's should include:

1. Scope and Application
2. Method Summary
3. Method Validation
4. Safety Precautions

5. Interferences
6. Apparatus and Materials
7. Reagents and Standards
8. Sample Preservation and Storage
9. Holding Times
10. Operating Conditions and Calibration
11. Sample Preparation
12. Sample Analysis
13. QA/QC Requirements
14. Reporting Limits
15. Qualitative Identification Information
16. Recovery Limits
17. Data Deliverables
18. Preventative Maintenance
19. Pollution Prevention
20. Waste Minimization
21. Method Flow Chart
22. References and Associated SOPs

QA/QC Schedules

As stated in Sections 4.3.3 and 4.3.4, most analyses will require calibration and the analysis of QC samples. Listed below are the QA/QC schedules of the various types of analyses performed in the WST laboratories. See Table 4-5.

4.4.1 Non-instrumental Wet Chemistry Analyses

Total Suspended Solids is an example of this type of analysis. The QA/QC required for these analyses are: a method blank, LCS and a duplicate analysis for every batch of twenty or fewer samples. For analyses which require an analytical balance, the balance will be checked daily for accuracy with two ASTM Type I weights near the weight range applicable to the method.

4.4.2 Instrumental Analyses

4.4.2.1 Non-GC Instrumental Analyses

Total petroleum hydrocarbon determination by infrared spectrophotometry is an example of this type of analysis. Requirements for this type of analysis are: initial calibration; daily continuing calibration; laboratory control samples, one for every ten samples analyzed; method blank and duplicate analyses, one per batch of twenty samples or less; and when available, external QC samples. For metals analysis, some wet chemistry analyses, and radiochemical analyses, matrix spike and, in some instances MSD, will also be performed.

4.4.2.2 GC and GC/MS Analyses

GC and GC/MS analyses require the following: initial calibration; daily continuing calibration (GC: one per ten samples and at the end of each batch; GC/MS one every 12 hours); reference samples, one per ten samples; method blanks, one per batch of twenty or fewer samples; matrix spike and matrix spike duplicate samples, one for twenty samples of the same matrix; surrogates and internal standards (when applicable), added to each standard and sample analysis; and external QC samples. Matrix spikes and matrix spike duplicates may also be analyzed according to project specific requirements.

The QA/QC requirements for each analysis are detailed in the corresponding analytical SOP.

Instrumentation

Table 4-3 lists the instrumentation and equipment available at Waste Stream Technology's Analytical Laboratory.

Audits

WST employs four types of audits to measure performance, define problem areas, and ensure conformance and compliance with formalized certification programs.

4.6.1 External Audits

External audits are performed by certifying agencies or clients through the use of performance evaluation samples and/or on-site inspections. Potential clients are welcome to audit the WST laboratory and submit evaluation samples as necessary.

4.6.2 System Audits

System audits are primary responsibility of the QA/QC Officer. System audits evaluate the procedures and documentation in the laboratory. A system audit checks for conformity to the QA plan and the SOP criteria for an analysis. Items covered include, but are not limited to, sample custody procedures, calibration frequency and checking, quality control, data reduction and validation, method validation (startup QC), and record keeping and retention. The entire range of analyses performed by the laboratory is reviewed as least annually by the QA/QC Officer. Quarterly audits are conducted by the QA/QC Officer in the company of the Laboratory Director and Assistant Lab Director.

4.6.3 Report Audit

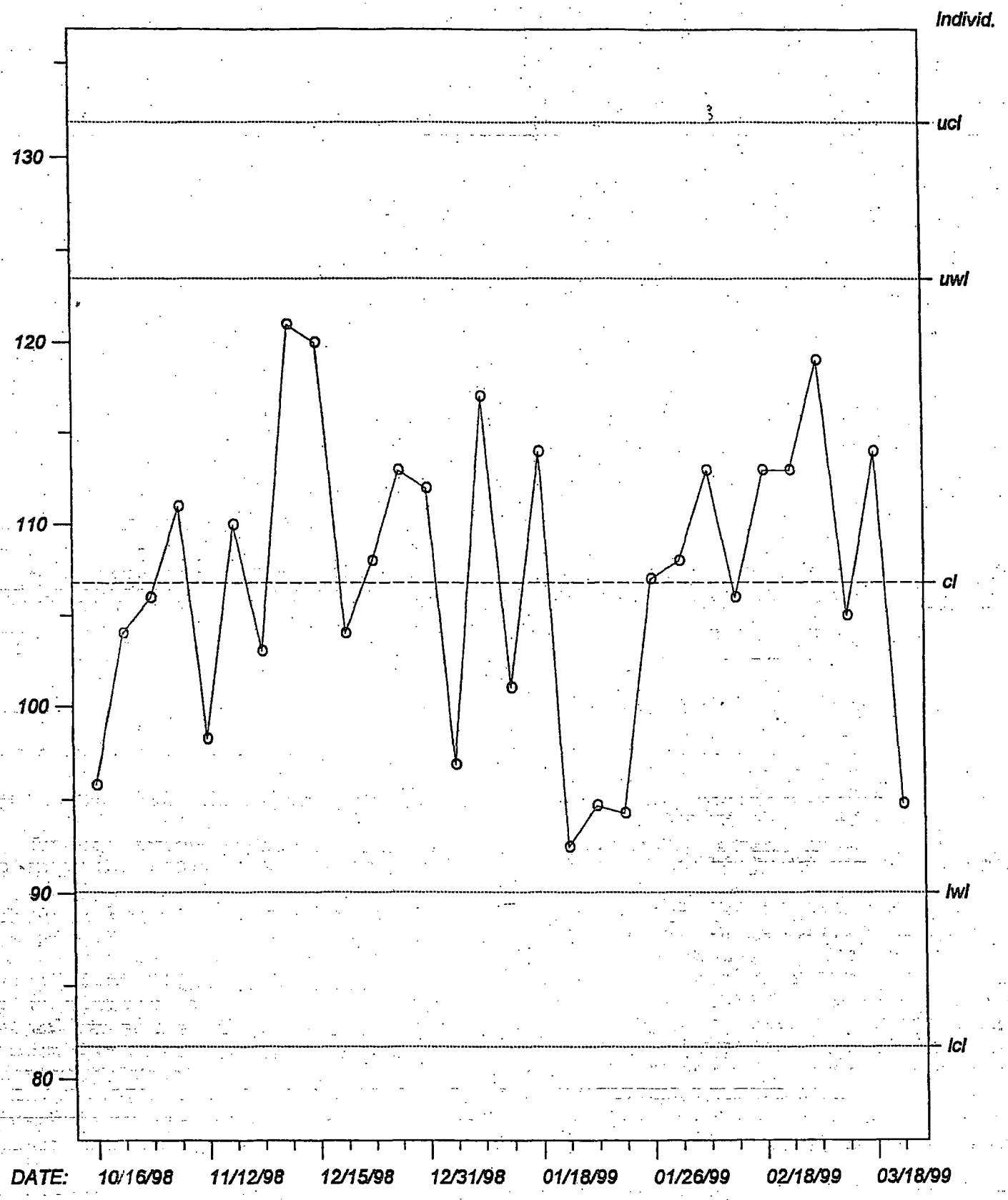
Report audits evaluate the correctness and appearance of the laboratory reports and are performed routinely by the QA/QC Officer. The report audit assures that the data reported is of consistent quality and content.

4.6.4 Blind Sample Audit

Blind sample audits are conducted by submitting samples of known concentrations through ordinary sample handling procedures and comparing the reported concentrations with the known values. Blind sample audits are carried out annually.

Figure 4-1

8260B Water TCL Matrix Spike %Rec Charts
benzene



Individ.: cl: 106.81 ucl: 131.881 lcl: 81.7389

Subgrp Size 1

Waste Stream Technology Inc. - MS %R for BENZENE
8260 TCL IN Water Printed: 09/15/04 15:35 by BSS
All Clients/Projects [2/1/04 to 9/15/04]

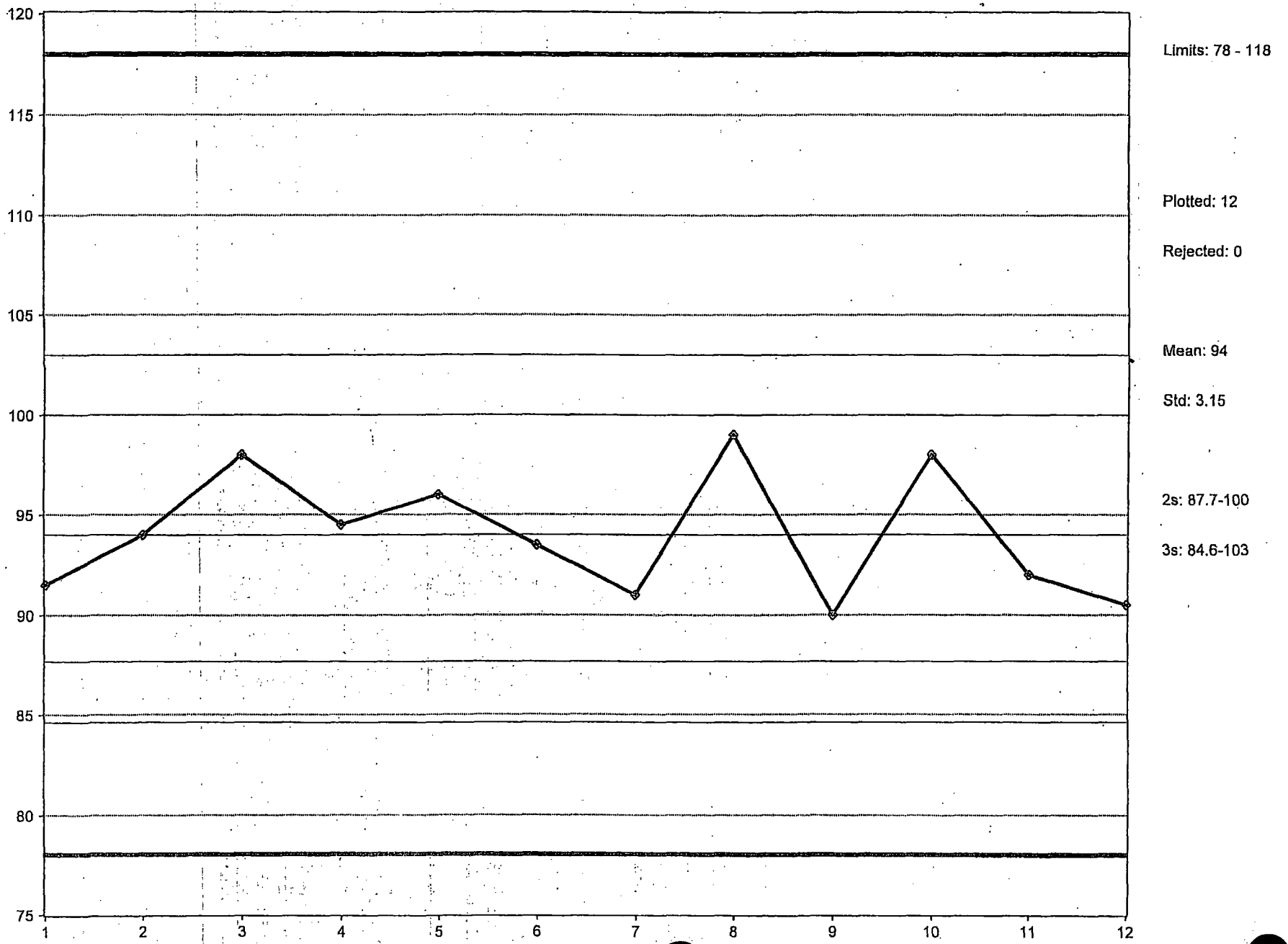
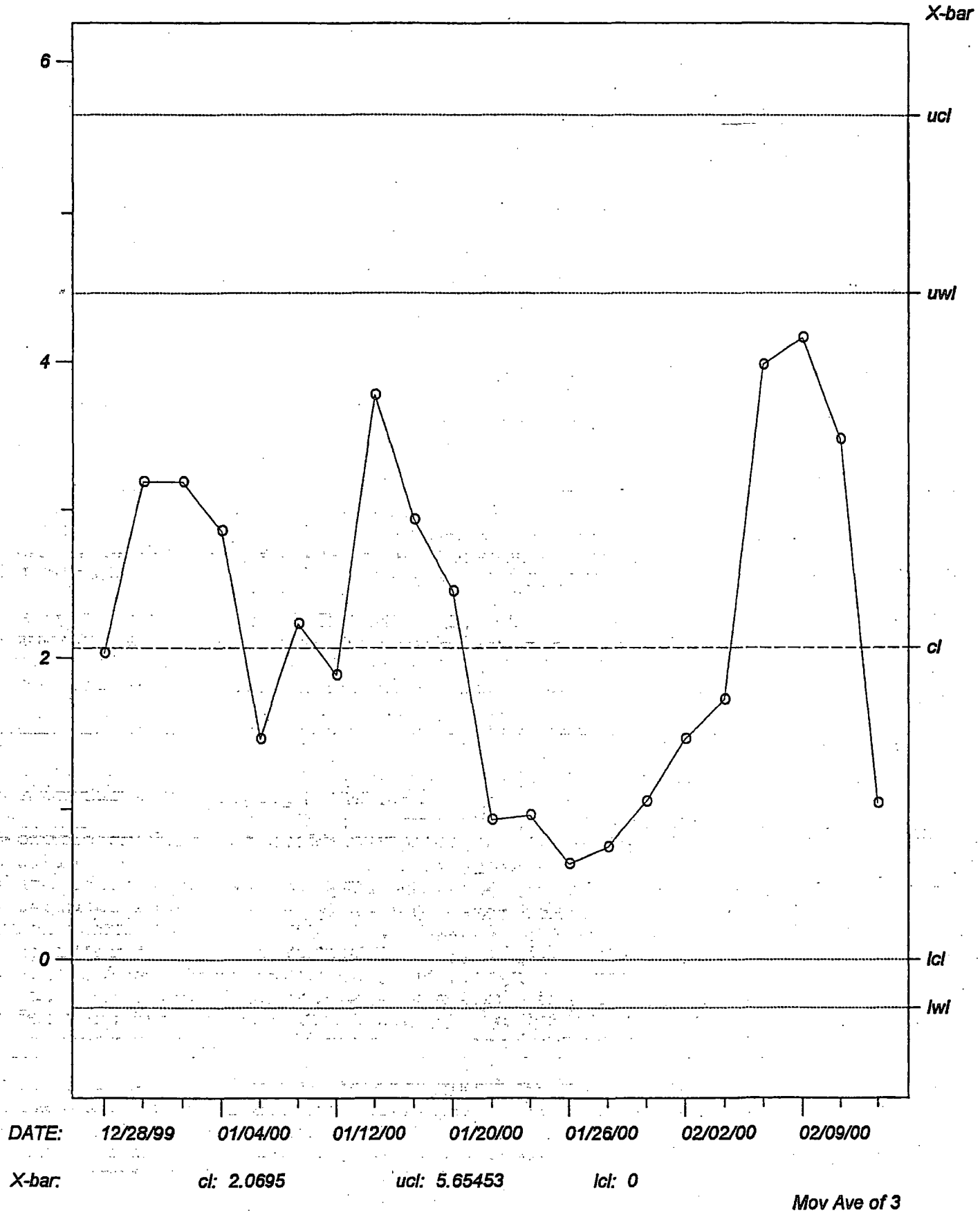
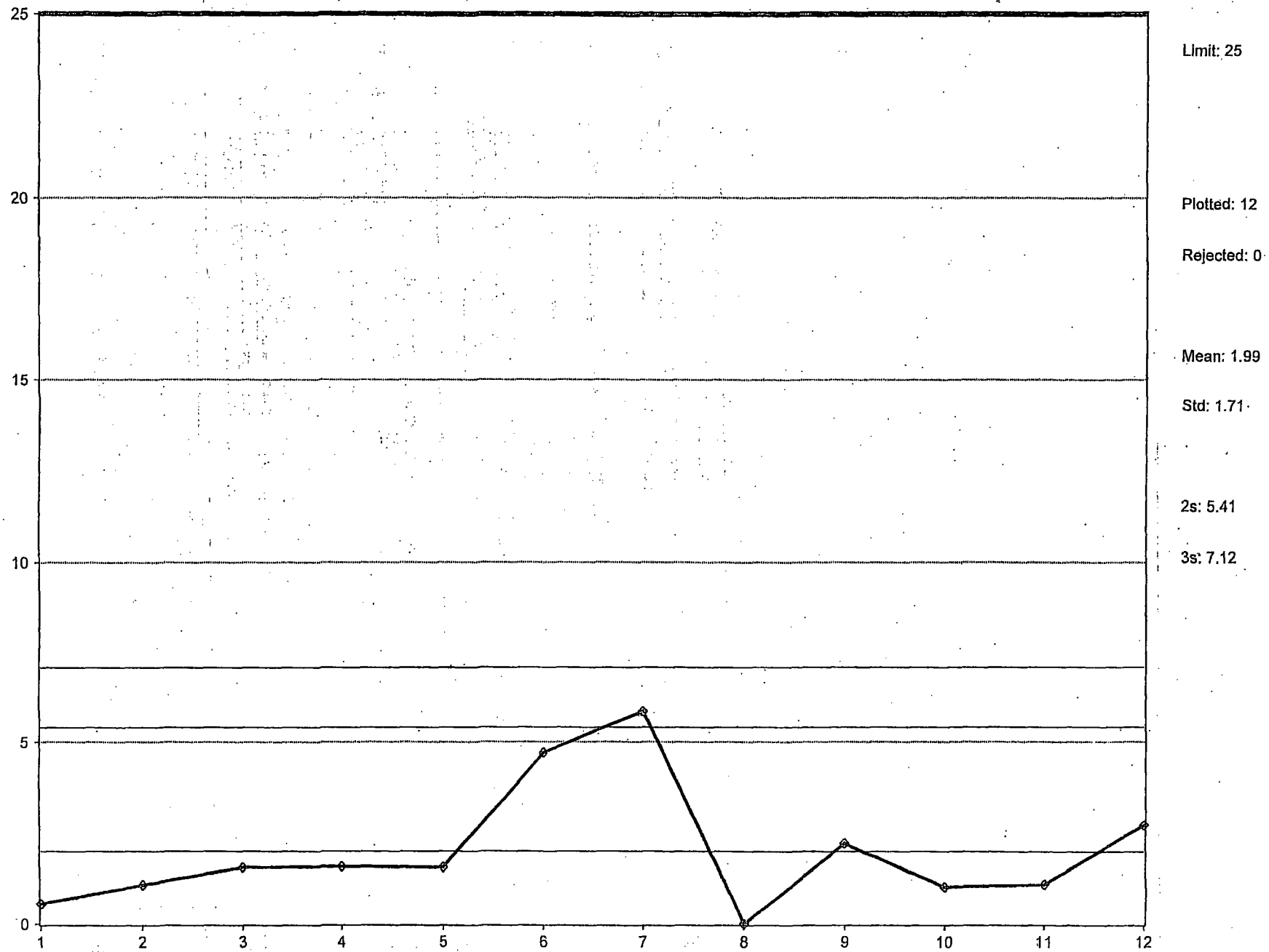


Figure 4-2

8260B Water MS/MSD RPD Charts
benzene



Waste Stream Technology Inc. - MS/MSD RPD for BENZENE
8260 TCL IN Water Printed: 09/15/04 15:36 by BSS
All Clients/Projects [2/1/04 to 9/15/04]



Method 8021B Relative Retention Time Window Calculation Sheet

Compound	R.T.-1	RRT-1	R.T.-2	RRT-2	R.T.-3	RRT-3	Avg. RRT	SD RRT	3 X SD Window
fluorobenzene IS	15.022		15.013		15.054				
MTBE	8.008	7.014	7.991	7.022	8.041	7.013	7.016	0.004933	0.015
benzene	14.408	0.614	14.399	0.614	14.442	0.612	0.613	0.001155	0.003
a,a,a-TFT SS	16.345	1.323	16.337	1.324	16.374	1.320	1.322	0.002082	0.006
toluene	19.768	4.746	19.761	4.748	19.790	4.736	4.743	0.006429	0.019
ethylbenzene	23.868	8.846	23.864	8.851	23.890	8.836	8.844	0.007638	0.023
m,p-xylene	24.074	9.052	24.069	9.056	24.095	9.041	9.050	0.0078	0.023
o-xylene	25.220	10.198	25.216	10.203	25.242	10.188	10.196	0.007638	0.023
isopropylbenzene	26.164	11.142	26.162	11.149	26.187	11.133	11.141	0.008021	0.024
n-propylbenzene	27.212	12.190	27.209	12.196	27.234	12.180	12.189	0.008083	0.024
1,3,5-trimethylbenzene	27.625	12.603	27.623	12.610	27.648	12.594	12.602	0.008021	0.024
tert-butylbenzene	28.556	13.534	28.581	13.568	28.577	13.523	13.542	0.023459	0.070
1,2,4-trimethylbenzene	28.640	13.618	28.638	13.625	28.663	13.609	13.617	0.008021	0.024
sec-butylbenzene	29.099	14.077	29.097	14.084	29.122	14.068	14.076	0.008021	0.024
p-isopropyltoluene	29.454	14.432	29.452	14.439	29.476	14.422	14.431	0.008544	0.026
n-butylbenzene	30.512	15.490	30.509	15.496	30.534	15.480	15.489	0.008083	0.024
naphthalene	35.840	20.818	35.836	20.823	35.862	20.808	20.816	0.007638	0.023

Comments:

R.T. denotes Retention Time
R.R.T. denotes Relative Retention Time

Figure 4-3

Table 4-1
STANDARD and SOLUTION HOLDING TIMES

MATERIAL	HOLDING TIME 1°Stock Sol'n	HOLDING TIME 2°Stock Sol'n	HOLDING TIME Working Sol'n[c]
Volatiles GC & GC/MS	month @-10°C[a]	1 week @-10°C	24 hr @-10°C
Semivolatiles GC & GC/MS	1 year @-10°C	6 months @4°C	1 week @4°C
TPH for IR	6 months @4°C	3 months @4°C	1 week @4°C
TPH for GC	6 months@-10°C	3 months @-10°C	1 week @-10°C
Metals for ICP & GFAA	1 year[b]	3 months[b]	2 weeks (ICP) Daily (GFAA)[b]
Radioisotopes	1 year	3 months	Daily

a Pre-prepared standard in an unopened ampule: expiration date on ampule @ -10°C. Opened ampules: 1 mo @ -10°C. For gases: 1 week after opening.

b 10% HNO_3 for ICP; 2% HNO_3 for GFAA.

c Working continuing calibration solution.

Table 4-2
Calibration Frequencies

Instrument	Application	Initial Cal.	Continuing
GC/MS	Volatiles	Once/Month*	Every twelve hours
GC/MS	Semivolatiles	Once/Month*	Every twelve hours
GC	Volatiles	Once/Month*	At the beginning and at the end of a sequence of runs, and after every 20 samples.
GC	Extracts	Once/Month*	At the beginning and at the end of a sequence of runs, and after every 10 samples.
ICP	Metals	Daily	At the beginning and
GFAA	Metals	Daily	at the end, and after
Mercury	Metals	Daily	0 samples.
Alpha Spectrometry	Alpha Isotopes	Annually	Daily***
Eberline Survey Meters	Alpha/Beta Gamma Isotopes	Annually	Daily
Gamma Spectrometry	Gamma Isotopes	Annually	Daily source check, Monthly background
Gas Proportional Counter	Alpha/Beta Isotopes	Annually	Daily ****
Gamma Spectrometry	Gamma Isotopes	Annually	Daily source check, Monthly background
pH Meter	All pHs	Daily	Every ten tests at the end of a test sequence
Spectro-photometer	Various Wet Chemistry	Annually	Every run of samples
Balances:			
Analytical	Weighing of samples & stds.	Weekly**	Daily
Top-loader	Weighing of samples & stds	Monthly**	Daily

*After repair, column change, or failure on continuing calibration check and/or quality control check standard. As long as continuing calibration analyses and LCS recoveries pass criteria, initial calibration will remain acceptable.
**Performed by WST; performed annually by manufacturer representative.
***Daily Pulser Check; Monthly Background Check and Secondary Cal Check.
****Self-Absorption Annually; Daily Source Check & Monthly Background Check.

Table 4-3
INSTRUMENT AND EQUIPMENT LIST

GC/MS:

Hewlett-Packard Model 5890 Series II GC with capillary split/splitless injector, Model 5972 Mass Selective Detector (MSD), HP Windows NT Chemstation for complete operation of GC/MS, Tekmar Model LSC 3000 Purge and Trap Concentrator, and EST Model Archon Purge and Trap Autosampler.

Agilent Model 6890 Series II GC with capillary split/splitless injector, Model 5973 Mass Selective Detector (MSD), Agilent Windows 2000 Chemstation, Enviroquant Chemstation G1701DA Software, Tekmar Model 2016 Purge and Trap Autosampler with heater pockets.

Hewlett-Packard Model 5890 Series II GC with capillary split/splitless injector, Model 5971A Mass Selective Detector (MSD), HP Windows 95 Chemstation, Tekmar Model LSC 2000 Purge and Trap Concentrator, Tekmar Model 2016 Purge and Trap Autosampler with heater pockets.

Hewlett-Packard Model 5890 Series II GC with capillary split/splitless injector, Model 5972 Mass Selective Detector (MSD) with direct capillary interface, HP Windows NT Chemstation, Model 7376A Autosampler.

Hewlett-Packard Model 5890 Series II GC with capillary split/splitless Injector, Model 5972 Mass Selective Detector (MSD), HP Window NT Chemstation, Model 7376B Autosampler.

GC:

Perkin-Elmer Model Autosystem Gas Chromatograph with Autosampler, Capillary Columns, Dual PID Detectors and split/splitless injector ports, Tekmar Model LCS 2000 Purge and Trap Concentrator, Tekmar Model LCS 2016 16 Place Autosampler, PE Nelson Turbochrome Software.

Perkin-Elmer Model Autosystem Gas Chromatograph with Capillary injection port, Dual PID Detectors, Tekmar Model LCS 2000 Purge and Trap Concentrator, Tekmar Model LCS 2016 16 Place Autosampler, PE Nelson Turbochrome Software.

Hewlett-Packard Model 5890 Series II GC with Dual capillary split/splitless injectors, Model 7673B Autosampler, Dual ECD detectors, with PE Nelson Turbochrome Software.

Perkin-Elmer Model Autosystem Gas Chromatograph with Autosampler, Capillary Columns, Dual ECD Detectors, Dual split/splitless injector ports with PE Nelson Turbochrome Software.

Tracor Model 540 GC with packed column injection port and FID detector with PE Nelson Turbochrome Software.

Perkin-Elmer Model Autosystem Gas Chromatograph with Autosampler, Capillary Columns, FID and ECD Detectors, Dual packed column injector ports with PE Nelson Turbochrome Software. Tekmar Model LSC 2000 Purge and Trap Concentrator, Tekmar Model LCS 2016 16 Place Autosampler.

Hewlett-Packard Model 5890 Series II GC with capillary split/splitless injectors, Dual tandem PID/ELCD detectors, Tekmar Model LSC 2000 Purge and Trap Concentrator, Tekmar Model 2016 Purge and Trap Autosampler with heater pockets and PE Nelson Turbochrome Software.

IR:

Perkin-Elmer Model 1310 Dispersive Infrared Spectrophotometer with:

- scan range of 4000 to 600 cm - 1 wavenumbers
- fixed or variable wavelength

Metals Analysis:

Perkin-Elmer Model 4100ZL Atomic Absorption Spectrometer with Transversely Heated Graphite Atomizer (THGA).

Perkin-Elmer Optima 3300 XL Spectrometer with AS-90 Autosampler.

Leeman PS200 Automated Mercury Analyzer.

Buck Scientific Atomic Absorption/Emission Spectrophotometer(2).

Buck Scientific Model-420 Hydride Continuous Flow Analyzer.

CEM Model MDS-2100 Microwave Sample Preparation System(2).

CPI 24 position digester hot block (MOD Block).

Radiochemical Analysis:

Tennelec XLB Series 5 Automatic Low Background Computer Assisted Alpha/Beta Counting System.

Canberra 7200-12 Chamber System Alpha Analyst.

Eberline Smart Alpha/Beta Survey Meter: SHP380AB Smart Alpha/Beta Probe, CA-100-60 Smart Probe Cable, E600 Smart Portable, E6000PT & Windows Program for E-600(2).

Eberline Micro R Survey Meter: ASP-2/SPA-8 with NaI scintillator. Range: 0-10,000 uR/h.

EG&G ORTEC GEM Series High Purity Germanium (Photopeak Efficiency >45%) Coaxial Detector; DSPec DSP-Based Gamma-Ray Spectrometer with GammaVision-32 Gamma-Ray Analysis Software.

Model 19μR Meter (2)

TCLP Equipment:

Associated Design and Manufacturing Model 3740-6-BRE Six Place Rotary Agitator(3)
(2) 24 Place Rotary Agitators
(1) 18 Place Rotary Agitator

Spectrophotometers:

Beckman Model 25 UV/Vis Spectrophotometer and Chart Recorder
Milton Roy Spectronic Spec 20 Gensys
Milton Roy Spectronic 20-D Plus

Extractors/Concentrators:

Soxhlet Extraction Apparatus including:
- Neslab Model CFT-75 Refrigerated Recirculator
- Precision 6 unit Heater with K-D Concentrators(2)
- Electromantle Model EM 250/C Heating Mantle (12 units; 6 for soxhlet extractors and 6 for distillation).

Tecator Soxtec System HT Model 1046 Service Unit with:
- (2) Tecator Soxtec System HT2 Model 1045 Extraction Units

Organomix Nitrogen Concentration Apparatus

Heat Systems(2) Model W-385 & Model XL2020 Ultrasonic Processor

Zero Headspace Extractors(9).

Zymark Model ZW 640-3 TurboVap Automated Nitrogen Evaporator/Concentrator

Kuderna-Danish concentration glassware

Gel Permeation Chromatography Equipment:
Zymark BenchMate Workstation, Scientific Systems Model 300 LC Pump, Jordi Associates Stainless Steel Column, Foxy 200 Fraction Collector, Isco UA-6 UV/Vis Detector.

Anion Analyzer (300 series):

Dionex DX-120 Ion Chromatograph with Windows 95 Peaknet vs.5.2 software and Model AS40 Autosampler.

Total Organic Carbon Analyzer:

Dohrman DC-180 Total Organic Carbon Analyzer with Dohrman Autosampler.

Flashpoint Tester:

Koehler Instrument Co, Model K16200 Closed Cup Flashpoint Tester.

Balances:

Mettler Model AE240 Analytical Balance, 200g capacity at 0.0001g readability.

Mettler Model AE16 Analytical Balance, 160g capacity at 0.0001g readability.

Mettler Model PN323 Top Loading Balance, 400g capacity at 0.001g readability.

Ohaus Model TS4000 Top Loading Balance, 400g/100g capacity at 0.01g/0.001g readability (2)

Fisher Model XD800 Top Loading Balance, 800g capacity at 0.01 readability (2)

Fisher Model XD400D Top Loading Balance, 400g capacity at 0.01 readability

Mettler Model 3100 Top Loading Balance, 3.1 Kg capacity at 0.01 readability

Centrifuges:

Sharples ARE 15MV Super Centrifuge, Vaportite Design

Fisher Model MDL2810 Centrifuge

Sorvall RC2-B Super Speed Centrifuge, Refrigerated Floor Model

Eppendorf Model 5810 Centrifuge

Fisher Microcentrifuge

pH/ISE Meters:

Acumet Model AB15 pH meter, 0.00 to 12.00 range at 0.01 readability

Acumet Model AR50 pH/ISE Meter

Orion Model 710A pH/ISE Meters (2)

Ovens/Incubators:

Fisher Model 349 Isotemp Oven

Fisher Model 230F Isotemp Oven

Fisher Model 655F Isotemp Oven

AC-Lab 15 cu.ft. Incubator

Soiltest Isotemp Oven

SYBRO Model 1300 Furnace

VWR Scientific Model 2020 Incubator

Water Purification Equipment:

Deionized Pre-treatment System fed into a D8904 High Capacity Activated Carbon Filter or into a Milli-Q Water Purification System

Freezers, Freeze-Driers & Refrigerators:

So-Low Environmental Chest Freezer (to-150EC)

Labconco Freeze Dry-5 Lyophilizer

18 cu.ft. Refrigerator Freezers (5)

Fisher Isotemp Refrigerator Circulator

Scienceware Frigimat Dry Ice Maker

14 cu.ft. Freezers (3)

216 cu. ft. Walk-in Coldrooms (2)

Laminar Flow Hoods:

Flow Laboratories Gel Aire AIRONE Hoods (3)

Laminar Flow Hoods (9)

Autoclave - All American Electric Pressure Steam Sterilizer

Hach COD Block Reactors (2)

Laboratory Information Management System (LIMS):

Element DataSystem Laboratory Information Management System (LIMS), Promium Essential Information Management.

Table 4-4.1

ANALYTICAL METHODS

The procedures employed by WST for the analysis of samples are taken from a variety of references. These analytical methods are condensed in the SOP's used in the laboratory. Specific method reference materials are also included.

Analytical procedures employed are based on the following:

1. Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020, March 1979, Revised 1983, U.S. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.
2. Federal Register, 40 CFR Part 136: Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act. Revised July 1991.
3. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. Third Edition, Revised December, 1996 United States EPA SW-846.
4. Superfund Contract Laboratory Program. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Las Vegas, Nevada. SOW for Inorganic and Organic Analysis #ILM03.0 and #OLM03.0.
5. Annual Book of ASTM Standards, Volume II. ASTM, 1916 Race Street, Philadelphia, Pennsylvania 19103.
6. Standard Methods for the Examination of Water and Wastewater. (20th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.
7. Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater. EPA 600/4-82-057, July 1982, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.
8. Verification of PCB Spill Cleanup by Sampling and Analysis. EPA 560/5-85-026, August, 1985, U.S. Environmental Protection Agency, Office of Toxic Substances, Washington, D.C.

1. HASL-300, 28th Edition, Feb. 97, Environmental Measurements Laboratory, US Department of Energy
2. Radiochemical Analytical Procedures for Analysis of Environmental Samples, EMSL LV053917, Mar. 97, Environmental Monitoring and Support Laboratory, US Environmental Protection Agency
3. Prescribed Procedures for Measurement of Radioactivity in Drinking Water, EPA-600 4-80-032, Aug. 80, Environmental Monitoring and Support Laboratory, US Environmental Protection Agency
4. Radiochemistry Procedures Manual, EPA 520/5-84-006, Jun. 84, Eastern Environmental Radiation Facility, US Environmental Protection Agency

Table 4-5
Schedule of Analysis for Quality Control Samples

Analysis	Method	Method Blanks	Dupli-cate	Matrix Spike	Surro-gates	Ref. (LCS)
GC-Purge	601-602	Daily	5%*	10%	100%	Daily
GCMS-Purge	624	Daily	5%*	5%	100%	Daily
GC-Pest/PCB	608	PB	5%*	5%	100%	10%**
GCMS Semivols.	625	PB	5%*	5%	100%	10%**
Oil&Grease	1664	PB	5%*	5%	N/A	10%
Pet. Hydro	418.1	PB	5%	5%	N/A	10%
GC-Purge	8021B	Daily	PB/5%*	PB/5%	100%	PB/10%
GCMS-Purge	8260B	Daily	PB/5%*	PB/5%	100%	PB/10%
GC-Pest GC-PCBs	8081A 8082	PB	PB/5%*	PB/5%	100%	PB/10%
GCMS-Semivols	8270C	PB	PB/5%*	PB/5%	100%	PB/10%
Pet.Hydro.	3550 418.1 8015B	PB	PB/5%	PB/5%	N/A; 100%#	PB5%
Radium 226/228	Ra-05 SM 7500	PB	PB/10%	PB/5%	N/A	PB/5%
Isotopic Thorium	HASL-300 Se-02	PB	PB/10%	PB/5%	N/A	PB/5%
Total Uranium	HASL-300 Se-03	PB	PB/10%	PB/5%	N/A	PB/5%
Gross Alpha/Beta	900,9310 SM 7110	PB	PB/10%	PB/5%	N/A	PB/5%
Metals	200 Series	PB	PB/5%*	PB/5%	NA	PB/10%
Metals	6010B 7000	PB	PB/5%*	PB5%	NA	PB/10%

PB - per batch
PB/5% - one QC sample per analytical batch or 5%, whichever is greater
PB/10% - one QC sample per analytical batch or 10%, whichever is greater
* Duplicate matrix spikes may replace duplicate samples
**Reference Samples (Laboratory Control Samples) will also be analyzed after every matrix spike outside control limits.
8015 (modified)
N/A - Not Applicable

DATA HANDLING

Since the objective of Waste Stream Technology's Analytical Laboratory is the production of data of known, documented quality, it is of the utmost importance that all the data regarding each sample is recorded and reduced in an accurate and precise manner. The greatest responsibilities to the production of this data are with the individual extraction technicians and analysts. They are, after all, the producers of the data. This section will address the procedures of handling the data. This section will also deal with the procedures used by the extraction technicians and the analysts for record keeping and ultimately, the traceability of the data within the laboratory. This section will then be followed by a brief discussion of data reduction, validation, review, and final reporting.

5.1 Record Keeping in the Laboratory

As mentioned in Section 3.4, Sample Custody in the Laboratory, the samples are logged into the Element DataSystem LIMS database which is then used to track the progress of the samples throughout the analytical process. The traceability of a sample or group of samples that require any laboratory analysis begins with the sample Batch form and Bench sheet. Some preparations and analysis also use a logbook in conjunction with the batch/bench sheet.

5.1.1 Batch Form

The Batch form is used to choose the preparation method, analyses, matrix and, for organic preparations, the surrogate standard that will apply to the batch. When a new batch form is created, the database automatically assigns a unique ID number to the batch for tracking purposes. The program uses the calculation parameters, reporting and control limits associated with that Batch Matrix based on the analyses designated in the batch. The ID numbers of any reagents used to prepare and/or analyze of the samples is also designated in the batch form. This form is the prerequisite for completing the Bench Sheet.

5.1.2 Bench Sheet

The Bench sheet involves the addition of Client Samples and QC Samples to the batch. Once samples are added to the bench sheet, the sample properties can be changed to record the following pertinent information: The Date Prepared, Initial Amount (sample weight or volume used), the Final Amount (final volume of the extract, digestate, scrubber, etc.), Initials of the Preparation Technician, Volume of Surrogate Standard (organic preparations), Comments, QC Sample Source (matrix spikes and duplicates), QC Spike Standard ID and Spike Amount. The date prepared will default to current date and time. Additional, unlimited numbers of samples can be added at any time. Default

QC samples will automatically be added based on the number of samples on the bench sheet and can be edited at any time. Additional parameters can be added to the Bench Sheet by modifying the print out format using Crystal Reports software (e.g. pH recorded for Method 8270 aqueous extractions). The Bench Sheet is intended to be filled-in by the persons preparing the samples. The Bench Sheet may also require the initials (and date) of the technician witnessing the addition of spike standards to QC samples. The Bench Sheet must be reviewed for accuracy by supervising personnel whom then signs and dates the sheet. Depending on the type of Bench Sheet (organic preparation, metals digestion, wet chemistry etc.) an Analyst or Data Reviewer may also be required to sign and date the Bench Sheets for review purposes.

5.1.3 Sample Preparation Logbooks

Some sample preparations use a logbook in conjunction with the batch/bench sheet. The logbooks are hard covered and bound notebooks with pre-numbered pages. The following information must be recorded into these logbooks:

a. The date of extraction and the initials of the technician performing the extraction.
b. The identification numbers of any standards used in the extraction.
c. The method of extraction used.
d. The QA/QC Batch Number assigned by Element.
e. The WST sample ID number (Work Order number) of each sample extracted and the weight or volume of sample extracted.
f. The final volume of extract.
g. The volume of laboratory control sample standard added to the spiked blank sample.
h. The WST sample ID number of the sample selected for matrix spike analysis, the volume of matrix spike added, and ID number of the matrix spike standard used.
i. Any comments or observations on occurrences during the extraction procedure, especially if they may effect the results of the data generated.
j. The lot number and manufacturer of the solvents used to extract the samples and the ID number of each reagent used.

Upon completion of the extraction, a photocopy of the sample preparation logbook will be given to the appropriate analyst along with the extracts and the bench sheet. The analyst will then submit the copy of the preparation logbook and the bench sheet as part of the data package for review.

5.1.4 Wet Chemistry Logbooks

Since the preparation of samples for wet chemistry analyses is typically not as involved as the extraction of samples for

organic, radiochemical, or metals analyses, the preparation and analysis data for wet chemistry analyses will be recorded in the same logbook. Each wet chemistry analysis will have its own individual logbook designed to record all the data pertinent to that analysis. This would including, the date of analysis, the initials of the technician performing the analysis, the WST sample ID numbers being analyzed, the final results obtained for each sample analyzed, the results of all QC sample analyses, and the lot number or ID number of the reagents and standards used for the analysis. Some of the other records kept in association with the wet chemistry analyses, such as reagent preparation, may be maintained in separate notebooks.

All notebooks used to record wet chemistry data are bound with hard covers and have pre-numbered pages. They are issued to the analysts by the QA/QC Officer. The QA/QC Officer assigns each notebook a number and records the date of issuance, the notebook title and the name of the analyst to whom the notebook was issued alongside of this number on a Notebook Distribution Sheet which he/she maintains.

Users of the notebook will maintain good laboratory practices in their use. All entries will be made with indelible ink. No pages will be torn out of the notebook. Corrections will be made by marking a single horizontal line through the mistake, followed by initializing and dating the correction. Tape or liquid paper will not be permitted when making corrections.

The use of notebooks, however, does not preclude the need to prepare the Bench Sheet for each analysis batch. Batches need to be created and sample IDs need to be added to Bench Sheets in order to enter sample results into the Element DataSystem. The appropriate QC samples will also be assigned in the Bench Sheet. Bench Sheets for wet chemistry analyses need to be peer reviewed for accuracy and signed and dated. After the analysis results are entered into the Element DataSystem, the signed Bench Sheet is then submitted for data review along with a copy of the completed notebook. The data reviewer will check the entered results for accuracy and completeness and then sign and date the Bench Sheet.

5.1.5 Radiochemistry Sample Preparation

Since the preparation of samples for radiochemistry analyses involves numerous steps, it is recorded using three documents, the Bench Sheet, an index tracking form and the preparation logbook. Each batch of samples is assigned a Work Order from Element DataSystem that is used to track the preparation. Also recorded are the date assigned, technicians initials, Work Order sample ID numbers of the samples being prepared, the number of samples in the batch, the analysis being performed, the client name and any applicable comments. The Bench Sheet is used to record the weight or volume of sample and the QC samples

associated with the batch while the sample preparation logbook is used to record each step of the digestion performed on the batch. The Work Order number, the date the step is performed and the name of the technician performing the step are recorded at the beginning of each day's entry. The Bench Sheet is peer reviewed, signed and dated and submitted with the data package for review.

5.1.6 Record Keeping in Instrumental Analysis

The analysis of samples by GC, GC/MS, ICP, graphite furnace AA, TOC Analyzer, Ion Chromatography, Gamma Counter, Alpha Analyst, and Gas Proportional Counter will be documented using an analysis sequence log. The sequence log may be in the form of a notebook or a computer generated log sheet that is filed in an analysis sequence binder. For GC/MS, ICP and GC analyses, an Analysis Sequence Sheet is created in the Element DataSystem and is used in conjunction with the analysis log. The analysis log or analysis log/Analysis Sequence Sheet combination must document, at a minimum, the following information:

1. The date of the analysis.
2. The WST sample ID numbers analyzed.
3. The ID of the instrument used for the analysis. Each instrument will have its own analysis sequence log.
4. The ID numbers of the initial, continuing or QC check standards used through out the analysis sequence. In the case of GC/MS analyses, the tune standard ID number must also be recorded.
5. The ID numbers of the QC samples analyzed in the sequence.
6. The dilution factor, if the sample required dilution prior to analysis.
7. The name of the data file associated with each analysis of the sequence (For ICP and graphite furnace AA there is only one date file name for the entire analysis sequence).

The analysis log must show the sequence in which the samples standards and QC samples were analyzed. The log may also contain data used in the reduction of data to obtain final results such as sample weights or volumes and final extraction volumes, however, this information is typically documented in the Element DataSystem Bench Sheet.

Upon completion of the analysis, the analyst will enter the sample results into the Element DataSystem. Data entry is performed either manually or by computer file transfer via Element DataSystem DataTool. The analyst will also enter the results of method blank, laboratory control sample, continuing calibration verification, matrix spike, and duplicate or matrix

spike duplicate sample analyses into Element DataSystem for review.

A copy of the analysis log or notebook will be submitted as part of the data package for review along with the Analysis Sequence Sheet, if applicable. The Analysis Sequence Sheet should be signed and dated by the analyst(s). The data package will also include the Element DataSystem Bench Sheet, the hard copy print outs of all continuing calibration standard, QC sample and site sample analyses.

5.2 Data Reduction

Reducing the data to a reportable form is the responsibility of the analyst performing the analysis. It is of utmost importance that the analyst pay close attention to the data being reduced by him or her since the data is only spot checked beyond analysis. In reducing the data generated by an analysis, the analyst must review the following:

a. The continuing calibration analysis to assess the validity of the current calibration.
b. The method blank analysis to assure that no analyte concentration is above the method detection limit.
c. The recoveries of each of the analytes from the laboratory control sample analysis to assure that they meet acceptable criteria.
d. The concentration of each integrated analyte to assess if the concentration has exceeded the upper linear range, making further dilution of the sample or sample extract necessary, or if the concentrations are below the detection limit.

For GC and GC/MS analyses the following must also be reviewed:

a. The retention times of each of the integrated analytes to assure that they are within the acceptable windows and that the analyte peaks were correctly identified.
b. The integration of each analyte peak.
c. For GC/MS analyses, the tuning standard must be reviewed to assure that it meets acceptable criteria.
d. For GC/MS analyses, the spectrum of each identified peak must be verified to assure that it meets acceptable criteria.

For Radiochemical analyses the following must also be reviewed:

a. For Alpha Spectrometry, daily Pulser check, monthly background and secondary calibration checks.
b. For Gas Proportional Counting, daily source and monthly background checks, and annual Self-Absorption check.
c. For gamma spectrometry, daily source and monthly background checks.

When the above reviews are completed and satisfactory, the concentration of each analyte in the sample can be determined using the following calculation:

$$C = \frac{I}{RF} \times \frac{1}{Vi} \times \frac{Ve}{As} \times DF$$

Where,
C = Concentration of the analyte in the sample, in appropriate units [µg/L (ppb), mg/L (ppm), or µg/Kg (ppb), mg/Kg (ppm)]

I = Signal size, in units appropriate to the method

RF = The response factor, in units of signal size per unit weight of the analyte. This response factor is essentially a mean response factor determined through regression of the initial calibration curve.

Vi = The aliquot size of the prepared sample taken for analysis, in units of ml. For some analyses this value is 1 since the same volume is used for initial calibration and for sample analyses.

Ve = The total volume of the prepared sample in ml.

As = The amount of sample taken for preparation. For liquid samples, the volume in liters is used; for solid samples, use the weight in Kg. If the results are to be determined on the basis of dry weight, use the following to determine sample size:

$$As\ (dry) = As\ (wet) \times \frac{\%\ Solids}{100}$$

DF = Dilution factor. The dilution factor is 1 for samples that are prepared exactly as prescribed in the protocol. If the soil or water extract required dilution, then the dilution factor differs from unity. For example, if an extract is diluted from 1 ml to 10 ml, the dilution factor becomes 10.

In most instrumental analyses, a computer is used that will automatically calculate the ratio I/RF for each analyte from the current calibration table or linear regression curve based on the initial calibration. The I/RF ratio is given in units of weight per volume for each of the analytes found in sample analyzed. These values are then either entered manually or by DataTool into DataElement. The values for Vi, Ve, As (usually dry weight for soils) are contained in the preparation bench sheet and DataElement then uses all of the data to calculate C for each analyte found in the sample.

Although computerized data reduction alleviates the need for extensive manual data reduction, manual calculation of some of the results from each analysis batch will checked by the analyst and a second tier reviewer. The QA/QC Department and Laboratory Director will also perform spot checks of the data reduction during data review to verify that the data was correctly reduced. These calculations will be signed and dated as proof of the review.

5.3 Data Validation

Before data from an analytic batch can be incorporated into reports, it must be validated by a Second Tier Reviewer and by the QA/QC Officer through the review of the overall data package associated with the analytic batch. The Second Tier Reviewer will check the items listed below, using a checklist to document the review. Figures 5-1 through 5-8 show the forms that are used for the review of data.

1. Is the batch complete?
2. Have all the analyses been performed within the holding times of the samples?
3. Is there a valid continuing calibration for each analyte associated with the analyses of the individual samples within the batch?
4. For metals analyses, is there a valid initial calibration curve for each analyte and were initial calibration verification, interference check and quality control check standards analyzed where appropriate?
5. For GC/MS analyses, is there a valid tune analysis associated with the sample batch?
6. Is the sequence of runs in which the samples were analyzed proper for the method? Were method blanks, continuing calibrations, duplicates, matrix spikes, and spiked blanks run within the frequency listed in the method?
7. For GC and GC/MS analyses, are the surrogate recoveries from the samples within established control limits for the sample matrix analyzed? If not, has the sample preparation and analysis been repeated, and have recoveries been acceptable in the repeated analysis?
8. Is the recovery of spiked compounds in the laboratory control sample acceptable?
9. Is the recovery of the spiked compounds in the matrix spike sample acceptable? If not, has there been an acceptable explanation or a repeat of the analysis?
10. Do duplicate analyses in the run sequence exhibit precision within the control limits?

11. Is the documentation in order? Are dates, QA/QC Batch Numbers, standard ID numbers, and reagent information complete?

If the answer to all of the above questions is "yes", the Second Tier Reviewer can submit the data to the QA/QC Department for third tier review. The Second Tier Reviewer will also check the results for each sample in the Element DataSystem database to assure that it is correct since the results from Element DataSystem will be used to generate the finalized result report.

If the answer to any of the above questions is "no", corrective actions will be initiated by the Second Tier Reviewer, in conjunction with the QA/QC Officer and the analyst. If, after implementation of corrective actions, all criteria are met, the data can then be released for third tier review. If some criteria are not met, the batch can be released, depending on what is not met and if there is sufficient explanation. However, regardless of the rationale, data will not be released if the following conditions exist:

1. GC/MS did not meet tuning criteria
2. Continuing calibration was not performed or did not meet the review criteria.
3. Laboratory control sample analysis (spiked blanks) did not meet review criteria.
4. The data set was not complete.

Corrective actions for these situations will be addressed in Section 6.0, Corrective Actions.

Once the Second Tier Reviewer approves the data, he or she will sign off on the checklist, attach it to the data package and will then lock the data in the Element DataSystem. The data package will then be submitted to the QA/QC Officer. The QA/QC Officer will also review the data package but not to the same extent as the second tier review. The QA/QC Officer will check the package for completeness, ensure the first and second tier reviews have been properly completed and spot check the results in the Element DataSystem. The QA/QC Officer will also ensure that all non-conformances have been properly addressed and that the appropriate corrective actions have been taken. This will also include, if necessary, ensuring that the data has been properly flagged. At the completion of review, the QA/QC Officer will change the status of the sample from Analyzed to Reviewed in the Element DataSystem LIMS, then sign and date the review form.

5.4 Final Reporting

After all of the analyses on a sample or group of samples is completed and reviewed for accuracy, a final analytical result report is generated by the Data Coordinator. The data from the Element DataSystem database is exported into

the appropriate Crystal Report form used to produce a final result report.

The final reports generated by the Data Coordinator are then submitted to the Laboratory Director or a designee for final review. The reviewer will sign off on the report and return it to the Data Coordinator. A copy of the report is made and filed according to the work order number and the original copy is sent to the client or the client's agent. As part of WST's confidentiality policy, a lead sheet that includes a confidentiality notice (Figure 5-9) must be used when results are transmitted via facsimile.

A report may also be produced as electronic data deliverable (EDD) using various formats (e.g., PDF, Excel, ERPIMS, ADR Adapt etc.). Typically, the hardcopy report is generated and reviewed first prior to the EDD. The EDD is then e-mailed to the client.

5.5 Data and Report Storage and Retention

Hard copies of generated data packages and final result reports will be archived in a locked storage area. Tapes containing electronically stored data will be stored in a locked, fireproof filing cabinet while archived laboratory notebooks will be stored in a locked, fireproof room. Any items retrieved from these rooms need to be recorded on an Archive Room Access Log Sheet. Recorded will be the person retrieving the item, the date and time taken, a description of the item retrieved and the date and time the item was returned.

Records for QA documentation are retained according to the schedule shown in Table 5-1. In the unlikely event that Waste Stream Technology Inc.'s laboratory transfers ownership or goes out of business, our clients will be contacted immediately and given the opportunity to obtain any available records associated with the analysis of their samples. Records older than the retention times listed in Table 5-1 may not be available.

Table 5-1

QUALITY ASSURANCE RECORDS

Records	Location	Retention
Analysis Report Hardcopy	Client File	5 years
Audit Reports	QA File	7 years
Certification Records	QA File	5 years
Correspondence		
Project-related	Project File	Project Specific
Non-project-related	QA File	5 years
Instrument/Equipment Calibration and Maintenance Records	QA File	5 years
Methods Manual, Revisions, Transmittal Records	QA File	7 years
Quality Assurance Manual, Revisions, Transmittal Records	QA File	7 years
Non-conformance/Corrective Action Reports	QA File	5 years
Procurement Documents	Procurement Log	1 year
Quality Control Acceptance Criteria, Control Charts, and Current Data	QA File	5 years
Quality Control Reports	QA File	5 years
Raw Data Notebooks, Discs, Printouts, Recorder Tracings	Laboratory Files	5 years
QA Project Plans	Project File	Project Specific
Standard Curves	Laboratory Files	5 years
Training Records	QA Files	5 years

FIGURE 5-1

Waste Stream Technology Inc.

First and Second Tier Lab Data Review Check List - GC

Work Order Number(s):
Batch Number(s)/Sequence Numbers(s)
Client(s):
Analysis Method(s)/Analysis Date(s):
Instrument ID:
Last Calibration Date:

Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review(X)
A. Initial Calibration				
1. Is Initial Calibration Included in Data Package				
1a. If yes, review 2 through 6 below.				
1b. If no, was initial calibration data previously reviewed and acceptable?				
2. Does the curve consist of at least five calibration levels?				
3. Is the low standard near, but above the MDL?				
3. Are the correlation coefficients within method criteria (>0.995)? Did the intercept/slope (b/m) ratio meet criteria?				
4. Was the initial calibration curve verified using an independent second source standard and did the analysis meet criteria?				
B. Sample Analysis				
1. For pesticide analysis, was an injection port primer standard analyzed? Was an endrin/DDT degradation standard analyzed and did it meet criteria?				
2. Was a continuing calibration analysis performed for every 10 sample analyses and at the end of the run sequence?				
3. Are the % recoveries of the compounds from the continuing calibration analyses within QC limits (85% to 115% of expected value)?				
4. Were dilutions performed on samples that contained analyte concentrations > the upper calibration range?				
5. Are reported compounds within retention time windows?				
6. Have reported compounds been confirmed on a second column (for pesticides, herbicides and GC VOCs)?				
7. Are internal standard areas within QC limits (for GC VOCs)?				
8. Are surrogate recoveries within QC limits?				
9. Was the sample re-analyzed to confirm sample matrix effects?				
10. Were the samples extracted and/or analyzed within holding time?				
11. For PCB analyses, were clean up methods used as appropriate?				

Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
C. QC Samples				
1. Is the concentration of the target analytes in the method blank analysis less than MRLs (or less than MDL for the appropriate projects)?				
2. Are the recoveries for the target analytes from the laboratory control sample (BS) within QC limits (or within sporadic margin of failures for USACE projects; except: Higgins Farm, no SMF's allowed)?				
3. Are the recoveries for the target analytes from the MS and MSD within QC limits (or within sporadic margin failures for USACE projects) and are the RPDs between the MS and MSD within QC limits?				
4. If the MS and MSD recoveries are not within QC limits have they been re-analyzed to confirm sample matrix effects?				
D. LIMS				
1. After the data has been imported into Element and saved, has the data been queried to identify any non-conformances (i.e., red flags)?				
2. Have all of the non-conformances been addressed?				
3. Has the compound list for each sample been reviewed and does an X appear for those compounds in the Rpt box?				
4. Has the data been reviewed for false positives and have all the false positive results been removed?				
5. Have the bench sheet(s) been reviewed for accuracy and are they appropriately reviewed?				
6. Are all bench sheets (extraction, TCLP) and sequences included in the data package? Have they been signed and dated appropriately?				

Comments on any "No" Response:		
Analyst:	Date:	
Second Tier Reviewer:	Date:	
QA/QC Officer:	Date:	

FIGURE 5-2

Waste Stream Technology Inc.
First and Second Tier Lab Data Review Check List-GC/MS

Work Order Number(s):
Batch Number(s)/Sequence Numbers(s)
Client(s):
SVOC Analysis Method(s): 8270C 625
VOC Analysis Method(s): 8260B 624 524
Instrument ID(circle one): SVOC 5972A 5972C
VOC: 5971 5972B 5973
Last Calibration Date:
Analysis Date(s):

Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
A. Initial Calibration				
1. Is Initial Calibration Included in Data Package				
1a. If yes, review 2 through 6 below.				
1b. If no, was initial calibration data previously reviewed and acceptable?				
2. Does the curve consist of at least five calibration levels?				
3. Did the DFTPP/BFB tune analysis associated with the initial calibration meet criteria?				
4. Is the low standard near, but above the MDL?				
5. Are the RRFs and %RSDs within method criteria appropriate to the method?				
6. Was the initial calibration curve verified using an independent second source standard and did the analysis meet criteria?				
B. Sample Analysis				
1. Did the 12-hour BFB/DFTPP analysis meet tuning criteria and were all analyses performed within the 12 hour tune period?				
2. Was a continuing calibration analysis performed for every 12-hour period?				
3. Are the RRFs and % differences within QC limits for the appropriate SPCC and CCC compounds?				
4. Were dilutions performed on samples that contained analyte concentrations > the upper calibration range?				
5. RRT of identified compounds within 0.06 RRT units of RRT of CCC standard component?				
6. Was the mass spectra visually reviewed (ion ratios and abundances) and compared to the reference spectrum for all hits?				
7. Are internal standard areas within QC limits?				
8. Are surrogate recoveries within QC limits (not more than one BN and one AP surrogate for SVOCs)?				
9. Was the sample re-analyzed to confirm sample matrix effects?				

10. Were the samples extracted and/or analyzed within holding time?				
Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
C. QC Samples				
1. Is the concentration of the target analytes in the method blank analysis less than MRLs (or less than MDL for the appropriate projects)?				
2. Are the recoveries for the target analytes from the laboratory control sample (BS) within QC limits (or within sporadic margin of failures for USACE projects; except: Higgins Farm, no SMF's allowed)?				
3. Are the recoveries for the target analytes from the MS and MSD within QC limits (or within sporadic margin failures for USACE projects) and are the RPDs between the MS and MSD within QC limits?				
4. If the MS and MSD recoveries are not within QC limits have they been re-analyzed to confirm sample matrix effects?				
D. LIMS				
1. After the data has been imported into Element and saved, has the data been queried to identify any non-conformances (i.e., red flags)?				
2. Have all of the non-conformances been addressed?				
3. Has the compound list for each sample been reviewed and does an X appear for those compounds in the Rpt box?				
4. Has the data been reviewed for false positives and have all the false positive results been removed for the compounds of interest ?				
5. Have the bench sheet(s) been reviewed for accuracy and are they appropriately reviewed?				
6. Are all bench sheets (extraction, TCLP) and sequences included in the data package? Have they been signed and dated appropriately?				

Comments on any "No" Response:		
Analyst:	Date:	
Second Tier Reviewer:	Date:	
QA/QC Officer:	Date:	

FIGURE 5-3

Check List - ICP

Waste Stream Technology Inc. First and Second Tier Lab Data Review Check List - ICP				
Work Order Number(s):				
Batch Number(s)/Sequence Numbers(s)				
Client(s):				
Analysis Method(s):				
Instrument ID:				
Last Calibration Date:				
Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
A. Initial Calibration				
1. Does the daily standard curve consist of a Calibration Blank and the required minimum number of calibration Standards?				
2. Is the low standard near, but above, the MDL?				
3. Are the highest calibration standards, HCV (10mg/L) and LCV (1mg/L), reanalyzed immediately after calibration and results within QC limits?				
4. Are the CCV standards analyzed at required frequency and at the end of the analytical sequence and all parameters within QC limits?				
5. Is a calibration blank (CCB) analyzed after initial calibration, at required frequency and at the end of the analytical sequence and all parameters within acceptance criteria?				
6. Was the initial calibration curve verified using an independent second source standard, SCV, and did the analysis meet criteria?				
7. Are the Interference Check Standards, IFA,B analyzed at at the beginning of the analytical sequence and all parameters within QC limits?				
B. Sample Analysis				
1. Are all sample holding times met?				
2. Are all samples with concentrations > the highest standard used for initial calibration diluted and reanalyzed? In the case of some analytes (e.g. Calcium) was the result reported within the linear range of the curve?				
3. Is the correct methodology used for sample prep and analysis?				
C. QC Samples				
1. Is the concentration of the target analytes in the method blank analysis less than MRLs (or less than MDL for the appropriate projects)?				
2. Are the recoveries for the target analytes from the laboratory control sample (BS) within QC limits (or within sporadic margin of failures for USACE projects; except: Higgins Farm, no SMF's allowed)?				

3. Are the recoveries for the target analytes from the MS and MSD within QC limits (or within sporadic margin failures for USACE projects) and are the RPDs between the MS and MSD within QC limits?				
Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
4. If the MS and MSD recoveries are not within QC limits have they been re-analyzed to confirm sample matrix effects?				
5. Are the recoveries for the target analytes from the post-digestion spike analyses within QC limits?				
6. Were 5X dilution interference checks analyzed and are the results within acceptance criteria?				
D. LIMS				
1. After the data has been imported into Element and saved, has the data been queried to identify any non-conformances (i.e., red flags)?				
2. Have all of the non-conformances been addressed?				
3. Has the compound list for each sample been reviewed and does an X appear for those compounds in the Rpt box?				
4. Has the data been reviewed for false positives and have all the false positive results been removed?				
5. Have the bench sheet(s) been reviewed for accuracy and are they appropriately reviewed?				
6. Are all bench sheets (extraction, TCLP) and sequences included in the data package? Have they been signed and dated appropriately?				
Comments on any "No" Response:				
Analyst:		Date:		
Second Tier Reviewer:		Date:		
QA/QC Officer:		Date:		

FIGURE 5-4

Check List -GFAA

Waste Stream Technology Inc. First and Second Tier Lab Data Review Check List -GFAA				
Work Order Number(s):				
Batch Number(s)/Sequence Numbers(s)				
Client(s):				
Analysis Method(s)/Analysis Date(s):				
Instrument ID:				
Last Calibration Date:				
Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
A. Initial Calibration				
1. Does the daily standard curve consist of a Calibration Blank and the required minimum number of calibration Standards? Does the curve meet acceptable criteria (r>0.995)				
2. Is the low standard near, but above, the MDL?				
3. Is a mid-level calibration standard (ICV) reanalyzed immediately after calibration and results within QC limits?				
4. Was the initial calibration curve verified using an independent second source standard, QC Check Standard or SCV, and did the analysis meet criteria?				
5. Was a CCB analyzed immediately after calibration, at the required frequency and at the end of the analytical sequence and did the analyses meet criteria?				
6. Are the CCV standards analyzed at the required frequency and at the end of the analytical sequence and were the analyses within QC limits?				
B. Sample Analysis				
1. Are all sample holding times met?				
2. Are all samples with concentrations > the highest-standard used for initial calibration diluted and reanalyzed?				
3. Is the correct methodology used for sample prep and analysis?				
4. Are post-digestion spikes analyzed and are the results within QC limits? If not, was the method of standard additions performed?				
C. QC Samples				
1. Is the concentration of the target analytes in the method blank analysis less than MRLs (or less than MDL for the appropriate projects)?				
2. Are the recoveries for the target analytes from the laboratory control sample (BS) within QC limits (or within sporadic margin of failures for USACE projects; except: Higgins Farm, no SMF's allowed)?				

3. Are the recoveries for the target analytes from the MS and MSD within QC limits (or within sporadic margin failures for USACE projects) and are the RPDs between the MS and MSD within QC limits?				
Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
4. If the MS and MSD recoveries are not within QC limits have they been re-analyzed to confirm sample matrix effects or was an MSA analysis performed on the sample digestate?				
D. LIMS				
1. After the data has been imported into Element and saved, has the data been queried to identify any non-conformances (i.e., red flags)?				
2. Have all of the non-conformances been addressed?				
3. If Data Tool was used, has the data been reviewed for false positives and have all the false positive results been removed?				
4. Have the bench sheet(s) been reviewed for accuracy and are they appropriately reviewed?				
5. Are all bench sheets (extraction, TCLP) and sequences included in the data package? Have they been signed and dated appropriately?				

Comments on any "No" Response:

Analyst:	Date:	
Second Tier Reviewer:	Date:	
QA/QC Officer:	Date:	

FIGURE 5-5

DATA VALIDATION CHECKLIST-RADIOISOTOPE ANALYSIS

			Complete for each batch of 26 samples		
	ANALYSIS:	STF#		SG#	
	ISO/MAT	00-			
Date Reviewed:	/ /	Reviewed By	Int:		Sample Location
		Duplicate Sample No(s):			
Spike Sample No(s):	0	0			
Requirement	Criteria		Sample(s) Reviewed	ata Acceptable (Y/N)	Comment
		Sample Tracking Form			
Sample Data	le Tracking Form in all applicable areas for analysis performed		Sample Tracking Form		
Method Blank (MB)	One MB per each group of 20 samples		MB		
thod Blank Spike (MBS)	One MBS per each group of 20 samples		MBS		
ample Duplicate (DUP)		One DUP per 10 samples	DUP (s)		
Spike (S)		One S per 10 samples	S (s)		
		Sample Results			
et data correctly entered	touts to spreadsheet without error. IF 25% of these points in error, THEN ALL data is reviewed.		MB		
			MBS		
		WS			
		WS			
MB \ MBS Recovery	40% min.		MB / MBS		
ample \ Spike Recovery	40% min Soil ONLY.				
e DUP \ Spike Recovery	40% min. Soil ONLY				
Tracer Recovery	40% min. Soil ONLY	WS			
		WS			
		Review by Rad Lab Mgr			
Sample Spectrum	r MBS, sample (2), DUP (2), and S (2) in every batch of 26				
		WS			
		WS			
Duplicate Error Ratio	Each DUP performed < = 1		DUP		
			DUP		
ative Percent Difference	Each DUP performed < 10%		DUP		
			DUP		
Control Charts Updated	Sample Batch	Date Entered		/ /	
	page 1 of 1				Rad Lab 11/30/99

FIGURE 5-6
DATA VALIDATION CHECKLIST
Ion Chromatography

Waste Stream Technology Inc.
First and Second Tier Lab Data Review Check List - Ion Chromatography

Work Order Number(s):
Batch Number(s)/Sequence Numbers(s)
Client(s):
Analysis Method: EPA 300.1
Analysis Date(s):
Instrument ID: Dionex DX 120 SE
Last Calibration Date:

Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
A. Initial Calibration				
1. Is Initial Calibration Included in Data Package				
1a. If yes, review 2 through 5 below.				
1b. If no, was initial calibration data previously reviewed and acceptable?				
2. Does the curve consist of at least five calibration levels?				
3. Is the low standard near, but above the MDL?				
4. Are the correlation coefficients within method criteria (>0.995)? Did the intercept/slope (b/m) ratio meet criteria?				
5. Was the initial calibration curve verified using an independent second source standard and did the analysis meet criteria?				
B. Sample Analysis				
1. Was a continuing calibration analysis performed at the beginning, for every 10 sample analyses and at the end of the run sequence?				
2. Are the % recoveries of the anions from the continuing calibration analyses within QC limits (90% to 110% of expected value)?				
3. Were dilutions performed on samples that contained analyte concentrations > the upper calibration range?				
4. Are the reported anions within retention time windows?				
5. Were the samples analyzed within holding time?				

Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
C. QC Samples				
1. Is the concentration of the target analytes in the method blank analysis less than MRLs?				
2. Are the recoveries for the target analytes from the laboratory control sample (BS) within QC limits?	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
3. Are the recoveries for the target analytes from the MS and MSD within QC limits and are the RPDs between the MS and MSD within QC limits?				
4. If the MS and MSD recoveries are not within QC limits have they been re-analyzed to confirm sample matrix effects?				
Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
D. LIMS				
1. After the data has been imported into Element and saved, has the data been queried to identify any non-conformances (i.e., red flags)?				
2. Have all of the non-conformances been addressed?				
3. Has the compound list for each sample been reviewed and does an X appear for those compounds in the Rpt box?				
4. Has the data been reviewed for false positives and have all the false positive results been removed?				
5. Have the bench sheet(s) been reviewed for accuracy and are they appropriately reviewed?				
6. Are all bench sheets and sequences included in the data package? Have they been signed and dated appropriately?				
Comments on any "No" Response:				
Analyst:		Date:		
Second Tier Reviewer:		Date:		
QA/QC Officer:		Date:		

FIGURE 5-7
CHECKLIST-TOC

Waste Stream Technology Inc.
First and Second Tier Lab Data Review Check List - Total Organic Carbon

Work Order Number(s):				
Batch Number(s):				
Client(s):				
Analysis Method: EPA 415.1				
Analysis Date(s):				
Instrument ID: Dohrmann DC-180				
Last Date of Single Point Calibration:				
Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
A. Sample Analysis				
1. Was a 0.2 mg/L continuing calibration analysis performed at the beginning of the run sequence?				
2. Was a laboratory control sample analyzed at the beginning and end of the run sequence and for every 10 samples analyzed?				
3. Were dilutions performed on samples that contained analyte concentrations > the upper calibration range?				
4. Were the samples analyzed within holding time?				
5. Were replicate analyses performed for each sample?				
6. Was the TOC spreadsheet reviewed against the instrument printout to ensure there were no transcription errors?				
C. QC Samples				
1. Is the concentration of TOC in the method blank analysis less than MRLs?				
2. Is the recovery of TOC from the laboratory control sample (BS) within QC limits (80% to 120% of expected value)?				
3. Are the TOC recoveries from the MS and MSD within QC limits and are the RPDs between the MS and MSD within QC limits?				
4. If the MS and MSD recoveries are not within QC limits have they been re-analyzed to confirm sample matrix effects?				
D. LIMS				
1. After the data has been entered into Element and saved, has the data been queried to identify any non-conformances (i.e., red flags)?				

Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
2. Have all of the non-conformances been addressed?				
3. Have the bench sheet(s) been reviewed for accuracy and are they appropriately reviewed?				
4. Is the bench sheet(s) included in the data package? Has it been signed and dated appropriately?				
5. Is a completed run log included in the data package?				

Comments on any "No" Response:		
Analyst:	Date:	
Second Tier Reviewer:	Date:	
QA/QC Officer:	Date:	

FIGURE 5-8
VALIDATION CHECKLIST-CYANIDE

Waste Stream Technology Inc.
First and Second Tier Lab Data Review Check List - Cyanide

Work Order Number(s):
Batch Number(s)
Client(s):
Analysis Method: EPA 335.2 9010B/9014
Analysis Date(s):
Instrument ID: Spectronic 20 Plus
Last Calibration Date:

Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
A. Initial Calibration				
1. Is Initial Calibration Included with the Data				
1a. If yes, review 2 through 5 below.				
1b. If no, was initial calibration data previously reviewed and acceptable?				
2. Does the curve consist of at least five calibration levels?				
3. Is the low standard near, but above the MDL?				
4. Are the correlation coefficients within method criteria (>0.995)? Did the intercept/slope (b/m) ratio meet criteria?				
5. Was the initial calibration curve verified using an independent second source standard and did the analysis meet criteria?				
6. Were the high and low curve standards distilled and analyzed and did the analysis results meet criteria?				
B. Sample Analysis				
1. Was a continuing calibration analysis performed at the beginning, for every 10 sample analyses and at the end of the run sequence?				
2. Was the % recovery of cyanide from the continuing calibration analyses within QC limits (85% to 115% of expected value)?				
3. Were dilutions performed on samples that contained analyte concentrations > the upper calibration range?				
4. For 9010B/9014 analyses, were the high and low curve standards distilled and analyzed and did the analysis results meet criteria?				

Review Item	Yes (X)	No (X)	N/A (X)	2nd Level Review (X)
5. Were the samples analyzed within holding time?				
6. Were samples containing interferences pre-treated prior to distillation?				
7. For amenable cyanide analysis, was a second portion of the sample chlorinated and distilled?				
C. QC Samples				
1. Is the concentration of cyanide in the method blank analysis less than MRLs?				
2. Is the recovery for cyanide from the laboratory control sample (BS) within QC limits?				
3. Are the recoveries for cyanide from the MS and MSD within QC limits and are the RPDs between the MS and MSD within QC limits?				
4. If the MS and MSD recoveries are not within QC limits have they been re-analyzed to confirm sample matrix effects?				
D. LIMS				
1. After the data has been entered into Element and saved, has the data been queried to identify any non-conformances (i.e., red flags)?				
2. Have all of the non-conformances been addressed?				
3. Have the bench sheet(s) been reviewed for accuracy and are they appropriately reviewed?				
4. Is the bench sheet(s) included in the data package? Have they been signed and dated appropriately?				

Comments on any "No" Response:		
Analyst:	Date:	
Second Tier Reviewer:	Date:	
QA/QC Officer:	Date:	

FIGURE 5-9

FAX LEAD SHEET

WASTE STREAM TECHNOLOGY

302 GROTE STREET
BUFFALO, NY 14207
Phone (716)876-5290

Environmental Laboratory Services, Radiological Laboratory Services, and Bioremediation Supplies and Services

If this fax is incomplete or illegible, please call the number listed above.

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CORRECTIVE ACTIONS, PREVENTIVE MAINTENANCE, AND INSTRUMENT MAINTENANCE LOGS

6.1 Identification and Documentation of Problems

There are many areas throughout an analysis where corrective actions may be required. The decision to undertake corrective actions and ensuing actions must be documented so that traceability can be maintained. The analyst, Second Tier Reviewer and/or the QA/QC Officer can initiate corrective actions. However, the Second Tier Reviewer and/or QA/QC Officer is more likely to initiate corrective actions since he/she is the most exposed to malfunctions of the laboratory as they reflect upon the data produced. Any actions taken that affect the quality of the data must be documented and become part of the laboratory's permanent record.

During the course of data review, the Second Tier Reviewer or QA/QC Officer may make an observation that will prompt a decision to pursue corrective actions. The Second Tier Reviewer or QA/QC Officer is responsible for informing the analyst that a problem appears to exist. The types of problems that are observed usually fall into three categories; procedural problems, sample matrix effects, and equipment or instrument problems. All three categories may prompt the Second Tier Reviewer or QA/QC Officer to request that a sample or group of samples be re-extracted and/or re-analyzed. When this situation arises, the Second Tier Reviewer and/or QA/QC Officer will initiate the corrective action by filling out a Sample Re-extraction/Re-Analysis Form (Figure 6-1). The following information will be entered on the form;

1. The date of the request.
2. The Request Number. This number (initials of person making request, followed by date and number of request for that date) is assigned by the Second Tier Reviewer or QA/QC Officer for purposes of tracking the distribution of request forms.
3. The ID number(s) of the sample(s) to be re-analyzed.
4. The analysis method to be performed and whether the sample(s) requires re-extraction and re-analysis or just re-analysis.
5. The reason for the request. This entry will detail the problem encountered and the corrective actions required prior to re-extraction or re-analysis of the sample(s).
6. The person to whom the request was submitted and the corresponding laboratory department.
7. The date by which the corrective actions and sample re-analysis must be completed.

Upon completion of the re-analysis, the analyst will return the Request Form to the Second Tier Reviewer or QA/QC Officer along with all of the data pertinent to the required corrective action and subsequent sample re-analysis. The Second Tier Reviewer or QA/QC Officer will review the data and record any comments regarding the review. When the review is completed, he/she will sign and date the form. The form will then be filed with the data package. Depending on the results of the re-analysis the Second Tier Reviewer or QA/QC Officer may need to record the review comments into the Memo field of the work order of the affected samples. The comments can then be incorporated into the case narrative of the work order if necessary.

Other corrective actions may be required that do not involve sample re-analysis. In these cases, the QA/QC Officer will notify the analyst or technician of a problem through a QC Memo. The memo will list the date of distribution, the name of the QA/QC Officer writing the memo, the person(s) to whom the memo was given, the memo reference number used by the QA/QC Officer for tracking memos that have been distributed, a detailed description of the problem and the corrective action(s) to be taken, and the date by which the actions need to be completed. If the problem identified by the QA/QC Officer is sufficient enough to significantly impact the quality of the data, the QA/QC Officer may stop the analysis of any additional samples until the problem is resolved. The analyst or technician must then record onto the memo a description of the corrective action(s) taken and the date it was performed. The analyst will then return the memo to the QA/QC Officer for review. If the QA/QC Officer is satisfied that the corrective action has mitigated the problem, analysis of samples can be resumed. If not, he/she may issue another memo detailing the additional actions that need to be taken in order to resolve the problem.

If, upon repeated attempts, the QA/QC Officer feels that the actions taken have not satisfactorily corrected the problem, he/she will inform the appropriate corporate officer of the problem. The problem will then be resolved through a joint effort between the laboratory management, the QA/QC Officer, and the corporate officers.

In some situations, the need to correct an operation is apparent to the analyst and does not originate from the data validation process. For example, instrumental failures are determined by the analyst and corrective action is taken by repairing the instrument, either through a service call or through laboratory personnel. In this case, the corrective action must be recorded in the Instrument Maintenance Log (See Section 6.5) of the effected instrument.

CORRECTIVE ACTIONS, PREVENTIVE MAINTENANCE, AND INSTRUMENT MAINTENANCE LOGS

6.1 Identification and Documentation of Problems

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2. The Request Number. This number (initials of person making request, followed by date and number of request for that date) is assigned by the Second Tier Reviewer or QA/QC Officer for purposes of tracking the distribution of request forms.
3. The ID number(s) of the sample(s) to be re-analyzed.
4. The analysis method to be performed and whether the sample(s) requires re-extraction and re-analysis or just re-analysis.
5. The reason for the request. This entry will detail the problem encountered and the corrective actions required prior to re-extraction or re-analysis of the sample(s).
6. The person to whom the request was submitted and the corresponding laboratory department.
7. The date by which the corrective actions and sample re-analysis must be completed.

6.2.4. Laboratory Method Blank Exceeds Quantitation Limits

When the laboratory method blank exceeds the quantitation limit, the analyst or 2nd Tier Reviewer will immediately notify the QA/QC Officer. The analyst will check the reagents and apparatus for potential contamination. If reagents are contaminated, the existing batch will be rejected and a fresh batch from a new container will be prepared. If the problem arose from the apparatus, whether glassware or instrumental, the problem will be corrected by the analyst and/or extraction technician. The corrective action will be documented before any further analyses can be undertaken. The analyst will then notify the QA/QC Officer of the corrective action.

The samples will be re-extracted and re-analyzed to produce acceptable data. However, in instances where the analyte found in the blank is not detected or detected below the quantitation limit in the samples associated with the blank, the data may be accepted. The data may also be accepted if the analyte is found in the sample at a level that is greater than ten times that found in the blank. If re-extraction or re-analysis of a sample is not an option (e.g. sample holding is exceeded or not enough sample available) the sample data will be flagged using the B data qualifier.

6.2.5 Laboratory Control Sample (Spiked Blank) Exhibits Recoveries Outside the Acceptance Limits

When the laboratory control (LC) sample recoveries do not meet the acceptance criteria, the samples in the batch associated with the failed LC sample will be re-analyzed with a new LC sample and the original data will be rejected only for those analytes that did not meet acceptance criteria. However, if the analyte is not detected in the associated sample and the analyte recovery is greater than the upper quality control recovery limit, re-preparation and re-analysis will not be required. For multi-component analyses, data will be accepted when analyte recoveries do not meet acceptance criteria with the following provisions: that the number of analytes not meeting criteria fall within the allowable number of sporadic marginal exceedences (based on the number of compounds in the analysis); and the analytes not meeting criteria are not detected in the associated samples.

Before repeating the re-preparations of samples, the calibration of the instrument shall be checked by analyzing a continuing calibration check standard. If the instrument is within calibration, the samples will be re-prepared and re-analyzed. The source used to prepare the LCS should also be checked and a new one should be obtained if required.

If the instrument calibration has drifted, re-calibration will be performed and the samples will be re-analyzed.

If re-extraction or re-analysis of a sample is not an option (e.g. sample holding is exceeded or not enough sample available) the sample data will be flagged using the appropriate J data qualifier (See Figure 6-3) as follows:

1. If the analyte was detected in the sample above the method quantitation limit, the result will be flagged the J data qualifier to indicate that the result is estimated due to a non-compliant LCS recovery.

2. If the analyte was not detected in sample and the analyte recovery from the LCS was less than the lower quality control recovery limit, then the not detected result will be flagged with both the U and J data qualifers. This indicates that the reported detection limit(s) is estimated since the low recovery may indicate that the reported detection limit is not achievable.

3. If the analyte was not detected in sample and the analyte recovery from the LCS was greater than the upper quality control recovery limit, then the J data qualifier does not need to be assigned.

6.2.6 Surrogate Compound Recoveries Outside the Acceptance Limits

If surrogate compound recoveries are outside the acceptance limits, but the laboratory control sample is within acceptance limits, the sample exhibiting the unacceptable recovery will be re-prepared and re-analyzed.

If surrogate recovery is out-of-control upon re-analysis and the deviation is in the same direction as the original analysis (i.e., the surrogate recovery was either high or low for both analyses) the original data will be reported. The unacceptable surrogate recovery will be flagged using the appropriate surrogate recovery qualifier (See Figure 6-3). The results for any detected compounds associated with the out-of-control surrogate recovery will be flagged as estimated using the appropriate J qualifier. The detection limit for non-detected compounds associated with a *low* out-of-control surrogate recovery will be flagged using the U and J qualifiers, since the low recovery may indicate that the reported detection limit is not achievable. The possibility of matrix effect will be discussed in the report to the client

If, upon re-analysis, the recovery of the surrogates fall within acceptable limits, the results of the re-analysis will be reported and the original analysis results rejected due to a potential procedural problem.

If the surrogate recovery is out-of-control upon re-analysis and the deviation is in the opposite direction as the original analysis (i.e., the surrogate recovery was high in one analysis

and low in the other) the results of both analyses will be reported. The unacceptable surrogate recovery will be flagged using appropriate surrogate recovery qualifier. The results for any detected compounds associated with the out-of-control surrogate recovery will be flagged as estimated using a J qualifier. The detection limit for non-detected compounds associated with a *low* out-of-control surrogate recovery will be flagged using the U and J qualifiers. The possibility of matrix effect will be discussed in the report to the client.

In some instances it may be obvious from the data produced, or, from the observations made during the preparation process that the sample matrix is causing the unacceptable recoveries. In these cases, the sample may not be re-prepared or re-analyzed. The observations made will be included in the report to the client, and the data will be flagged.

If the surrogate recovery in a method blank or reference sample is outside the acceptance limits (but the analytes in the reference sample are within acceptance limits), the analyst may need to analyze the surrogate standard solution to check for degradation or contamination. If the standard solution is determined to be the problem the analyst will immediately prepare a new standard and the affected samples will be re-extracted and re-analyzed. It is also possible that the calibration of the surrogate compound has drifted, in which case the analyst should re-calibrate the system, and re-analyze the affected samples.

6.2.7 Matrix Spikes Exhibit Recoveries Outside the Acceptance Limits

If recoveries of spiked analytes are outside the acceptance limits, but the laboratory spiked blank is within acceptance limits, the apparent poor or enhanced recovery may be due to matrix effect. The matrix spike sample should be re-prepared and re-analyzed to assess this possibility.

If the matrix spike recoveries are out-of-control upon re-analysis, both analyses will be reported. The unacceptable matrix spike recoveries will be flagged with the G qualifier if the recovery is greater than the upper QC limit, or an L qualifier if the recovery is less than the lower QC limit. The G and L qualifiers will only be used with respect to the actual matrix spike sample results.

Positive detections in the associated field sample of compounds that were out-of-control in the matrix spikes will be flagged as estimated using the appropriate J qualifier. The detection limit for non-detected compounds associated with low out-of-control matrix spike recoveries will be flagged using the U and J qualifiers since low recovery may indicate that the reported detection limit may not be achievable. The possibility of matrix effect will be discussed in the report to the client.

If, upon re-analysis, the recovery of the spiked analytes fall within acceptable limits, the results of the re-analysis will be reported and the original analysis results rejected due to a potential procedural problem.

In cases where the concentration of the analyte in un-spiked sample approaches a level that is 5 times higher than the amount of the spike added to the MS and MSD analyses, the recovery of the analyte will be flagged with the NC qualifier. The NC qualifier denotes that the calculated recovery may not be accurate due to the level of the analyte found in the sample that was spiked.

In some instances it may be obvious from the data produced or from the observations made during the preparation process that the sample matrix is causing the unacceptable recoveries. In these cases, the sample will not be re-prepared or re-analyzed. The observations made will be included in the report to the client, and the data will be flagged using a J qualifier as stated previously.

6.2.8 Relative Percent Differences from MS/MSD or Duplicate Sample Analysis Outside the Acceptance Limits

When the relative percent difference (RPD) of an analyte from MS/MSD sample or duplicate sample analyses is outside acceptance limits, the MS/MSD or duplicate samples may require re-preparation and/or re-analysis. If both recoveries of the analyte from the MS and MSD are within QC limits and the analyte is not detected in the associated sample, re-preparation will not be required. For duplicate analyses, if the sample and duplicate results are less than 5 times the reporting limit, re-preparation will not be required since a statistically valid RPD cannot be determined.

If the RPD is out of control upon re-analysis, the results of both analyses will be reported. The unacceptable RPD will be flagged with the # qualifier. The possibility of matrix effect will be discussed in the report to the client.

If, upon re-analysis, the RPD falls within acceptable limits, the results of the re-analysis will be reported and the original analysis results rejected due to a potential procedural problem. Figure 6-3 shows the Data Qualifier Sheet which is incorporated into the final result reports when applicable.

6.3 Flagging Requirements for Radiochemistry Data

Samples can be identified by quality control objectives as one of four possible results. The results are either estimated (J / NJ), unacceptable (R / NR), less than Minimum Detectable Activity (<MDA), or an outlier to normal data (O). J and NJ flags denote data that is estimated based on the results of tracer , spike, or LCS recovery (J flag), or the results of the Normalized Absolute Difference (NAD) to a 2 σ confidence level (NJ flag). R and NR flags denote data that is unusable based on the results of tracer, spike, or LCS recovery (R flag), or the results of the Normalized Absolute Difference (NAD) to a 2 σ confidence level (NR flag). The flags <MDA and O can be applied to either J or R data, or they may stand separately or together.

The Radiochemistry Lab at Waste Stream, will review ALL data pertinent to sample analysis prior to final assignment of qualifying flags. As a rule R flagged data will not be reported. Rather, the data problem is first reviewed for a root cause of the result error and secondly, if necessary, discussed with the client. Once a root cause is determined, it is possible to determine if a corrective action can be applied. If applicable, the corrective action will be applied and the analysis re-performed. In the case of lack of sample for re-analysis, or in the case of non-correctable root cause, the sample is flagged R and the case narrative of the report will discuss the problem for the client's determined resolution. Data flagged J, O, or <MDA may be re-analyzed as requested by the client. Figure 6-5 shows the Radiochemistry Data Qualifier Sheet that is included in all radiochemistry analysis reports.

6.4 Preventive Maintenance

Preventive maintenance is necessary in order to keep the system operating properly. Not all preventive maintenance measures need to be documented, except those that are considered a repair or a replacement. These types of preventive maintenance will be documented in the Instrument Maintenance Log of the affected instrument. Each instrument will have a preventive maintenance schedule which can be found in the analytical SOP. The schedule may also include preventive maintenance performed by the manufacturer as per the terms of the service contract, which is purchased for laboratory instruments.

Routinely scheduled preventive maintenance consists of the following:

1. General
   a. Maintenance logs are maintained for each major instrument (See Section 6.4).
   b. Room temperature and humidity are maintained according to the manufacturers' specifications.

2. Gas Chromatograph and Gas Chromatograph/ Mass Spectrometer (GC and GC/MS)

Daily Procedures
   a. Purge traps are baked out. Changes of the traps are logged.
   b. Columns are baked out.
   c. Volume of gas cylinders is checked.

As Required Procedures
   a. Teflon ferrules are replaced.
   b. Injection port liners are cleaned or replaced.
   c. GC septa are changed after 50 injections.
   d. Detectors are baked out.

Quarterly Procedures
   a. Instrument electronics are visually inspected and cleaned.
   b. Detectors are cleaned on a schedule recommended by the manufacturer or more frequently as needed.

Annual Procedures
   a. Electron capture detectors are wipe tested.
   b. Preventive maintenance performed by manufacturer as per service contract terms.

Spare Parts

a. Septa
b. Purge and trap sparger
c. Purge and trap traps
d. Tubing and fittings
e. Thermal conductivity leak detector
f. Column ferrules
g. U.V. lamp for PID detectors
h. Nickel catalyst tubes for ELCD detectors
i. Syringes for spiking
j. Mass spectrometer source filaments
k. Jet separator
l. Pump oil
m. Analytical columns
n. Flow meter bubble solution
o. Flow meters
p. Spare guard columns
q. Injection port liners

3. Infrared Spectrometer

Daily Procedures or After Each Use

a. Clean IR cells, store in desiccator

Weekly Procedures

a. Run spectrum of polystyrene.

Spare Parts - IR cells, chart paper & pens

4. Inductively Coupled Plasma Spectrometer (ICP)

Daily Procedures

a. Check gases before operation
b. Monitor detector response and instrument performance through calibration and verification.

Procedures as Needed

a. Clean nebulizer and spray chamber
b. Replace peristaltic pump tubing
c. Clean plasma torch assembly when discoloration is evident or after analyzing high dissolved solids.

Spare Parts - Spare plasma torch, argon chamber and pump tubing

5. AA/Graphite Furnace

Daily Procedures

a. Warm up AA lamp for 15 minutes prior to analysis
b. Check and align source lamp
c. Check autosampler alignment and deposition

Procedure as Needed

a. Change graphite contact rings
b. Change background correction lamp

c. Clean furnace housing and injector tip
d. Replace pyrollytic graphite furnace tubes as indicated by instrument performance

Spare parts- Contact rings, furnace tube assemblies, lamps

6. Gas Proportional Counter
   Daily Procedures
      a. Check gas flow

   Weekly Procedures
      a. Clean sample tray

   Monthly Procedures
      a. Check bubbler oil level

7. Alpha Spectroscopy
   Every 6 months
      a. Change vacuum pump oil

   Procedure as needed
      a. Clean sample holder

.5 Instrument Maintenance Logs

All instrument repair and maintenance which will effect the steady state of the analytical system must be documented in the Instrument Maintenance Log. A description of the problem and the corrective actions taken to remedy the problem will be recorded.

If a service representative is called in to make the repair, a copy of the Field Service Report, if available, is filed into the Instrument Maintenance Log. The corrective actions explanation will reference the number of the Field Service Report.

When a major repair is performed or when the column is replaced, a 2 times method detection limit sample should be analyzed to see if it has changed significantly. If it has, new method detection limits need to be established and documented. If the MDL check sample passes, a new MDL study need not be performed.

6.6 Handling Complaints

Procedures for receiving, reviewing, and evaluation of complaints are necessary. This ensures that all complaints are processed in a uniform and timely manner. They must be documented so that traceability can be maintained.

Customer complaints can be received by the Project Manager, QA/QC

Officer, or Laboratory Director. These designated personnel initiate corrective actions since they are the client's contact, are the most exposed when it comes to the functions of the laboratory, and have the ability to prioritize laboratory activities to respond to the needs of the complainant. Any actions taken must be documented and become part of the laboratory's permanent record.

Upon verbal or written receipt of a complaint, the complainant's information is recorded on a Complaint Form Figure 6-4) and complaintive actions taken. The person who receives the complaint is responsible for investigating the nature and details of the complaint, identifying personnel that will be involved in its resolution, and following through with its corrective actions.

Figure 6-1

Sample Re-Extraction/Re-Analysis Request Form

Date _____ Request Number _____

Requested By _____

Sample ID # _____

Analysis Method Requested _____

_____ Re-extract and re-analyze

_____ Re-analyze only

Reason for Request _____

_____

_____

_____

Request Submitted To : _____

Department : _____

Submit Results By (Date) _____

Return this form along with a copy of the re-analysis results to the person listed at the top of this form. If re-extraction was required, and if the sample extract is to be analyzed by a different person or department, submit this form along with the extract to the appropriate analyst. The analyst must then submit this form along with the results of the re-analysis.

Re-analysis Results Reviewed By :

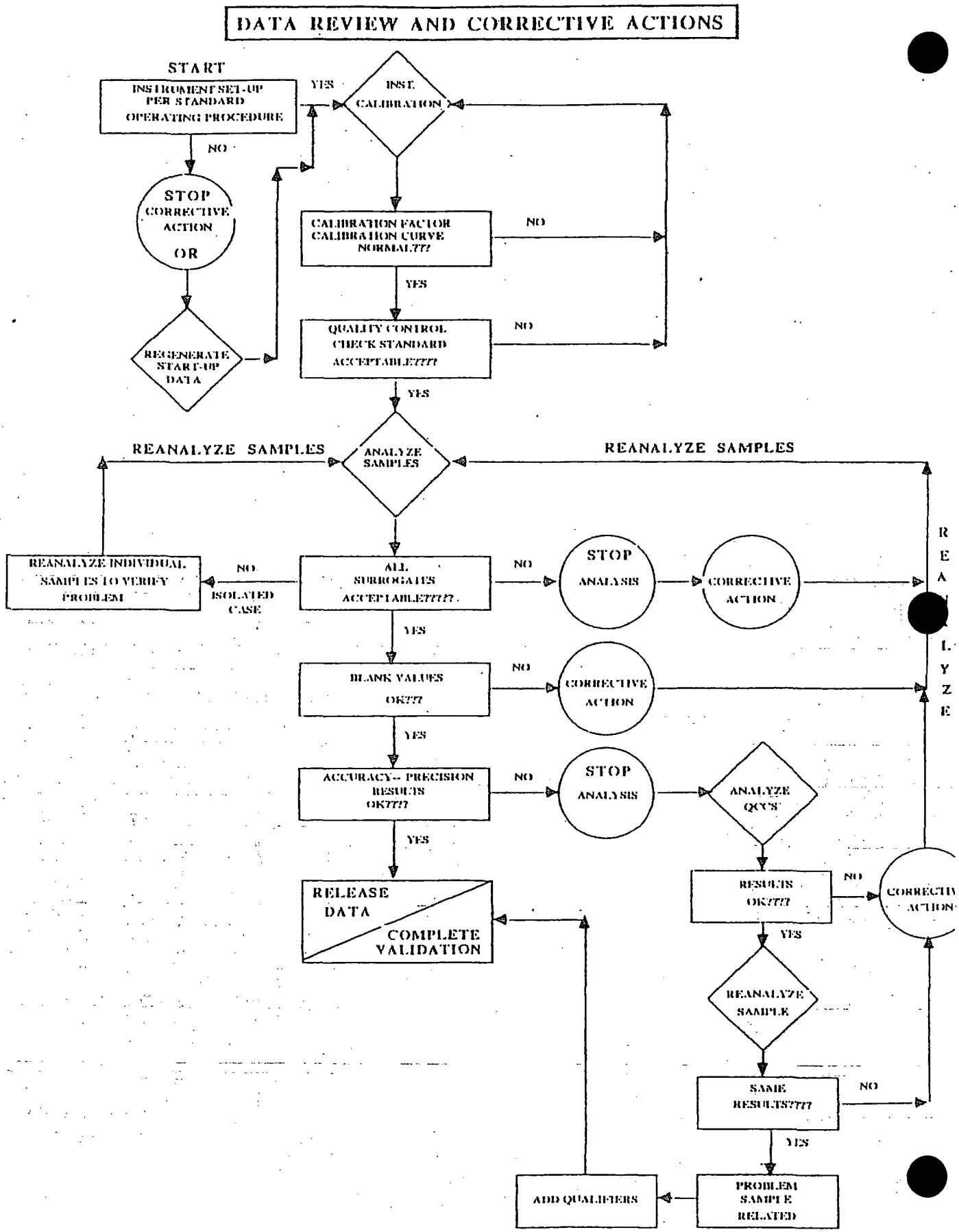
_____ Date _____

Comments: _____

_____

_____

Figure 6-2


DATA REVIEW AND CORRECTIVE ACTIONS
START
INSTRUMENT SET-UP PER STANDARD OPERATING PROCEDURE
YES
INST. CALIBRATION
NO
STOP CORRECTIVE ACTION
OR
REGENERATE START-UP DATA
CALIBRATION FACTOR CALIBRATION CURVE NORMAL???
NO
YES
QUALITY CONTROL CHECK STANDARD ACCEPTABLE????
NO
YES
REANALYZE SAMPLES
ANALYZE SAMPLES
REANALYZE SAMPLES
REANALYZE INDIVIDUAL SAMPLES TO VERIFY PROBLEM
NO
ISOLATED CASE
ALL SURROGATES ACCEPTABLE?????
NO
STOP ANALYSIS
CORRECTIVE ACTION
YES
BLANK VALUES OK???
NO
CORRECTIVE ACTION
YES
ACCURACY-- PRECISION RESULTS OK????
NO
STOP ANALYSIS
ANALYZE QC'S
YES
RELEASE DATA
COMPLETE VALIDATION
RESULTS OK????
NO
YES
REANALYZE SAMPLE
SAME RESULTS????
NO
YES
PROBLEM SAMPLE RELATED
ADD QUALIFIERS

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Qualifiers

Qualifier	TextBody	isRetain
#	Denotes RPD is outside QC limits.	
#-01	Both the sample and duplicate results are less than five times the reporting limit yielding an RPD that is outside QC limits.	
<MDA	Analyte determined to be below Minimum Detectable Activity.	
>149	>149	X
>200	>200	X
A-01	[Custom Value]	
B	Analyte is found in the associated blank as well as in the sample (CLP B-flag).	
B-01	The sample dilutions set-up for the BOD analysis did not meet the oxygen depletion criteria of at least 2 mg/l dissolved oxygen depletion. Therefore the reported result i	
B-02	The sample dilutions set up for the BOD analysis failed to met the criteria of a residual dissolved oxygen of at least 1 mg/l. Therefore the reported result is an estimated	
B-03	Contamination in blank is carryover from previous analyses. Value was subtracted from associated samples.	
B-05	Contamination in blank is carryover from previous sample analyzed in same purge vessel. This contamination is not present in purge vessels that associated samples w	
C-01	To reduce matrix interference, the sample extract has undergone sulfuric acid clean-up, method 3665, which is specific to hydrocarbon contamination.	
C-03	To reduce matrix interference, the sample extract has undergone silica-gel clean-up, method 3630, which is specific to polar compound contamination.	
C-04	To reduce matrix interference, the sample extract has undergone florisil clean-up, method 3620, which is specific to non-polar compound contamination.	
C-05	To reduce matrix interference, the sample extract has undergone GPC clean-up, method 3640, which is specific to contamination from high molecular weight material.	
D	This flag assigned to compounds identified in an analysis at a secondary dilution factor.	
D-01	This sample appears to contain volatile range organics.	
D-02	Hydrocarbon pattern present in the requested fuel quantitation range but does not resemble the pattern of the requested fuel.	
D-03	The result for this hydrocarbon is elevated due to the presence of single analyte peak(s) in the quantitation range.	
D-04	The hydrocarbons present are a complex mixture of diesel range and heavy oil range organics.	
D-06	The sample chromatographic pattern does not resemble the fuel standard used for quantitation.	
D-08	Results in the diesel organics range are primarily due to overlap from a gasoline range product.	
D-09	Results in the diesel organics range are primarily due to overlap from a heavy oil range product.	
D-10	The heavy oil range organics present are due to hydrocarbons eluting primarily in the diesel range.	
D-12	Results in the Gasoline Range are primarily due to overlap from a heavier fuel hydrocarbon product.	
D-13	Low boiling point fuel hydrocarbons are present below the requested fuel quantitation range.	
D-14	Unidentified Hydrocarbons < C17.	
D-15	Diesel	
D-16	Gasoline	
D-17	Diesel + unidentified hydrocarbons.	
D-20	Unidentified Hydrocarbons > C9.	
D-25	The hydrocarbon resembles weathered diesel.	
D-30	Unidentified hydrocarbons C9-C16.	
D-35	Sample does not display a fuel pattern. Sample contains several discreet peaks.	
E	The concentration indicated for this analyte is an estimated v[illegible] above the calibration range of the instrument. This value is considered an estimat[illegible] .P E-flag).	

Figure 6-3

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Qualifiers

Qualifier	TextBody	isRetain
E-01	Reported is the time of count activity, however, the error is based on the time corrected activity. Therefore, the error is greater than the reported activity.	
F	Fail	X
F-01	No flash detected up to 60 °C (140 °F).	
F-02	No flash detected up to [Custom Value] °C	
FILT	The sample was filtered prior to analysis.	
FRE-P	Free product was observed in the sample container.	
G	G denotes analyte recovery is greater than the upper quality control limit.	
G-04	This sample contains compounds not identified as Benzene, Toluene, Ethylbenzene or Xylene.	
GC-05	Results confirmed by GCMS.	
GC-10	A unknown compound is coeluting with MTBE. This is Probably causing an artificially high MTBE value.	
GC-15	Unidentified Hydrocarbons C6 - C12.	
GC-20	An unknown compound is coeluting with naphthalene. Probably causing an artificially high naphthalene value.	
GC-25	Weathered gasoline.	
GC-30	MTBE did not confirm via GCMS on a sample from this site. Thus, MTBE for this sample was reported as non-detect.	
GC-35		
GC-40	Naphthalene analyzed by GCMS - method 8260B.	
GC-NC	8260 confirmation analysis was performed; initial GC results were not supported by GC/MS analysis and are reported as ND.	
HDSP	Sample aliquot taken from VOA vial with headspace (air bubble greater than 6 mm diameter).	
I-01	Due to matrix interference, the sample cannot be accurately quantified. The reported result is qualitative.	
I-02	This result was analyzed outside of the EPA recommended holding time.	
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).	
J-01	Indicates an estimated value based on the sample tracer, the associated matrix spike or the Lab Control Sample.	
J-02	The detection limit or result reported for the analyte is considered an estimated value due to a low analyte recovery in the associated LCS.	
J-03	The detection limit or result reported for the analyte is considered an estimated value due to a low analyte recovery in the associated MS and/or MSD.	
J-04	The detection limit or result reported for the analyte is considered an estimated value due to a low recovery of the associated surrogate compound. The low recovery wa	
J-05	The detection limit and/or result reported for the analyte is considered an estimated value due to analysis performed outside holding time.	
J-06	The result reported for the analyte is considered an estimated value due to a high analyte recovery in the associated MS and/or MSD.	
J-07	The nuclide peak has a high uncertanitity or a poor FWHM.	
J-08	The nuclide has a low peak area count.	
J-09	The detection limit or result reported for the analyte is considered an estimated value. Refer to case narrative for explanation.	
L	L denotes analyte recovery is less than the lower quality control limit.	
MSA	This result was determined by method of standard addition.	
NC	NC denotes Not Calculated. Concentration of the analyte in the unspiked sample was to high to obtain accurate recoveries from the MS and MSD samples.	
NJ	Indicates an esimated value based on the Normalized Absolute Difference between the sample and sample duplicate or the sample and the blank	
NN	NN denotes result is obtained through methodology that is not certified by NELAP.	

Waste Stream Technology Inc.

Qualifiers

Qualifier	TextBody	isRetain
NR	Indicates an unacceptable value based on the Normalized Absolute Difference between the sample and sample duplicate or the sample and the blank	
O-01	This compound is a common laboratory contaminant.	
O-02	Due to matrix interference, the sample cannot be accurately quantitated. The reported result is qualitative.	
O-03	The concentration reported is an estimated value above the linear quantitation range. Dilution and reanalysis is being performed and an amended report will follow.	
O-04	This sample was analyzed outside the EPA recommended holding time.	
O-05	This sample was extracted outside of the EPA recommended holding time.	
O-06	Reanalysis by an alternate column or method has confirmed the identification and/or concentration of this result.	
O-08	The original extraction of this sample yielded QC recoveries outside acceptance criteria. It was re-extracted after the recommended maximum hold time.	
P	Pass	X
P-5	Due to the nature of the sample matrix a 1:10 dilution was necessary to perform a corrosivity measurement.	
PH	Insufficient preservative to reduce the sample pH to less than 2. Sample was analyzed within 14 days of sampling, but beyond the 7 days recommended for Benzene, T	
PRELM	Preliminary result. Revised report to follow.	
QB-01	The method blank contains analyte at a concentration above the MRL; however, concentration is less than 10% of the sample result, which is negligible according to me	
QC-5	Sample was originally analyzed within hold time. However, it was determined that positive interference was contributing to the sample result. So the sample was reanaly	
QI-01	Internal standards for this sample were out of control during the initial analysis performed within hold time. Immediate re-analysis (outside of recommended hold time) h	
QL-01	Sample results for the QC batch were accepted based on LCS/LCSD percent recoveries and RPD values.	
QM-01	The spike recovery for this QC sample is outside of established control limits due to sample matrix interference.	
QM-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.	
QM-03	Multiple analyses indicate the percent recovery exceeds the Quality Control acceptance criteria due to a matrix effect.	
QM-04	Visual evaluation of the sample indicates the RPD is above the control limit due to a non-homogeneous sample matrix.	
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that t	
QM-06	Due to noted non-homogeneity of the QC sample matrix, the MS/MSD did not provide reliable results for accuracy and precision. Sample results for the QC batch were	
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.	
QM-10	LCS/LCSD were analyzed in place of MS/MSD.	
QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batc	
QR-01	Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit. QC batch accepted based on LCS and/or LCSD QC result	
QR-02	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent re	
QR-03	The RPD value for the sample duplicate or MS/MSD was outside if QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD rec	
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.	
R-02	Elevated Reporting Limits due to limited sample volume.	
R-03	The Reporting Limit for this analyte has been raised to account for interference from coeluting organic compounds present in the sample.	
R-04	The Reporting Limits for this analysis are elevated due to sample foaming.	
R-05	The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.	
R-06	Indicates data is unacceptable based on the sample tracer.	
RxCN	This sample does not contain levels of reactive cyanide that are characteristic of a reactive waste as defined by 40CFR 261.23. Concentration is below 250 ppm.	

Waste Stream Technology Inc.

Qualifiers

Qualifier	TextBody	isRetain
RxS	This sample does not contain levels of reactive sulfide that are characteristic of a reactive waste as defined by 40CFR 261.23. Concentration is below 500 ppm.	
S-01	The surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interference's.	
S-02	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.	
S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.	
S-06	The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interference's.	
S-AC	Acid surrogate recovery outside of control limits. The data was accepted based on valid recovery of remaining two acid surrogates.	
S-BN	Base/Neutral surrogate recovery outside of control limits. The data was accepted based on valid recovery of remaining two base/neutral surrogates.	
S-DUP	Duplicate analysis confirmed surrogate failure due to matrix effects.	
S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.	
S-HI	High surrogate recovery was confirmed as a matrix effect by a second analysis.	
S-LIM	Surrogate recoveries outside method QC limits. Site matrix effects verified by 10% duplicate analysis (including sample duplicate and MS/MSD analysis).	
S-LOW	Low surrogate recovery confirmed as a matrix effect by a second analysis.	
S-MS	Surrogate recovery outside of acceptance window confirmed as matrix effect by analysis of MS/MSD on this sample.	
S-ND	Compound was not present in spikie mix.	
UNC	Uncertainty	
W-01	No determinable quantities of cyanide amenable to chlorination.	
W-04	Free liquid was visually observed in the sample container but the sample did not exhibit free liquid as defined by 40CFR 264.314 or 265.314.	
Z-01	[Custom Value]	X

Figure 6-4

Complaint Form

Date ______________ Request Number ______________

Requested By ________________________

Sample ID #(s) ____

Name of Complainant ____________________________________

Address ____

Phone __________________ FAX ___________ E-mail______________

Nature & Details of Complaint

____

____

Date & Results of Investigation

____

____

____

Corrective Actions

____

____

Reply to Complainant

____

____

Name____________________ Signature __________________ Date__________

= =

Return this form along with a copy to the QA/QC Officer

Figure 6-5

Radiochemistry Data Qualifiers

<MDA	Indicates analyte was determined to be below Minimum Detectable Activity
J-01	Indicates an estimated value based on the sample tracer, the associated matrix spike or the Laboratory Control Sample
R-06	Indicates data that is unacceptable based on the sample tracer, the associated matrix spike or the Laboratory Control Sample
NJ	Indicates an estimated value based on the Normalized Absolute Difference between the sample and sample duplicate or the sample and the blank
NR	Indicates an unacceptable value based on the Normalized Absolute Difference between the sample and sample duplicate or the sample and the blank

BIOGRAPHIES OF KEY PERSONNEL

Dr. Brian S. Schepart Laboratory Director

Dr. Schepart received his B.A. in Biology from Clark University in 1977, and his Ph.D. in Experimental Pathology from the State University of New York at Buffalo in February of 1983, and his B.S. Pharmacy from the State University of New York at Buffalo in 1994. He was a Damon Runyon - Walter Winchell Fellow at the University of North Carolina at Chapel Hill and an Instructor of Microbiology at Duke University. Since 1986, Dr. Schepart has been an Assistant Professor of Microbiology and Immunology at Allegheny University of the Health Sciences, where he presently retains an adjunct position. While at Allegheny, he directed and managed a team of seven researchers whose work was supported by extramural funds. To his credit, Dr. Schepart has authored over thirty peer-reviewed publications and has received numerous awards and grants, from both public and private agencies. He is the Chairman of ASTM F20.24, a subcommittee within Spill Response F20 since 1991. He joined Waste Stream Technology in 1989.

Daniel W. Vollmer QA/QC Director

Mr. Vollmer graduated from the State University of New York at Buffalo with a B.A. in Biology. Since his graduation, he has gained extensive experience in analytical chemistry as a laboratory technician, a GC, GC/MS, and HPLC analyst, and a laboratory supervisor. Since 1989, in conjunction with Dr. Schepart, he has been responsible for setting up WST's analytical laboratory and establishing the current laboratory protocol. In doing so, he has obtained extensive experience in US EPA methodologies, including the requirements necessary for maintaining good Quality Assurance and Quality Control.

Sidney Tyrrell Assistant Laboratory Director

Mr. Tyrrell received his A.S. in Chemistry from Erie Community College in 1983. He joined WST in February, 1994 after 10 years of experience as a GC and GC/MS Analyst. Since joining WST, he has established analyses for drinking water and continues to provide expertise in GC and GC/MS volatile organics and semi-volatile organics. He is currently responsible for assisting the Laboratory Director and directly supervises the analysts.

Rebecca King Organics Analyst

Ms. King received her B.S. in Chemistry from Baldwin-Wallace College in 1993. She joined WST in 1996 after working for three years as an industrial chemist, responsible for formulation of precious metal anode coatings, product inspection, instrument maintenance and calibration, environmental wastewater monitoring, and technical support. She is currently a Volatiles GC/MS Analyst.

Anthony Portfilio Senior Metals Analyst and Metals Laboratory Supervisor

Mr. Portfilio received his B.S. in Recombinant DNA Technology at the State University of New York at Fredonia. He joined WST in 1993 with 4 years experience in operation and interpretation of metals analysis by Inductively Coupled Plasma Spectrophotometry, Flame Atomic Absorption Spectrophotometry and Graphite Furnace Atomic Absorption Spectrophotometry. In addition, he operates a Hydride Continuous Flow Analyzer for low level analysis of metals. He is also responsible for supervising the metals analysis laboratory.

Gregory Ignaszak Wet Chemistry Lab Supervisor

Mr. Ignaszak received his B.S. in Chemistry from Rosary Hill College in 1973. He joined WST in 1995 He has over 25 years of experience in analytical chemistry, over 13 of which is in the evironmental testing field. He is responsible for supervising the Wet Chemistry laboratory, as well as Sample Disposal. He supervises the Wet Chemistry laboratory in procedures according to USEPA, ASTM, and Standard Methodologies.

Thomas Franks Organics Analyst

Mr. Franks received his B.A. in Chemistry from Buffalo State College in 1993. He then joined WST first as an extraction chemist then as a GC Analyst. He is responsible for the analysis of environmental samples for the determination of PCBs/Pesticides and Herbicides using standard and innovative techniques.

Oliver Levi QA/QC Officer

Mr. Levi graduated from the State University of New York College at Buffalo with a B.A. in Chemistry. Since his graduation in 2001, he joined Waste Stream Technology where he has obtained extensive experience in US EPA methodologies, including the requirements necessary for maintaining good Quality Assurance and Quality Control.

Maria Bradley Radiochemistry Laboratory Manager

Ms. Bradley graduated from Canisius College with a B.S. in Environmental Science. She joined Waste Stream Technology as an intern, and has been an employee since her graduation in 1999. Her expertise include the operation of alpha, beta, and gamma radiological testing equipment, radiological and chemical data interpretation and validation, technical preparation of environmental monitoring reports, and radiological health and safety.

Joe Giacomazza Project Manager

Mr. Giacomazza received his B.S. in Earth Science from the Buffalo State College. He interned at Waste Stream in 1997, and was subsequently hired as a Data Manager, responsible for accurate and timely delivery of analytic data. Thereafter, Mr. Giacomazza became the sample control manager for 3 years, and subsequently a project manager and client liaison.

Kevin Burke Sample Control Manager

Mr. Burke received his B.A. in Education (1991) and M.A. (1994) from Buffalo State College. He joined Waste Stream in 2001 as an organic extraction technician. Subsequently, he became a data reporter, and now serves as the Sample Control Manager.

APPENDICES

SAFETY

Safety requires an open attitude and a knowledgeable awareness of potential hazards. Safety is a collective effort and requires the full cooperation of management, supervisors, and employees. This cooperation means that everyone should adhere to the established procedures of the company which are incorporated into the laboratory's "Chemical Hygiene Plan," "Hazard Communication Standard," and the "Waste Stream Technology Safety Manual@, and ""Waste Stream Radiation Control Standard Operating Procedure (SOP).@

Briefly, these manuals include guidelines, procedures, and suggestions for the following areas:

1. Personal protective equipment
2. Training
3. Emergency action
4. Chemical and Radiation hazards
5. Chemical storage
6. Fume hood monitoring program
7. Accident reporting
8. Established work rules

Personal Protective Equipment

Eye protection is required at all times in the laboratory and where chemicals are stored and handled. Appropriate clothing must be worn, including a protective lab coat. Open-toed shoes or sandals are not permitted. Gloves of the proper material should be selected to provide sufficient protection to minimize the chance of skin contact. Respirators should be worn as needed.

Training

Adequate training will be provided by management and the Health and Safety Department. Employees are expected to adhere to all safety rules as well as to seek advice and guidance whenever they have doubts about safety procedures or potential hazards. The training incorporates chemical and radiation hazards, evacuation, use of fire extinguishers, and use of the eye wash and other protective equipment. The employees are also instructed on signs and symptoms of over-exposure, OSHA permissible exposure limits (PEL's), location of Material Safety Data Sheets (MSDS), and how to read MSDS and reagent labeling. Employees are also instructed in proper respirator selection and use including fit testing.

Emergency Action

Employees are instructed on emergency action procedures which include spills/release, evacuation, and reporting. Routine drills are conducted throughout the entire company. An emergency action plan is provided and used in the training of all laboratory personnel. Escape routes are mapped out throughout the building. Fire alarms, fire extinguishers, and a sprinkler system are in place and inspected every other month. The Buffalo Fire Department is located approximately 300 feet from the facility at the intersection of Grote Street, Great Arrow Drive, and Elmwood Avenue.

Chemical and Radiological Hazards

All employees who may be exposed to chemicals and radioisotopes which may present a hazard, are fully informed of potential hazards and proper handling that is required to avoid exposure. This is accomplished through reagent labeling and MSDS's. Each employee is instructed on how to decipher a MSDS Sheet, providing the employee with special instructions on personal protective equipment, storage requirements, and associated health hazards. Special precautions and labeling are required for toxic, carcinogenic, or mutagenic compounds.When there has been a spill of radioactive material which may have produced contamination of the person or clothing, both the person and the clothing shall be monitored. Personnel contamination shall be removed as soon as possible.

Personnel External Exposure Monitoring Program

Personnel monitoring devices shall be provided for individuals in accordance the following criteria:

1) Personnel who handle millicurie quantities of photon or energetic beta emitting radionuclides on a regular basis* shall be supplies with a film or TLD finger monitor.
2) Personnel who handle millicuries quantities of energetic photon emitting radioactive materials on a regular basis* shall be supplied with film or TLD whole body monitors.
3) Personnel who are occupationally exposed to radiation on an occasional basis, need not be monitored if the requirements of 38.24 do not apply.

*This refers to personnel such as laboratory workers who handle millicurie quantities either routinely or as stock quantities.

Storage

Chemicals are arranged so only compatible chemical families are stored together. Flammable liquids are stored in minimum quantities within the laboratory,

while additional storage is provided on the first level of the facility in a non-flammable, fire resistant cabinet. Radiological samples and sources are stored in a containment area and a locked safe in the containment area, respectively, accessible to Radiological Laboratory personnel only.

Medical Surveillance

Employees have the option to receive medical attention whenever any of the following occur:

1. Employees develop signs or symptoms associated with hazardous chemicals.
2. Exposure levels routinely exceed the action levels.
3. There is a spill, leak, or release into the working environment.

Reporting of Injury or Illness

Employees must report all work-related injuries or illnesses. This will ensure that the appropriate medical treatment or follow-up is obtained. This will also alert management to unsafe work practices or conditions so corrective actions can be taken.

Established Work Rules

The following is a list of established safety rules which everyone must abide by:

1. Consumption, preparation, and storage of food and beverages, and application of cosmetics, are prohibited in the laboratory.
2. Laboratory glassware will not be used to contain food or beverages.
3. Smoking is prohibited in the laboratory and in the facility.
4. Safety glasses or goggles are required in the laboratory.
5. All visitors to the laboratory must follow the safety regulations.
6. Chemicals are not allowed in offices.
7. Horseplay and other acts of mischief are prohibited.
8. Unauthorized experiments are prohibited.
9. Work surfaces and personnel should be monitored after working with radioactive materials, and decontaminated if necessary.
10. Pipetting of radioactive solutions by mouth is prohibited.
11. Do not store food, drink, or personal effects with radioactive material.
12. Always transport radioactive materials in appropriately shielded containers, and other laboratory reagents in appropriate containers.

WASTE DISPOSAL

Procedures for the disposal of waste and virgin chemicals are outlined in the Waste Disposal SOP. Workers should follow this program with care to avoid any safety hazards or damage to the environment.

In general, WST has incorporated four routes of disposal into the Waste Disposal SOP. They are:

1. If possible, samples received for laboratory analyses are returned to the client or site upon completion.

2. Solvents are recovered/recycled through distillation.

3. Certain highly diluted, water soluble chemicals may be disposed of in small quantities in the sanitary sewer system.

4. The remaining waste will be separated and drummed for incineration or landfill by an appropriately licensed vendor.

Waste is segregated based upon its chemical properties. Liquids are packaged separately from solids. Reactive waste is isolated from non-reactive waste. Radioactive waste is isolated form non-radioactive waste. In general, the Waste Coordinator will assist in the segregation of waste.

Laboratory wastes will be stored in 5 gallon poly-buckets in the laboratory until full when they will be dumped into appropriate drums. Samples containing PCB material will be held separately. Samples that are sent back to the client are recorded on a type

All waste is stored in the posted waste storage area until disposal. Lab pack Disposal drums require DOT approved containers. All inside lab pack containers must be compatible for that waste. The maximum internal lab pack size is one gallon for metal, plastic, and glass containers. The chemical name and type/size of container should be recorded onto the side of the drum/written sheet and relinquished to a transporter or directly to a client. These completed forms are maintained by Sample Control and are filed in a three ring bound notebook. The forms are maintained for seven years after disposal.

The small containers that are packed in drums are separated based upon DOT hazard classes. In decreasing hazard order, they are:

- Radioactive
- Poison A
- Flammable gas
- Non-flammable gas
- Flammable liquid
- Oxidizer
- Flammable solid
- Corrosive (liquid)
- Poison B
- Corrosive (solid)
- Irritating agent
- ORM-B
- ORM-A
- Combustible liquid
- ORM-E

The Waste Coordinator prepares the waste manifest, shipping inventory and drum labels. The drums are labeled according to DOT requirements. Records of the disposal are maintained and filed with the Waste Coordinator for seven years.

RADIOACTIVE WASTE DISPOSAL

Currently material that enters the Radiochemistry lab are of relatively low specific activity. However, the lab operates in the same manner as if the material was of a higher activity. All wastes produced in Radiochemistry lab operations are to be handled in the proper manner. All wastes generated in the Rad Lab, until verified otherwise, are to be considered potentially radioactively contaminated. Care is used to ensure that the production of waste is kept to as minimum an amount as practical. Wastes shall be disposed of in the proper receptacles. Separate receptacles will be in-place for contaminated wastes. Unused samples and potentially contaminated wastes are to be collected and stored in assigned containers and locations. Waste material should be surveyed to verify activity levels. Material that is determined as non-radioactive is disposed of as Anormal@ trash. Acid wastes are documented as to the quantity generated and then neutralized prior to being disposed.

All radioactive wastes are returned as negotiated to the client along with unused sample material. Radioactive solid wastes and samples are documented as to their Specific Activities prior to return. All samples returned are accompanied by appropriate shipping papers and survey results. Under NO circumstance shall the requirements of Waste Stream Technology, Inc=s. Radioactive Material License OR the regulations of 12NYCRR38, 10CFR, or 40CFR be violated in the discharge of wastes to the environment.

SECURITY

There are three main areas to be considered when dealing with security. They are:

1. Laboratories
2. Offices
3. Sample storage areas

Security for the facility is provided by restricted admission through a main entrance during standard working hours. Key personnel are allowed access to the facility during non-standard hours using a computer-linked individualized numeric access code.

The integrity of the facility is monitored at key points using motion and audio sensors in addition to strategically placed door switches. Twenty-four hour monitoring of the system includes:

1. Computer link-up
2. Audio monitoring
3. 911 and hold-up protection
4. Perimeter security
5. Secure check-in/check-out
6. Monthly reports on check-in/check-out

In addition to the electronic security system, the samples are stored in a secured area. All cabinets and refrigerators are kept locked at all times. The Sample Custodian is in charge of access and all samples removed or returned must be logged out.

ANNUAL EXECUTIVE SUMMARY REPORT

The laboratory management will prepare an annual executive summary report. The report will be a review of the laboratory's quality system and its testing and calibration activities to ensure its continuing suitability and effectiveness and to introduce any necessary changes or improvements in the quality system and laboratory operations. The summary shall take into account reports from managerial and supervisory personnel, the outcome of recent internal audits, assessments by external bodies, the results of interlaboratory comparisons or proficiency tests, any changes in the volume of work undertaken, feedback from clients, corrective actions and other relevant factors.

The annual summary report will be reviewed by the Laboratory Director and Quality Control/Quality Assurance Officer who will also sign and date the cover of the report. Copies of the report will be distributed to the laboratory managerial and supervisory staff while the original report will then be placed into the QA/QC Officer's files.

Section No.: App-5
Issue Date: 08/01/04
Updated ~~1/11/06~~ ~~4/13/06~~ 11/16/06 JAS

Laboratory Certifications

1. New York State Department of Health
2. State of New Jersey Department of Environmental Protection
3. U.S. Army Corps of Engineers
4. Florida Department of Health
5. State of Connecticut, Department of Public Health
6. ~~South Carolina Department of Health and Environmental Control~~ JAS
6 ~~X~~. Commonwealth of Pennsylvania Department of Environmental Protection
7. Utah Department of Health

New York State Department of Health

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Wadsworth Center The Governor Nelson A. Rockefeller Empire State Plaza P.O. BOX 509 Albany, New York 12201-0509

Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

LAB ID: 11179

April 03, 2006

DR. BRIAN S. SCHEPART
WASTE STREAM TECHNOLOGY
302 GROTE STREET
BUFFALO, NY 14207

Certificate Expiration Date: April 01, 2007

Dear Dr. Schepart,

Enclosed are the ELAP and/or NELAP Certificate(s) of Approval issued to your environmental laboratory for the current permit year. The Certificate(s) supersede any previously issued and is(are) in effect through the expiration date listed above. Please carefully examine the Certificate(s) to insure that the categories, subcategories, analytes and methods for which your laboratory is approved are listed correctly, as well as verifying your laboratory's name, address, lead technical director and identification number.

Pursuant to regulation (Part 55-2 NYCRR), original certificates must be posted conspicuously in the laboratory and shall, upon request, be made available to any client of the laboratory. Certificates remain the property of the New York State Department of Health and must be surrendered promptly on demand.

Please note, pursuant to Section 55-2.5(a) NYCRR, any misrepresentation of the Fields of Accreditation (Matrix - Method - Analyte) for which your laboratory is approved may result in denial, suspension, or revocation of your certification. Any use of the ELAP or NELAP name, reference to the laboratory's approval status and/or using the NELAC/NELAP logo in any catalogs, advertising, business solicitations, proposals, quotations, laboratory analytical reports or other materials must include the laboratory's ELAP identification number, and must distinguish between proposed testing for which the laboratory is approved and the proposed testing for which the laboratory is not approved.

Please notify the ELAP office of any changes you feel need to be made to your Certificate(s). We may be reached via email to elap@health.state.ny.us or by calling (518) 485-5570.

Sincerely,

Joyce Reilly

Joyce Reilly
Program Administrator
Environmental Laboratory
Approval Program

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
Antonia C. Novello, M.D., M.P.H., Dr.P.H.

Expires 12:01 AM April 01, 2007
Issued April 1, 2006

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

DR. BRIAN S. SCHEPART
WASTE STREAM TECHNOLOGY
302 GROTE STREET
BUFFALO, NY 14207

NY Lab Id No: 11179
EPA Lab Code: NY00068

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Drinking Water Metals I	
Arsenic, Total	EPA 200.7
	EPA 200.9
Barium, Total	EPA 200.7
Cadmium, Total	EPA 200.7
Chromium, Total	EPA 200.7
Copper, Total	EPA 200.7
Iron, Total	EPA 200.7
Lead, Total	EPA 200.9
Manganese, Total	EPA 200.7
Mercury, Total	EPA 245.1
Selenium, Total	EPA 200.9
Silver, Total	EPA 200.7
Zinc, Total	EPA 200.7
Drinking Water Metals II	
Antimony, Total	EPA 200.9
Beryllium, Total	EPA 200.7
Nickel, Total	EPA 200.7
Thallium, Total	EPA 200.9
Drinking Water Metals III	
Sodium, Total	EPA 200.7
Drinking Water Non-Metals	
Cyanide, Free	SM 18-20 4500-CN E

Drinking Water Non-Metals	
Nitrate (as N)	EPA 300.0
Nitrite (as N)	EPA 300.0
Drinking Water Trihalomethanes	
Bromodichloromethane	EPA 524.2
Bromoform	EPA 524.2
Chloroform	EPA 524.2
Dibromochloromethane	EPA 524.2
Total Trihalomethanes	EPA 524.2
Radiological Analytes	
Gross Alpha	EPA 900.0
Gross Beta	EPA 900.0
Radium-226	EPA 1984 Ra-03
Radium-228	EPA 1984 Ra-05
Uranium	DOE 1990 U-02
Volatile Aromatics	
1,2,3-Trichlorobenzene	EPA 524.2
1,2,4-Trichlorobenzene	EPA 524.2
1,2,4-Trimethylbenzene	EPA 524.2
1,2-Dichlorobenzene	EPA 524.2
1,3,5-Trimethylbenzene	EPA 524.2
1,3-Dichlorobenzene	EPA 524.2
1,4-Dichlorobenzene	EPA 524.2

Serial No.: 29332

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificates have a raised seal. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify laboratory's accreditation status.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
Antonia C. Novello, M.D., M.P.H., Dr.P.H.

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Issued April 1, 2006

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EPA Lab Code: NY00068

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All approved analytes are listed below:

Volatile Aromatics

2-Chlorotoluene	EPA 524.2
4-Chlorotoluene	EPA 524.2
Benzene	EPA 524.2
Bromobenzene	EPA 524.2
Chlorobenzene	EPA 524.2
[illegible]hyl benzene	EPA 524.2
[illegible]exachlorobutadiene	EPA 524.2
Isopropylbenzene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
p-Isopropyltoluene (P-Cymene)	EPA 524.2
sec-Butylbenzene	EPA 524.2
Styrene	EPA 524.2
tert-Butylbenzene	EPA 524.2
Toluene	EPA 524.2
Total Xylenes	EPA 524.2

Volatile Halocarbons

1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloroethene	EPA 524.2

Volatile Halocarbons

1,1-Dichloropropene	EPA 524.2
1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichloropropane	EPA 524.2
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2
cis-1,2-Dichloroethene	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2
Methylene chloride	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Trichloroethene	EPA 524.2
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2

Serial No.: 29332

[illegible]erty of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificates have a raised seal. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify laboratory's accreditation status.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
Antonia C. Novello, M.D., M.P.H., Dr.P.H.

Expires 12:01 AM April 01, 2007
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DR. BRIAN S. SCHEPART
WASTE STREAM TECHNOLOGY
302 GROTE STREET
BUFFALO, NY 14207

NY Lab Id No: 11179
EPA Lab Code: NY00068

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved subcategories and/or analytes are listed below:

Radiological Analytes

Photon Emitters	EPA 901.1

Serial No.: 29333

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WADSWORTH CENTER
Antonia C. Novello, M.D., M.P.H., Dr.P.H.

Expires 12:01 AM April 01, 2007
Issued April 1, 2006

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

DR. BRIAN S. SCHEPART
WASTE STREAM TECHNOLOGY
302 GROTE STREET
BUFFALO, NY 14207

NY Lab Id No: 11179
EPA Lab Code: NY00068

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Amines

2-Nitroaniline	EPA 8270C
3-Nitroaniline	EPA 8270C
4-Chloroaniline	EPA 8270C
4-Nitroaniline	EPA 8270C
Aniline	EPA 8270C
Carbazole	EPA 8270C
Pyridine	EPA 8270C

Benzidines

3,3' -Dichlorobenzidine	EPA 625
	EPA 8270C
Benzidine	EPA 625
	EPA 8270C

Chlorinated Hydrocarbon Pesticides

4,4'-DDD	EPA 608
	EPA 8081A
4,4'-DDE	EPA 608
	EPA 8081A
4,4'-DDT	EPA 608
	EPA 8081A
Aldrin	EPA 608
	EPA 8081A
alpha-BHC	EPA 608

Chlorinated Hydrocarbon Pesticides

alpha-BHC	EPA 8081A
beta-BHC	EPA 608
	EPA 8081A
Chlordane Total	EPA 608
	EPA 8081A
delta-BHC	EPA 608
	EPA 8081A
Dieldrin	EPA 608
	EPA 8081A
Endosulfan I	EPA 608
	EPA 8081A
Endosulfan II	EPA 608
	EPA 8081A
Endosulfan sulfate	EPA 608
	EPA 8081A
Endrin	EPA 608
	EPA 8081A
Endrin aldehyde	EPA 608
	EPA 8081A
Heptachlor	EPA 608
	EPA 8081A
Heptachlor epoxide	EPA 608
	EPA 8081A

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Chlorinated Hydrocarbon Pesticides	
Lindane	EPA 608
	EPA 8081A
Methoxychlor	EPA 608
	EPA 8081A
Chlorinated Hydrocarbons	
1,4-Trichlorobenzene	EPA 625
	EPA 8270C
2-Chloronaphthalene	EPA 625
	EPA 8270C
Hexachlorobenzene	EPA 625
	EPA 8270C
Hexachlorobutadiene	EPA 625
	EPA 8270C
Hexachlorocyclopentadiene	EPA 625
	EPA 8270C
Hexachloroethane	EPA 625
	EPA 8270C
Chlorophenoxy Acid Pesticides	
2,4,5-T	EPA 1978, p.115
	EPA 8151A
2,4,5-TP (Silvex)	EPA 1978, p.115
	EPA 8151A
Chlorophenoxy Acid Pesticides	
2,4-D	EPA 1978, p.115
	EPA 8151A
Dalapon	EPA 8151A
Dicamba	EPA 1978, p.115
	EPA 8151A
Dinoseb	EPA 8151A
Demand	
Biochemical Oxygen Demand	EPA 405.1
	SM 18-20 5210B
Chemical Oxygen Demand	EPA 410.4
	SM 18-20 5220D
Fuel Oxygenates	
Methyl tert-butyl ether	EPA 8021B
	EPA 8260B
t-Butyl alcohol	EPA 8260B
Haloethers	
4-Bromophenylphenyl ether	EPA 625
	EPA 8270C
4-Chlorophenylphenyl ether	EPA 625
	EPA 8270C
Bis (2-chloroisopropyl) ether	EPA 625
	EPA 8270C

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Haloethers	
Bis(2-chloroethoxy)methane	EPA 625
	EPA 8270C
Bis(2-chloroethyl)ether	EPA 625
	EPA 8270C
Microextractables	
-Dibromo-3-chloropropane	EPA 8260B
1,2-Dibromoethane	EPA 8260B
Mineral	
Alkalinity	EPA 310.1
Chloride	ASTM D512-89A
	EPA 300.0
	SM 18-20 4500-Cl B
Hardness, Total	EPA 130.2
Sulfate (as SO4)	EPA 300.0
	EPA 375.4
Nitroaromatics and Isophorone	
2,4-Dinitrotoluene	EPA 625
2,6-Dinitrotoluene	EPA 625
Isophorone	EPA 625
Nitrobenzene	EPA 625
Nitrosoamines	
N-Nitrosodimethylamine	EPA 625
	EPA 8270C
N-Nitrosodi-n-propylamine	EPA 625
	EPA 8270C
N-Nitrosodiphenylamine	EPA 625
	EPA 8270C
Nutrient	
Ammonia (as N)	EPA 350.3
Kjeldahl Nitrogen, Total	EPA 351.4
Nitrate (as N)	EPA 300.0
Nitrite (as N)	EPA 300.0
Orthophosphate (as P)	EPA 365.3
Phosphorus, Total	EPA 365.2
Phthalate Esters	
Benzyl butyl phthalate	EPA 625
	EPA 8270C
Bis(2-ethylhexyl) phthalate	EPA 625
	EPA 8270C
Diethyl phthalate	EPA 625
	EPA 8270C
Dimethyl phthalate	EPA 625
	EPA 8270C

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Phthalate Esters

Di-n-butyl phthalate	EPA 625
	EPA 8270C
Di-n-octyl phthalate	EPA 625
	EPA 8270C

Polychlorinated Biphenyls

PCB-1016	EPA 608
	EPA 8082
PCB-1221	EPA 608
	EPA 8082
PCB-1232	EPA 608
	EPA 8082
PCB-1242	EPA 608
	EPA 8082
PCB-1248	EPA 608
	EPA 8082
PCB-1254	EPA 608
	EPA 8082
PCB-1260	EPA 608
	EPA 8082

Polynuclear Aromatics

Acenaphthene	EPA 625
	EPA 8270C

Polynuclear Aromatics

Acenaphthylene	EPA 625
	EPA 8270C
Anthracene	EPA 625
	EPA 8270C
Benzo(a)anthracene	EPA 625
	EPA 8270C
Benzo(a)pyrene	EPA 625
	EPA 8270C
Benzo(b)fluoranthene	EPA 625
	EPA 8270C
Benzo(ghi)perylene	EPA 625
	EPA 8270C
Benzo(k)fluoranthene	EPA 625
	EPA 8270C
Chrysene	EPA 625
	EPA 8270C
Dibenzo(a,h)anthracene	EPA 625
	EPA 8270C
Fluoranthene	EPA 625
	EPA 8270C
Fluorene	EPA 625
	EPA 8270C
Indeno(1,2,3-cd)pyrene	EPA 625

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Polynuclear Aromatics

Indeno(1,2,3-cd)pyrene	EPA 8270C
Naphthalene	EPA 625
	EPA 8270C
Phenanthrene	EPA 625
	EPA 8270C
rene	EPA 625
	EPA 8270C

Priority Pollutant Phenols

2,4,5-Trichlorophenol	EPA 625
	EPA 8270C
2,4,6-Trichlorophenol	EPA 625
	EPA 8270C
2,4-Dichlorophenol	EPA 625
	EPA 8270C
2,4-Dimethylphenol	EPA 625
	EPA 8270C
2,4-Dinitrophenol	EPA 625
	EPA 8270C
2,6-Dichlorophenol	EPA 8270C
2-Chlorophenol	EPA 625
	EPA 8270C
2-Methyl-4,6-dinitrophenol	EPA 625
	EPA 8270C

Priority Pollutant Phenols

2-Methylphenol	EPA 8270C
2-Nitrophenol	EPA 625
	EPA 8270C
3-Methylphenol	EPA 8270C
4-Chloro-3-methylphenol	EPA 625
	EPA 8270C
4-Methylphenol	EPA 8270C
4-Nitrophenol	EPA 625
	EPA 8270C
Cresols, Total	EPA 8270C
Pentachlorophenol	EPA 625
	EPA 8270C
Phenol	EPA 625
	EPA 8270C

Purgeable Aromatics

1,2-Dichlorobenzene	EPA 602
	EPA 624
	EPA 625
	EPA 8021B
	EPA 8260B
	EPA 8270C
1,3-Dichlorobenzene	EPA 602
	EPA 624

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Purgeable Aromatics	
1,3-Dichlorobenzene	EPA 625
	EPA 8021B
	EPA 8260B
	EPA 8270C
1,4-Dichlorobenzene	EPA 602
	EPA 624
	EPA 625
	EPA 8021B
	EPA 8260B
	EPA 8270C
Benzene	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
Chlorobenzene	EPA 602
	EPA 624
	EPA 8260B
Ethyl benzene	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
Styrene	EPA 624
	EPA 8260B
Purgeable Aromatics	
Toluene	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
Total Xylenes	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
Purgeable Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260B
1,1,1-Trichloroethane	EPA 624
	EPA 8260B
1,1,2,2-Tetrachloroethane	EPA 624
	EPA 8260B
1,1,2-Trichloroethane	EPA 624
	EPA 8260B
1,1-Dichloroethane	EPA 624
	EPA 8260B
1,1-Dichloroethene	EPA 624
	EPA 8260B
1,1-Dichloropropene	EPA 8260B
1,2,3-Trichloropropane	EPA 8260B
1,2-Dichloroethane	EPA 624

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Purgeable Halocarbons	
1,2-Dichloroethane	EPA 8260B
1,2-Dichloropropane	EPA 624
	EPA 8260B
2,2-Dichloropropane	EPA 8260B
2-Chloroethylvinyl ether	EPA 624
	EPA 8260B
Bromodichloromethane	EPA 624
	EPA 8260B
Bromoform	EPA 624
	EPA 8260B
Bromomethane	EPA 624
Carbon tetrachloride	EPA 624
	EPA 8260B
Chloroethane	EPA 624
	EPA 8260B
Chloroform	EPA 624
	EPA 8260B
Chloromethane	EPA 624
	EPA 8260B
cis-1,2-Dichloroethene	EPA 8260B
cis-1,3-Dichloropropene	EPA 624
	EPA 8260B
Dibromochloromethane	EPA 624

Purgeable Halocarbons	
Dibromochloromethane	EPA 8260B
Dichlorodifluoromethane	EPA 624
	EPA 8260B
Methylene chloride	EPA 624
	EPA 8260B
Tetrachloroethene	EPA 624
	EPA 8260B
trans-1,2-Dichloroethene	EPA 624
	EPA 8260B
trans-1,3-Dichloropropene	EPA 624
	EPA 8260B
Trichloroethene	EPA 624
	EPA 8260B
Trichlorofluoromethane	EPA 624
	EPA 8260B
Vinyl chloride	EPA 624
	EPA 8260B
Purgeable Organics	
2-Butanone (Methylethyl ketone)	EPA 8260B
2-Hexanone	EPA 8260B
4-Methyl-2-Pentanone	EPA 8260B
Acetone	EPA 8260B
Carbon Disulfide	EPA 8260B

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Purgeable Organics	
Vinyl acetate	EPA 8260B
Residue	
Solids, Total	EPA 160.3
	SM 18-20 2540B
Solids, Total Dissolved	EPA 160.1
	SM 18-20 2540C
Solids, Total Suspended	EPA 160.2
	SM 18-20 2540D
Semi-Volatile Organics	
Acetophenone	EPA 8270C
Benzoic Acid	EPA 8270C
Benzyl alcohol	EPA 8270C
Dibenzofuran	EPA 8270C
Wastewater Metals I	
Barium, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Cadmium, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Calcium, Total	EPA 200.7
	EPA 3010A
Wastewater Metals I	
Calcium, Total	EPA 6010B
Chromium, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Copper, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Iron, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Lead, Total	EPA 200.7
	EPA 200.9
	EPA 239.2
	EPA 3010A
	EPA 3020A
	EPA 6010B
	EPA 7421
Magnesium, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Manganese, Total	EPA 200.7
	EPA 3010A
	EPA 6010B

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Wastewater Metals I

Nickel, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Potassium, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Silver, Total	EPA 200.7
	EPA 6010B
Sodium, Total	EPA 200.7
	EPA 3010A
	EPA 6010B

Wastewater Metals II

Aluminum, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Antimony, Total	EPA 200.7
	EPA 200.9
	EPA 204.2
	EPA 6010B
	EPA 7041
Arsenic, Total	EPA 200.7
	EPA 200.9
	EPA 3010A

Wastewater Metals II

Arsenic, Total	EPA 6010B
	EPA 7060A
Beryllium, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Chromium VI	EPA 7196A
	SM 18-19 3500-Cr D
Mercury, Total	EPA 245.1
	EPA 7470A
Selenium, Total	EPA 200.7
	EPA 270.2
	EPA 3010A
	EPA 6010B
Vanadium, Total	EPA 200.7
	EPA 3010A
	EPA 6010B
Zinc, Total	EPA 200.7
	EPA 3010A
	EPA 6010B

Wastewater Metals III

Cobalt, Total	EPA 200.7
	EPA 3010A
	EPA 6010B

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Wastewater Metals III

Gold, Total	AES 0029
Molybdenum, Total	EPA 200.7
	EPA 6010B
Palladium, Total	AES 0029
Platinum, Total	AES 0029
Thallium, Total	EPA 200.7
	EPA 200.9
	EPA 279.2
	EPA 3010A
	EPA 6010B
Tin, Total	EPA 200.7

Wastewater Miscellaneous

Boron, Total	EPA 200.7
	EPA 6010B
Bromide	EPA 300.0
Cyanide, Total	EPA 335.2
	EPA 9010B
Hydrogen Ion (pH)	EPA 150.1
	EPA 9040B
Oil & Grease Total Recoverable	EPA 1664A
	EPA 413.1
Organic Carbon, Total	EPA 415.1
Phenols	EPA 420.1

Wastewater Miscellaneous

Specific Conductance	EPA 120.1
Sulfide (as S)	EPA 376.1
	EPA 9030B
	EPA 9034
Surfactant (MBAS)	SM 18-20 5540C

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ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved subcategories and/or analytes are listed below:

Chlorinated Hydrocarbon Pesticides	
Toxaphene	EPA 608
	EPA 8081A
Wastewater Metals I	
Strontium, Total	EPA 200.7
	EPA 6010B
ewater Metals II	
Selenium, Total	EPA 7740

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is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Amines

2-Nitroaniline	EPA 8270C
3-Nitroaniline	EPA 8270C
4-Chloroaniline	EPA 8270C
4-Nitroaniline	EPA 8270C
Aniline	EPA 8270C
[illegible]-bazole	EPA 8270C

Benzidines

3,3'-Dichlorobenzidine	EPA 8270C
Benzidine	EPA 8270C

Characteristic Testing

E.P. Toxicity	EPA 1310
Ignitability	EPA 1010
Reactivity	SW-846 Ch7, Sec. 7.3
TCLP	EPA 1311

Chlorinated Hydrocarbon Pesticides

4,4'-DDD	EPA 8081A
4,4'-DDE	EPA 8081A
4,4'-DDT	EPA 8081A
Aldrin	EPA 8081A
alpha-BHC	EPA 8081A
beta-BHC	EPA 8081A
Chlordane Total	EPA 8081A

Chlorinated Hydrocarbon Pesticides

delta-BHC	EPA 8081A
Dieldrin	EPA 8081A
Endosulfan I	EPA 8081A
Endosulfan II	EPA 8081A
Endosulfan sulfate	EPA 8081A
Endrin	EPA 8081A
Endrin aldehyde	EPA 8081A
Endrin Ketone	EPA 8081A
Heptachlor	EPA 8081A
Heptachlor epoxide	EPA 8081A
Lindane	EPA 8081A
Methoxychlor	EPA 8081A

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene	EPA 8270C
2-Chloronaphthalene	EPA 8270C
Hexachlorobenzene	EPA 8270C
Hexachlorobutadiene	EPA 8270C
Hexachlorocyclopentadiene	EPA 8270C
Hexachloroethane	EPA 8270C

Chlorophenoxy Acid Pesticides

2,4,5-T	EPA 8151A
2,4,5-TP (Silvex)	EPA 8151A

Serial No.: 29336

[illegible]rty of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificates have a raised seal. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify laboratory's accreditation status.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
Antonia C. Novello, M.D., M.P.H., Dr.P.H.

Expires 12:01 AM April 01, 2007
Issued April 1, 2006

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

DR. BRIAN S. SCHEPART
WASTE STREAM TECHNOLOGY
302 GROTE STREET
BUFFALO, NY 14207

NY Lab Id No: 11179
EPA Lab Code: NY00068

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Chlorophenoxy Acid Pesticides	
2,4-D	EPA 8151A
2,4-DB	EPA 8151A
Dalapon	EPA 8151A
Dicamba	EPA 8151A
Dinoseb	EPA 8151A
[illegible]PA	EPA 8151A
[illegible]CPP	EPA 8151A
Haloethers	
Bis (2-chloroisopropyl) ether	EPA 8270C
Bis(2-chloroethoxy)methane	EPA 8270C
Bis(2-chloroethyl)ether	EPA 8270C
Metals I	
Barium, Total	EPA 6010B
Cadmium, Total	EPA 6010B
Chromium, Total	EPA 6010B
Lead, Total	EPA 6010B
Nickel, Total	EPA 6010B
Silver, Total	EPA 6010B
Metals II	
Antimony, Total	EPA 6010B
Arsenic, Total	EPA 6010B
	EPA 7060A
Metals II	
Selenium, Total	EPA 6010B
Minerals	
Bromide	EPA 9056
Chloride	EPA 9056
Sulfate (as SO4)	EPA 9056
Miscellaneous	
Boron, Total	EPA 6010B
Hydrogen Ion (pH)	EPA 9040B
	EPA 9045C
Lead in Dust Wipes	APP. 14.2, HUD JUNE 1995
Oil & Grease Total Recoverable	EPA 9071
Phenols	EPA 9065
Sulfide (as S)	EPA 9030B
	EPA 9034
Nitroaromatics and Isophorone	
2,4-Dinitrotoluene	EPA 8270C
2,6-Dinitrotoluene	EPA 8270C
Isophorone	EPA 8270C
Nitrobenzene	EPA 8270C
Pyridine	EPA 8270C

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Nitrosoamines	
N-Nitrosodimethylamine	EPA 8270C
N-Nitrosodiphenylamine	EPA 8270C
Nutrients	
Nitrate (as N)	EPA 9056
Orthophosphate (as P)	EPA 9056
[illegible]alate Esters	
Benzyl butyl phthalate	EPA 8270C
Bis(2-ethylhexyl) phthalate	EPA 8270C
Diethyl phthalate	EPA 8270C
Dimethyl phthalate	EPA 8270C
Di-n-butyl phthalate	EPA 8270C
Di-n-octyl phthalate	EPA 8270C
Polychlorinated Biphenyls	
PCB-1016	EPA 8082
PCB-1221	EPA 8082
PCB-1232	EPA 8082
PCB-1242	EPA 8082
PCB-1248	EPA 8082
PCB-1254	EPA 8082
PCB-1260	EPA 8082

Polynuclear Aromatic Hydrocarbons	
Acenaphthene	EPA 8270C
Acenaphthylene	EPA 8270C
Anthracene	EPA 8270C
Benzo(a)anthracene	EPA 8270C
Benzo(a)pyrene	EPA 8270C
Benzo(b)fluoranthene	EPA 8270C
Benzo(ghi)perylene	EPA 8270C
Chrysene	EPA 8270C
Dibenzo(a,h)anthracene	EPA 8270C
Fluoranthene	EPA 8270C
Fluorene	EPA 8270C
Indeno(1,2,3-cd)pyrene	EPA 8270C
Naphthalene	EPA 8270C
Phenanthrene	EPA 8270C
Pyrene	EPA 8270C
Priority Pollutant Phenols	
2,4,5-Trichlorophenol	EPA 8270C
2,4,6-Trichlorophenol	EPA 8270C
2,4-Dichlorophenol	EPA 8270C
2,4-Dimethylphenol	EPA 8270C
2,4-Dinitrophenol	EPA 8270C
2-Chlorophenol	EPA 8270C
2-Methyl-4,6-dinitrophenol	EPA 8270C

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302 GROTE STREET
BUFFALO, NY 14207

NY Lab Id No: 11179
EPA Lab Code: NY00068

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Priority Pollutant Phenols	
2-Nitrophenol	EPA 8270C
3-Methylphenol	EPA 8270C
4-Chloro-3-methylphenol	EPA 8270C
4-Methylphenol	EPA 8270C
4-Nitrophenol	EPA 8270C
ntachlorophenol	EPA 8270C
enol	EPA 8270C
Purgeable Aromatics	
1,2,4-Trimethylbenzene	EPA 8021B
	EPA 8260B
1,2-Dichlorobenzene	EPA 8021B
	EPA 8260B
1,3,5-Trimethylbenzene	EPA 8021B
	EPA 8260B
1,3-Dichlorobenzene	EPA 8021B
	EPA 8260B
1,4-Dichlorobenzene	EPA 8021B
	EPA 8260B
2-Chlorotoluene	EPA 8260B
4-Chlorotoluene	EPA 8260B
Benzene	EPA 8021B
	EPA 8260B
Bromobenzene	EPA 8260B

Purgeable Aromatics	
Chlorobenzene	EPA 8021B
	EPA 8260B
Ethyl benzene	EPA 8021B
	EPA 8260B
Isopropylbenzene	EPA 8021B
	EPA 8260B
n-Butylbenzene	EPA 8021B
	EPA 8260B
sec-Butylbenzene	EPA 8021B
	EPA 8260B
Styrene	EPA 8260B
tert-Butylbenzene	EPA 8021B
	EPA 8260B
Toluene	EPA 8021B
	EPA 8260B
Total Xylenes	EPA 8021B
	EPA 8260B
Purgeable Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260B
1,1,1-Trichloroethane	EPA 8260B
1,1,2,2-Tetrachloroethane	EPA 8260B
1,1,2-Trichloroethane	EPA 8260B
1,1-Dichloroethane	EPA 8260B

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All approved analytes are listed below:

Purgeable Halocarbons

1,1-Dichloroethene	EPA 8260B
1,1-Dichloropropene	EPA 8260B
1,2,3-Trichloropropane	EPA 8260B
1,2-Dibromo-3-chloropropane	EPA 8260B
1,2-Dichloroethane	EPA 8260B
[illegible]-Dichloropropane	EPA 8260B
1,3-Dichloropropane	EPA 8260B
2,2-Dichloropropane	EPA 8260B
2-Chloroethylvinyl ether	EPA 8260B
Bromochloromethane	EPA 8260B
Bromodichloromethane	EPA 8260B
Bromoform	EPA 8260B
Bromomethane	EPA 8260B
Carbon tetrachloride	EPA 8260B
Chloroethane	EPA 8260B
Chloroform	EPA 8260B
Chloromethane	EPA 8260B
cis-1,2-Dichloroethene	EPA 8260B
cis-1,3-Dichloropropene	EPA 8260B
Dibromochloromethane	EPA 8260B
Dichlorodifluoromethane	EPA 8260B
Methylene chloride	EPA 8260B
Tetrachloroethene	EPA 8260B

Purgeable Halocarbons

trans-1,2-Dichloroethene	EPA 8260B
trans-1,3-Dichloropropene	EPA 8260B
Trichloroethene	EPA 8260B
Trichlorofluoromethane	EPA 8260B
Vinyl chloride	EPA 8260B

Purgeable Organics

1,4-Dioxane	EPA 8260B
2-Butanone (Methylethyl ketone)	EPA 8260B
2-Hexanone	EPA 8260B
Acetone	EPA 8260B
Carbon Disulfide	EPA 8260B
Vinyl acetate	EPA 8260B

Semi-Volatile Organics

2-Methylnaphthalene	EPA 8270C
Benzoic Acid	EPA 8270C
Benzyl alcohol	EPA 8270C
Dibenzofuran	EPA 8270C

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NY Lab Id No: 11179
EPA Lab Code: NY00068

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Chlorinated Hydrocarbon Pesticides	
Toxaphene	EPA 8081A
Haloethers	
4-Bromophenylphenyl ether	EPA 8270C
4-Chlorophenylphenyl ether	EPA 8270C
Metals I	
Calcium, Total	EPA 6010B
Copper, Total	EPA 6010B
Iron, Total	EPA 6010B
Magnesium, Total	EPA 6010B
Manganese, Total	EPA 6010B
Potassium, Total	EPA 6010B
Sodium, Total	EPA 6010B
Metals II	
Aluminum, Total	EPA 6010B
Beryllium, Total	EPA 6010B
Chromium VI	EPA 7196A
Mercury, Total	EPA 7471A
Vanadium, Total	EPA 6010B
Zinc, Total	EPA 6010B
Metals III	
Cobalt, Total	EPA 6010B
Metals III	
Molybdenum, Total	EPA 6010B
Thallium, Total	EPA 6010B
Miscellaneous	
Cyanide, Total	EPA 9010B
	EPA 9014
Lead in Paint	EPA 6010B
Nitrosoamines	
N-Nitrosodi-n-propylamine	EPA 8270C
Polynuclear Aromatic Hydrocarbons	
Benzo(k)fluoranthene	EPA 8270C
Priority Pollutant Phenols	
2-Methylphenol	EPA 8270C
Purgeable Organics	
4-Methyl-2-Pentanone	EPA 8260B

Serial No.: 29337

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State of New Jersey
Department of Environmental Protection

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: SDW02 – Inorganic Parameters Including Na + Ca

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NY	SDW02.15000	DW	Spectrophotometric, Distill, Amenable	[SM 4500-CN C,G]	Cyanide
Certified	Yes	NY	SDW02.15100	DW	Spectrophotometric, Distill, Manual	[SM 4500-CN C,E]	Cyanide
Certified	No	NY	SDW02.20000	DW	ICP	[EPA 200.7]	Sodium

Category: SDW04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SDW04.06000	DW	AA, Platform Furnace	[EPA 200.9]	Antimony
Certified	Yes	NY	SDW04.10000	DW	AA, Platform Furnace	[EPA 200.9]	Arsenic
Certified	Yes	NY	SDW04.16000	DW	ICP	[EPA 200.7]	Barium
Certified	Yes	NY	SDW04.20000	DW	ICP	[EPA 200.7]	Beryllium
Applied	No	NY	SDW04.23000	DW	AA, Platform Furnace	[EPA 200.9]	Cadmium
Certified	Yes	NY	SDW04.24000	DW	ICP	[EPA 200.7]	Cadmium
Certified	Yes	NY	SDW04.28000	DW	ICP	[EPA 200.7]	Chromium
Certified	Yes	NY	SDW04.33000	DW	ICP	[EPA 200.7]	Copper
Certified	Yes	NY	SDW04.37000	DW	ICP	[EPA 200.7]	Iron
Certified	Yes	NY	SDW04.39000	DW	AA, Platform Furnace	[EPA 200.9]	Lead
Certified	Yes	NY	SDW04.44000	DW	ICP	[EPA 200.7]	Manganese
Certified	Yes	NY	SDW04.46000	DW	Manual Cold Vapor	[EPA 245.1]	Mercury
Certified	Yes	NY	SDW04.52000	DW	ICP	[EPA 200.7]	Nickel
Certified	Yes	NY	SDW04.56000	DW	AA, Platform Furnace	[EPA 200.9]	Selenium
Applied	No	NY	SDW04.61000	DW	AA, Platform Furnace	[EPA 200.9]	Silver
Certified	Yes	NY	SDW04.62000	DW	ICP	[EPA 200.7]	Silver
Certified	Yes	NY	SDW04.64000	DW	AA, Platform Furnace	[EPA 200.9]	Thallium
Certified	Yes	NY	SDW04.67000	DW	ICP	[EPA 200.7]	Zinc

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: *SDW06 – Organic Parameters, Chromatography/MS*

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SDW06.01010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromoform
Certified	Yes	NY	SDW06.01020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloroform
Certified	Yes	NY	SDW06.01030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromochloromethane
Certified	Yes	NY	SDW06.01040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromodichloromethane
Certified	Yes	NY	SDW06.02010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Benzene
Certified	Yes	NY	SDW06.02020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Carbon tetrachloride
Certified	Yes	NY	SDW06.02030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorobenzene
Certified	Yes	NY	SDW06.02040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,2-)
Certified	Yes	NY	SDW06.02050	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,3-)
Certified	Yes	NY	SDW06.02060	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorobenzene (1,4-)
Certified	Yes	NY	SDW06.02070	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethane (1,1-)
Certified	Yes	NY	SDW06.02080	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethane (1,2-)
Certified	Yes	NY	SDW06.02090	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (cis-1,2-)
Certified	Yes	NY	SDW06.02100	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (trans-1,2-)
Certified	Yes	NY	SDW06.02110	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Methylene chloride (Dichloromethane)
Certified	Yes	NY	SDW06.02120	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (1,2-)
Certified	Yes	NY	SDW06.02130	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Ethylbenzene
Certified	Yes	NY	SDW06.02160	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Styrene
Certified	Yes	NY	SDW06.02170	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NY	SDW06.02180	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethene
Certified	Yes	NY	SDW06.02190	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethane (1,1,1-)
Certified	Yes	NY	SDW06.02200	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethene
Certified	Yes	NY	SDW06.02210	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Toluene
Certified	Yes	NY	SDW06.02220	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorobenzene (1,2,4-)
Certified	Yes	NY	SDW06.02230	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloroethene (1,1-)
Certified	Yes	NY	SDW06.02240	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloroethane (1,1,2-)
Certified	Yes	NY	SDW06.02250	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Vinyl chloride
Certified	Yes	NY	SDW06.02260	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Xylenes (total)
Certified	Yes	NY	SDW06.03010	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromobenzene
Certified	Yes	NY	SDW06.03020	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromochloromethane
Certified	Yes	NY	SDW06.03030	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Bromomethane
Certified	Yes	NY	SDW06.03040	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Butyl benzene (n-)

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

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302 GROTE ST
BUFFALO, NY 14207

Category: SDW06 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SDW06.03050	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Sec-butylbenzene
Certified	Yes	NY	SDW06.03060	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tert-butylbenzene
Certified	Yes	NY	SDW06.03070	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloroethane
Certified	Yes	NY	SDW06.03080	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chloromethane
Certified	Yes	NY	SDW06.03090	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorotoluene (2-)
Certified	Yes	NY	SDW06.03100	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Chlorotoluene (4-)
Certified	Yes	NY	SDW06.03130	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dibromomethane
Certified	Yes	NY	SDW06.03140	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichlorodifluoromethane
Certified	Yes	NY	SDW06.03150	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (1,3-)
Certified	Yes	NY	SDW06.03160	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropane (2,2-)
Certified	Yes	NY	SDW06.03170	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (1,1-)
Certified	Yes	NY	SDW06.03180	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (cis-1,3-)
Certified	Yes	NY	SDW06.03190	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Dichloropropene (trans-1,3-)
Certified	Yes	NY	SDW06.03200	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Hexachlorobutadiene (1,3-)
Certified	Yes	NY	SDW06.03210	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Isopropylbenzene
Certified	Yes	NY	SDW06.03220	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Isopropyltoluene (4-)
Certified	Yes	NY	SDW06.03230	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Propylbenzene (n-)
Certified	Yes	NY	SDW06.03240	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Tetrachloroethane (1,1,1,2-)
Certified	Yes	NY	SDW06.03250	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorobenzene (1,2,3-)
Certified	Yes	NY	SDW06.03260	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichlorofluoromethane
Certified	Yes	NY	SDW06.03270	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trichloropropane (1,2,3-)
Certified	Yes	NY	SDW06.03280	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trimethylbenzene (1,2,4-)
Certified	Yes	NY	SDW06.03300	DW	GC/MS, P & T or Direct Injection, Capillary	[EPA 524.2]	Trimethylbenzene (1,3,5-)

Category: SDW07 -- Radiochem.: Radioactivity / Radionuclide

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SDW07.01000	DW	Proportional or Scintillation	[EPA 900.0]	Gross - alpha-beta
Certified	Yes	NJ	SDW07.01001	DW	48-Hour Rapid Gross Alpha Test	[OTHER N. J. A. C. 7:18-6]	Gross - alpha (incl. radium & U excl. radon)
Certified	Yes	NY	SDW07.02030	DW	Gamma Spectrometry	[EPA 901.1]	Radioactive iodine

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New Jersey Department of Environmental Protection

National Environmental Lab[illegible]tory Accreditation Program

ANNUAL CERTIFIED PARAME[illegible]R LIST AND CURRENT STATUS

Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: SDW07 – Radiochem.: Radioactivity / Radionuclide

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SDW07.03000	DW	Gamma Spectrometry	[EPA 901.1]	Cesium 134/137
Certified	Yes	NY	SDW07.03110	DW	Gamma Spectrometry	[EPA 901.1]	Barium 133
Certified	Yes	NY	SDW07.03120	DW	Gamma Spectrometry	[EPA 901.1]	Cobalt 60
Certified	Yes	NY	SDW07.03130	DW	Gamma Spectrometry	[EPA 901.1]	Zinc 65
Applied	No	NJ	SDW07.03800	DW	Radiochemical	[OTHER NJDHSS - Rev. 4, 2/99]	Radium - 224
Certified	Yes	NY	SDW07.03900	DW	Radiochemical	[USER DEFINED EPA 1984 Ra-03] [SM 7500-Ra B]	Radium - 226
Certified	Yes	NY	SDW07.04100	DW	Precipitation	[USER DEFINED EPA 1984 Ra-05] [SM 7500-Ra D]	Radium - 228
Applied	No	NY	SDW07.05000	DW	Precipitation	[SM 7500 -Ra B]	Radium - total
Applied	No	NY	SDW07.06000	DW	Total Sr & Strontium 90	[EPA 905.0] [SM 7500-Sr B]	Strontium - 89, 90
Applied	No	NY	SDW07.06010	DW	Strontium 90	[EPA 905.0] [SM 7500-Sr B]	Strontium - 90
Certified	Yes	NY	SDW07.08100	DW	Co-Precipition	[USER DEFINED DOE 1990 U-2]	Uranium

Category: SHW04 – Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NJ	SHW04.01000	NPW	Acid Digestion/Surface and Groundwater, ICP, FLAA	[SW-846 3005A, Rev. 1, 7/92]	Metals, Total Rec and Dissolved
Certified	Yes	NJ	SHW04.01500	NPW	Acid Digestion/Aqueous Samples, ICP, FLAA	[SW-846 3010A, Rev. 1, 7/92]	Metals, Total
Applied	No	NJ	SHW04.02000	NPW	Acid Digestion For GFAA, Aqueous	[SW-846 3020A, Rev. 1, 7/92]	Metals
Certified	Yes	NJ	SHW04.02100	NPW	Acid Digestion For GFAA, Micro asst Aqueous	[SW-846 3015, Rev. 0, 9/94]	Metals
Certified	Yes	NY	SHW04.05000	NPW	ICP	[SW-846 6010B, Rev. 2, 12/96]	Aluminum
Certified	No	NY	SHW04.08000	NPW	AA, Graphite Furnace	[SW-846 7041, Rev. 0, 9/86]	Antimony

Category: SHW05 – Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NJ	SHW05.01000	NPW	Separatory Funnel Extraction	[SW-846 3510C, Rev. 3, 12/96]	Semivolatile organics
Applied	No	NJ	SHW05.02000	NPW	Continuous Liquid-Liquid Extraction	[SW-846 3520C, Rev. 3, 12/96]	Semivolatile organics

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National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

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Category: SHW05 -- Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.07000	NPW	Purge & Trap Aqueous	[SW-846 5030B, Rev. 2, 12/96]	Volatile organics

Category: SHW06 -- Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW06.05360	NPW	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Methyl tert-butyl ether
Certified	Yes	NY	SHW06.23066	NPW	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev. 1, 9/96]	Pentachlorophenol

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04185	NPW	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dibromoethane (1,2-) (EDB)
Certified	Yes	NY	SHW07.05700	NPW	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dichlorobenzene (1,4-)

Category: SHW09 -- Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW09.24100	NPW	Extraction & Gravimetric - LL or SPE	[SW-846 1664A, Rev. 1, 2/99]	Oil & grease - hem

Category: WPP02 -- Inorganic Parameters, Nutrients and Dema

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NY	WPP02.01000	NPW	Electrometric or Phenolphthalein	[EPA 305.1]	Acidity as CaCO3
Certified	Yes	NY	WPP02.01500	NPW	Electrometric or Color Titration	[EPA 310.1]	Alkalinity as CaCO3
Certified	Yes	NY	WPP02.03500	NPW	Distillation, Electrode	[EPA 350.2 + .3]	Ammonia
Certified	Yes	NY	WPP02.05000	NPW	Dissolved Oxygen Depletion	[EPA 405.1]	Biochemical oxygen demand
Certified	Yes	NY	WPP02.08000	NPW	Digestion, ICP	[EPA 200.7]	Calcium

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302 GROTE ST
BUFFALO, NY 14207

Category: WPP02 -- Inorganic Parameters, Nutrients and Dema

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NY	WPP02.10000	NPW	Titrimetric	[EPA 410.1 or .2 or .3] [SM 5220 C]	Chemical oxygen demand
Certified	Yes	NY	WPP02.10500	NPW	Spectrophotometric Manual/Auto	[EPA 410.4] [SM 5220 D]	Chemical oxygen demand
Certified	Yes	NY	WPP02.11000	NPW	Titrimetric, Silver Nitrate	[SM 4500-Cl B]	Chloride
Certified	Yes	NY	WPP02.11500	NPW	Titrimetric, Mercuric Nitrate	[ASTM D512-89(A)]	Chloride
Certified	Yes	NY	WPP02.12600	NPW	Ion Chromatography	[EPA 300.0]	Chloride
Certified	Yes	NY	WPP02.15000	NPW	Distillation, Spectrophotometric (Manual)	[EPA 335.2]	Cyanide
Certified	Yes	NY	WPP02.18100	NPW	Ion Chromatography	[EPA 300.0]	Fluoride
Certified	Yes	NY	WPP02.19000	NPW	Titrimetric, EDTA	[EPA 130.2]	Hardness - total as CaCO3
Certified	Yes	NY	WPP02.24000	NPW	Digestion, ICP	[EPA 200.7]	Magnesium
Certified	Yes	NY	WPP02.26100	NPW	Ion Chromatography	[EPA 300.0]	Nitrate
Applied	No	NY	WPP02.26500	NPW	Cadmium Reduction, Manual	[EPA 353.3]	Nitrate - nitrite
Certified	Yes	NY	WPP02.29000	NPW	Gravimetric	[EPA 413.1]	Oil & grease - total recov
Certified	Yes	NY	WPP02.29100	NPW	Gravimetric, Hexane Extractable Material-LL	[EPA 1664A]	Oil & grease - hem-LL
Applied	No	NY	WPP02.31500	NPW	Ascorbic Acid, Manual Single Reagent	[EPA 365.2]	Orthophosphate
Certified	Yes	NY	WPP02.32000	NPW	Ascorbic Acid, Manual Two Reagent	[EPA 365.3]	Orthophosphate
Applied	No	NY	WPP02.32100	NPW	Ion Chromatography	[EPA 300.0]	Orthophosphate
Certified	Yes	NY	WPP02.32500	NPW	Manual Distillation, Colorimetric 4AAP	[EPA 420.1]	Phenols
Certified	Yes	NY	WPP02.34000	NPW	Persulfate Digestion + Manual	[EPA 365.2 + .3]	Phosphorus (total)
Certified	Yes	NY	WPP02.36500	NPW	Digestion, ICP	[EPA 200.7]	Potassium
Certified	Yes	NY	WPP02.38000	NPW	Gravimetric, 103-105 Degrees C	[EPA 160.3]	Residue - total
Certified	Yes	NY	WPP02.38500	NPW	Gravimetric, 180 Degrees C	[EPA 160.1]	Residue - filterable (TDS)
Certified	Yes	NY	WPP02.39000	NPW	Gravimetric, 103-105 Degrees C, Post Washing	[EPA 160.2]	Residue - nonfilterable (TSS)
Applied	No	NY	WPP02.39500	NPW	Volumetric (Imhoff Cone) or Gravimetric	[EPA 160.5]	Residue - settleable
Applied	No	NY	WPP02.40000	NPW	Gravimetric, 550 Degrees C	[EPA 160.4]	Residue - volatile
Certified	Yes	NY	WPP02.44000	NPW	Digestion, ICP	[EPA 200.7]	Sodium
Certified	Yes	NY	WPP02.45500	NPW	Wheatstone Bridge	[EPA 120.1]	Specific conductance
Certified	Yes	NY	WPP02.46500	NPW	Turbidimetric	[EPA 375.4]	Sulfate
Certified	Yes	NY	WPP02.47100	NPW	Ion Chromatography	[EPA 300.0]	Sulfate
Certified	Yes	NY	WPP02.47500	NPW	Titrimetric, Iodine	[EPA 376.1]	Sulfides
Certified	Yes	NY	WPP02.48500	NPW	Colorimetric (Methylene Blue)	[SM 5540 C]	Surfactants

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: WPP03 – Analyze-Immediately Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP03.09000	NPW	Electrometric	[EPA 150.1]	pH

Category: WPP04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP04.02000	NPW	Digestion, ICP	[EPA 200.7]	Aluminum
Certified	Yes	NY	WPP04.04000	NPW	Digestion, AA Furnace	[EPA 204.2]	Antimony
Certified	Yes	NY	WPP04.04100	NPW	Digestion, Platform Furnace	[EPA 200.9]	Antimony
Certified	Yes	NY	WPP04.04500	NPW	Digestion, ICP	[EPA 200.7]	Antimony
Certified	Yes	NY	WPP04.05100	NPW	Digestion, Platform Furnace	[EPA 200.9]	Arsenic
Certified	Yes	NY	WPP04.05600	NPW	Digestion, ICP	[EPA 200.7]	Arsenic
Certified	Yes	NY	WPP04.08000	NPW	Digestion, ICP	[EPA 200.7]	Barium
Certified	Yes	NY	WPP04.11000	NPW	Digestion, ICP	[EPA 200.7]	Beryllium
Applied	No	NY	WPP04.12000	NPW	Digestion, AA Furnace	[EPA 213.2]	Cadmium
Applied	No	NY	WPP04.12100	NPW	Digestion, Platform Furnace	[EPA 200.9]	Cadmium
Certified	Yes	NY	WPP04.13500	NPW	Digestion, ICP	[EPA 200.7]	Cadmium
Certified	Yes	NY	WPP04.15000	NPW	0.45u Filter, Colorimetric DPC	[SM 3500-Cr D]	Chromium (VI)
Certified	Yes	NY	WPP04.18000	NPW	Digestion, ICP	[EPA 200.7]	Chromium
Applied	No	NY	WPP04.19000	NPW	Digestion, AA Furnace	[EPA 219.2]	Cobalt
Applied	No	NY	WPP04.19100	NPW	Digestion, Platform Furnace	[EPA 200.9]	Cobalt
Certified	Yes	NY	WPP04.19500	NPW	Digestion, ICP	[EPA 200.7]	Cobalt
Certified	Yes	NY	WPP04.21500	NPW	Digestion, ICP	[EPA 200.7]	Copper
Certified	Yes	NY	WPP04.26500	NPW	Digestion, ICP	[EPA 200.7]	Iron
Applied	No	NY	WPP04.27500	NPW	Digestion, AA Furnace	[EPA 239.2]	Lead
Certified	Yes	NY	WPP04.27600	NPW	Digestion, Platform Furnace	[EPA 200.9]	Lead
Certified	Yes	NY	WPP04.28000	NPW	Digestion, ICP	[EPA 200.7]	Lead
Certified	Yes	NY	WPP04.31000	NPW	Digestion, ICP	[EPA 200.7]	Manganese
Certified	Yes	NY	WPP04.33000	NPW	Manual Cold Vapor	[EPA 245.1]	Mercury
Applied	No	NY	WPP04.34500	NPW	Digestion, AA Furnace	[EPA 246.2]	Molybdenum
Certified	Yes	NY	WPP04.35000	NPW	Digestion, ICP	[EPA 200.7]	Molybdenum

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National Environmental La' tory Accreditation Program

ANNUAL CERTIFIED PARAME R LIST AND CURRENT STATUS

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Laboratory Name: WASTE STREAM TECHNOLOGY INC **Laboratory Number:** NY977 **Activity ID:** NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: WPP04 – Inorganic Parameters, Metals

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NY	WPP04.37000	NPW	Digestion, AA Furnace	[EPA 249.2]	Nickel
Certified	Yes	NY	WPP04.37500	NPW	Digestion, ICP	[EPA 200.7]	Nickel
Certified	Yes	NY	WPP04.45000	NPW	Digestion, AA Furnace	[EPA 270.2]	Selenium
Certified	Yes	NY	WPP04.45500	NPW	Digestion, ICP	[EPA 200.7]	Selenium
Applied	No	NY	WPP04.47000	NPW	Digestion, AA Furnace	[EPA 272.2]	Silver
Certified	Yes	NY	WPP04.48000	NPW	Digestion, ICP	[EPA 200.7]	Silver
Certified	Yes	NY	WPP04.49500	NPW	Digestion, AA Furnace	[EPA 279.2]	Thallium
Certified	Yes	NY	WPP04.49600	NPW	Digestion, Platform Furnace	[EPA 200.9]	Thallium
Certified	Yes	NY	WPP04.50000	NPW	Digestion, ICP	[EPA 200.7]	Thallium
Certified	Yes	NY	WPP04.54000	NPW	Digestion, ICP	[EPA 200.7]	Vanadium
Certified	Yes	NY	WPP04.56500	NPW	Digestion, ICP	[EPA 200.7]	Zinc

Category: WPP05 – Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP05.02010	NPW	Purge & Trap, GC (PID)	[EPA 602]	Benzene
Certified	Yes	NY	WPP05.02020	NPW	Purge & Trap, GC (PID)	[EPA 602]	Chlorobenzene
Certified	Yes	NY	WPP05.02030	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,2-)
Certified	Yes	NY	WPP05.02040	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,3-)
Certified	Yes	NY	WPP05.02050	NPW	Purge & Trap, GC (PID)	[EPA 602]	Dichlorobenzene (1,4-)
Certified	Yes	NY	WPP05.02060	NPW	Purge & Trap, GC (PID)	[EPA 602]	Ethylbenzene
Certified	Yes	NY	WPP05.02070	NPW	Purge & Trap, GC (PID)	[EPA 602]	Toluene
Certified	Yes	NY	WPP05.02080	NPW	Purge & Trap, GC (PID)	[EPA 602]	Xylenes (total)
Certified	Yes	NY	WPP05.09010	NPW	Extract/GC (ECD)	[EPA 608]	Aldrin
Certified	Yes	NY	WPP05.09020	NPW	Extract/GC (ECD)	[EPA 608]	Alpha BHC
Certified	Yes	NY	WPP05.09030	NPW	Extract/GC (ECD)	[EPA 608]	Beta BHC
Certified	Yes	NY	WPP05.09040	NPW	Extract/GC (ECD)	[EPA 608]	Delta BHC
Certified	Yes	NY	WPP05.09050	NPW	Extract/GC (ECD)	[EPA 608]	Lindane (gamma BHC)
Certified	Yes	NY	WPP05.09060	NPW	Extract/GC (ECD)	[EPA 608]	Chlordane
Certified	Yes	NY	WPP05.09070	NPW	Extract/GC (ECD)	[EPA 608]	DDD (4,4'-)

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Category: WPP05 – Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP05.09080	NPW	Extract/GC (ECD)	[EPA 608]	DDE (4,4'-)
Certified	Yes	NY	WPP05.09090	NPW	Extract/GC (ECD)	[EPA 608]	DDT (4,4'-)
Certified	Yes	NY	WPP05.09100	NPW	Extract/GC (ECD)	[EPA 608]	Dieldrin
Certified	Yes	NY	WPP05.09110	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan I
Certified	Yes	NY	WPP05.09120	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan II
Certified	Yes	NY	WPP05.09130	NPW	Extract/GC (ECD)	[EPA 608]	Endosulfan sulfate
Certified	Yes	NY	WPP05.09140	NPW	Extract/GC (ECD)	[EPA 608]	Endrin
Certified	Yes	NY	WPP05.09150	NPW	Extract/GC (ECD)	[EPA 608]	Endrin aldehyde
Applied	No	NY	WPP05.09160	NPW	Extract/GC (ECD)	[EPA 608]	Endrin ketone
Certified	Yes	NY	WPP05.09170	NPW	Extract/GC (ECD)	[EPA 608]	Heptachlor
Certified	Yes	NY	WPP05.09180	NPW	Extract/GC (ECD)	[EPA 608]	Heptachlor epoxide
Certified	Yes	NY	WPP05.09190	NPW	Extract/GC (ECD)	[EPA 608]	Methoxychlor
Certified	Yes	NY	WPP05.09200	NPW	Extract/GC (ECD)	[EPA 608]	Toxaphene
Certified	Yes	NY	WPP05.11010	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1016
Certified	Yes	NY	WPP05.11020	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1221
Certified	Yes	NY	WPP05.11030	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1232
Certified	Yes	NY	WPP05.11040	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1242
Certified	Yes	NY	WPP05.11050	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1248
Certified	Yes	NY	WPP05.11060	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1254
Certified	Yes	NY	WPP05.11070	NPW	Extract/GC (ECD)	[EPA 608]	PCB 1260

Category: WPP06 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP06.02010	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Benzene
Certified	Yes	NY	WPP06.02020	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromodichloromethane
Certified	Yes	NY	WPP06.02030	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromoform
Certified	Yes	NY	WPP06.02040	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Bromomethane
Certified	Yes	NY	WPP06.02050	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Carbon tetrachloride
Certified	Yes	NY	WPP06.02060	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chlorobenzene

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BUFFALO, NY 14207

Category: WPP06 – Organic Parameters, Chromatography/MS

Status	*Eligible to* Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP06.02070	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroethane
Certified	Yes	NY	WPP06.02080	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroethyl vinyl ether (2-)
Certified	Yes	NY	WPP06.02090	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloroform
Certified	Yes	NY	WPP06.02100	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Chloromethane
Certified	Yes	NY	WPP06.02110	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dibromochloromethane
Certified	Yes	NY	WPP06.02120	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,2-)
Certified	Yes	NY	WPP06.02130	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,3-)
Certified	Yes	NY	WPP06.02140	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichlorobenzene (1,4-)
Certified	Yes	NY	WPP06.02150	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethane (1,1-)
Certified	Yes	NY	WPP06.02160	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethane (1,2-)
Certified	Yes	NY	WPP06.02170	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (1,1-)
Certified	Yes	NY	WPP06.02180	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloroethene (trans-1,2-)
Certified	Yes	NY	WPP06.02190	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropane (1,2-)
Certified	Yes	NY	WPP06.02200	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropene (cis-1,3-)
Certified	Yes	NY	WPP06.02210	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Dichloropropene (trans-1,3-)
Certified	Yes	NY	WPP06.02220	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Ethylbenzene
Certified	Yes	NY	WPP06.02230	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methylene chloride (Dichloromethane)
Applied	No	NY	WPP06.02232	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Methyl tert-butyl ether
Applied	No	NY	WPP06.02234	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tert-butyl alcohol
Applied	No	NY	WPP06.02238	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Styrene
Certified	Yes	NY	WPP06.02240	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NY	WPP06.02250	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Tetrachloroethene
Certified	Yes	NY	WPP06.02260	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Toluene
Certified	Yes	NY	WPP06.02270	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethane (1,1,1-)
Certified	Yes	NY	WPP06.02280	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethane (1,1,2-)
Certified	Yes	NY	WPP06.02290	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichloroethene
Certified	Yes	NY	WPP06.02300	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Trichlorofluoromethane
Certified	Yes	NY	WPP06.02310	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Vinyl chloride
Certified	Yes	NY	WPP06.02312	NPW	GC/MS, P & T, Capillary Column	[EPA 624]	Xylenes (total)
Certified	Yes	NY	WPP06.03010	NPW	Extract, GC/MS	[EPA 625]	Acenaphthene
Certified	Yes	NY	WPP06.03020	NPW	Extract, GC/MS	[EPA 625]	Acenaphthylene
Certified	Yes	NY	WPP06.03030	NPW	Extract, GC/MS	[EPA 625]	Anthracene

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department [illegible]vironmental Protection

National Environmental La[illegible]tory Accreditation Program

ANNUAL CERTIFIED PARAME[illegible]ER LIST AND CURRENT STATUS

Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: WPP06 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	WPP06.03040	NPW	Extract, GC/MS	[EPA 625]	Benzo(a)anthracene
Certified	Yes	NY	WPP06.03050	NPW	Extract, GC/MS	[EPA 625]	Benzo(b)fluoranthene
Certified	Yes	NY	WPP06.03060	NPW	Extract, GC/MS	[EPA 625]	Benzo(k)fluoranthene
Certified	Yes	NY	WPP06.03070	NPW	Extract, GC/MS	[EPA 625]	Benzo(a)pyrene
Certified	Yes	NY	WPP06.03080	NPW	Extract, GC/MS	[EPA 625]	Benzo(ghi)perylene
Certified	Yes	NY	WPP06.03090	NPW	Extract, GC/MS	[EPA 625]	Butyl benzyl phthalate
Certified	Yes	NY	WPP06.03100	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroethyl) ether
Certified	Yes	NY	WPP06.03110	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroethoxy) methane
Certified	Yes	NY	WPP06.03120	NPW	Extract, GC/MS	[EPA 625]	Bis (2-ethylhexyl) phthalate
Certified	Yes	NY	WPP06.03130	NPW	Extract, GC/MS	[EPA 625]	Bis (2-chloroisopropyl) ether
Certified	Yes	NY	WPP06.03140	NPW	Extract, GC/MS	[EPA 625]	Bromophenyl-phenyl ether (4-)
Certified	Yes	NY	WPP06.03150	NPW	Extract, GC/MS	[EPA 625]	Chloronaphthalene (2-)
Certified	Yes	NY	WPP06.03160	NPW	Extract, GC/MS	[EPA 625]	Chlorophenyl-phenyl ether (4-)
Certified	Yes	NY	WPP06.03170	NPW	Extract, GC/MS	[EPA 625]	Chrysene
Certified	Yes	NY	WPP06.03180	NPW	Extract, GC/MS	[EPA 625]	Dibenzo(a,h)anthracene
Certified	Yes	NY	WPP06.03190	NPW	Extract, GC/MS	[EPA 625]	Di-n-butyl phthalate
Certified	Yes	NY	WPP06.03200	NPW	Extract, GC/MS	[EPA 625]	Dichlorobenzene (1,3-)
Certified	Yes	NY	WPP06.03210	NPW	Extract, GC/MS	[EPA 625]	Dichlorobenzene (1,2-)
Certified	Yes	NY	WPP06.03220	NPW	Extract, GC/MS	[EPA 625]	Dichlorobenzene (1,4-)
Certified	Yes	NY	WPP06.03230	NPW	Extract, GC/MS	[EPA 625]	Dichlorobenzidine (3,3'-)
Certified	Yes	NY	WPP06.03240	NPW	Extract, GC/MS	[EPA 625]	Diethyl phthalate
Certified	Yes	NY	WPP06.03250	NPW	Extract, GC/MS	[EPA 625]	Dimethyl phthalate
Certified	Yes	NY	WPP06.03260	NPW	Extract, GC/MS	[EPA 625]	Dinitrotoluene (2,4-)
Certified	Yes	NY	WPP06.03270	NPW	Extract, GC/MS	[EPA 625]	Dinitrotoluene (2,6-)
Certified	Yes	NY	WPP06.03280	NPW	Extract, GC/MS	[EPA 625]	Di-n-octyl phthalate
Certified	Yes	NY	WPP06.03290	NPW	Extract, GC/MS	[EPA 625]	Fluoranthene
Certified	Yes	NY	WPP06.03300	NPW	Extract, GC/MS	[EPA 625]	Fluorene
Certified	Yes	NY	WPP06.03310	NPW	Extract, GC/MS	[EPA 625]	Hexachlorobenzene
Certified	Yes	NY	WPP06.03320	NPW	Extract, GC/MS	[EPA 625]	Hexachlorobutadiene (1,3-)
Certified	Yes	NY	WPP06.03330	NPW	Extract, GC/MS	[EPA 625]	Hexachloroethane
Certified	Yes	NY	WPP06.03340	NPW	Extract, GC/MS	[EPA 625]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NY	WPP06.03350	NPW	Extract, GC/MS	[EPA 625]	Isophorone

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National Environmental Laboratory Accreditation Program

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302 GROTE ST
BUFFALO, NY 14207

Category: WPP06 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NY	WPP06.03358	NPW	Extract, GC/MS	[EPA 625]	Methylnaphthalene (2-)
Certified	Yes	NY	WPP06.03360	NPW	Extract, GC/MS	[EPA 625]	Naphthalene
Applied	No	NY	WPP06.03366	NPW	Extract, GC/MS	[EPA 625]	Chloroaniline (4-)
Applied	No	NY	WPP06.03367	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (2-)
Applied	No	NY	WPP06.03368	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (3-)
Applied	No	NY	WPP06.03369	NPW	Extract, GC/MS	[EPA 625]	Nitroaniline (4-)
Certified	Yes	NY	WPP06.03370	NPW	Extract, GC/MS	[EPA 625]	Nitrobenzene
Certified	Yes	NY	WPP06.03380	NPW	Extract, GC/MS	[EPA 625]	N-Nitroso-di-n-propylamine
Certified	Yes	NY	WPP06.03390	NPW	Extract, GC/MS	[EPA 625]	Phenanthrene
Certified	Yes	NY	WPP06.03400	NPW	Extract, GC/MS	[EPA 625]	Pyrene
Certified	Yes	NY	WPP06.03410	NPW	Extract, GC/MS	[EPA 625]	Trichlorobenzene (1,2,4-)
Applied	No	NY	WPP06.03417	NPW	Extract, GC/MS	[EPA 625]	Methylphenol (2-)
Applied	No	NY	WPP06.03418	NPW	Extract, GC/MS	[EPA 625]	Methylphenol (4-)
Certified	Yes	NY	WPP06.03420	NPW	Extract, GC/MS	[EPA 625]	Methyl phenol (4-chloro-3-)
Certified	Yes	NY	WPP06.03430	NPW	Extract, GC/MS	[EPA 625]	Chlorophenol (2-)
Certified	Yes	NY	WPP06.03440	NPW	Extract, GC/MS	[EPA 625]	Dichlorophenol (2,4-)
Certified	Yes	NY	WPP06.03450	NPW	Extract, GC/MS	[EPA 625]	Dimethylphenol (2,4-)
Certified	Yes	NY	WPP06.03460	NPW	Extract, GC/MS	[EPA 625]	Dinitrophenol (2,4-)
Certified	Yes	NY	WPP06.03470	NPW	Extract, GC/MS	[EPA 625]	Dinitrophenol (2-methyl-4,6-)
Certified	Yes	NY	WPP06.03480	NPW	Extract, GC/MS	[EPA 625]	Nitrophenol (2-)
Certified	Yes	NY	WPP06.03490	NPW	Extract, GC/MS	[EPA 625]	Nitrophenol (4-)
Certified	Yes	NY	WPP06.03500	NPW	Extract, GC/MS	[EPA 625]	Pentachlorophenol
Certified	Yes	NY	WPP06.03510	NPW	Extract, GC/MS	[EPA 625]	Phenol
Certified	Yes	NY	WPP06.03520	NPW	Extract, GC/MS	[EPA 625]	Trichlorophenol (2,4,6-)
Applied	No	NY	WPP06.03530	NPW	Extract, GC/MS	[EPA 625]	Benzoic acid
Applied	No	NY	WPP06.03570	NPW	Extract, GC/MS	[EPA 625]	Aniline
Certified	Yes	NY	WPP06.03580	NPW	Extract, GC/MS	[EPA 625]	Benzidine
Applied	No	NY	WPP06.03590	NPW	Extract, GC/MS	[EPA 625]	Carbazole
Certified	Yes	NY	WPP06.03660	NPW	Extract, GC/MS	[EPA 625]	Hexachlorocyclopentadiene
Certified	Yes	NY	WPP06.03680	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodimethylamine
Certified	Yes	NY	WPP06.03690	NPW	Extract, GC/MS	[EPA 625]	N-Nitrosodiphenylamine

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Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Applied	No	NY	WPP06.03720	NPW	Extract, GC/MS	[EPA 625]	Pyridine

Category: SHW02 – Characteristics of Hazardous Waste

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW02.03000	NPW, SCM	Aqueous Waste, Potentiometric	[SW-846 9040B, Rev. 2, 1/95]	Corrosivity - pH waste, >20% water

Category: SHW03 – Analyze-Immediately Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW03.01000	NPW, SCM	Aqueous, Electrometric	[SW-846 9040B, Rev. 2, 1/95]	pH

Category: SHW04 – Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW04.06500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2, 12/96]	Antimony
Certified	Yes	NY	SHW04.09000	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Arsenic
Certified	Yes	NY	SHW04.11500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Barium
Certified	Yes	NY	SHW04.13500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Beryllium
Certified	Yes	NY	SHW04.15500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Cadmium
Certified	Yes	NY	SHW04.17500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Calcium
Certified	Yes	NY	SHW04.18500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Chromium
Certified	Yes	NY	SHW04.21000	NPW, SCM	Colorimetric	[SW-846 7196A, Rev. 1, 7/92]	Chromium (VI)
Certified	Yes	NY	SHW04.22500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Cobalt
Certified	Yes	NY	SHW04.24500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Copper
Certified	Yes	NY	SHW04.26000	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Iron
Certified	Yes	NY	SHW04.27500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Lead
Certified	Yes	NY	SHW04.30500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2, 12/96]	Magnesium

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302 GROTE ST
BUFFALO, NY 14207

Category: SHW04 – Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW04.31500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2, 12/96]	Manganese
Certified	Yes	NY	SHW04.33000	NPW, SCM	AA, Manual Cold Vapor	[SW-846 7470A, Rev. 1, 9/94]	Mercury - liquid waste
Certified	Yes	NY	SHW04.34000	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Molybdenum
Certified	Yes	NY	SHW04.35500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2, 12/96]	Nickel
Certified	Yes	NY	SHW04.38000	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Potassium
Certified	Yes	NY	SHW04.39000	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Selenium
Certified	Yes	NY	SHW04.41000	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Silver
Certified	Yes	NY	SHW04.43000	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Sodium
Certified	Yes	NY	SHW04.45000	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Thallium
Certified	Yes	NY	SHW04.47500	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Vanadium
Certified	Yes	NY	SHW04.49000	NPW, SCM	ICP	[SW-846 6010B, Rev. 2 12/96]	Zinc
Dropped	No	NY	SHW04.50000	NPW, SCM	AA	[SW-846 7950, Rev. 0, 9/86]	Zinc

Category: SHW06 – Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	No	NY	SHW06.05010	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Benzene
Certified	Yes	NJ	SHW06.05020	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Chlorobenzene
Certified	Yes	NY	SHW06.05030	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Dichlorobenzene (1,2-)
Certified	Yes	NY	SHW06.05040	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Dichlorobenzene (1,3-)
Certified	Yes	NY	SHW06.05050	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Dichlorobenzene (1,4-)
Certified	Yes	NY	SHW06.05060	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Ethylbenzene
Certified	Yes	NY	SHW06.05070	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Toluene
Certified	Yes	NY	SHW06.05080	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Xylene (o-)
Certified	Yes	NY	SHW06.05090	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Xylene (m-)
Certified	Yes	NY	SHW06.05100	NPW, SCM	GC, Direct Injection or P & T, PID-HECD	[SW-846 8021B, Rev. 2, 12/96]	Xylene (p-)
Certified	Yes	NY	SHW06.12010	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Aldrin
Certified	Yes	NY	SHW06.12020	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Alpha BHC
Certified	Yes	NY	SHW06.12030	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Beta BHC
Certified	Yes	NY	SHW06.12040	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Delta BHC

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Certified	Yes	NY	SHW06.12050	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Lindane (gamma BHC)
Certified	Yes	NY	SHW06.12060	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Chlordane (technical)
Certified	Yes	NY	SHW06.12090	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	DDD (4,4'-)
Certified	Yes	NY	SHW06.12100	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	DDE (4,4'-)
Certified	Yes	NY	SHW06.12110	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	DDT (4,4'-)
Certified	Yes	NY	SHW06.12120	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Dieldrin
Certified	Yes	NY	SHW06.12130	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endosulfan I
Certified	Yes	NY	SHW06.12140	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endosulfan II
Certified	Yes	NY	SHW06.12150	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endosulfan sulfate
Certified	Yes	NY	SHW06.12160	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endrin
Certified	Yes	NY	SHW06.12170	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endrin aldehyde
Certified	Yes	NY	SHW06.12190	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Heptachlor
Certified	Yes	NY	SHW06.12200	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Heptachlor epoxide
Certified	Yes	NY	SHW06.12210	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Methoxychlor
Certified	Yes	NY	SHW06.12220	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Toxaphene
Certified	Yes	NY	SHW06.13110	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1016
Certified	Yes	NY	SHW06.13120	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1221
Certified	Yes	NY	SHW06.13130	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1232
Certified	Yes	NY	SHW06.13140	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1242
Certified	Yes	NY	SHW06.13150	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1248
Certified	Yes	NY	SHW06.13160	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1254
Certified	Yes	NY	SHW06.13170	NPW, SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8082, Rev. 0, 12/96]	PCB 1260
Certified	Yes	NY	SHW06.23010	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	Dalapon
Certified	Yes	NY	SHW06.23020	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	Dicamba
Certified	Yes	NY	SHW06.23030	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	Dinoseb
Certified	Yes	NY	SHW06.23040	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	D (2,4-)
Certified	Yes	NY	SHW06.23050	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	T (2,4,5-)
Certified	Yes	NY	SHW06.23060	NPW, SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev 1, 9/96]	TP (2,4,5-) (Silvex)

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New Jersey Department of Environmental Protection

National Environmental La[illegible]tory Accreditation Program

ANNUAL CERTIFIED PARAME[illegible]R LIST AND CURRENT STATUS

Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04010	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Benzene
Certified	Yes	NY	SHW07.04020	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chlorobenzene
Certified	Yes	NY	SHW07.04030	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichlorobenzene (1,2-)
Certified	Yes	NY	SHW07.04040	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichlorobenzene (1,3-)
Certified	Yes	NY	SHW07.04050	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichlorobenzene (1,4-)
Certified	Yes	NY	SHW07.04060	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Ethylbenzene
Certified	Yes	NY	SHW07.04070	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Toluene
Certified	Yes	NY	SHW07.04080	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Xylenes (total)
Certified	Yes	NY	SHW07.04090	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Bromodichloromethane
Certified	Yes	NY	SHW07.04100	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Bromoform
Certified	Yes	NJ	SHW07.04110	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Bromomethane
Certified	Yes	NY	SHW07.04120	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Carbon tetrachloride
Certified	Yes	NY	SHW07.04130	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chloroethane
Certified	Yes	NY	SHW07.04140	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chloroethyl vinyl ether (2-)
Certified	Yes	NY	SHW07.04150	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chloroform
Certified	Yes	NY	SHW07.04160	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chloromethane
Certified	Yes	NY	SHW07.04170	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloropropene (trans-1,3-)
Certified	Yes	NY	SHW07.04180	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dibromochloromethane
Certified	Yes	NY	SHW07.04187	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dibromo-3-chloropropane (1,2-)
Certified	Yes	NY	SHW07.04190	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichlorodifluoromethane
Certified	Yes	NY	SHW07.04200	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloroethane (1,1-)
Certified	Yes	NY	SHW07.04210	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloroethane (1,2-)
Certified	Yes	NY	SHW07.04220	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloroethene (1,1-)
Certified	Yes	NY	SHW07.04230	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloroethene (trans-1,2-)
Certified	Yes	NY	SHW07.04235	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloroethene (cis-1,2-)
Certified	Yes	NY	SHW07.04240	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloropropane (1,2-)
Certified	Yes	NY	SHW07.04242	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloropropane (2,2-)
Certified	Yes	NY	SHW07.04250	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloropropene (cis-1,3-)
Certified	Yes	NY	SHW07.04260	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Methylene chloride (Dichloromethane)
Certified	Yes	NY	SHW07.04270	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Tetrachloroethane (1,1,2,2-)
Certified	Yes	NY	SHW07.04280	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Tetrachloroethene
Certified	Yes	NY	SHW07.04290	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichloroethane (1,1,1-)

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New Jersey Department [illegible]vironmental Protection

National Environmental La[illegible]tory Accreditation Program

ANNUAL CERTIFIED PARAME[illegible]R LIST AND CURRENT STATUS

Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04300	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichloroethane (1,1,2-)
Certified	Yes	NY	SHW07.04310	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichloroethene
Certified	Yes	NY	SHW07.04320	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichlorofluoromethane
Certified	Yes	NY	SHW07.04325	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichloropropane (1,2,3-)
Certified	Yes	NY	SHW07.04327	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Vinyl acetate
Certified	Yes	NY	SHW07.04330	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Vinyl chloride
Certified	Yes	NY	SHW07.04340	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Acetone
Certified	Yes	NY	SHW07.04350	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Carbon disulfide
Certified	Yes	NY	SHW07.04360	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Butanone (2-)
Certified	Yes	NY	SHW07.04370	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Hexanone (2-)
Certified	Yes	NY	SHW07.04380	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Pentanone (4-methyl-2-)
Certified	Yes	NY	SHW07.04390	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Methyl tert-butyl ether
Certified	Yes	NY	SHW07.04395	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Tert-butyl alcohol
Applied	No	NY	SHW07.04400	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Acrolein
Applied	No	NY	SHW07.04410	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Acrylonitrile
Applied	No	NY	SHW07.04500	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Hexachlorobutadiene (1,3-)
Applied	No	NY	SHW07.04530	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Hexachloroethane
Applied	No	NY	SHW07.04540	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260C, Rev. 2, 12/96]	Naphthalene
Certified	Yes	NY	SHW07.04560	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Tetrachloroethane (1,1,1,2-)
Applied	No	NY	SHW07.04570	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trichlorobenzene (1,2,4-)
Applied	No	NY	SHW07.04580	NPW, SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Nitrobenzene
Applied	No	NY	SHW07.05004	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	N-Nitrosodiethylamine
Certified	Yes	NY	SHW07.05005	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	N-Nitrosodimethylamine
Certified	Yes	NY	SHW07.05006	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	N-Nitroso-di-n-propylamine
Certified	Yes	NY	SHW07.05010	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	N-Nitrosodiphenylamine
Certified	Yes	NY	SHW07.05030	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Carbazole
Certified	Yes	NY	SHW07.05038	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Benzidine
Certified	Yes	NY	SHW07.05040	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dichlorobenzidine (3,3'-)
Certified	Yes	NY	SHW07.05048	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Aniline
Certified	Yes	NY	SHW07.05050	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Chloraniline (4-)
Certified	Yes	NY	SHW07.05060	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Nitroaniline (2-)
Certified	Yes	NY	SHW07.05062	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Nitroaniline (3-)

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New Jersey Department of Environmental Protection

National Environmental Laboratory Accreditation Program

ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS

Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: SHW07 -- Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.05063	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Nitroaniline (4-)
Certified	Yes	NY	SHW07.05070	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Chloronaphthalene (2-)
Certified	Yes	NY	SHW07.05080	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Hexachlorobenzene
Certified	Yes	NY	SHW07.05090	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Hexachlorobutadiene (1,3-)
Certified	Yes	NY	SHW07.05100	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Hexachlorocyclopentadiene
Certified	Yes	NY	SHW07.05110	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Hexachloroethane
Certified	Yes	NY	SHW07.05120	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Trichlorobenzene (1,2,4-)
Certified	Yes	NY	SHW07.05130	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Bis (2-chloroethoxy) methane
Certified	Yes	NY	SHW07.05132	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Bis (2-chloroethyl) ether
Certified	Yes	NY	SHW07.05140	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Bis (2-chloroisopropyl) ether
Certified	Yes	NY	SHW07.05150	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Chlorophenyl-phenyl ether (4-)
Certified	Yes	NY	SHW07.05160	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Bromophenyl-phenyl ether (4-)
Certified	Yes	NY	SHW07.05210	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Butyl benzyl phthalate
Certified	Yes	NY	SHW07.05220	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Bis (2-ethylhexyl) phthalate
Certified	Yes	NY	SHW07.05230	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Diethyl phthalate
Certified	Yes	NY	SHW07.05240	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dimethyl phthalate
Certified	Yes	NY	SHW07.05250	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Di-n-butyl phthalate
Certified	Yes	NY	SHW07.05260	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Di-n-octyl phthalate
Certified	Yes	NY	SHW07.05270	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Acenaphthene
Certified	Yes	NY	SHW07.05280	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Anthracene
Certified	Yes	NY	SHW07.05290	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Acenaphthylene
Certified	Yes	NY	SHW07.05300	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Benzo(a)anthracene
Certified	Yes	NY	SHW07.05310	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Benzo(a)pyrene
Certified	Yes	NY	SHW07.05320	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Benzo(b)fluoranthene
Certified	Yes	NY	SHW07.05330	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Benzo(ghi)perylene
Certified	Yes	NY	SHW07.05340	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Benzo(k)fluoranthene
Certified	Yes	NY	SHW07.05350	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Chrysene
Certified	Yes	NY	SHW07.05360	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dibenzo(a,h)anthracene
Certified	Yes	NY	SHW07.05370	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Fluoranthene
Certified	Yes	NY	SHW07.05380	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Fluorene
Certified	Yes	NY	SHW07.05390	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Indeno(1,2,3-cd)pyrene
Certified	Yes	NY	SHW07.05410	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Naphthalene

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302 GROTE ST
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Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.05420	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Phenanthrene
Certified	Yes	NY	SHW07.05430	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Pyrene
Certified	Yes	NY	SHW07.05440	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Methyl phenol (4-chloro-3-)
Certified	Yes	NY	SHW07.05450	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Chlorophenol (2-)
Certified	Yes	NY	SHW07.05460	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dichlorophenol (2,4-)
Certified	Yes	NY	SHW07.05470	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dimethylphenol (2,4-)
Certified	Yes	NY	SHW07.05480	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dinitrophenol (2,4-)
Certified	Yes	NY	SHW07.05490	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dinitrophenol (2-methyl-4,6-)
Certified	Yes	NY	SHW07.05500	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Methylphenol (2-)
Certified	Yes	NY	SHW07.05510	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Methylphenol (4-)
Certified	Yes	NY	SHW07.05520	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Nitrophenol (2-)
Certified	Yes	NY	SHW07.05530	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Nitrophenol (4-)
Certified	Yes	NY	SHW07.05540	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Pentachlorophenol
Certified	Yes	NY	SHW07.05550	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Phenol
Certified	Yes	NY	SHW07.05560	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Trichlorophenol (2,4,5-)
Certified	Yes	NY	SHW07.05570	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Trichlorophenol (2,4,6-)
Certified	Yes	NY	SHW07.05710	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Benzoic acid
Certified	Yes	NY	SHW07.05720	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Benzyl alcohol
Certified	Yes	NY	SHW07.05750	NPW, SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Pyridine

Category: SHW09 – Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW09.02000	NPW, SCM	Distillation	[SW-846 9010B, Rev. 2, 12/96]	Cyanide
Certified	Yes	NY	SHW09.03000	NPW, SCM	Distillation	[SW-846 9010B, Rev. 2, 12/96]	Cyanide - amenable to Cl2
Certified	Yes	NY	SHW09.09000	NPW, SCM	Redox Titration	[SW-846 9030B, Rev. 2, 12/96]	Sulfides, acid sol. & insol.
Certified	Yes	NY	SHW09.10100	NPW, SCM	Titration	[SW-846 9034, Rev. 0, 12/96]	Sulfides, acid sol. & insol.
Certified	Yes	NY	SHW09.14000	NPW, SCM	Electrometric	[SW-846 9040B, Rev. 2, 1/95]	pH - waste, >20% water
Applied	No	NY	SHW09.34000	NPW, SCM	Titrimetric, Silver Nitrate	[SW-846 9253, Rev. 0, 9/94]	Chloride

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

New Jersey Department of Environmental Protection

National Environmental La' tory Accreditation Program

ANNUAL CERTIFIED PARAME R LIST AND CURRENT STATUS

Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: SHW02 – Characteristics of Hazardous Waste

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW02.01000	SCM	Pensky Martens	[SW-846 1010, Rev. 0, 9/86]	Ignitability
Applied	No	NY	SHW02.02000	SCM	Setaflash	[SW-846 1020A, Rev. 1, 7/92]	Ignitability
Certified	Yes	NY	SHW02.06900	SCM	TCLP, Toxicity Procedure, ZHE	[SW-846 1311, Rev. 0, 7/92]	Volatile organics
Certified	Yes	NY	SHW02.07000	SCM	TCLP, Toxicity Procedure, Shaker	[SW-846 1311, Rev. 0, 7/92]	Metals - semi volatile organics
Certified	Yes	NY	SHW02.07100	SCM	EP Toxicity Test	[SW-846 1310A, Rev. 1, 7/92]	Metals - organics
Certified	Yes	NY	SHW02.08000	SCM	Synthetic PPT Leachate Procedure	[SW-846 1312, Rev. 0, 9/94]	Metals - organics
Certified	Yes	NY	SHW02.09000	SCM	Multiple Extraction	[SW-846 1320, Rev. 0, 9/86]	Metals - organics

Category: SHW04 – Inorganic Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW04.02500	SCM	Dissolution of Oil, Grease & Wax	[SW-846 3040A, Rev. 1, 12/96]	Metals
Certified	Yes	NJ	SHW04.03000	SCM	Acid Digestion, Soil Sediment & Sludge	[SW-846 3050B, Rev. 2, 12/96]	Metals
Certified	Yes	NY	SHW04.11100	SCM	AA, Graphite Furnace	[SW-846 7060A, Rev. 0, 9/94]	Arsenic
Certified	Yes	NY	SHW04.33500	SCM	AA, Manual Cold Vapor	[SW-846 7471A, Rev. 1, 9/94]	Mercury - solid waste

Category: SHW05 – Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.03000	SCM	Soxhlet Extraction	[SW-846 3540C, Rev. 3, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.04000	SCM	Automatic Soxhlet Extraction	[SW-846 3541, Rev. 0, 9/94]	Semivolatile organics
Certified	Yes	NJ	SHW05.05000	SCM	Ultrasonic Extraction	[SW-846 3550B, Rev. 2, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.06000	SCM	Waste Dilution	[SW-846 3580A, Rev. 1, 7/92]	Organics
Certified	Yes	NJ	SHW05.07300	SCM	Closed System Purge & Trap	[SW-846 5035L, Rev. 0, 12/96]	Volatile organics - low conc.
Certified	Yes	NJ	SHW05.07310	SCM	Methanol Extract, Closed System P & T	[SW-846 5035H, Rev. 0, 12/96]	Volatile organics - high conc.
Certified	Yes	NJ	SHW05.12000	SCM	Cleanup-Florisil	[SW-846 3620B, Rev. 2, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.13000	SCM	Cleanup-Silica Gel	[SW-846 3630C, Rev. 3, 12/96]	Semivolatile organics
Certified	Yes	NJ	SHW05.14000	SCM	Cleanup-Gel Permeation	[SW-846 3640A, Rev. 1, 9/94]	Semivolatile organics
Certified	Yes	NJ	SHW05.16000	SCM	Cleanup-Sulfur Removal	[SW-846 3660B, Rev. 2, 12/96]	Semivolatile organics

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New Jersey Department of Environmental Protection
National Environmental Laboratory Accreditation Program
ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS
Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: SHW05 – Organic Parameters, Prep. / Screening

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW05.17000	SCM	Cleanup-Sulfuric Acid/KMnO4	[SW-846 3665A, Rev. 1, 12/96]	Semivolatile organics

Category: SHW06 – Organic Parameters, Chromatography

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW06.12180	SCM	GC, Extraction, ECD or HECD, Capillary	[SW-846 8081A, Rev. 1, 12/96]	Endrin ketone
Certified	Yes	NY	SHW06.23041	SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev. 1, 9/96]	DB (2,4-)
Certified	Yes	NY	SHW06.23063	SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev. 1, 9/96]	MCPA
Certified	Yes	NY	SHW06.23064	SCM	GC, Extraction, ECD, Capillary	[SW-846 8151A, Rev. 1, 9/96]	MCPP

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.04011	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Bromobenzene
Certified	Yes	NY	SHW07.04012	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Butyl benzene (n-)
Certified	Yes	NY	SHW07.04013	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Sec-butylbenzene
Certified	Yes	NY	SHW07.04014	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Tert-butylbenzene
Certified	Yes	NY	SHW07.04022	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chlorotoluene (2-)
Certified	Yes	NY	SHW07.04023	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Chlorotoluene (4-)
Certified	Yes	NY	SHW07.04065	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Isopropylbenzene
Certified	Yes	NY	SHW07.04073	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trimethylbenzene (1,2,4-)
Certified	Yes	NY	SHW07.04074	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Trimethylbenzene (1,3,5-)
Certified	Yes	NY	SHW07.04089	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Bromochloromethane
Certified	Yes	NY	SHW07.04241	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dichloropropane (1,3-)
Certified	Yes	NY	SHW07.04550	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Styrene
Certified	Yes	NY	SHW07.04590	SCM	GC/MS, P & T or Direct Injection, Capillary	[SW-846 8260B, Rev. 2, 12/96]	Dioxane (1,4-)
Certified	Yes	NY	SHW07.05170	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dinitrotoluene (2,4-)
Certified	Yes	NY	SHW07.05180	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dinitrotoluene (2,6-)
Certified	Yes	NY	SHW07.05190	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Isophorone

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New Jersey Department of Environmental Protection

National Environmental Lab-atory Accreditation Program

ANNUAL CERTIFIED PARAME. R LIST AND CURRENT STATUS

Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: SHW07 – Organic Parameters, Chromatography/MS

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW07.05200	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Nitrobenzene
Certified	Yes	NY	SHW07.05400	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Methylnaphthalene (2-)
Certified	Yes	NY	SHW07.05590	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Methylphenol (3-)
Certified	Yes	NY	SHW07.05600	SCM	GC/MS, Extract or Dir Inj, Capillary	[SW-846 8270C, Rev. 3, 12/96]	Dibenzofuran

Category: SHW09 – Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NY	SHW09.04100	SCM	Titrimetric/Manual Spectrophotometric	[SW-846 9014, Rev. 0, 12/96]	Cyanide
Certified	Yes	NY	SHW09.13050	SCM	Ion Chromatography	[SW-846 9056, Rev. 0, 9/94]	Sulfate
Certified	Yes	NY	SHW09.16000	SCM	Mix with Water or Calcium Chloride	[SW-846 9045C, Rev. 3, 1/95]	pH - soil and waste
Certified	Yes	NY	SHW09.21000	SCM	Colorimetric, Man, 4AAP Distillation	[SW-846 9065, Rev. 0, 9/86]	Phenols
Certified	Yes	NY	SHW09.25000	SCM	Extraction & Gravimetric	[SW-846 9071 B, Rev. 2, 5/99]	Oil & grease - sludge-hem
Certified	Yes	NY	SHW09.25100	SCM	Extraction & Gravimetric - LL or SPE	[SW-846 9071 B, Rev. 2, 5/99]	Oil & grease - sludge-hem-npm
Applied	No	NY	SHW09.29000	SCM	Flow-Through Paint Filter, Observation	[SW-846 9095, Rev. 0, 9/86]	Free liquid
Certified	Yes	NY	SHW09.30150	SCM	Ion Chromatography	[SW-846 9056, Rev. 0, 12/94]	Nitrate
Certified	Yes	NY	SHW09.30250	SCM	Ion Chromatography	[SW-846 9056, Rev. 0, 12/96]	Bromide
Certified	Yes	NY	SHW09.33100	SCM	Ion Chromatography	[SW-846 9056, Rev. 0, 12/96]	Chloride
Certified	Yes	NY	SHW09.54150	SCM	Ion Chromatography	[SW-846 9056, Rev. 0, 12/94]	Orthophosphate
Certified	Yes	NJ	SHW09.60106	SCM	Precipitation	[SM 7500-Ra B]	Radium - 226
Certified	Yes	NJ	SHW09.60160	SCM	Gamma Spectrometry	[DOE 4.5.2.3]	Photon Emitters
Certified	Yes	NJ	SHW09.60310	SCM	Alpha Spectrometry	[DOE U-02]	Uranium

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New Jersey Department of Environmental Protection
National Environmental Laboratory Accreditation Program
ANNUAL CERTIFIED PARAMETER LIST AND CURRENT STATUS
Effective as of 07/01/2006 until 06/30/2007

Laboratory Name: WASTE STREAM TECHNOLOGY INC Laboratory Number: NY977 Activity ID: NLC060001
302 GROTE ST
BUFFALO, NY 14207

Category: SHW09 – Miscellaneous Parameters

Status	Eligible to Report NJ Data	State	Code	Matrix	Technique Description	Approved Method	Parameter Description
Certified	Yes	NJ	SHW09.60400	SCM	Alpha Spectrometry	[DOE 4.5.5]	Thorium

Joseph F. Aiello, Chief J. Aiello

KEY: AE = Air and Emissions, BT = Biological Tissues, DW = Drinking Water, NPW = Non-Potable Water, SCM = Solid and Chemical Materials

U.S. Army Corps of Engineers

RECEIVED MAY 1 3 2004

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
12565 WEST CENTER ROAD
OMAHA NE 68144-3869

REPLY TO
ATTENTION OF

May 7, 2004

Hazardous, Toxic and Radioactive Waste
Center of Expertise

Dan Vollmer
Waste Stream Technology Inc.
302 Grote Street
Buffalo, NY 14207

Dear Mr. Vollmer:

This correspondence addresses the recent evaluation of Waste Stream Technology Inc. (WST) of Buffalo, NY by the U.S. Army Corps of Engineers (USACE) for chemical and radiological analysis in support of the USACE Hazardous, Toxic and Radioactive Waste Program.

Your laboratory is now validated for the parameters listed below:

METHOD	PARAMETERS	MATRIX(1)
300 series	Anions(5)	Water(2)
1632	Chemical Speciation of Arsenic	Water(2)
9010C/9014	Cyanide	Water(2)
9013/9010C/9014	Cyanide	Solid(2)
8151A	Herbicides	Water(2)
8151A	Herbicides	Solids(2)
3510C/8081B	Organochlorine Pesticides	Water(2)
3550B/8081B	Organochlorine Pesticides	Solids(2)
3510C/8082A	Polychlorinated Biphenyls	Water(2)
3550B/8082A	Polychlorinated Biphenyls	Solids(2)
3510C/8270C	Semivolatile Organics	Water(2)
3550B/8270C	Semivolatile Organics	Solids(2)
3005A/3010A/3015A/6010C/7470A	TAL Metals(3)	Water(2)
3051A/6010C/7471B	TAL Metals(3)	Solids(2)
9060	Total Organic Carbon	Water(2)
5030B/5035/Mod 8015	TPH - GRO	Water(2)
5030B/5035/Mod 8015	TPH - GRO	Solids(2)
3510C/Mod 8015	TPH – DRO	Water(2)
3550B/Mod 8015	TPH - DRO	Solids(2)
5030B/5035/8260B	Volatile Organics	Water(2)
5030B/5035/8260B	Volatile Organics	Solids(2)

Printed on Recycled Paper

M-RADSMPLPREP-01-XX	Radioactive Analysis Sample Preparation	Water(4)
M-RADSMPLPREP-01-XX	Radioactive Analysis Sample Preparation	Solids(4)
M-TEVA-01-XX	Measuring Thorium with Eichrom TEVA Columns	NA(4)
M-UTEVA-01-XX	Measuring Uranium or Thorium with Eichrom UTEVA Columns	NA(4)
M-RA228EPA-00-XX	Measuring Radium 228 by EPA 904.0	Water(4)
M-RA226&224-00-XX	Measuring Radium-226 and Radium 224 by Alpha Spectrometry	NA(4)
M-GAMMA-01-XX	Gamma Spectrometry using EG&G ORTEC Dspec	Water(4)
M-GAMMA-01-XX	Gamma Spectrometry using EG&G ORTEC Dspec	Solids(4)
M-ALPHANYLST-02-XX	Alpha Spectroscopy Counting System	NA(4)
M-GASPRO-02-XX	Gas Proportional Alpha-Beta Counter	Water(4)

Remarks:

1) 'Solids' includes soils, sediments, and solid waste. NA = not applicable

2) The laboratory has successfully analyzed a Proficiency Testing (PT) or performance evaluation sample for this method/matrix.

3) TAL Metals: Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc.

4) Approval for this parameter is based primarily on review of SOPs.

5) Anions: Chloride, fluoride, sulfate, nitrate, nitrite, and ortho-phosphate.

Enclosed for your information is a copy of the Laboratory Inspection and Evaluation Report. Your laboratory has responded to the deficiencies as noted in the report. No further responses are necessary.

Based on the successful analysis of the National Environmental Laboratory Accreditation Conference Proficiency Testing samples for the appropriate fields of testing, the results of the laboratory inspection, and your Corrective Action Report, your laboratory will be validated for sample analysis by the methods listed above. Approval for radiological parameters is based on review of the laboratory's SOPs; the results of the laboratory inspection, the Corrective Action Report, and the laboratory's analysis of Performance Evaluation samples from commercial suppliers and for the DOE Quality Assessment Program (QAP). The evaluation of your facility is based substantially on ISO Guide 25 (General Requirements for the Competence of Testing Laboratories) and USACE Engineering Manual (EM) 200-1-3, Appendix I (Shell for Analytical Chemistry Requirements. The period of validation is 24 months and expires on May 7, 2006.

The USACE reserves the right to conduct additional laboratory inspections or to suspend validation status for any or all of the listed parameters if deemed necessary. It should be noted that your laboratory may not subcontract USACE analytical work to any other laboratory location without the approval of this office. This laboratory validation does not guarantee the delivery of any analytical samples from a USACE Contracting Officer Representative.

Any questions or comments can be directed to Dr. Jan W. Dunker at (402) 697-2566. General questions regarding laboratory validation may be directed to the Laboratory Validation Coordinator at (402) 697-2574.

Sincerely,

for Marcia C. Davies, Ph.D.
Director, USACE Hazardous,
Toxic and Radioactive Waste
Center of Expertise

Enclosure

Florida Department of Health

FLORIDA DEPARTMENT OF HEALTH

State of Florida
Department of Health, Bureau of Laboratories

This is to certify that

E87662

Waste Stream Technology, Inc.

302 Grote Street

Buffalo, NY 14207

has complied with Florida Administrative Code 64E-1, for the examination of Environmental samples in the following categories:

DRINKING WATER - Group II Unregulated Contaminants, Other Regulated Contaminants, Primary Inorganic Contaminants, Secondary Inorganic Contaminants

NON-POTABLE WATER - Extractable Organics, General Chemistry, Metals, Pesticides-Herbicides-PCB's, Volatile Organics

SOLID and CHEMICAL MATERIALS - Extractable Organics, Metals, Pesticides-Herbicides-PCB's, Volatile Organics

Continued certification is contingent upon successful on-going compliance with the NELAC Standards and FAC Rule 64E-1 regulations. Specific methods and analytes certified are cited on the Laboratory Scope of Accreditation for this laboratory and are on file at the Bureau of Laboratories, P. O. Box 210, Jacksonville, Florida 32231. Clients and customers are urged to verify with this agency the laboratory's certification status in Florida for particular methods and analytes.

EFFECTIVE JULY 1, 2005 THROUGH JUNE 30, 2006

Ming S. Chan, Ph.D.
Bureau Chief, Bureau of Laboratories
Florida Department of Health
DH Form 1697, 7/04
NON-TRANSFERABLE 05/27/2005-E87662

Jeb Bush
Governor

FLORIDA DEPARTMENT OF HEALTH

John O. Agwunobi, M.D., M.B.A., M.P.H.
Secretary

Laboratory Scope of Accreditation

THIS LISTING OF ACCREDITED ANALYTES SHOULD BE USED ONLY WHEN ASSOCIATED WITH A VALID CERTIFICATE

State Laboratory ID: E87662 **EPA Lab Code: NY00068** **(716) 876-5290**

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Drinking Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1,2-Tetrachloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
1,1,1-Trichloroethane	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
1,1,2,2-Tetrachloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
1,1,2-Trichloroethane	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
1,1-Dichloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
1,1-Dichloroethylene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
1,1-Dichloropropene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
1,2,3-Trichlorobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
1,2,3-Trichloropropane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
1,2,4-Trichlorobenzene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
1,2,4-Trimethylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
1,2-Dichlorobenzene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
2-Dichloroethane	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
,2-Dichloropropane	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
1,3,5-Trimethylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
1,3-Dichlorobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
1,3-Dichloropropane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
1,4-Dichlorobenzene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
2,2-Dichloropropane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
2,4,6-Trichlorophenol	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
2,4-Dinitrotoluene (2,4-DNT)	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
2,6-Dinitrotoluene (2,6-DNT)	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
2-Chlorophenol	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
2-Chlorotoluene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
2-Methyl-4,6-dinitrophenol	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
4-Chlorotoluene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
4-Isopropyltoluene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Antimony	EPA 200.9	Primary Inorganic Contaminants	NELAP	5/16/2001
Arsenic	EPA 200.7	Primary Inorganic Contaminants	NELAP	5/16/2001
Arsenic	EPA 200.9	Primary Inorganic Contaminants	NELAP	5/16/2001
Barium	EPA 200.7	Primary Inorganic Contaminants	NELAP	5/16/2001
Benzene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
Beryllium	EPA 200.7	Primary Inorganic Contaminants	NELAP	5/16/2001
Bromobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Bromochloromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
utyl benzyl phthalate	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001

"STATE" indicates certification for the analyte by the method specified. "NELAP" further indicates certification compliant with the NELAC Standards.

Laboratory Scope of Accreditation

THIS LISTING OF ACCREDITED ANALYTES SHOULD BE USED ONLY WHEN ASSOCIATED WITH A VALID CERTIFICATE

State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Drinking Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Cadmium	EPA 200.7	Primary Inorganic Contaminants	NELAP	5/16/2001
Cadmium	EPA 200.9	Primary Inorganic Contaminants	NELAP	5/16/2001
Carbon tetrachloride	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
Chlorobenzene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
Chloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Chromium	EPA 200.7	Primary Inorganic Contaminants	NELAP	5/16/2001
cis-1,2-Dichloroethylene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
cis-1,3-Dichloropropene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Copper	EPA 200.7	Secondary Inorganic Contaminants,Primary Inorganic Contaminants	NELAP	5/16/2001
Dibromomethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Dichlorodifluoromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
hloromethane (DCM, Methylene chloride)	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
Diethyl phthalate	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
Dimethyl phthalate	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
Di-n-butyl phthalate	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
Di-n-octyl phthalate	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
Ethylbenzene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
Fluoride	EPA 300.0	Primary Inorganic Contaminants	NELAP	5/16/2001
Hexachlorobutadiene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Iron	EPA 200.7	Secondary Inorganic Contaminants	NELAP	5/16/2001
Isophorone	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
Isopropylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Lead	EPA 200.9	Primary Inorganic Contaminants	NELAP	5/16/2001
Manganese	EPA 200.7	Secondary Inorganic Contaminants	NELAP	5/16/2001
Mercury	EPA 245.1	Primary Inorganic Contaminants	NELAP	5/16/2001
Methyl bromide (Bromomethane)	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Methyl chloride (Chloromethane)	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Methyl tert-butyl ether (MTBE)	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Naphthalene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
n-Butylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Nickel	EPA 200.7	Primary Inorganic Contaminants	NELAP	5/16/2001
Nitrobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
n-Propylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Phenol	EPA 625	Group II Unregulated Contaminants	NELAP	5/16/2001
Butylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001

Laboratory Scope of Accreditation

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State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Drinking Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Selenium	EPA 200.9	Primary Inorganic Contaminants	NELAP	5/16/2001
Silver	EPA 200.7	Secondary Inorganic Contaminants	NELAP	5/16/2001
Sodium	EPA 200.7	Primary Inorganic Contaminants	NELAP	5/16/2001
Styrene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
tert-Butylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Tetrachloroethylene (Perchloroethylene)	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
Thallium	EPA 200.9	Primary Inorganic Contaminants	NELAP	5/16/2001
Toluene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
Total dissolved solids	EPA 160.1	Secondary Inorganic Contaminants	NELAP	5/16/2001
trans-1,2-Dichloroethylene	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
trans-1,3-Dichloropropylene	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
Trichloroethene (Trichloroethylene)	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
hlorofluoromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	5/16/2001
ylene (total)	EPA 524.2	Other Regulated Contaminants	NELAP	5/16/2001
Zinc	EPA 200.7	Secondary Inorganic Contaminants	NELAP	5/16/2001

Laboratory Scope of Accreditation

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State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1-Trichloroethane	EPA 624	Volatile Organics	NELAP	5/16/2001
1,1,1-Trichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1,2,2-Tetrachloroethane	EPA 624	Volatile Organics	NELAP	5/16/2001
1,1,2,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1,2-Trichloroethane	EPA 624	Volatile Organics	NELAP	5/16/2001
1,1,2-Trichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1-Dichloroethane	EPA 624	Volatile Organics	NELAP	5/16/2001
1,1-Dichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1-Dichloroethylene	EPA 624	Volatile Organics	NELAP	5/16/2001
1,1-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2,4-Trichlorobenzene	EPA 625	Extractable Organics	NELAP	5/16/2001
1,2-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	5/16/2001
Dichlorobenzene	EPA 625	Extractable Organics	NELAP	5/16/2001
-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dichloroethane	EPA 624	Volatile Organics	NELAP	5/16/2001
1,2-Dichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dichloropropane	EPA 624	Volatile Organics	NELAP	5/16/2001
1,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,3-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	5/16/2001
1,3-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	5/16/2001
1,3-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,4-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	5/16/2001
1,4-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	5/16/2001
1,4-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
2,4,5-T	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
2,4,6-Trichlorophenol	EPA 625	Extractable Organics	NELAP	5/16/2001
2,4-D	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
2,4-Dichlorophenol	EPA 625	Extractable Organics	NELAP	5/16/2001
2,4-Dimethylphenol	EPA 625	Extractable Organics	NELAP	5/16/2001
2,4-Dinitrophenol	EPA 625	Extractable Organics	NELAP	5/16/2001
2,4-Dinitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4-Dinitrotoluene (2,4-DNT)	EPA 625	Extractable Organics	NELAP	5/16/2001
2,6-Dinitrotoluene (2,6-DNT)	EPA 625	Extractable Organics	NELAP	5/16/2001
2-Chloroethyl vinyl ether	EPA 624	Volatile Organics	NELAP	5/16/2001
2-Chloroethyl vinyl ether	EPA 8260	Volatile Organics	NELAP	7/1/2003
loronaphthalene	EPA 625	Extractable Organics	NELAP	5/16/2001

"STATE" indicates certification for the analyte by the method specified. "NELAP" further indicates certification compliant with the NELAC Standards.

Jeb Bush
Governor

FLORIDA DEPARTMENT OF HEALTH

John O. Agwunobi, M.D., M.B.A., M.P.H.
Secretary

Laboratory Scope of Accreditation

THIS LISTING OF ACCREDITED ANALYTES SHOULD BE USED ONLY WHEN ASSOCIATED WITH A VALID CERTIFICATE

State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
2-Chlorophenol	EPA 625	Extractable Organics	NELAP	5/16/2001
2-Chlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Methyl-4,6-dinitrophenol	EPA 625	Extractable Organics	NELAP	5/16/2001
2-Methylnaphthalene	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Nitrophenol	EPA 625	Extractable Organics	NELAP	5/16/2001
2-Nitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
3,3'-Dichlorobenzidine	EPA 625	Extractable Organics	NELAP	5/16/2001
3,3'-Dichlorobenzidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
4,4'-DDD	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
4,4'-DDD	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
4,4'-DDE	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
4,4'-DDE	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
DDT	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
-DDT	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
4-Bromophenyl phenyl ether	EPA 625	Extractable Organics	NELAP	5/16/2001
4-Chloro-3-methylphenol	EPA 625	Extractable Organics	NELAP	5/16/2001
4-Chloro-3-methylphenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Chlorophenyl phenylether	EPA 625	Extractable Organics	NELAP	5/16/2001
4-Nitrophenol	EPA 625	Extractable Organics	NELAP	5/16/2001
4-Nitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
Acenaphthene	EPA 625	Extractable Organics	NELAP	5/16/2001
Acenaphthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Acenaphthylene	EPA 625	Extractable Organics	NELAP	5/16/2001
Acenaphthylene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Aldrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aluminum	EPA 200.7	Metals	NELAP	5/16/2001
Anthracene	EPA 625	Extractable Organics	NELAP	5/16/2001
Anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Antimony	EPA 200.7	Metals	NELAP	5/16/2001
Aroclor-1016 (PCB-1016)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aroclor-1016 (PCB-1016)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1221 (PCB-1221)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
or-1221 (PCB-1221)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003

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State Laboratory ID: E87662 **EPA Lab Code: NY00068** **(716) 876-5290**

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Aroclor-1232 (PCB-1232)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aroclor-1232 (PCB-1232)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1242 (PCB-1242)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aroclor-1242 (PCB-1242)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1248 (PCB-1248)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aroclor-1248 (PCB-1248)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1254 (PCB-1254)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aroclor-1254 (PCB-1254)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1260 (PCB-1260)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aroclor-1260 (PCB-1260)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Arsenic	EPA 200.7	Metals	NELAP	5/16/2001
Arsenic	EPA 6010	Metals	NELAP	5/16/2001
[illegible]um	EPA 200.7	Metals	NELAP	5/16/2001
Barium	EPA 6010	Metals	NELAP	7/1/2003
Benzene	EPA 624	Volatile Organics	NELAP	5/16/2001
Benzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Benzidine	EPA 625	Extractable Organics	NELAP	5/16/2001
Benzo(a)anthracene	EPA 625	Extractable Organics	NELAP	5/16/2001
Benzo(a)anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(a)pyrene	EPA 625	Extractable Organics	NELAP	5/16/2001
Benzo(a)pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(b)fluoranthene	EPA 625	Extractable Organics	NELAP	5/16/2001
Benzo(b)fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(g,h,i)perylene	EPA 625	Extractable Organics	NELAP	5/16/2001
Benzo(g,h,i)perylene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(k)fluoranthene	EPA 625	Extractable Organics	NELAP	5/16/2001
Beryllium	EPA 200.7	Metals	NELAP	5/16/2001
beta-BHC (beta-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
bis(2-Chloroethoxy)methane	EPA 625	Extractable Organics	NELAP	5/16/2001
bis(2-Chloroethoxy)methane	EPA 8270	Extractable Organics	NELAP	7/1/2003
bis(2-Chloroethyl) ether	EPA 625	Extractable Organics	NELAP	5/16/2001
bis(2-Chloroisopropyl) ether	EPA 625	Extractable Organics	NELAP	5/16/2001
bis(2-Chloroisopropyl) ether	EPA 8270	Extractable Organics	NELAP	7/1/2003
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 625	Extractable Organics	NELAP	5/16/2001
[illegible] Ethylhexyl) phthalate (DEHP)	EPA 8270	Extractable Organics	NELAP	7/1/2003

Laboratory Scope of Accreditation

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State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Bromodichloromethane	EPA 624	Volatile Organics	NELAP	5/16/2001
Bromodichloromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Bromoform	EPA 624	Volatile Organics	NELAP	5/16/2001
Bromoform	EPA 8260	Volatile Organics	NELAP	7/1/2003
Butyl benzyl phthalate	EPA 625	Extractable Organics	NELAP	5/16/2001
Butyl benzyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Cadmium	EPA 200.7	Metals	NELAP	5/16/2001
Cadmium	EPA 6010	Metals	NELAP	5/16/2001
Calcium	EPA 200.7	Metals	NELAP	5/16/2001
Carbon tetrachloride	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chlordane (tech.)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Chlordane (tech.)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
C[illegible]obenzene	EPA 624	Volatile Organics	NELAP	5/16/2001
C[illegible]obenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chloroethane	EPA 624	Volatile Organics	NELAP	5/16/2001
Chloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chloroform	EPA 624	Volatile Organics	NELAP	5/16/2001
Chloroform	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chromium	EPA 200.7	Metals	NELAP	5/16/2001
Chromium	EPA 6010	Metals	NELAP	5/16/2001
Chromium VI	EPA 218.4	Metals	NELAP	5/16/2001
Chrysene	EPA 625	Extractable Organics	NELAP	5/16/2001
Chrysene	EPA 8270	Extractable Organics	NELAP	7/1/2003
cis-1,3-Dichloropropene	EPA 624	Volatile Organics	NELAP	5/16/2001
cis-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Cobalt	EPA 200.7	Metals	NELAP	5/16/2001
Copper	EPA 200.7	Metals	NELAP	5/16/2001
Copper	EPA 6010	Metals	NELAP	5/16/2001
delta-BHC	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
delta-BHC	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Dibenz(a,h) anthracene	EPA 625	Extractable Organics	NELAP	5/16/2001
Dibenz(a,h) anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Dibromochloromethane	EPA 624	Volatile Organics	NELAP	5/16/2001
Dibromochloromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Dicamba	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
D[illegible]rodifluoromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003

Laboratory Scope of Accreditation

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State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Dieldrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Dieldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Diethyl phthalate	EPA 625	Extractable Organics	NELAP	5/16/2001
Diethyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Dimethyl phthalate	EPA 625	Extractable Organics	NELAP	5/16/2001
Dimethyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Di-n-butyl phthalate	EPA 625	Extractable Organics	NELAP	5/16/2001
Di-n-butyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Di-n-octyl phthalate	EPA 625	Extractable Organics	NELAP	5/16/2001
Di-n-octyl phthalate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Endosulfan I	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Endosulfan I	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
[illegible]sulfan II	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
[illegible]osulfan II	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endosulfan sulfate	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Endosulfan sulfate	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Endrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endrin aldehyde	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Endrin aldehyde	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endrin ketone	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Ethylbenzene	EPA 624	Volatile Organics	NELAP	5/16/2001
Ethylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Fluoranthene	EPA 625	Extractable Organics	NELAP	5/16/2001
Fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Fluorene	EPA 625	Extractable Organics	NELAP	5/16/2001
Fluorene	EPA 8270	Extractable Organics	NELAP	7/1/2003
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Heptachlor	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Heptachlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Heptachlor epoxide	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Heptachlor epoxide	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Hexachlorobenzene	EPA 625	Extractable Organics	NELAP	5/16/2001
[illegible]chlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
[illegible]achlorobutadiene	EPA 625	Extractable Organics	NELAP	5/16/2001

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Laboratory Scope of Accreditation

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State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Hexachlorobutadiene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Hexachlorobutadiene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Hexachlorocyclopentadiene	EPA 625	Extractable Organics	NELAP	5/16/2001
Hexachlorocyclopentadiene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Hexachloroethane	EPA 625	Extractable Organics	NELAP	5/16/2001
Indeno(1,2,3-cd)pyrene	EPA 625	Extractable Organics	NELAP	5/16/2001
Indeno(1,2.3-cd)pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Iron	EPA 200.7	Metals	NELAP	5/16/2001
Isophorone	EPA 625	Extractable Organics	NELAP	5/16/2001
Lead	EPA 200.7	Metals	NELAP	5/16/2001
Lead	EPA 6010	Metals	NELAP	5/16/2001
Magnesium	EPA 200.7	Metals	NELAP	5/16/2001
ıganese	EPA 200.7	Metals	NELAP	5/16/2001
ıercury	EPA 245.1	Metals	NELAP	5/16/2001
Mercury	EPA 7470	Metals	NELAP	5/16/2001
Methoxychlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Methyl bromide (Bromomethane)	EPA 624	Volatile Organics	NELAP	5/16/2001
Methyl chloride (Chloromethane)	EPA 624	Volatile Organics	NELAP	5/16/2001
Methyl chloride (Chloromethane)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Methylene chloride	EPA 624	Volatile Organics	NELAP	5/16/2001
Methylene chloride	EPA 8260	Volatile Organics	NELAP	7/1/2003
Molybdenum	EPA 200.7	Metals	NELAP	5/16/2001
Molybdenum	EPA 6010	Metals	NELAP	5/16/2001
Naphthalene	EPA 625	Extractable Organics	NELAP	5/16/2001
Naphthalene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Nickel	EPA 200.7	Metals	NELAP	5/16/2001
Nickel	EPA 6010	Metals	NELAP	5/16/2001
Nitrobenzene	EPA 625	Extractable Organics	NELAP	5/16/2001
n-Nitrosodimethylamine	EPA 625	Extractable Organics	NELAP	5/16/2001
n-Nitrosodi-n-propylamine	EPA 625	Extractable Organics	NELAP	5/16/2001
n-Nitrosodiphenylamine	EPA 625	Extractable Organics	NELAP	5/16/2001
Oil & Grease	EPA 1664	General Chemistry	NELAP	5/16/2001
Pentachlorophenol	EPA 625	Extractable Organics	NELAP	5/16/2001
Pentachlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
Phenanthrene	EPA 625	Extractable Organics	NELAP	5/16/2001
ıanthrene	EPA 8270	Extractable Organics	NELAP	7/1/2003

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Laboratory Scope of Accreditation

THIS LISTING OF ACCREDITED ANALYTES SHOULD BE USED ONLY WHEN ASSOCIATED WITH A VALID CERTIFICATE

State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Non-Potable Water

Analyte	Method/Tech	Category	Certification Type	Effective Date
Phenol	EPA 625	Extractable Organics	NELAP	5/16/2001
Phenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
Potassium	EPA 200.7	Metals	NELAP	5/16/2001
Pyrene	EPA 625	Extractable Organics	NELAP	5/16/2001
Pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Pyridine	EPA 8270	Extractable Organics	NELAP	7/1/2003
Residue-filterable (TDS)	EPA 160.1	General Chemistry	NELAP	5/16/2001
Residue-nonfilterable (TSS)	EPA 160.2	General Chemistry	NELAP	5/16/2001
Residue-settleable	EPA 160.5	General Chemistry	NELAP	5/16/2001
Residue-total	EPA 160.3	General Chemistry	NELAP	5/16/2001
Residue-volatile	EPA 160.4	General Chemistry	NELAP	5/16/2001
Selenium	EPA 200.7	Metals	NELAP	5/16/2001
[illegible]ium	EPA 6010	Metals	NELAP	5/16/2001
Silver	EPA 200.7	Metals	NELAP	5/16/2001
Silver	EPA 6010	Metals	NELAP	7/1/2003
Silvex (2,4,5-TP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Sodium	EPA 200.7	Metals	NELAP	5/16/2001
Tetrachloroethylene (Perchloroethylene)	EPA 624	Volatile Organics	NELAP	5/16/2001
Tetrachloroethylene (Perchloroethylene)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Thallium	EPA 200.7	Metals	NELAP	5/16/2001
Toluene	EPA 624	Volatile Organics	NELAP	5/16/2001
Toluene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Toxaphene (Chlorinated camphene)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
trans-1,2-Dichloroethylene	EPA 624	Volatile Organics	NELAP	5/16/2001
trans-1,3-Dichloropropylene	EPA 624	Volatile Organics	NELAP	5/16/2001
Trichloroethene (Trichloroethylene)	EPA 624	Volatile Organics	NELAP	5/16/2001
Trichloroethene (Trichloroethylene)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Trichlorofluoromethane	EPA 624	Volatile Organics	NELAP	5/16/2001
Trichlorofluoromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Vanadium	EPA 200.7	Metals	NELAP	5/16/2001
Vinyl chloride	EPA 624	Volatile Organics	NELAP	5/16/2001
Vinyl chloride	EPA 8260	Volatile Organics	NELAP	7/1/2003
Xylene (total)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Zinc	EPA 200.7	Metals	NELAP	5/16/2001
Zinc	EPA 6010	Metals	NELAP	5/16/2001

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Laboratory Scope of Accreditation

THIS LISTING OF ACCREDITED ANALYTES SHOULD BE USED ONLY WHEN ASSOCIATED WITH A VALID CERTIFICATE

State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1-Trichloroethane	EPA 8260	Volatile Organics	NELAP	5/16/2001
1,1,2,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	5/16/2001
1,1,2-Trichloroethane	EPA 8260	Volatile Organics	NELAP	5/16/2001
1,1-Dichloroethane	EPA 8260	Volatile Organics	NELAP	5/16/2001
1,1-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	5/16/2001
1,2-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	5/16/2001
1,2-Dichloroethane	EPA 8260	Volatile Organics	NELAP	5/16/2001
1,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	5/16/2001
1,3-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	5/16/2001
1,4-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	5/16/2001
2,4,5-T	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
2,4-D	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
'-Dinitrophenol	EPA 8270	Extractable Organics	NELAP	5/16/2001
-Dinitrotoluene (2,4-DNT)	EPA 8270	Extractable Organics	NELAP	5/16/2001
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270	Extractable Organics	NELAP	5/16/2001
2-Chloroethyl vinyl ether	EPA 8260	Volatile Organics	NELAP	5/16/2001
2-Chlorophenol	EPA 8270	Extractable Organics	NELAP	5/16/2001
2-Methylnaphthalene	EPA 8270	Extractable Organics	NELAP	5/16/2001
2-Nitrophenol	EPA 8270	Extractable Organics	NELAP	5/16/2001
3,3'-Dichlorobenzidine	EPA 8270	Extractable Organics	NELAP	5/16/2001
4,4'-DDD	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
4,4'-DDE	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
4,4'-DDT	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
4-Chloro-3-methylphenol	EPA 8270	Extractable Organics	NELAP	5/16/2001
4-Chloroaniline	EPA 8270	Extractable Organics	NELAP	5/16/2001
4-Methylphenol (p-Cresol)	EPA 8270	Extractable Organics	NELAP	5/16/2001
4-Nitrophenol	EPA 8270	Extractable Organics	NELAP	5/16/2001
Acenaphthene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Acenaphthylene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Acetone	EPA 8260	Volatile Organics	NELAP	5/16/2001
Aldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Anthracene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Aroclor-1016 (PCB-1016)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aroclor-1221 (PCB-1221)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
lor-1232 (PCB-1232)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	5/16/2001

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Laboratory Scope of Accreditation

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State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Aroclor-1242 (PCB-1242)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aroclor-1248 (PCB-1248)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aroclor-1254 (PCB-1254)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Aroclor-1260 (PCB-1260)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Arsenic	EPA 6010	Metals	NELAP	5/16/2001
Barium	EPA 6010	Metals	NELAP	5/16/2001
Benzene	EPA 8260	Volatile Organics	NELAP	5/16/2001
Benzo(a)anthracene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Benzo(a)pyrene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Benzo(b)fluoranthene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Benzo(g,h,i)perylene	EPA 8270	Extractable Organics	NELAP	5/16/2001
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
-Chloroethoxy)methane	EPA 8270	Extractable Organics	NELAP	5/16/2001
-Chloroisopropyl) ether	EPA 8270	Extractable Organics	NELAP	5/16/2001
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 8270	Extractable Organics	NELAP	5/16/2001
Bromodichloromethane	EPA 8260	Volatile Organics	NELAP	5/16/2001
Bromoform	EPA 8260	Volatile Organics	NELAP	5/16/2001
Butyl benzyl phthalate	EPA 8270	Extractable Organics	NELAP	5/16/2001
Cadmium	EPA 6010	Metals	NELAP	5/16/2001
Carbon disulfide	EPA 8260	Volatile Organics	NELAP	5/16/2001
Carbon tetrachloride	EPA 8260	Volatile Organics	NELAP	5/16/2001
Chlordane (tech.)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Chlorobenzene	EPA 8260	Volatile Organics	NELAP	5/16/2001
Chloroethane	EPA 8260	Volatile Organics	NELAP	5/16/2001
Chloroform	EPA 8260	Volatile Organics	NELAP	5/16/2001
Chromium	EPA 6010	Metals	NELAP	5/16/2001
Chrysene	EPA 8270	Extractable Organics	NELAP	5/16/2001
cis-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	5/16/2001
Dalapon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
delta-BHC	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Dibenz(a,h) anthracene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Dibromochloromethane	EPA 8260	Volatile Organics	NELAP	5/16/2001
Dicamba	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Dichlorodifluoromethane	EPA 8260	Volatile Organics	NELAP	5/16/2001
Dieldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
yl phthalate	EPA 8270	Extractable Organics	NELAP	5/16/2001

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Laboratory Scope of Accreditation

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State Laboratory ID: E87662 **EPA Lab Code:** NY00068 (716) 876-5290

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Dimethyl phthalate	EPA 8270	Extractable Organics	NELAP	5/16/2001
Di-n-butyl phthalate	EPA 8270	Extractable Organics	NELAP	5/16/2001
Di-n-octyl phthalate	EPA 8270	Extractable Organics	NELAP	5/16/2001
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Endosulfan I	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Endosulfan II	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Endosulfan sulfate	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Endrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Endrin aldehyde	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Endrin ketone	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Ethylbenzene	EPA 8260	Volatile Organics	NELAP	5/16/2001
Fluoranthene	EPA 8270	Extractable Organics	NELAP	5/16/2001
[illegible]rene	EPA 8270	Extractable Organics	NELAP	5/16/2001
[illegible]mma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Heptachlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Heptachlor epoxide	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Hexachlorobenzene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Hexachlorobutadiene	EPA 8260	Volatile Organics	NELAP	5/16/2001
Hexachlorobutadiene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Hexachlorocyclopentadiene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Indeno(1,2,3-cd)pyrene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Lead	EPA 6010	Metals	NELAP	5/16/2001
Mercury	EPA 7470	Metals	NELAP	5/16/2001
Mercury	EPA 7471	Metals	NELAP	5/16/2001
Methoxychlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Methyl bromide (Bromomethane)	EPA 8260	Volatile Organics	NELAP	5/16/2001
Methyl chloride (Chloromethane)	EPA 8260	Volatile Organics	NELAP	5/16/2001
Methyl tert-butyl ether (MTBE)	EPA 8260	Volatile Organics	NELAP	5/16/2001
Methylene chloride	EPA 8260	Volatile Organics	NELAP	5/16/2001
Naphthalene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Nickel	EPA 6010	Metals	NELAP	5/16/2001
Nitrobenzene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Pentachlorophenol	EPA 8270	Extractable Organics	NELAP	5/16/2001
Phenanthrene	EPA 8270	Extractable Organics	NELAP	5/16/2001
Phenol	EPA 8270	Extractable Organics	NELAP	5/16/2001
[illegible]ne	EPA 8270	Extractable Organics	NELAP	5/16/2001

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Laboratory Scope of Accreditation

THIS LISTING OF ACCREDITED ANALYTES SHOULD BE USED ONLY WHEN ASSOCIATED WITH A VALID CERTIFICATE

State Laboratory ID: E87662 **EPA Lab Code: NY00068** **(716) 876-5290**

E87662
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Matrix: Solid and Chemical Materials

Analyte	Method/Tech	Category	Certification Type	Effective Date
Pyridine	EPA 8270	Extractable Organics	NELAP	5/16/2001
Selenium	EPA 6010	Metals	NELAP	5/16/2001
Silver	EPA 6010	Metals	NELAP	5/16/2001
Silvex (2,4,5-TP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Styrene	EPA 8260	Volatile Organics	NELAP	5/16/2001
Tetrachloroethylene (Perchloroethylene)	EPA 8260	Volatile Organics	NELAP	5/16/2001
Toluene	EPA 8260	Volatile Organics	NELAP	5/16/2001
Toxaphene (Chlorinated camphene)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	5/16/2001
Trichloroethene (Trichloroethylene)	EPA 8260	Volatile Organics	NELAP	5/16/2001
Trichlorofluoromethane	EPA 8260	Volatile Organics	NELAP	5/16/2001
Vinyl chloride	EPA 8260	Volatile Organics	NELAP	5/16/2001
Xylene (total)	EPA 8260	Volatile Organics	NELAP	5/16/2001

State of Connecticut, Department of Public Health

State of Connecticut, Department of Public Health

Approved Environmental Laboratory

THIS IS TO CERTIFY THAT THE LABORATORY DESCRIBED BELOW HAS BEEN APPROVED BY THE STATE DEPARTMENT OF PUBLIC HEALTH PURSUANT TO APPLICABLE PROVISIONS OF THE PUBLIC HEALTH CODE AND GENERAL STATUTES OF CONNECTICUT, FOR MAKING THE EXAMINATIONS, DETERMINATIONS OR TESTS SPECIFIED BELOW WHICH HAVE BEEN AUTHORIZED IN WRITING BY THAT DEPARTMENT.

WASTE STREAM TECHNOLOGY, INC.

LOCATED AT 302 Grote Street IN Buffalo, NY 14207

AND REGISTERED IN THE NAME OF Edward M. Oddo

THIS CERTIFICATE IS ISSUED IN THE NAME OF Brian S. Schepart, Ph. D. WHO HAS BEEN DESIGNATED

BY THE REGISTERED OWNER\AUTHORIZED AGENT TO BE IN CHARGE OF THE LABORATORY WORK COVERED BY THIS CERTIFICATE OF APPROVAL AS FOLLOWS:

Potable Water

Examination for:
Radiochemicals

SEE COMPUTER PRINT-OUT FOR SPECIFIC TESTS APPROVED

THIS CERTIFICATE EXPIRES June 30, 2006 AND IS REVOCABLE FOR CAUSE BY THE STATE DEPARTMENT OF PUBLIC HEALTH

DATED AT HARTFORD, CONNECTICUT, THIS 11th DAY OF May 2004

PH-0306

Ellen J. Blaschinski

PUBLIC HEALTH SERVICE MANAGER, DIVISION OF ENVIRONMENTAL HEALTH

CONNECTICUT DEPARTMENT OF PUBLIC HEALTH
BUREAU OF REGULATORY SERVICES
410 CAPITOL AVENUE
HARTFORD, CT 06134
ENVIRONMENTAL LABORATORY CERTIFICATION SECTION

WASTE STREAM TECHNOLOGY, INC.

CT PUBLIC HEALTH APPROVAL NUMBER:
PH- 0306

DATE ISSUED: May 11, 2004
EXPIRATION DATE: June 30, 2006

ADDRESS:
302 Grote Street
Buffalo, N.Y. 14207

DIRECTOR:
Brian S. Schepart, Ph.D.

CO-DIRECTOR(S):

REGISTRANT:
Edward M. Oddo

Reviewed and Approved by:

APPROVED ANALYTES LIST

[TESTS ***APPROVED*** INDICATED BY "✓"]

RADIOCHEMISTRY

Cesium -134	
Cesium -137	
Cobalt -60	
Gross alpha	✓
Gross beta	✓
Iodine-131	
Nickel -65	
Photon Emitters	✓
Radium-226	✓
Radium-228	✓
Radon	
Strontium -89	
Strontium -90	
Tritium	
Uranium	✓

ASBESTOS

Air - Fiber Counting {PCM}	
Air - Fiber Counting {TEM}	
Bulk Materials-Identification {PLM}	
Bulk Materials-Identification {TEM}	
Water – {TEM}	

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

May 10, 2004

Mr. Edward M. Oddo, Registrant
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

Dear Mr. Oddo:

In accordance with Sections 19a-29a and 25-40 of the Connecticut General Statutes, and Sections 19a-36-A25 through 19a-36-A33, 19a-36-A57 through 19a-36-A63, and 19-4-1 of the Connecticut Public Health Code, registration and approval of the above-mentioned laboratory is hereby granted. On the records of this Department you are listed as Registrant, and **Brian S. Schepart**, Ph. D. as Director.

The Connecticut registration number assigned to your laboratory is **PH- 0306**. This registration will expire on **June 30, 2006.**

Please find enclosed a Certificate of Approval as a Public Health Laboratory. Before you can perform any tests in addition to those listed on this certificate, prior written approval from this department must be obtained.

In the event your laboratory should need additional information, please contact a laboratory certification officer at (860) 509-7389.

Sincerely yours,

Jeffrey Curran
Supervising Environmental Laboratory Consultant

C:\0PH_Numbered_Docs\PH0306_InitialAppFrm_051004.doc

Certified Mail: 70032260000548401604

Phone: (860) 509-7389
Telephone Device for the Deaf: (860) 509-7191
410 Capitol Avenue - MS # 51Lab
P.O. Box 340308 Hartford, CT 06134
Affirmative Action / An Equal Opportunity Employer

Commonwealth of Pennsylvania
Department of Environmental Protection

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

OFFICE OF FIELD OPERATIONS

BUREAU OF LABORATORIES

Certifies that

WASTE STREAM TECHNOLOGY INC
302 GROTE ST
BUFFALO, NY 14207
68-757

Having duly met the requirement of
Chapter 109, Subchapter H, Safe Drinking Water Rules and Regulations
issued under the Pennsylvania Safe Drinking Water Act of May 1, 1984
(P.L. 206, No. 43), (35 P.S. §§ 721.1 - 721.17)
and the National Environmental Laboratory Accreditation Conference Standards

is hereby approved as a

Certified Drinking Water Laboratory

As more fully described in the attached Scope of Accreditation

Expiration Date: March 1, 2005

Roger H. Carlson, PhD, Director
Bureau of Laboratories

Certificate not transferable
Surrender upon revocation
To Be Conspicuously Displayed at the Laboratory
Not valid unless accompanied by a valid Scope of Accreditation
Shall not be used to imply endorsement by the Commonwealth of Pennsylvania
Customers are urged to verify the laboratory's current status

1500-FM-LAB0007 Rev. 10/2003

Pennsylvania Department of Environmental Protection

Laboratory Scope of Accreditation

Organization

757 (716)876-5290

Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

SDWA Certification

Method Code	Method Ref	Analyte	Status	Date Effective	Type	AA
10112400	EPA 900	Gross-alpha	Accredited	2/20/2004	NELAP	NY
10112400	EPA 900	Gross-beta	Accredited	2/20/2004	NELAP	NY
10112808	EPA 901.1	Gross gamma	Accredited	2/20/2004	NELAP	NY
10212201	EPA Ra- 03	Radium-226	Accredited	2/20/2004	NELAP	NY
10212803	EPA Ra-05	Radium-228	Accredited	2/20/2004	NELAP	NY
	DOE 1990 U-02	Uranium MS	Accredited	2/20/2004	NELAP	NY

Print Date 4/14/2004 8:55:18 AM

Customers are urged to verify the laboratory's current accreditation standing.

RECEIVED MAR 1 1 2004

Pennsylvania Department of Environmental Protection

P. O. Box 1467
Harrisburg, PA 17105-1467
February 27, 2004

Bureau of Laboratories

717-783-7150
Fax: 717-783-1502

Waste Stream Technology Inc
302 Grote St
Buffalo, NY 14207

Re: Lab ID No. 68-757

Dear Sir:

Enclosed is your new certificate to operate as a Pennsylvania Certified Drinking Water Laboratory. It is valid for a period of one year from the date of issuance unless otherwise indicated.

The Department of Environmental Protection (Department) has assigned you a new laboratory number. This number is effective immediately. Please use this number on all correspondence with the PA Department of Environmental Protection (Department).

Your laboratory is certified to perform only the analyses stated on the certificate. The certificate remains the property of Department and should be displayed in the laboratory.

Please note this certification must be renewed annually. Under 25 Pa. Code Section 109.808, renewal applications must be submitted to the Department no later than 60 days prior to the expiration of the certification. Failure to submit a renewal application within this time period may result in a lapse of the laboratory's certification. Should this occur, the laboratory may not conduct any further analyses for which certification is required and must notify the public water suppliers served by the laboratory of the laboratory's failure to renew its certification. Copies of the renewal application may be found on the Department's web site (www.dep.state.pa.us/dep/deputate/mts/bol).

If you have any questions concerning your certificate, you may contact the Laboratory Accreditation Section at the address, phone number or fax number listed above.

Sincerely,

Richard H. Sheibley, Chief
Laboratory Accreditation Section

Enclosure

Pennsylvania Department of Environmental Protection

PO Box 1467
Harrisburg, PA 17105-1467
April 14, 2004

Bureau of Laboratories

Phone: 717-783-7150
Fax: 717-783-1502

CERTIFIED MAIL NO. 7002 3150 0003 4032 0952

Brian S. Schepart, Ph.D.
Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207-2496

RE: Updated Accreditation Status
DEP 68-757

Dear Dr. Schepart:

Your current status in the National Environmental Laboratory Accreditation Program in Pennsylvania is as shown on the enclosed listing. That list of accredited fields of testing replaces all previous lists.

Waste Stream Technology, Inc. shall not use this Scope of Accreditation to imply endorsement by the Department or the National Environmental Laboratory Accreditation Program. In order to maintain accreditation, Waste Stream Technology, Inc. must remain in compliance with Departmental regulations and guidance.

Any person aggrieved by this action may appeal, pursuant to Section 4 of the Environmental Hearing Board Act, 35 P.S. Section 7514, and the Administrative Agency Law, 2 Pa. C.S. Chapter 5A, to the Environmental Hearing Board, Second Floor, Rachel Carson State Office Building, 400 Market Street, PO Box 8457, Harrisburg, PA 17105-8457, 717-787-3483. TDD users may contact the Board through the Pennsylvania Relay Service, 800-654-5984. Appeals must be filed with the Environmental Hearing Board within 30 days of receipt of written notice of this action unless the appropriate statute provides a different time period. Copies of the appeal form and the Board's rules of practice and procedure may be obtained from the Board. The appeal form and the Board's rules of practice and procedure are also available in Braille or on audiotape from the Secretary to the Board at 717-787-3483. This paragraph does not, in and of itself, create any right of appeal beyond that permitted by applicable statutes and decisional law. If you want to challenge this action, your appeal must reach the Board within 30 days. You do not need a lawyer to file an appeal with the Board. Important legal rights are at stake, however, so you should show this document to a lawyer at once. If you cannot afford a lawyer, you may qualify for free Pro Bono representation. Call the Secretary to the Board 717-787-3483 for more information.

If you have any questions regarding your laboratory certification status, please contact Mr. Ronald L. Houck, Jr. at 717-705-2433.

Sincerely,

Richard H. Sheibley, Chief
Laboratory Accreditation Program

Enclosure

Pennsylvania Department of Environmental Protection

Laboratory Scope of Accreditation

Organization

757 (716)876-5290

Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

SDWA Certification

Method Code	Method Ref	Analyte	Status	Date Effective	Type	AA
10112400	EPA 900	Gross-alpha	Accredited	2/20/2004	NELAP	NY
10112400	EPA 900	Gross-beta	Accredited	2/20/2004	NELAP	NY
10112808	EPA 901.1	Gross gamma	Accredited	2/20/2004	NELAP	NY
10212201	EPA Ra- 03	Radium-226	Accredited	2/20/2004	NELAP	NY
10212803	EPA Ra-05	Radium-228	Accredited	2/20/2004	NELAP	NY

Print Date 2/20/2004 2:45:56 PM

Customers are urged to verify the laboratory's current accreditation standing

Utah Department of Health

State of Utah
JON HUNTSMAN Jr.
Governor
GARY HERBERT
Lieutenant Governor

Utah Department of Health
David N. Sundwall, MD
Executive Director

Epidemiology and Laboratory Services
Barbara R. Jepson, MPA, MT (ASCP) - Acting Director
Division Director

Bureau of Laboratory Improvement
David B Mendenhall, MPA, MT (ASCP)
Bureau Director

NELAP
Recogn

4/13/2005

Waste Stream Technology, Inc
Brian Schepart, Ph.D.
302 Grote St
Buffalo NY 14207

ID # WAS
Account # 7168465290

Director,

On the basis of your most recent assessment, Proficiency Testing results and continuing compliance with the ELCP requirements, the laboratory listed is certified for environmental monitoring under the Resource Conservation and Recovery Act and authorized to perform the following methods, for the analytes and matrix listed:l

Radiochemistry

	Solid	Non-Potable Water	
9315	☑	☐	Alpha Emit Radium Isotope
9320	☑	☐	Radium 228

The effective date of this certificate letter is: 4/12/2005.

The analytes by method which a laboratory is authorized to perform at any given time will be those indicated in the most recent certificate letter. The most recent certification letter supersedes all previous certification or authorization letters. It is the certified laboratory's responsibility to review this letter for discrepancies. The certified laboratory must document any discrepancies in this letter and send notice to this bureau within 15 days of receipt. This certificate letter will be recalled in the event your laboratory's certification is revoked.

Respectfully,

Barbara R. Jepson

Barbara R. Jepson, MPA, MT (ASCP) - Acting Director
Division Director

The expiration for the laboratory's certification is 6/30/2005. The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method. For further assistance please call Lorna Ward 801-584-8469.

Quality Control Sample Acceptance Criteria

METHOD 6010B, 7000 SERIES COMPOUND LISTS AND LABORATORY CONTROL SAMPLE (LCS) OBJECTIVES	
Constituent	LCS Objectives [% Recovery]
Aluminum	85-115
Antimony	85-115
Antimony (SW-846 7041)	80-120
Arsenic	85-115
Barium	85-115
Beryllium	85-115
Cadmium	85-115
Calcium	85-115
Chromium	85-115
Cobalt	85-115
Copper	85-115
Iron	85-115
Lead	85-115
Lead (SW-846 7421)	80-120
Magnesium	85-115
Manganese	85-115
Mercury (SW-846 7470A)	80-120
Nickel	85-115
Potassium	85-115
Selenium	85-115
Silver	85-115
Sodium	85-115
Thallium	85-115
Vanadium	85-115
Zinc	85-115

Waste Stream Technology Inc.

QC Acceptance Criteria for Metals

Analyte	Reference Sample QC Limits		RPD QC Limits	Matrix Spike QC Limits	
	Soil	Water		Soil	Water
Zinc	85 - 115	85 - 115	25	75 - 125	75 - 125
Lead	85 - 115	85 - 115	25	75 - 125	75 - 125
Cadmium	85 - 115	85 - 115	25	75 - 125	75 - 125
Cobalt	85 - 115	85 - 115	25	75 - 125	75 - 125
Nickel	85 - 115	85 - 115	25	75 - 125	75 - 125
Barium	85 - 115	85 - 115	25	75 - 125	75 - 125
Manganese	85 - 115	85 - 115	25	75 - 125	75 - 125
Iron	85 - 115	85 - 115	25	75 - 125	75 - 125
Chromium	85 - 115	85 - 115	25	75 - 125	75 - 125
Magnesium	85 - 115	85 - 115	25	75 - 125	75 - 125
Vanadium	85 - 115	85 - 115	25	75 - 125	75 - 125
Aluminum	85 - 115	85 - 115	25	75 - 125	75 - 125
Beryllium	85 - 115	85 - 115	25	75 - 125	75 - 125
Calcium	85 - 115	85 - 115	25	75 - 125	75 - 125
Copper	85 - 115	85 - 115	25	75 - 125	75 - 125
Silver	85 - 115	85 - 115	25	75 - 125	75 - 125
Potassium	85 - 115	85 - 115	25	75 - 125	75 - 125
Sodium	85 - 115	85 - 115	25	75 - 125	75 - 125
Arsenic	85 - 115	85 - 115	25	75 - 125	75 - 125
Antimony	85 - 115	85 - 115	25	75 - 125	75 - 125
Selenium	85 - 115	85 - 115	25	75 - 125	75 - 125
Thallium	85 - 115	85 - 115	25	75 - 125	75 - 125
Mercury	80 - 120	80 - 120	25	75 - 125	75 - 125

METHOD 1632 ARSENIC SPECIATION LIST AND LABORATORY CONTROL SAMPLE OBJECTIVES	
Constituent	**LCS Objectives (% Recovery)**
As(III)	75-125
AsH_3	75-125
MMA	75-125
DMA	75-125

WASTE STREAM TECHNOLOGY INC.

2003 Laboratory Control Sample QC Limits for Volatile Organics by GC/MS Methods 624 and 8260B (Comparison Table-H2O)

Compound	Laboratory Control Sample QC Limits (%)		
	60VWREFC	60VWREF2	60VWREF3
dichlorodifluoromethane	53 - 142	14 - 168	35 - 179
chloromethane	36 - 117	20 - 159	37 - 153
vinyl chloride	71 - 118	57 - 140	68 - 140
bromomethane	40 - 140	41 - 141	57 - 139
chloroethane	63 - 123	66 - 124	68 - 124
trichlorofluoromethane	83 - 115	59 - 139	69 - 140
1,1-dichloroethene	76 - 124	61 - 127	67 -132
acetone	53 - 152	75 - 141	67 - 141
carbon disulfide	64 - 125	55 - 125	56 - 124
methylene chloride	(41) - 251	(41) - 240	(14) - 242
methyl-t-butyl ether	53 - 145	74 - 117	75 - 111
trans-1,2-dichloroethene	73 - 125	64 - 125	69 - 127
1,1-dichloroethane	79 - 116	69 - 117	67 - 124
vinyl acetate	44 - 90	(2) - 100	32 - 95
2-butanone	65 - 136	76 - 129	69 - 133
2-dichloropropane	81 - 111	68 - 121	77 - 120
cis-1,2-dichloroethene	77 - 116	63 - 125	72 - 124
chloroform	80 - 111	73 - 120	79 - 120
bromochloromethane	73 - 127	65 - 122	64 - 128
1,1,1-trichloroethane	77 - 119	69 - 124	73 - 126
carbon tetrachloride	79 - 113	62 - 125	71 - 124
1,1-dichloropropene	78 - 111	70 - 113	69 - 120
benzene	81 - 112	75 - 114	78 - 117
1,2-dichloroethane	73 - 106	68 - 113	68 - 115
trichloroethene	75 - 109	75 - 102	76 - 101
1,2-dichloropropane	77 - 104	74 - 108	81 - 106
bromodichloromethane	79 - 113	75 - 117	78 - 115
2-chloroethylvinyl ether	17 - 168	36 - 168	35 - 152
4-methyl-2-pentanone	66 - 127	69 - 133	69 - 130
cis-1,3-dichloropropene	79 - 109	74 - 107	76 - 107
toluene	82 - 110	78 - 113	83 - 113
trans-1,3-dichloropropene	80 - 118	80 - 116	84 - 111
1,1,2-trichloroethane	75 - 110	84 - 106	82 - 106
2-hexanone	57 - 136	56 - 148	67 - 128
tetrachloroethene	84 - 119	69 - 121	66 - 130
1,3-dichloropropane	74 - 110	80 - 107	82 - 105
dibromochloromethane	81 - 114	72 - 118	76 - 118
2-dibromoethane	72 - 113	73 - 110	76 - 110
1-chlorohexane	85 - 111	78 - 113	77 - 117
chlorobenzene	79 - 109	73 - 113	78 - 116

WASTE STREAM TECHNOLOGY INC.

2003 Laboratory Control Sample
for Volatile Organics by GC/MS
Methods 624 and 8260B (Comparison Table-H2O)

Compound	Laboratory Control Sample QC Limits (%)		
	60VWREFC	60VWREF2	60VWREF3
1,1,1,2-tetrachloroethane	78 - 105	69 - 112	72 - 112
ethylbenzene	82 - 110	76 - 115	81 - 118
m,p-xylene	85 - 112	78 - 114	81 - 117
o-xylene	84 - 112	75 - 114	77 - 116
styrene	83 - 112	76 - 118	82 - 115
bromoform	73 - 114	60 - 126	61 - 127
isopropylbenzene	88 - 115	79 - 123	85 - 122
1,1,2,2-tetrachloroethane	72 - 121	79 - 116	75 - 118
bromobenzene	80 - 111	73 - 117	74 - 122
1,2,3-trichloropropane	62 - 123	73 - 122	75 - 119
n-propylbenzene	83 - 112	81 - 116	78 - 124
2-chlorotoluene	79 - 111	80 - 116	78 - 123
1,3,5-trimethylbenzene	83 - 110	80 - 117	82 - 122
4-chlorotoluene	80 - 112	81 - 117	79 - 124
tert-butylbenzene	84 - 114	77 - 122	76 - 123
2,4-trimethylbenzene	81 - 110	80 - 112	80 - 114
sec-butylbenzene	84 - 113	75 - 117	73 - 125
p-isopropyltoluene	90 - 120	83 - 120	80 - 127
1,3-dichlorobenzene	83 - 111	76 - 116	82 - 117
1,4-dichlorobenzene	82 - 112	76 - 114	78 - 117
n-butylbenzene	83 - 113	77 - 119	78 - 124
1,2-dichlorobenzene	81 - 110	76 - 116	81 -116
1,2-dibromo-3-chloropropane	55 - 135	69 - 125	65 - 127
1,2,4-trichlorobenzene	88 - 125	67 - 124	66 - 130
hexachlorobutadiene	81 - 123	57 - 137	73 - 134
naphthalene	57 - 193	59 - 144	63 - 147
1,2,3-trichlorobenzene	71 - 172	57 - 139	53 - 153
n-amyl acetate	70 - 130	NA	NA
ethyl acetate	70 - 130	NA	NA
isopropyl acetate	70 - 130	NA	NA
tertiary butyl alcohol	70 - 130	NA	NA
acrylonitrile	70 - 130	70 - 130	NA
acrolein	60 - 140	NA	NA
Dibromofluoromethane (%)	82 - 116	75 - 125	NA
1,2 Dichloroethane-d4 (%)	76 - 114	76 - 118	77 - 118
Toluene-d8 (%)	84 - 118	73 - 117	84 - 112
Bromofluorobenzene (%)	82 - 117	76 - 115	79 - 125

WASTE STREAM TECHNOLOGY INC.

2003 Laboratory Control Sample QC Limits for Volatile Organics by GC/MS Methods 624 and 8260B

Compound	Laboratory Control Sample QC Limits (%)		
	Water	Soil	TCLP
dichlorodifluoromethane	14 - 168	13 - 156	NA
chloromethane	20 - 159	46 - 107	NA
vinyl chloride	57 - 140	38 - 143	62 - 146
bromomethane	41 - 141	31 - 146	NA
chloroethane	66 - 124	53 - 140	NA
trichlorofluoromethane	59 - 139	67 - 128	NA
1,1-dichloroethene	61 - 127	72 - 123	69 - 124
acetone	75 - 141	38 - 173	NA
carbon disulfide	55 - 125	58 - 119	NA
methylene chloride	48 - 133	26 - 200	NA
methyl-t-butyl ether	74 - 117	76 - 129	NA
trans-1,2-dichloroethene	64 - 125	79 - 119	NA
1,1-dichloroethane	69 - 117	79 - 117	NA
vinyl acetate	10 - 100	38 - 106	NA
2-butanone	76 - 129	77 - 138	70 - 137
2,2-dichloropropane	68 - 121	76 - 133	NA
cis-1,2-dichloroethene	63 - 125	79 - 129	NA
chloroform	73 - 120	79 - 123	84 - 116
bromochloromethane	65 - 122	76 - 134	NA
1,1,1-trichloroethane	69 - 124	82 - 120	NA
carbon tetrachloride	62 - 125	82 - 115	73 - 122
1,1-dichloropropene	70 - 113	78 - 116	NA
benzene	75 - 114	79 - 120	79 - 116
1,2-dichloroethane	68 - 113	75 - 122	76 - 114
trichloroethene	75 - 102	70 - 117	75 - 106
1,2-dichloropropane	74 - 108	74 - 119	NA
bromodichloromethane	75 - 117	79 - 125	NA
2-chloroethylvinyl ether	36 - 168	NA	NA
4-methyl-2-pentanone	69 - 133	66 - 132	NA
cis-1,3-dichloropropene	74 - 107	78 - 119	NA
toluene	78 - 113	78 - 122	NA
trans-1,3-dichloropropene	80 - 116	81 - 131	NA
1,1,2-trichloroethane	84 - 106	78 - 121	NA
2-hexanone	56 - 148	60 - 138	NA
tetrachloroethene	69 - 121	77 - 133	72 - 127
1,3-dichloropropane	80 - 107	76 - 119	NA
dibromochloromethane	72 - 118	80 - 130	NA
2-dibromoethane	73 - 110	76 - 120	NA
1-chlorohexane	78 - 113	73 - 127	NA
chlorobenzene	73 - 113	77 - 124	76 - 116

WASTE STREAM TECHNOLOGY INC.

2003 Laboratory Control Sample for Volatile Organics by GC/MS Methods 624 and 8260B

Compound	Laboratory Control Sample QC Limits (%)		
	Water	Soil	TCLP
1,1,1,2-tetrachloroethane	69 - 112	73 - 122	NA
ethylbenzene	76 - 115	80 - 121	NA
m,p-xylene	78 - 114	77 - 123	NA
o-xylene	75 - 114	77 - 123	NA
styrene	76 - 118	79 - 125	NA
bromoform	60 - 126	73 - 132	NA
isopropylbenzene	79 - 123	81 - 127	NA
1,1,2,2-tetrachloroethane	79 - 116	63 - 136	NA
bromobenzene	73 - 117	82 - 125	NA
1,2,3-trichloropropane	73 - 122	75 - 116	NA
n-propylbenzene	81 - 116	79 - 123	NA
2-chlorotoluene	80 - 116	78 - 123	NA
1,3,5-trimethylbenzene	80 - 117	76 - 122	NA
4-chlorotoluene	81 - 117	78 - 124	NA
tert-butylbenzene	77 - 122	77 - 123	NA
2,4-trimethylbenzene	80 - 112	73 - 122	NA
sec-butylbenzene	75 - 117	76 - 121	NA
p-isopropyltoluene	83 - 120	80 - 130	NA
1,3-dichlorobenzene	76 - 116	80 - 124	NA
1,4-dichlorobenzene	76 - 114	81 - 125	76 - 120
n-butylbenzene	77 - 119	77 - 122	NA
1,2-dichlorobenzene	76 - 116	77 - 128	NA
1,2-dibromo-3-chloropropane	69 - 125	59 - 126	NA
1,2,4-trichlorobenzene	67 - 124	75 - 132	NA
hexachlorobutadiene	57 - 137	67 - 132	NA
naphthalene	59 - 144	61 - 140	NA
1,2,3-trichlorobenzene	57 - 139	76 - 132	NA
n-amyl acetate	70 - 130	NA	NA
ethyl acetate	70 - 130	NA	NA
isopropyl acetate	70 - 130	NA	NA
tertiary butyl alcohol	70 - 130	NA	NA
acrylonitrile	70 - 130	70 - 130	NA
acrolein	60 - 140	NA	NA
Dibromofluoromethane (%)	82 - 116	75 - 125	NA
1,2 Dichloroethane-d4 (%)	74 - 117	69 - 132	77 - 118
Toluene-d8 (%)	82 - 123	81 - 121	76 - 124
Bromofluorobenzene (%)	85 - 123	83 - 121	83 - 121

WASTE STREAM TECHNOLOGY INC.

2003 Matrix Spike Sample QC Limits and MS/MSD RPD Limits for Volatile Organics by GC/MS Methods 624 and 8260B

Compound	Matrix Spike Sample QC Limits (%)			MS/MSD RPD Limits (%)	
	Water	Soil	TCLP	Water	Soil
dichlorodifluoromethane	46 - 162	28 - 164	NA	20	25
chloromethane	37 - 135	39 - 126	NA	20	25
vinyl chloride	60 - 146	58 - 144	62 - 144	20	25
bromomethane	24 - 161	17 - 156	NA	20	25
chloroethane	63 - 136	63 - 151	NA	20	25
trichlorofluoromethane	65 - 147	72 - 130	NA	20	25
1,1-dichloroethene	64 - 137	76 - 125	69 - 127	20	25
acetone	23 - 192	35 - 214	NA	20	25
carbon disulfide	48 - 141	64 - 116	NA	20	25
methylene chloride	52 - 143	22 - 169	NA	20	25
methyl-t-butyl ether	43 - 162	66 - 142	NA	20	25
trans-1,2-dichloroethene	74 - 131	80 - 119	NA	20	25
1,1-dichloroethane	67 - 128	67 - 131	NA	20	25
vinyl acetate	15 - 116	10 - 112	NA	20	25
2-butanone	64 - 143	26 - 219	60 - 165	20	25
[illegible]chloropropane	74 - 116	72 - 129	NA	20	25
c[illegible],2-dichloroethene	76 - 120	75 - 129	NA	20	25
chloroform	79 - 118	78 - 125	78 - 125	20	25
bromochloromethane	71 - 127	70 - 144	NA	20	25
1,1,1-trichloroethane	72 - 126	74 - 125	NA	20	25
carbon tetrachloride	71 - 125	69 - 118	71 - 124	20	25
1,1-dichloropropene	73 - 117	74 - 113	NA	20	25
benzene	78 - 118	82 - 118	82 - 115	20	25
1,2-dichloroethane	72 - 118	73 - 128	77 - 125	20	25
trichloroethene	59 - 133	55 - 140	75 - 109	20	25
1,2-dichloropropane	77 - 109	75 - 119	NA	20	25
bromodichloromethane	78 - 117	73 - 123	NA	20	25
2-chloroethylvinyl ether	NA	NA	NA	20	25
4-methyl-2-pentanone	63 - 136	32 - 184	NA	20	25
cis-1,3-dichloropropene	72 - 113	67 - 117	NA	20	25
toluene	69 - 124	72 - 132	NA	20	25
trans-1,3-dichloropropene	81 - 117	68 - 137	NA	20	25
1,1,2-trichloroethane	74 - 113	65 - 136	NA	20	25
2-hexanone	59 - 140	33 - 184	NA	20	25
tetrachloroethene	78 - 119	70 - 128	71 - 122	20	25
1,3-dichloropropane	80 - 109	65 - 135	NA	20	25
[illegible]bromochloromethane	82 - 114	64 - 138	NA	20	25
[illegible]bromoethane	77 - 112	65 - 132	NA	20	25
1-chlorohexane	77 - 116	70 - 118			
chlorobenzene	81 - 112	77 - 124	75 - 118	20	25

WASTE STREAM TECHNOLOGY INC.

2003 Matrix Spike Sample QC Limits and MS/MSD RPD Limits for Volatile Organics by GC/MS Methods 624 and 8260B

Compound	Matrix Spike Sample QC Limits (%)			MS/MSD RPD Limits (%)	
	Water	Soil	TCLP	Water	Soil
1,1,1,2-tetrachloroethane	73 - 112	69 - 123	NA	20	25
ethylbenzene	66 - 127	79 - 122	NA	20	25
m,p-xylene	68 - 129	78 - 127	NA	20	25
o-xylene	70 - 123	77 - 128	NA	20	25
styrene	83 - 117	48 - 148	NA	20	25
bromoform	73 - 118	56 - 131	NA	20	25
isopropylbenzene	84 - 125	80 - 128	NA	20	25
1,1,2,2-tetrachloroethane	65 - 126	59 - 141	NA	20	25
bromobenzene	80 - 115	76 - 131	NA	20	25
1,2,3-trichloropropane	68 - 124	58 - 155	NA	20	25
n-propylbenzene	79 - 122	80 - 129	NA	20	25
2-chlorotoluene	78 - 122	78 - 133	NA	20	25
1,3,5-trimethylbenzene	77 - 122	76 - 133	NA	20	25
4-chlorotoluene	76 - 122	82 - 126	NA	20	25
tert-butylbenzene	75 - 124	77 - 132	NA	20	25
1,[illegible] trimethylbenzene	72 - 120	71 - 130	NA	20	2[illegible]
se[illegible]butylbenzene	74 - 122	77 - 123	NA	20	25
p-isopropyltoluene	77 - 132	81 - 129	NA	20	25
1,3-dichlorobenzene	86 - 111	79 - 123	NA	20	25
1,4-dichlorobenzene	81 - 114	78 - 121	75 - 119	20	25
n-butylbenzene	70 - 136	80 - 116	NA	20	25
1,2-dichlorobenzene	82 - 116	76 - 126	NA	20	25
1,2-dibromo-3-chloropropane	55 - 142	34 - 171	NA	20	25
1,2,4-trichlorobenzene	69 - 125	60 - 119	NA	20	25
hexachlorobutadiene	55 - 137	47 - 119	NA	20	25
naphthalene	52 - 157	34 - 165	NA	20	25
1,2,3-trichlorobenzene	56 - 134	52 - 125	NA	20	25
n-amyl acetate	60 - 140	NA	NA	20	NA
ethyl acetate	60 - 140	NA	NA	20	NA
isopropyl acetate	60 - 140	NA	NA	20	NA
tertiary butyl alcohol	60 - 140	NA	NA	20	NA
acrylonitrile	60 - 140	60 - 140	NA	20	25
acrolein	50 - 150	NA	NA	30	NA

WASTE STREAM TECHNOLOGY INC.

2003 Laboratory Control Sample and Surrogate QC Limits for Semivolatile Organics by GC/MS Methods 625 and 8270C

Compound	Laboratory Control Sample QC Limits (%)		
	Water	Solid	TCLP
pyridine	NA	NA	6 - 51
n-nitrosodimethylamine	15 - 63	48 - 109	NA
phenol	13 - 44	61 - 109	NA
bis(2-chloroethyl)ether	37 - 121	52 - 119	NA
2-chlorophenol	36 - 101	60 - 104	NA
1,3-dichlorobenzene	39 - 106	62 - 103	NA
1,4-dichlorobenzene	41 - 107	62 - 105	49 - 102
benzyl alcohol	37 - 76	59 - 107	NA
1,2-dichlorobenzene	41 - 108	63 - 106	NA
2-methylphenol	32 - 93	69 - 114	44 - 88
bis(2-chloroisopropyl)ether	40 - 120	63 - 117	NA
3 & 4-methylphenol	41 - 93	76 - 136	47 - 85
n-nitroso-di-n-propylamine	37 - 118	58 - 112	NA
hexachloroethane	36 - 107	59 - 106	45 - 103
nitrobenzene	35 - 114	57 - 109	50 - 107
isophorone	38 - 123	66 - 110	NA
2-nitrophenol	46 - 112	68 - 110	NA
2,4-dimethylphenol	43 - 114	62 - 121	NA
bis(2-chloroethoxy)methane	42 - 120	66 - 110	NA
benzoic acid	20 - 100	34 - 121	NA
2,4-dichlorophenol	47 - 109	66 - 109	NA
1,2,4-trichlorobenzene	38 - 112	60 - 105	NA
naphthalene	44 - 114	65 - 108	NA
4-chloroaniline	58 - 114	71 - 112	NA
hexachlorobutadiene	38 - 124	58 - 122	53 - 108
4-chloro-3-methylphenol	46 - 111	71 - 114	NA
2-methylnaphthalene	16 - 128	44 - 113	NA
hexachlorocyclopentadiene	31 - 133	35 - 151	NA
2,4,6-trichlorophenol	50 - 121	69 - 112	65 - 106
2,4,5-trichlorophenol	38 - 126	64 - 108	67 - 99
2-chloronaphthalene	46 - 119	67 - 110	NA
2-nitroaniline	48 - 128	70 - 120	NA
dimethylphthalate	51 - 128	69 - 117	NA
acenaphthylene	53 - 130	72 - 123	NA
3-nitroaniline	55 - 126	75 - 118	NA
2,6-dinitrotoluene	54 - 128	76 - 116	NA
acenaphthene	45 - 130	69 - 115	NA
2,4-dinitrophenol	31 - 142	62 - 135	NA
4-nitrophenol	10 - 48	52 - 118	NA
dibenzofuran	49 - 123	71 - 111	NA

WASTE STREAM TECHNOLOGY INC.

2003 Laboratory Control Sample and Surrogate QC Limits for Semivolatile Organics by GC/MS Methods 625 and 8270C

Compound	Laboratory Control Sample QC Limits (%)		
	Water	Solid	TCLP
2,4-dinitrotoluene	56 - 128	76 - 119	66 - 125
diethylphthalate	41 - 134	62 - 121	NA
fluorene	49 - 124	71 - 112	NA
4-nitroaniline	49 - 127	68 - 125	NA
4-chlorophenyl-phenylether	40 - 126	66 - 111	NA
4,6-dinitro-2-methylphenol	59 - 144	70 - 140	NA
n-nitrosodiphenylamine	55 - 128	68 - 118	NA
azobenzene	60 - 140	60 - 140	NA
4-bromophenyl-phenylether	48 - 113	62 - 106	NA
hexachlorobenzene	53 - 126	66 - 122	67 - 113
pentachlorophenol	45 - 123	61 - 115	58 - 118
phenanthrene	58 - 129	72 - 123	NA
anthracene	57 - 127	73 - 118	NA
carbazole	60 - 140	76 - 112	NA
di-n-butylphthalate	59 - 126	74 - 115	NA
fluoranthene	58 - 122	74 - 113	NA
benzidine	10 - 50	5 - 63	NA
pyrene	60 - 133	75 - 122	NA
butylbenzylphthalate	60 - 133	78 - 120	NA
3,3'-dichlorobenzidine	54 - 118	59 - 124	NA
benzo(a)anthracene	55 - 124	72 - 114	NA
chrysene	57 - 128	67 - 119	NA
bis(2-ethylhexyl)phthalate	60 - 130	75 - 118	NA
di-n-octylphthalate	60 - 130	74 - 124	NA
benzo(b)fluoranthene	52 - 125	70 - 113	NA
benzo(k)fluoranthene	49 - 124	66 - 113	NA
benzo(a)pyrene	57 - 124	74 - 116	NA
indeno(1,2,3-cd)pyrene	39 - 139	58 - 128	NA
dibenzo(a,h)anthracene	59 - 130	65 - 131	NA
benzo(g,h,i)perylene	52 - 135	59 - 132	NA
2-fluorophenol (%)	24 - 59	50 - 112	22 - 57
phenol-d6 (%)	16 - 40	52 - 117	15 - 38
nitrobenzene-d5 (%)	37 - 118	48 - 122	45 - 106
2-fluorobiphenyl (%)	40 - 119	50 - 121	45 - 105
2,4,6-tribromophenol (%)	44 - 124	50 - 132	45 - 119
p-terphenyl-d14 (%)	44 - 121	36 - 134	31 - 127

WASTE STREAM TECHNOLOGY INC.

2003 Matrix Spike Sample QC Limits and MS/MSD RPD Limits for Semivolatile Organics by GC/MS Methods 625 and 8270C

Compound	Matrix Spike Sample QC Limits (%)			MS/MSD RPD Limits (%)	
	Water	Soil	TCLP	Water	Soil
pyridine	NA	NA	5 - 66	NA	NA
n-nitrosodimethylamine	21 - 65	30 - 112	NA	30	35
phenol	18 - 40	35 - 126	NA	30	35
bis(2-chloroethyl)ether	57 - 116	44 - 120	NA	30	35
2-chlorophenol	54 - 93	48 - 115	NA	30	35
1,3-dichlorobenzene	57 - 101	49 - 109	NA	30	35
1,4-dichlorobenzene	60 - 102	47 - 112	51 - 100	30	35
benzyl alcohol	37 - 86	50 - 109	NA	30	35
1,2-dichlorobenzene	48 - 116	50 - 110	NA	30	35
2-methylphenol	48 - 88	52 - 121	13 - 126	30	35
bis(2-chloroisopropyl)ether	64 - 115	53 - 120	NA	30	35
3 & 4-methylphenol	49 - 88	62 - 142	26 - 114	30	35
n-nitroso-di-n-propylamine	56 - 114	57 - 113	NA	30	35
hexachloroethane	59 - 100	46 - 106	42 - 107	30	35
nitrobenzene	50 - 113	41 - 118	44 - 129	30	35
isophorone	65 - 110	57 - 118	NA	30	35
[illegible]itrophenol	60 - 106	53 - 114	NA	30	35
2[illegible]methylphenol	68 - 95	41 - 136	NA	30	35
bis(2-chloroethoxy)methane	69 - 107	53 - 122	NA	30	35
benzoic acid	10 - 38	10 - 138	NA	30	35
2,4-dichlorophenol	64 - 100	49 - 123	NA	30	35
1,2,4-trichlorobenzene	58 - 103	43 - 120	NA	30	35
naphthalene	66 - 104	49 - 119	NA	30	35
4-chloroaniline	44 - 116	49 - 123	NA	30	35
hexachlorobutadiene	61 - 115	38 - 138	54 - 116	30	35
4-chloro-3-methylphenol	66 - 95	63 - 118	NA	30	35
2-methylnaphthalene	37 - 138	37 - 131	NA	30	35
hexachlorocyclopentadiene	45 - 125	10 - 141	NA	30	35
2,4,6-trichlorophenol	67 - 113	55 - 124	50 - 122	30	35
2,4,5-trichlorophenol	63 - 116	49 - 127	47 - 128	30	35
2-chloronaphthalene	65 - 110	55 - 121	NA	30	35
2-nitroaniline	65 - 122	69 - 120	NA	30	35
dimethylphthalate	77 - 114	60 - 126	NA	30	35
acenaphthylene	75 - 117	68 - 124	NA	30	35
3-nitroaniline	61 - 125	67 - 125	NA	30	35
2,6-dinitrotoluene	67 - 124	66 - 126	NA	30	35
acenaphthene	78 - 112	60 - 127	NA	30	35
2,4-dinitrophenol	45 - 140	10 - 174	NA	30	35
[illegible]phenol	10 - 44	25 - 132	NA	30	35
dibenzofuran	72 - 112	62 - 124	NA	30	35

WASTE STREAM TECHNOLOGY INC.

2003 Matrix Spike Sample QC Limits and MS/MSD RPD Limits for Semivolatile Organics by GC/MS Methods 625 and 8270C

Compound	Matrix Spike Sample QC Limits (%)			MS/MSD RPD Limits (%)	
	Water	Soil	TCLP	Water	Soil
2,4-dinitrotoluene	64 - 127	67 - 126	48 - 133	30	35
diethylphthalate	70 - 126	56 - 130	NA	30	35
fluorene	75 - 111	64 - 121	NA	30	35
4-nitroaniline	67 - 120	62 - 128	NA	30	35
4-chlorophenyl-phenylether	71 - 112	58 - 125	NA	30	35
4,6-dinitro-2-methylphenol	72 - 145	10 - 196	NA	30	35
n-nitrosodiphenylamine	70 - 125	49 - 146	NA	30	35
azobenzene	79 - 129	59 - 145	NA	30	35
4-bromophenyl-phenylether	61 - 105	53 - 118	NA	30	35
hexachlorobenzene	70 - 116	59 - 129	50 - 127	30	35
pentachlorophenol	64 - 111	12 - 144	30 - 146	30	35
phenanthrene	78 - 119	56 - 136	NA	30	35
anthracene	78 - 115	67 - 127	NA	30	35
carbazole	71 - 117	68 - 122	NA	30	35
di-n-butylphthalate	78 - 119	66 - 129	NA	30	35
fluoranthene	78 - 112	65 - 124	NA	30	35
bel[illegible]ine	5 - 36	5 - 47	NA	30	35
pyrene	74 - 126	64 - 140	NA	30	35
butylbenzylphthalate	77 - 126	65 - 141	NA	30	35
3,3'-dichlorobenzidine	51 - 120	27 - 128	NA	30	35
benzo(a)anthracene	72 - 115	68 - 120	NA	30	35
chrysene	72 - 124	59 - 136	NA	30	35
bis(2-ethylhexyl)phthalate	80 - 124	64 - 138	NA	30	35
di-n-octylphthalate	79 - 128	49 - 170	NA	30	35
benzo(b)fluoranthene	73 - 114	59 - 134	NA	30	35
benzo(k)fluoranthene	76 - 117	59 - 130	NA	30	35
benzo(a)pyrene	76 - 113	69 - 121	NA	30	35
indeno(1,2,3-cd)pyrene	56 - 127	36 - 138	NA	30	35
dibenzo(a,h)anthracene	70 - 122	46 - 134	NA	30	35
benzo(g,h,i)perylene	59 - 124	28 - 142	NA	30	35

WASTE STREAM TECHNOLOGY INC.

2003 Laboratory Control Sample and Surrogate QC Limits for Pesticide and PCBs by GC/ECD Methods 608, 8081A and 8082

Compound	Laboratory Control Sample QC Limits (%)		
	Water	Solid	TCLP
alpha-BHC	69 - 130	80 - 127	NA
beta-BHC	66 - 130	73 - 124	NA
gamma-BHC (Lindane)	69 - 130	75 - 124	60 - 122
delta-BHC	71 - 136	77 - 132	NA
Heptachlor	67 - 136	80 - 135	59 - 136
Aldrin	61 - 146	86 - 126	NA
Heptachlor Epoxide	67 - 123	76 - 118	64 - 120
Endosulfan I	71 - 125	78 - 120	NA
4,4'-DDE	67 - 121	77 - 123	NA
Dieldrin	65 - 128	71 - 128	NA
Endrin	65 - 149	82 - 144	68 - 137
Endosulfan II	73 - 129	80 - 119	NA
4,4' - DDD	66 - 131	79 - 130	NA
Endrin Aldehyde	67 - 125	56 - 114	NA
Endosulfan Sulfate	65 - 150	59 - 176	NA
4,4' - DDT	57 - 169	78 - 167	NA
Endrin Ketone	64 - 158	74 - 164	NA
Methoxychlor	61 - 150	79 - 157	62 - 143
Toxaphene	60 - 150	60 - 150	60 - 150
Chlordane	60 - 150	60 - 150	60 - 150
Aroclor 1016	56 - 137	68 - 126	NA
Aroclor 1221	60 - 140	60 - 140	NA
Aroclor 1232	60 - 140	60 - 140	NA
Aroclor 1242	60 - 140	60 - 140	NA
Aroclor 1248	60 - 140	60 - 140	NA
Aroclor 1254	60 - 140	60 - 140	NA
Aroclor 1260	54 - 135	63 - 134	NA
Tetrachloro-m-xylene (%)	67 - 131	74 - 122	67 - 123
Decachlorobiphenyl (%)	68 - 129	64 - 127	68 - 132

Compound	Laboratory Control Sample QC Limits (%)	
	Wipes	Oil
Aroclor 1016	60 - 144	63 - 144
Aroclor 1221	60 - 140	60 - 140
Aroclor 1232	60 - 140	60 - 140
Aroclor 1242	60 - 140	60 - 140
Aroclor 1248	60 - 140	60 - 140
Aroclor 1254	60 - 140	60 - 140
Aroclor 1260	60 - 142	66 - 154
Tetrachloro-m-xylene (%)	70 - 141	54 - 131
Decachlorobiphenyl (%)	49 - 142	51 - 145

WASTE STREAM TECHNOLOGY INC.

2003 Matrix Spike Sample QC Limits and MS/MSD RPD Limits for Pesticides and PCBs Methods 608, 8081A and 8082

Compound	Matrix Spike Sample QC Limits (%)			MS/MSD RPD Limits (%)	
	Water	Soil	TCLP	Water	Soil
alpha-BHC	68 - 117	75 - 124	NA	25	30
beta-BHC	74 - 110	55 - 134	NA	25	30
gamma-BHC (Lindane)	71 - 113	70 - 116	55 - 125	25	30
delta-BHC	64 - 133	63 - 141	NA	25	30
Heptachlor	53 - 137	73 - 123	55 - 134	25	30
Aldrin	54 - 117	56 - 139	NA	25	30
Heptachlor Epoxide	59 - 118	58 - 128	35 - 132	25	30
Endosulfan I	61 - 121	64 - 120	NA	25	30
4,4'-DDE	51 - 133	30 - 169	NA	25	30
Dieldrin	57 - 128	69 - 124	NA	25	30
Endrin	61 - 140	61 - 147	58 - 148	25	30
Endosulfan II	58 - 125	69 - 118	NA	25	30
4,4' - DDD	59 - 133	45 - 170	NA	25	30
Endrin Aldehyde	46 - 130	23 - 136	NA	25	30
Endosulfan Sulfate	59 - 135	62 - 141	NA	25	30
4,4' - DDT	64 - 136	42 - 172	NA	25	30
Endrin Ketone	54 - 140	58 - 153	NA	25	30
Methoxychlor	56 - 149	45 - 169	43 - 165	25	30
Toxaphene	50 - 160	50 - 160	50 - 160	25	30
Chlordane	50 - 160	50 - 160	50 - 160	25	30
Aroclor 1016	56 - 140	69 - 126	NA	25	30
Aroclor 1221	50 - 160	50 - 160	NA	25	30
Aroclor 1232	50 - 160	50 - 160	NA	25	30
Aroclor 1242	50 - 160	50 - 160	NA	25	30
Aroclor 1248	50 - 160	50 - 160	NA	25	30
Aroclor 1254	50 - 160	50 - 160	NA	25	30
Aroclor 1260	37 - 140	62 - 152	NA	25	30

Compound	Matrix Spike Sample QC Limits (%)	MS/MSD RPD Limits (%)
	Oil	Oil
Aroclor 1016	50 - 160	30
Aroclor 1221	50 - 160	30
Aroclor 1232	50 - 160	30
Aroclor 1242	50 - 160	30
Aroclor 1248	50 - 160	30
Aroclor 1254	50 - 160	30
Aroclor 1260	50 - 160	30

WASTE STREAM TECHNOLOGY INC.

2003 Laboratory Control Sample and Surrogate QC Limits for Herbicides by GC/ECD Methods 615 and 8151A

Compound	Laboratory Control Sample QC Limits (%)		
	Water	Solid	TCLP
Dalapon	40 - 130	40 - 130	NA
4-Nitrophenol	40 - 130	40 - 130	NA
Dicamba	40 - 130	40 - 130	NA
MCPP	40 - 130	40 - 130	NA
MCPA	40 - 130	40 - 130	NA
Dichloroprop	40 - 130	40 - 130	NA
2,4-D	40 - 130	40 - 130	68 - 167
Pentachlorophenol	40 - 130	40 - 130	NA
2,4,5-TP	40 - 130	40 - 130	81 - 143
2,4,5-T	40 - 130	40 - 130	NA
2,4-DB	40 - 130	40 - 130	NA
Dinoseb	40 - 130	40 - 130	NA
2,4-DCPAA (%)	27 - 151	22 - 140	24 - 146

WASTE STREAM TECHNOLOGY INC.

2003 Matrix Spike Sample QC Limits and MS/MSD RPD Limits for Herbicide Methods 615 and 8151A

Compound	Matrix Spike Sample QC Limits (%)			MS/MSD RPD Limits (%)	
	Water	Soil	TCLP	Water	Soil
Dalapon	30 - 140	30 - 140	NA	30	35
4-Nitrophenol	30 - 140	30 - 140	NA	30	35
Dicamba	30 - 140	30 - 140	NA	30	35
MCPP	30 - 140	30 - 140	NA	30	35
MCPA	30 - 140	30 - 140	NA	30	35
Dichloroprop	30 - 140	30 - 140	NA	30	35
2,4-D	30 - 140	30 - 140	41 - 171	30	35
Pentachlorophenol	30 - 140	30 - 140	NA	30	35
2,4,5-TP	30 - 140	30 - 140	78 - 146	30	35
2,4,5-T	30 - 140	30 - 140	NA	30	35
2,4-DB	30 - 140	30 - 140	NA	30	35
Dinoseb	30 - 140	30 - 140	NA	30	35

Radiochemistry Lab Data Quality Objectives

Effective 9/24/2004

Data Quality Control Objectives	Analysis							Acceptance Criteria	Flagging Requirement/Corrective Actions All flags applied to sample data are to be announced and explained in the Sample Group Case Narrative
	Gamma Spectrum	Gross Alpha	Gross Beta	Radium 226	Radium 228	Thorium Isotopic	Uranium Isotopic		
Holding Time		X	X		X			< 4 $t_{1/2}$ for most critical isotope	None - If criteria is met J - If criteria for holding times is not met R - If criteria for holding time is not met and the data is <MDA
Preservation								Bioassay, Drinking Water, or Ground Water samples to be preserved to a pH = 2.0 with Nitric Acid. Hydrochloric Acid is acceptable, if clearly identified by sampler. Unpreserved samples preserved at time of receipt by the Rad Lab, not to be analyzed within 16 hours of preservation.	None - If criteria is met J - If criteria for preservation is not met.
Energy Calibration Check	X			X	X			Daily prior to use of Gamma Spectroscopy system (geometry specific).	None - If criteria is met J - If criteria is exceeded >24 hrs. = 32 hrs. R - If criteria is exceeded by > 32 hrs.
								Per sample analyzed by Gamma Spectroscopy Check of Peak Centroid Energy of Analyte ± 0.5 keV from Calculated Peak Warning ±2.0 = E > ±0.5 Control E > ± 2.0 Unacceptable	None - If Warning criteria is met J - If Control criteria met R - If Control criteria exceeded Trend analysis of Recovery results
								50 = R = 100 % Warning 20 - 50% < R >100 - 150% Control 20% < R > 150% Unacceptable ± 2ó deviation Warning limit between results	
Enrgy Pulser Check				X		X	X	Daily prior to use of Alpha Spectroscopy system Pass system check criteria	None - If criteria is met J- If criteria is exceeded >24 hrs. = 32 hrs. R - If criteria is exceeded by > 32 hrs.
Cal Check		X	X					Daily prior to use	None - If criteria is met J- If criteria is exceeded >24 hrs. = 32 hrs. R - If criteria is exceeded by > 32 hrs.
								50 = R = 100 % Warning 20 - 50% < R >100 - 150% Control 20% < R > 150% Unacceptable ± 2ó deviation Warning limit between results	None - If Warning criteria is met J - If Control criteria met R - If Control criteria exceeded Trend analysis of Recovery results

Data Quality Control Objectives	Analysis							Acceptance Criteria	Flagging Requirement/Corrective Actions All flags applied to sample data are to be announced and explained in the Sample Group Case Narrative
	Gamma Spectrum	Gross Alpha	Gross Beta	Radium 226	Radium 228	Thorium Isotopic	Uranium Isotopic		
Background Count Rate	X	X	X	X	X	X	X	Calculated monthly for each geometry and counting time used with each counting system. ± 3ó deviation Warning limit between results	None - If criteria is met in < 4 days* J - If criteria not met within +5 - 7 days R - If criteria not met within = 8 days
				X	X	X	X	Current Alpha Spectrum background file used	None - If criteria met Reanalyze with proper file - If criteria not met
	X	X	X					Checked Daily prior to use ± 3ó deviation Warning limit between results	None - If criteria is met in < 4 days* J - If criteria not met within +5 - 7 days R - If criteria f not met within = 8 days*
Method Blank	X	X	X	X	X	X	X	One per sample batch of the same matrix ± 3ó deviation Warning limit between results	None - If criteria is met R - If criteria not met
Laboratory Control Sample	X	X	X	X	X	X	X	One per sample batch of the same matrix ± 3ó deviation Warning limit between results	Trend analysis applied None - If Warning criteria met Corrective Actions - If Warning criteria exceeded
Laboratory Control Sample Recovery	X	X	X	X	X	X	X	One per sample batch of the same matrix See following tables for warning and control limits. ± 2ó deviation Warning limit between results ± 3ó deviation Control limit between results	None - If Warning criteria is met J - If Control criteria met R - If Control criteria exceeded
Method Blank/Sample Normalized Absolute Difference		X	X	X	X	X	X	One per sample batch of the same matrix determined against lowest sample activity measured, when blank activity is subtracted from sample activity. **Not Applicable** to Air Filter matrix due to inability to simulate a representative blank air at prescribed volumes of air through filter NAD as calculated > 2.58 Warning 1.96 = NAD = 2.58 Control NAD < 1.96 Unacceptable	None - If Warning criteria is met NJ - If Control criteria met NR - If Control criteria exceeded NAD examined against background result trend. IF background within specifications and sample results near background, THEN Control criteria will be exceeded. In this instance NO flag is required. Explanation required in Case Narrative

Radiochemistry Lab Data Quality Objectives

Effective 9/24/2004

Data Quality Control Objectives	Analysis							Acceptance Criteria	Flagging Requirement/Corrective Actions All flags applied to sample data are to be announced and explained in the Sample Group Case Narrative
	Gamma Spectrum	Gross Alpha	Gross Beta	Radium 226	Radium 228	Thorium Isotopic	Uranium Isotopic		
Duplicate	X	X	X	X	X	X	X	One per sample batch of the same matrix **Not Applicable** to Air Filter matrix IF sample is being digested, AND ONLY personal breathing zone air filters comprise sample batch.	None – If criteria met R – If criteria not met
Sample/ Duplicate Normalized Absolute Difference	X	X	X	X	X	X	X	One per sample batch of the same matrix NAD as calculated > 3.92 Warning 1.96 = NAD = 3.92 Control NAD < 1.96	Calculate when performed None – If Warning criteria is met NJ – If Control criteria met NR – If Control criteria exceeded
Tracer Recovery				X	X	X	X	One per sample and method blank 50 = R = 100 % Warning 20 – 50% < R >100 – 150% Control 20% < R > 150% Unacceptable ± 2ó deviation Warning limit between results	± 3ó deviation Warning limit between results None – If Warning criteria is met J – If Control criteria met R – If Control criteria exceeded Trend analysis of Recovery results
Matrix Spike Recovery		X	X	X	X	X	X	One per sample batch of the same matrix See following tables for warning and control limits.	± 3ó deviation Warning limit between results None – If Warning criteria is met J – If Control criteria met R – If Control criteria exceeded
Target Nuclide Identification	X		X	X	X	X	X	Per sample analyzed by Gamma Spectroscopy Check of Peak Centroid Energy of Analyte E = ± 0.5 keV Warning ± 0.5 > E = ± 2.0 Control E > ± 2.0 Unacceptable Per sample analyzed by Alpha Spectroscopy Check of Peak Centroid Energy of Analyte E = ± 100 keV Warning ± 100 keV > E = ± 750 keV Control E > ± 750 keV Unacceptable	None – If Warning criteria is met J – If Control criteria met R – If Control criteria exceeded

Data Quality Control Objectives	Analysis							Acceptance Criteria	Flagging Requirement/Corrective Actions All flags applied to sample data are to be announced and explained in the Sample Group Case Narrative
	Gamma Spectrum	Gross Alpha	Gross Beta	Radium 226	Radium 228	Thorium Isotopic	Uranium Isotopic		
FWHM	X			X	X	X	X	Review FWHM values for each peak of interest Gamma Spectroscopy FWHM = 1.4 Warning FWHM = 1.4-2.8 Control FWHM > 2.8 Unacceptable Alpha Spectroscopy FWHM = 150 Warning >80 FWHM = 150-350 Control < 350 Review for Acceptability	None – If Warning criteria is met J – If Control criteria met R – If Control criteria exceeded
Equilibrium	X			X	X	X	X	Each sample where the analyses performed provide sufficient data to relate secular equilibrium and transient equilibrium to the results	None - When criteria met J - If criteria not met
Isotope Distribution	X					X	X	Each sample where the analyses performed provide sufficient data to relate expected isotope distribution based on historical or calculated correlation data	None - When criteria met J - If criteria not met

Legend

A Sample Batch is equal to a maximum of 20 samples of the same matrix, AND if soil, from the same sample site.

The above stated Data Quality Objectives (DQOs) are those currently applied by The Radiochemistry Lab at Waste Stream Technology, Inc. The client may request changes to any of these parameters. Specification changes will be documented and approved by written agreement prior to performance of any analysis.

- - Deviation from prescribed Quality Criteria requires approval from the Radiochemistry Lab Manager

Radiochemistry Lab Data Quality Objectives

Effective 9/24/2004

	matrix		warning limits	control limits
Radium 226	soil	lcs	63-121	48-136
		ms/msd	53-135	32-156
Radium 226	air filter	lcs	43-117	24-136
		ms/msd	51-104	37-117
Radium 226	bioassay	lcs	87-117	80-125
		ms/msd	80-107	74-113
Radium 226	water	lcs	90-114	84-120
		ms/msd	70-123	57-136
Thorium 230	soil	lcs	64-118	51-131
		ms/msd	84-122	75-132
Thorium 230	air filter	lcs	72-114	62-124
		ms/msd	69-106	60-116
Thorium 230	bioassay	lcs	59-114	45-128
		ms/msd	76-119	65-130
Total Uranium	soil	lcs	82-103	77-109
		ms/msd	64-113	52-125
Radium 224	water	lcs	49-103	36-117
		ms/msd	50-108	35-123
Radium 228	soil	lcs	103-127	97-133
Radium 228	water	lcs	22-146	0-177
		ms/msd	37-156	7-186

	matrix	Isotope	Warning Limits	Control Limits
Gamma Spec	Soil	K 40	101-132	93-140
		Cs 137	110-124	106-128
		Bi 212	47-99	34-112
		Pb 212	107-124	103-128
		Bi 214	99-125	92-131
		Pb 214	103-131	97-138
		Ac 228	103-127	97-133
		Th 234	113-250	79-284
	Water	Co 60	99-115	95-119
		Zn 65	73-137	57-153
		Ba 133	94-102	92-104
		Cs 134	108-120	89-108
		Cs 137	108-119	105-122