REDACTED VERSION

FINAL
HEALTH AND SAFETY PLAN (HASP)

FOR THE
US OIL RECOVERY SUPERFUND SITE
AREA OF INVESTIGATION 1
400 N. RICHEY STREET
PASADENA, TEXAS

PREPARED BY:

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DECEMBER 23, 2015

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TABLE OF CONTENTS

TABLE OF CONTENTS 3
LIST OF FIGURES 5
LIST OF APPENDICES 5

1.0 PROJECT BACKGROUND 6
1.1 GENERAL INFORMATION 6
1.2 HEALTH AND SAFETY OBJECTIVES 7
1.3 SITE-SPECIFIC HEALTH AND SAFETY PLAN SCOPE/APPLICABILITY 7
1.4 SITE DESCRIPTION 8

2.0 PROJECT ORGANIZATION 10

3.0 HAZARD ANALYSIS 14
3.1 WORK TASKS 14
3.2 SITE-SPECIFIC PHYSICAL HAZARDS 14
3.3 SITE-SPECIFIC BIOLOGICAL HAZARDS 15
3.4 SITE-SPECIFIC CHEMICAL HAZARDS 15
3.5 CHEMICALS USED TO PERFORM ONSITE TASKS 18
3.6 WORKPLACE SAFETY SURVEYS 19
3.7 GENERAL SAFE WORK PRACTICES 19

4.0 PERSONNEL TRAINING 21
4.1 REQUIRED TRAINING 21
4.2 PRE-JOB SAFETY MEETING 22
4.3 SAFETY COMPLIANCE 22
4.4 TAILGATE SAFETY MEETINGS 22

5.0 PERSONAL PROTECTIVE EQUIPMENT 24

6.0 MEDICAL SURVEILLANCE 26

7.0 EXPOSURE MONITORING 27
7.1 MONITORING INSTRUMENTS 27
7.2 ACTION LEVELS 27

8.0 SITE CONTROLS 30

9.0 DECONTAMINATION 31

10.0 HANDLING AND STORAGE OF INVESTIGATION DERIVED WASTES 32

11.0 EMERGENCY RESPONSE PLAN 33
11.1 INTRODUCTION 33
11.2 EMERGENCY PROCEDURES 33
11.3 MEDICAL EMERGENCIES 35
11.4 ADVERSE WEATHER 35
11.5 INCIDENT INVESTIGATION 35

12.0 CONFINED SPACE ENTRY 36

13.0 SPILL CONTAINMENT 37

14.0 FALL PROTECTION 38

15.0 REFERENCES 389

LIST OF FIGURES

Figure	Title
1	Site Location Map
2	Site Map

LIST OF APPENDICES

Appendix	Title
A	Task Hazard Analysis Worksheets
B	Forms
C	Directions to Nearest Hospital
D	Reserved for HASP Addenda

1.0 PROJECT BACKGROUND

1.1 GENERAL INFORMATION

Project Name: U.S. Oil Recovery (USOR) Superfund Site, Area of Investigation 1 (AOI-1), Remedial Investigation/Feasibility Study (RI/FS) **Site Location/Address**: 400 N. Richey Street, Pasadena, Texas (Site)	
Consultant for USOR PRP Group	
PASTOR, BEHLING & WHEELER, LLC (PBW) Round Rock, TX Office: 2201 Double Creek Dr., Suite 4004 Round Rock, TX 78664 Victoria, TX Office: 620 E. Airline Victoria, TX 77901 Houston, TX Office: 11231 Richmond Ave., Suite D104 Houston, TX 77082	 Phone: 512-671-3434 Fax: 512-671-3446 Phone: 361-573-6442 Fax: 361-573-6449 Phone: 832-916-3690
Site Access Contact(s)	
To Be Determined (at time of submittal)	
Regulatory Agency/Contact(s):	
U.S. Environmental Protection Agency (USEPA) Remedial Project Manager Raji Josiam On-Scene Coordinator Adam Adams	 Direct Phone: 214-665-8529 Superfund: 1-800-533-3508 Phone: 214-664-2779
PBW Subcontractors:	
To Be Determined (and updated as necessary)	

1.2 HEALTH AND SAFETY OBJECTIVES

The overall health and safety objective for this project is to perform the field tasks in a manner that minimizes the potential for accidents or injuries, and minimizes the potential for worker exposure to hazardous chemicals.

PBW will seek to instill in project workers the attitude that all accidents, injuries, and exposures can be prevented, and that the goal of zero injuries, accidents and exposures is attainable. This will be done through the ongoing communication of PBW's safety expectations. There is no project issue that is more important than the safety of workers, including project schedule and budget.

This Site-Specific Health and Safety Plan ("HASP" or "the plan") is based on the primary concept of hazard identification and analysis. If the potential hazards can be identified early, the greater the potential that these hazards can be avoided. Hazards associated with the work tasks (as anticipated at this time) are identified in this HASP and each hazard has been evaluated using a Task Hazard Analysis (Appendix A).

Lastly, safety at the Site will rely on the open communication between project workers at all times. This is based on the premise that while conducting field activities, all actions that a person performs have the potential to affect other workers, and vice versa. A climate of open communication and intervention is necessary to ensure safe working conditions at the Site.

1.3 SITE-SPECIFIC HEALTH AND SAFETY PLAN SCOPE/APPLICABILITY

This HASP applies to the activities that are anticipated to be performed during the RI/FS at the Site. The current list of anticipated tasks is provided in Section 3.1. As additional activities are added to the Scope of Work, the hazards associated with those activities will be evaluated and added to this HASP as addenda (Appendix D is reserved for HASP Addenda).

This HASP has been prepared to comply with the requirements of 29 CFR 1910.120 (b)(4). The primary purpose of the HASP is to provide the results of a hazard assessment conducted for the prescribed work tasks, and the health and safety requirements and protocols that will minimize hazards to Site workers.

The provisions of this plan are mandatory for all personnel assigned to field work, including subcontractors or other persons or entities involved, for or on behalf of PBW, in site operations conducted as part of this project.

However, subcontractors are required to have their own health and safety program and subcontractor employees bear the ultimate responsibility for all matters dealing with safety in the performance of their work. This responsibility includes the safety of all persons and property and any and all employees of subcontractors that may perform work on their behalf. Information provided by PBW to non-PBW employees at the site shall not constitute control over the means, methods, and safety practices used by those parties to complete their work.

A copy of this plan will be kept on-Site at all times during field activities. All personnel will complete the Safety Compliance Agreement attached in Appendix B, stating that they have reviewed the plan and agree to comply with the requirements herein.

1.4 SITE DESCRIPTION

The Site is comprised of one parcel of land located at 400 North Richey Street in Pasadena, Harris County, Texas, in an industrial area situated north of Highway 225 (Figures 1 and 2).

When the Site was last operational, it was known as US Oil Recovery LP and operated as a used oil processing and waste treatment facility (USOR LP and related entities herein referred to as "USOR LP"). The Site was proposed to the National Priorities List (NPL) on September 16, 2011, and was placed on the National Priorities List on September 18, 2012. An Administrative Settlement Agreement and Administrative Order on Consent (Removal Action AOC) for a Removal Action for the Site (both AOI-1 and AOI-2) was executed by certain Potentially Responsible Parties (PRP Group, or Respondents) and the U.S. Environmental Protection Agency (EPA) on August 25, 2011. An AOC for the AOI-1 Remedial Investigation/Feasibility Study (RI/FS) was executed by the Respondents and the EPA effective on May 14, 2015. Note that the term RI/FS as used in this document references plans and anticipated work only at AOI-1.

The approximately 12.2 acre Site was most recently used as a used oil processing and waste treatment facility by USOR LP. USOR LP began operations on-Site around June 2003 and acquired the Site in December 2003. Prior to June 2003, multiple businesses operated on the Site including chemical manufacturing companies (specializing in fertilizers and/or herbicides/pesticides), a cow hide exporter, and a leather tanner.

USOR LP had ceased operations in June of 2010, prior to the state-court appointed Receivership in July of 2010. An office building, security guard shack, and large warehouse (approximately 25,000 square feet in size) are present on the property. The warehouse includes a former laboratory, machine shop, parts warehouse, and a material processing area that included a filter press. More than 1,000 drums and poly totes containing

various industrial wastes were present within the warehouse but have since been removed by contractors under the direction of the PRP Group. A tank farm with approximately 32 aboveground storage tanks (ASTs) and various sumps containing industrial wastes located within secondary containment is present at the north end of the warehouse. A large, concrete-walled aeration basin (also called the bioreactor) was formerly located west of the tank farm but was removed as part of an EPA-approved removal action. A stormwater containment pond is located west of the warehouse and south of the former aeration basin. Approximately 225 roll-off boxes are located on the USOR Property; however, wastes left in the roll-off boxes by USOR LP have been removed and properly disposed. An inactive rail spur enters the south-central part of the USOR Property from the south and extends north along the west side of the warehouse. A utility right-of-way with various pipelines is present within the southern part of the USOR Property and pipelines are also present outside of but adjacent to the USOR Property along the eastern and western sides.

Currently, the Site is enclosed within a six-foot chain link security fence with locked gates. Security cameras have been installed and access is monitored by a security contractor.

2.0 PROJECT ORGANIZATION

TITLE	NAME	AFFILIATION	PHONE (Work)	PHONE (Other)
PBW Corp H&S Director (HASD)	Matt Wickham	PBW – Victoria	361-573-6442	361-652-1756 (cell)
PBW USOR Project Coordinator	Eric Pastor	PBW-Austin	512-671-3434	512-750-9582 (cell)
PBW USOR RI/FS Manager	Matt Wickham	PBW – Victoria	361-573-6442	361-652-1756 (cell)
Site Safety Officer (SSO)	TBD			
Field Investigation Manager	TBD			
Field Project Supervisor (FPS)	TBD			
Field Project Staff	TBD			
Contractors	TBD			
Subcontractors	TBD			

RESPONSIBILITIES:

PBW Corporate Health and Safety Director. The PBW Corporate Health and Safety Director (HASD) is the highest ranking PBW health and safety official. The HASD monitors the PBW safety program status by maintaining the PBW Corporate Health and Safety Program (written program), tracking accident statistics, coordinating training, and conducting audits and site visits to ensure conformance with established rules and procedures.

USOR Project Coordinator. The USOR Project Coordinator will provide the principal point of contact and control for matters concerning the project and field investigation implementation. In consultation with the Respondents (the USOR PRP Group Steering Committee and USOR PRP Group Technical Committee), the USOR Project Coordinator will:

- Coordinate field investigation activities and develop a detailed schedule;
- Establish project policies and procedures to meet the specific objectives of the project;

- Review the work performed on each project to help ensure its quality, responsiveness and timeliness; and
- Represent the project team at meetings and public hearings, if necessary.

USOR RI/FS Manager. The RI/FS Manager will direct and supervise the RI/FS work. The RI/FS Manager's responsibilities will be to review all RI/FS project work to ensure that it meets the specific project goals, meets technical standards, and is in accordance with the objectives and procedures discussed herein. The RI/FS Manager is responsible for developing staffing requirements, orienting field staff concerning the project, and developing mechanisms to review and evaluate each work product. Additionally, the RI/FS Manager will be responsible for maintaining the official, approved Quality Assurance Project Plan (QAPP) (PBW, 2015, and distributing the QAPP and any subsequent QAPP revisions, addenda, and amendments to the individuals named in the distribution list.

Site Safety Officer. The Site Safety Officer will be responsible for overall health and safety practices associated with the field work. Specific functions and duties will include the following tasks:

- Establish the requirements of the project HASP (PBW, 2014c);
- Arrange or conduct audits of field activities to ensure that proper health and safety procedures are being used; and
- Communicate with the RI/FS Manager, Field Investigation Manager, and field technical staff concerning project issues related to health and safety.

Human Health Risk Assessment Manager. The Human Health Risk Assessment Manager will direct and supervise human health risk assessment activities. The Human Health Risk Assessment Manager will provide input to the development of the RI/FS WP and will direct human-health risk-related data evaluation activities. The Human Health Risk Assessment Manager's responsibilities will be to ensure that human health risk assessment work meets the specific project goals, meets technical standards, and is in accordance with the objectives and procedures discussed in the RI/FS WP, FSP, QAPP, and HASP.

Ecological Risk Assessment Manager. The Ecological Risk Assessment Manager will direct and supervise ecological risk assessment activities. The Ecological Risk Assessment Manager will provide input to the development of the RI/FS WP and will direct ecological-health risk-related data evaluation activities. The Ecological Risk Assessment Manager's responsibilities will be to ensure that ecological risk assessment work meets the specific project goals, meets technical standards, and is in accordance with the objectives and procedures discussed in the RI/FS WP, FSP, QAPP, and HASP.

Field Investigation Manager. The Field Investigation Manager will be responsible for the field work performed as part of a specific RI/FS activity. Duties of the Field Investigation Manager will include:

- Maintaining field records;
- Continually surveying the work area for potential work hazards and relate any new information to RI/FS personnel at the Tailgate Safety Meeting held each day prior to beginning field activities;
- Ensuring that field personnel are properly trained, equipped, and familiar with standard operating procedures (SOPs) and the HASP;
- Overseeing sample collection, handling and shipping; ensuring proper functioning of field equipment; and
- Informing the laboratory when samples are shipped to the lab and verifying samples arrived at the lab.

The primary duty of the Field Investigation Manager is to ensure that the field sampling is performed in accordance with the FSP and the QAPP. The Field Investigation Manager will also require that appropriate personal protective equipment will be worn and disposed of according to the HASP. In addition, the Field Investigation Manager may be responsible for preparing monitoring reports for review by the RI/FS Manager.

Field Project Supervisor. The Field Project Supervisor (FPS) is responsible for executing the safety, health, and emergency response procedures described in this HASP. The FPS will be in the field at all times that work activities are conducted; therefore, the FPS is the person that is most responsible for safety in the field. The responsibilities of the FPS are to:

- Continually observe field activities and evaluate potential hazards and ensure that all hazards are communicated to site workers, eliminated and/or minimized;
- Initiate contact with the SSO who will advise the emergency services (police, fire, medical) of the site activities and ensure the accuracy of the emergency phone numbers;
- Regularly coordinate field activities with Project Manager;
- Locate the on-site support facilities in an uncontaminated area and communicate to crew;
- Implement the safety, health, and emergency response training described in this HASP;
- Observe site activities to ensure the proper use of personal protective equipment and the proper application of safety practices;
- Take appropriate action, as described in this HASP regarding accidents, fires, or other emergency situations;
- Conduct daily safety training/review sessions for PBW onsite personnel (Tailgate Safety Meetings);
- Attend and participate in contractor safety meetings;
- Ensure that daily work schedules integrate heat and cold stress prevention measures, as appropriate;
- Ensure that the field crews observe the work zones and decontamination procedures as described in this plan and in other applicable plans (i.e. the Clean Harbors Health and Safety Plan);
- Ensure that safety equipment is properly maintained or disposed of;
- Ensure that appropriate monitoring is conducted and that personal protective equipment is selected based on the results of this monitoring;
- Initiate corrective action for any observed safety violation, and report unsuccessful attempts to correct a violation to the SSO or PM; and

- Stop work if unsafe conditions exist.

Field Project Staff. Field project staff conducts the majority of the work and are the most likely to be injured or exposed. All field project staff will be responsible for the following:

- Continually observe field activities and evaluate potential hazards and ensure that all hazards are communicated to site workers, eliminated and/or minimized.
- Becoming familiar and complying with the General HASP and any addenda;
- Attending training sessions to review the General HASP and other safety and information;
- Being alert to identified and non-identified hazards;
- Reporting newly-identified hazards to the FPS; and
- Offering suggestions, ideas, or recommendations that will improve or enhance site safety.

3.0 HAZARD ANALYSIS

3.1 WORK TASKS

The following table lists the specific work tasks to be performed. A Task Hazard Analysis Worksheet was prepared for each task and is included in Appendix A.

TASK NO.	TASK	TASK DESCRIPTION
1	Site Visits and Inspections	Project, Regulatory, and Contractor/Subcontractor personnel will be visiting the site[1] to scope future investigations, conduct safety planning, evaluate site access, evaluate site environmental features, collect information with which to submit cost estimates/bids for certain activities, etc. These activities are broadly described as those that are non-intrusive and that do not require tools or equipment. Personnel without the proper training will not be allowed to perform intrusive activities such as sampling, drilling, well inspections, etc. This task also encompasses the activities performed by professional surveying crews.
2	Soil and On-Property Sediment Sampling	Collection of soil samples from multiple areas of the site during the RI/FS. Collection of sediment samples from the areas where shallow ponded water is present at the Site (water depth less than approximately 2 feet).
3	Groundwater Monitoring Well Installation	Installation of groundwater monitor wells at various locations at the site during the RI/FS. Also includes the use of other drilling equipment such as cone penetrometer testing (CPT) equipment, rapid optical screening tool (ROST) equipment, etc.
4	Groundwater Sampling	Collection of groundwater samples from the monitoring wells that will be installed during the RI/FS.
5	On-Property Surface Water Sampling	Collection of surface water samples from the areas where shallow ponded water is present at the site (water depth less than 2 feet).
6	Marine Sampling	Collection of surface water, sediment, and/or biota samples from Vince Bayou and/or Little Vince Bayou during the RI/FS.
7	Staff Gauge Installation	Installation of staff gauges to monitor water-level fluctuations in Vince Bayou during the RI/FS.

3.2 SITE-SPECIFIC PHYSICAL HAZARDS

Physical Hazards and engineering controls were evaluated for each work task and are shown on the Task Hazard Analysis Worksheets contained in Appendix A. Chemical hazards are addressed below and on the Task Hazard

1 For this HASP, the "site" refers to any location where RI/FS activities will be undertaken, specifically where environmental samples will be collected.

Analysis Worksheets. General safe work practices that apply to all tasks are discussed in Section 3.7.

In general, the following are the primary physical hazards at the site for the work tasks:

1. Heat stress - the high temperatures and high humidity typical to the area create a significant potential for heat stress-related illness.
2. Cold stress – at least a portion of the work will be performed during the early spring months and temperatures may occasionally fall below 50º F.
3. Sunburn – a portion of the work is performed in full sun.
4. Slips/trips/falls – the presence of a large amount of equipment and supplies creates slip/trip/fall hazards.
5. Inclement Weather – weather in the area may change drastically without warning and this may pose as a hazard to workers.
6. Large equipment and heavy machinery- large machinery will be present during the RI/FS (e.g., drilling rigs, support vehicles) and presents multiple hazards to workers.
7. Underground and aboveground utilities – underground and aboveground utilities are present at the site and pose hazards to workers.

These hazards and the safe work practices that have been developed to reduce these hazards, and others, are discussed in more detail in the Task Hazard Analysis Worksheets in Appendix A.

3.3 SITE-SPECIFIC BIOLOGICAL HAZARDS

Biological Hazards were evaluated for each work task. In general, the following are the primary biological hazards at the site for the work tasks:

1. Insects – bees, wasps, centipedes, etc. may be present at the site.
2. Snakes – snakes may be present at the site.
3. Poisonous plants - poisonous plants such as poison ivy, poison oak, etc. are present on the site.
4. Dangerous animals – large mammals may be present at the site (e.g., a bobcat has been recently observed at the Site).

These hazards and the safe work practices that have been developed to reduce these hazards, and others, are discussed in more detail in Appendix A.

3.4 SITE-SPECIFIC CHEMICAL HAZARDS

The chemicals in the following tables have been detected in samples from waste materials present at the site at concentrations that exceed applicable human health screening criteria. Although the potential for exposure during the RI/FS activities is limited and will be minimized using personal protective equipment and engineering

controls, the physical and toxicological data are provided below. As new data are collected at the site, these tables will be updated with other constituents, as necessary.

GENERAL PROPERTIES				
CONSTITUENT	**HAZARD CLASS (NFPA)**	**PHYSICAL STATE**	**POTENTIAL EXPOSURE ROUTES**	**TASKS INVOLVING POTENTIAL EXPOSURE**
Acetone	Health: 1 Flammability: 3 Reactivity: 0	Liquid	Inhalation, skin contact, skin absorption, eye contact, ingestion	Tasks 1 and 2
Benzene	Health: 2 Flammability: 3 Reactivity: 0	Liquid	Inhalation, skin contact, skin absorption, eye contact, ingestion	Tasks 1 and 2
Ethylbenzene	Health: 2 Flammability: 3 Reactivity: 0	Liquid	Inhalation, skin contact, skin absorption, eye contact, ingestion	Tasks 1 and 2
Toluene	Health: 2 Flammability: 3 Reactivity: 0	Liquid	Inhalation, skin contact, skin absorption, eye contact, ingestion	Tasks 1 and 2
Xylene	Health: 2 Flammability: 3 Reactivity: 0	Liquid	Inhalation, skin contact, skin absorption, eye contact, ingestion	Tasks 1 and 2
Methyl Ethyl Ketone	Health: 1 Flammability: 3 Reactivity: 0	Liquid	Inhalation, skin contact, skin absorption, eye contact, ingestion	Tasks 1 and 2
Hydrogen Sulfide	Health: 1 Flammability: 3 Reactivity: 0	Gas	Inhalation, skin contact, eye contact	Tasks 1 and 2

National Fire Protection Association (NFPA) Chemical Hazard Classification:

Health
4 = Danger – Highly toxic, may be fatal on short exposure, known or suspected human carcinogen
3 = Warning – Toxic or corrosive, may cause serious injury on short exposure, known or suspected animal carcinogen
2 = Warning – Moderately toxic, may cause injury on intense or continued exposure
1 = Caution – May cause irritation or minor injury
0 = No unusual hazard

Flammability
4 = Danger – Flammable gas or extremely flammable liquid flash point <73°F
3 = Warning – Flammable liquid flash point below 100°F but >73°F
2 = Caution – Combustible liquid flash point >100°F but <200°F
1 = Combustible if heated, flash point >200°F
0 = Not combustible

Reactivity
4 = Danger – Explosive material at room temperature
3 = Danger – May be explosive if shocked, heated under confinement, or mixed with water
2 = Warning – Unstable or may react violently if mixed with water
1 = Caution – May react if heated or mixed with water, but not violently
0 = Not reactive when mixed with water

Special Precautions
W = Water reactive
OX = Oxidizing Agent

Physical state taken from NIOSH, Pocket Guide to Chemical Hazards (NIOSH, 2015).

EXPOSURE LIMITS				
CONSTITUENT	**EXPOSURE LIMIT (ACGIH/OSHA/NIOSH)**	**STEL**	**IDLH**	**LEL**
Acetone	ACGIH: 500 ppm OSHA: 750 ppm NIOSH: 250 ppm	1000 ppm	2500 ppm	2.6%
Benzene	ACGIH: 0.5 ppm OSHA: 1.0 ppm NIOSH: 0.1 ppm	1.0 ppm	500 ppm	1.2%
Ethylbenzene	ACGIH: 100 ppm OSHA: 100 ppm NIOSH: 100 ppm	125 ppm	800 ppm	0.8%
Toluene	ACGIH: 50 ppm OSHA: 200 ppm NIOSH: 100 ppm	150 ppm	500 ppm	1.1%
Xylenes	ACGIH: 100 ppm OSHA: 100 ppm NIOSH: 100 ppm	150 ppm	900 ppm	1.0%
Methyl Ethyl Ketone	ACGIH: 200 ppm OSHA: 200 ppm NIOSH: 200 ppm	300 ppm	3000 ppm	1.8%
Hydrogen Sulfide	ACGIH: 1.0 ppm OSHA: 20 ppm NIOSH: 10 ppm	10 ppm	100 ppm	4.0%

Notes:

ACGIH: **TLV-TWA** = *Threshold Limit Value-Time Weighted Average* - "The TWA concentration for a conventional 8 hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, for a working lifetime without adverse effect." (ACGIH, Threshold Limit Values and Biological Exposure Indices, 2014)

OSHA: **PEL** = *Permissible Exposure Limit* – "…TWA concentrations that must not be exceeded during any 8-hour workshift of a 40-hour workweek." (NIOSH, 2015)

NIOSH: **REL** = *Recommended Exposure Limit*- "…RELs are time-weighted average (TWA) concentrations for up to a 10-hour workday during a 40-hour workweek." (NIOSH, 2015)

C = *Ceiling* – value which should not be exceeded at any time (NIOSH, 2015)

Ca = *Carcinogen* – Any substance that NIOSH considers to be a potential occupational carcinogen

STEL = *Short Term Exposure Limit* – "a 15-minute TWA exposure that should not be exceeded at any time during a workday" (NIOSH, 2015)

IDLH = *Immediately Dangerous to Life or Health Concentrations* – "a condition 'that poses a threat of exposure to airborne contaminants when that exposure is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment." (NIOSH, 2015)

LEL = Lower Explosive Limit

ppm = parts per million; **mg/m^3** = milligrams per cubic meter

NA = Not Available **ND** = Not Determined

WARNING PROPERTIES/EXPOSURE SYMPTOMS	
CONSTITUENT	**EXPOSURE SYMPTOMS**
Acetone	Eye, nose and/or throat irritation, dizziness, central nervous system depression
Benzene	Eye, nose and/or throat irritation, giddiness, headache, nausea, staggered gait, fatigue, anorexia, weakness, exhaustion, dermatitis, bone marrow depression
Ethylbenzene	Eye, skin and/or mucous membrane irritation, headache, dermatitis, coma, narcosis
Toluene	Eye and/or nose irritation, fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, tear discharge, muscle fatigue, insomnia, paresthesia, dermatitis, liver and/or kidney damage
Xylenes	Eye, skin, nose and/or throat irritation, dizziness, excitement, drowsiness, staggering gait, incoordination, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermatitis
Methyl Ethyl Ketone	Eye, skin and/or nose irritation, headache, vomiting, dermatitis
Hydrogen Sulfide	Eye and/or respiratory system irritation, apnea, coma, convulsions, corneal vesiculation, eye pain, tear discharge, photophobia, dizziness, headache, fatigue, irritability, insomnia, gastrointestinal disturbance

3.5 CHEMICALS USED TO PERFORM ONSITE TASKS

Chemicals are occasionally used by personnel during the performance of work at the site. The chemicals that may be used are listed in the following table.

TASK NO.	TASK	CHEMICAL	HAZARD CLASS (NFPA)	PHYSICAL STATE	COMMENTS
2-6	Various	Acids/Bases	Health: 3 Flammability: 0 Reactivity: 0 Other: Oxidizer	Liquid	Acids (nitric, hydrochloric) or bases (sodium hydroxide) are often used as preservatives for certain samples. The preservative is typically placed in the sample containers by the laboratory before being shipped to the field. This is the preferred method. Preservative is sometimes added to the sample container by field personnel at the time of sample collection, but this practice is discouraged due to the potential for contact with the acid or base. Regardless, personnel shall wear the appropriate personal protective equipment (nitrile or butyl rubber gloves and goggles) while handling sample containers that contain acids/bases and shall limit contact with the preservative.

Notes:
Safety Data Sheets (SDSs) for hazardous chemicals used to perform on-site tasks will be kept at the site and made available to site personnel by the FPS.

3.6 WORKPLACE SAFETY SURVEYS

The Corporate HASD, RI/FS Manager, Site Safety Officer and Field Project Supervisor will survey the Site for potential work hazards at the beginning of each primary field mobilization. The Field Supervisor shall continually survey the Site for potential work hazards and relate any new information to site personnel at the Tailgate Safety Meeting held each day prior to beginning field activities. Additional Site safety surveys or safety audits will be performed (1) in the event of an accident, injury, or illness related to the Site; (2) whenever a new substance, process or piece of equipment is introduced that was not contemplated in this HASP; (3) whenever a safety deficiency is noted; (4) when a new hazard is recognized and needs to be evaluated; or (5) periodically as needed. A random site safety audit will be performed by the HASD during the project.

3.7 GENERAL SAFE WORK PRACTICES

The following work practices will be instituted in order to limit worker exposure to contaminants and other hazards:

1. If a person observes an unsafe condition or behavior, they must immediately intervene to correct the unsafe condition or behavior. All workers are expected to intervene with all other site workers, even those who work for different companies.
2. Each worker is empowered to stop the job to correct an unsafe condition or behavior.
3. Take breaks and drink water (outside of the work area and decontamination area) to mitigate the effects of heat stress.
4. Unauthorized persons will not be allowed in the work areas. Non-essential personnel will maintain an appropriate distance from heavy equipment, sampling, etc.
5. No eating, drinking, chewing gum or use of tobacco products will be permitted in the work areas or decontamination area. All personnel shall wash their hands and face prior to eating or leaving the Site.
6. Use of disposable lighters is prohibited on the Site.
7. Employees must be physically fit and properly trained in both health and safety procedures and specific field activity procedures prior to performing any field activities
8. Employees must inspect the job site for safety hazards prior to beginning any field activities. The Field Project Supervisor will inform all employees of the potential hazards of the job during the initial Tailgate Safety Meeting and will review potential hazards daily during the Tailgate Safety Meeting.
9. All field personnel shall immediately report any accident or injury to the Field Project Supervisor. This includes minor or slight injuries and near-miss events.
10. Employees are required to keep their work environment clean and orderly.

11. Changes in work activities, procedures or rules that involve deviations from the Site Health and Safety Plan, or that introduce new hazards, will be implemented only after approval by: (1) the Project Manager; and (2) the Site Safety Officer.
12. Horseplay, practical joking, or any other actions that jeopardize safety will not be tolerated.
13. All personnel will avoid contact with potentially contaminated substances.
14. Field personnel must observe each other for signs of toxic exposure. Indications of adverse effects include, but are not limited to: (1) changes in complexion and skin discoloration; (2) changes in coordination; (3) changes in demeanor; (4) excessive salivation and pupillary response; (5) changes in speech pattern.
15. Field personnel will inform each other of non-visual effects of toxic exposure such as headaches, dizziness, nausea, blurred vision, cramps or irritation of eyes, skin, or respiratory tract (see Section 3.4).
16. Measures to provide secure footing shall be taken at all locations where personnel will be working.
17. Whenever solvents, cleaners, or other chemical substances are used, a properly completed Material Safety Data Sheet for the chemicals will be available at the work site, and these containers will be appropriately labeled.
18. Always stay upwind of any intrusive sampling activity, to the extent practicable.
19. Follow all emergency procedures explicitly.
20. Be aware of site conditions, and especially any changes in conditions. If an unsafe condition is encountered, rectify and/or report it immediately.
21. If a person observes unsafe behavior by any other person, it is their duty to immediately communicate their concern to the other person. If they are uncomfortable doing so, the person should report the behavior to the FPS.
22. If other people are present or working nearby, always check in with the FPS or other appropriate personnel to coordinate your activities and request their cooperation.
23. Employees shall follow all client-designated safety procedures.
24. Inspect, clean and maintain personal protective equipment issued to you on a daily basis when in use. Report any defects in the equipment immediately to the FPS or replace.
25. Anticipate local weather conditions. Wear appropriate clothing and bring extra clothing/rain gear.
26. Beards or long sideburns will not be allowed on sites where respiratory protection may be required, since they interfere with respiratory protection. Trimmed sideburns and mustaches are acceptable, provided they do not interfere with respiratory protection. Report to work clean-shaven when there is a potential need for the use of respiratory protection.
27. Persons should only use equipment for which they are trained and qualified to use.

4.0 PERSONNEL TRAINING

4.1 REQUIRED TRAINING

All PBW personnel, contractors, and subcontractors engaged in work involving potential exposure to hazardous chemicals at the Site (i.e., those performing all tasks with the exception of Task 1, Site Visits and Inspections) will have completed training in accordance with OSHA Standard 29 CFR 1910.120 (e). Records for personnel training are kept in accordance with 29 CFR 1910.120 and copies are available from the Corporate Health and Safety Director. At a minimum, all PBW personnel shall have the following health and safety training:

- A 40-Hour OSHA HAZWOPER training course.
- Current annual OSHA HAZWOPER refresher course.

If a person is to enter an area where a respirator is (or may be) required, that person must have all of the above listed training as well as having been fitted for a respirator per the requirements of OSHA 29 CFR 1910.120.

The Field Project Supervisor shall have completed an additional 8-Hour OSHA Supervisor training course. The Site Safety Officer and Field Project Supervisor shall hold a current certificate for first aid and CPR training.

PBW will obtain and verify all records from contractors and subcontractors documenting the required training prior to the contractor or subcontractor performing any work on the Site.

Personnel that will visit the Site for certain non-intrusive activities may not be required to have the training listed in the first paragraph of this section. Personnel visiting the Site for the purposes of viewing site activities, general inspection of the site, site walks related to project bidding, etc., may be considered for this exclusion at the discretion of the PBW RI/FS Manager and Corporate HASD; however, all persons who enter areas requiring potential respirator protection will have received all of the training listed in this section.

4.2 PRE-JOB SAFETY MEETING

A pre-job safety meeting is generally required for all PBW personnel that will enter the Site for any reason. The pre-job safety meeting is to be administered by the RI/FS Manager, Corporate Health and Safety Director, or Field Investigation Manager. It is anticipated that a pre-job safety meeting will be held at the beginning of each primary field mobilization, and should include all personnel reasonably expected to participate in the activities covered by this plan. The main objective of the pre-job safety meeting is to review the information in this HASP. The pre-job safety meeting is to be documented with the form contained in Appendix B. All personnel attending the meeting will have to sign the form to be allowed to perform work at the Site. Personnel visiting the Site for short periods of time (e.g., for deliveries) or during the middle of a major field mobilization, and who cannot attend the initial pre-job safety meeting, will be provided appropriate pre-job safety training based on the activities they may perform.

4.3 SAFETY COMPLIANCE

All personnel that enter the Site for any reason will have to review and understand this HASP, with few exceptions (see below). Personnel will acknowledge that they have read the HASP and agree to abide by its requirements by signing the Safety Compliance Agreement form included in Attachment B. Personnel that will visit the Site for certain non-intrusive activities such as viewing Site activities, general inspection of the Site, Site walks related to project bidding, etc., will be restricted from entering areas where work is being performed and where there is a potential for exposure to physical or chemical hazards.

As for the pre-job safety meeting, the appropriate level of training and review of this HASP will be determined based on the activities that a person may perform at the Site. Personnel who visit the Site for short periods of time (e.g., deliveries) and have limited potential for exposure to hazardous substances will be provided the appropriate level of HASP review.

4.4 TAILGATE SAFETY MEETINGS

Tailgate safety meetings (TSMs) will be conducted to discuss Site activities and task-specific hazards. Forms documenting the TSMs are included in Attachment B. TSMs will be conducted according to the following schedule:

- Every day before work begins which involves more than one person.
- Every time a new individual enters the Work Area that did not attend the morning TSM or the Pre-Job Safety Meeting.

- Whenever new work conditions or activities not covered at the TSM occur.

5.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) refers to **protective** clothing or **equipment** designed to protect workers from site physical, chemical, and biological hazards. The following tables list the PPE required and when that PPE should be utilized.

PPE LEVEL SELECTION									
Work will be performed using the level PPE checked below:									
	Level A		Level B		Level C		Modified Level D	**X**	Level D
PPE may be upgraded to:									
	Level A		Level B	**X**	Level C	**X**	Modified Level D		Level D
All personnel who enter the site will be required to wear Level D PPE. Upgrades to Modified Level D or Level C may be necessary depending on site conditions and/or air monitoring. Current respirator fit testing documentation is required for personnel who may upgrade to Level C PPE attire.									

PPE UTILIZATION CHART	
PPE	**UTILIZATION REQUIREMENTS**
Hard Hat (ANSI Z 89.1)	At all times (all PPE levels)
Steel-toe boots (ANSI Z 41.1)	At all times (all PPE levels)
Safety Glasses/Sunglasses (ANSI Z 87.1)	At all times (all PPE levels) (except when Face Shield or full-face respirators are being used)
Face Shield	When using high pressure washing equipment (e.g., for equipment decontamination).
Hearing Protection	At all times near operating machinery (use arms length rule); when noise level exceeds 85 dB
Cotton or Leather Work Gloves	As needed to mitigate hand/finger physical hazards identified in Tailgate Safety Meeting
Chemical Resistant Gloves (Nitrile)	As needed to mitigate hand/finger chemical hazards, to be identified prior to activities that require them and/or in Tailgate Safety Meeting
Rain gear	As necessary
Chemical Resistant Suit (Tyvek or as appropriate)	When conditions exist where potential exposure to contaminated soil or water is indicated (by air monitoring but below action levels, or by existing analytical data) or when working in wet conditions (Modified Level D). Required when in Level C PPE.
Bright-colored Orange Traffic Safety Vest	As needed when working in roadways, near high-traffic areas, and/or near railroad tracks
Half- or Full-Face Respirator	As required when air monitoring indicates their need (Level C)

Other: Construction attire	100% cotton clothing; blue jeans; shirts with long sleeves; long hair must be restrained; no dangling jewelry
Types of respirator cartridges that will be available on-site: Organic vapor cartridge with dust, aerosol or particulate pre-filter.	
Respirator cartridges changes: Organic vapor cartridge replacement frequencies will be determined based on the concentrations of organic compounds present in the ambient air. If respirators are donned, the concentration of organic vapors will be measured, and compared against the cartridge manufacturers guidelines. With respect to dust pre-filters, the pre-filter will be replaced when the wearer notices an increased effort is required to draw air through the filter.	

6.0 MEDICAL SURVEILLANCE

Medical exams meeting the requirements of 29 CFR 1910.120(f) will be required for all personnel with the potential for exposure to hazardous substances. Medical surveillance will include a baseline and annual exams conducted or reviewed by a licensed physician or under the supervision of a licensed physician. Each contractor will maintain the medical surveillance records for their employees. They will provide a copy of the "Physician's Written Opinion," or approval for Site work, to the PBW Field Investigation Manager or Field Project Supervisor.

Anyone who may be required to wear a respirator must be approved to do so by qualified medical personnel. The approval process will include a pulmonary function test and respiratory questionnaire (29 CFR 1910.134, Appendix C).

On-Site personnel who may be exposed to noise levels above 85 dbA must be included in a Hearing Conservation Program, which includes audiometric testing. In addition, some activities may necessitate the use of hearing protection and inclusion in a Hearing Conservation Program (e.g., some drilling operations).

Workers who have experienced a known or suspected chemical exposure will be evaluated by a medical professional. Any known or suspected exposures will be documented and kept in the employee's files. Employees can request copies of any medical records.

Specific medical surveillance tests (e.g., for specific chemicals) may be required as new data are acquired at the site. This HASP will be amended if these tests become necessary.

7.0 EXPOSURE MONITORING

7.1 MONITORING INSTRUMENTS

The monitoring instruments checked in the following table will be used as described below:

X	Photo Ionization Detector (PID)		Flame Ionization Detector (FID)	**X**	Combustible Gas Indicator (CGI) Lower Explosive Limit (LEL)/Oxygen	**X**	Dust Monitor		Hydrogen Sulfide
X	Sorbent Tubes (List): Hydrogen Sulfide								
	Other (List):								

Monitoring of ambient air in the breathing zone of workers will be conducted during intrusive (subsurface) activities during Tasks 2 and 3, as follows:

- For organic vapors using a PID;
- For dust using a dust monitor;
- For the LEL using a CGI; and
- For hydrogen sulfide using sorbent tubes.

Monitoring instruments will be calibrated in accordance with the manufacturer's written instructions.

7.2 ACTION LEVELS

The following table lists the action levels for the contaminants that will be measured in ambient air during the intrusive activities to be performed during the RI/FS:

CONSTITUENT	ACTION LEVEL	MEDIUM	REQUIRED ACTION
Organic Vapors	1 ppmv	Air	See below
LEL	10%	Air	See below
Dust	None (see below)	Air	See below
Hydrogen Sulfide	>10 ppm	Air	See below

Action levels have been developed for this Site to provide a safe level of exposure in which project workers may perform their activities. When the established action levels are exceeded, certain actions will be taken to limit potential exposure. Engineering controls will be implemented first whenever possible. When engineering controls are not possible or prove to be insufficient, PPE will be used to limit potential exposure. It is anticipated that airborne dust containing organic vapors (some of which are explosive) and metals are the primary sources of exposure to Site workers.

The level of PPE worn by field personnel will be defined, controlled, and implemented by the Field Project Supervisor. Protection may be upgraded or downgraded by the FPS on the basis of the action levels presented in this section.

During intrusive activities at upland locations (Tasks 2 and 3), the breathing zone of workers will be monitored for organic vapors, dust, LEL and hydrogen sulfide. Monitoring instrument readings will be entered on a Daily Field Record or in a Field Notebook. The criteria for upgrading to a higher level of respiratory protection are as follows:

Organic Vapors: A PID will be used to measure the concentration of total organic vapors in the breathing zone of workers. If a sustained reading (more than 60 seconds) of 1 ppmv is measured, work activities will cease at that location. Workers will move to an upwind location, if possible, and the FPS will continue to monitor the area every five minutes for 15 minutes (three times). If concentrations of organic vapors do not subside below the action level, the area will be cleared and work at that location will not continue until all workers have donned respiratory protection (half-face respirator with an organic vapor cartridge). Engineering controls may be attempted to disperse the vapors, for instance the use of industrial fans.

Lower Explosive Limit: The lower explosive limit is used to ensure that explosive vapors (typically organic vapors from volatile compounds such as benzene) do not gather in the work area. An LEL meter will be used to monitor the air in the work area (both in the breathing zone and at ground level). If an LEL meter (combustible gas indicator) measures 10% LEL (calibrated as methane) near the work area, activities will cease and the area cleared. The FPS will continue to monitor the area every five minutes for 15 minutes. If LEL measurements do not subside below the action level, work at that location will not continue. Engineering controls will be used to disperse the vapors, and all equipment will be moved from the area. The location will be flagged and barricaded and no further work will be conducted in the work area.

Dust: Exposure from airborne dust containing metals (primarily arsenic) has been considered during the preparation of this HASP. However, there are very limited site data for arsenic concentrations in site soils. A typical method for calculating action levels for exposure monitoring in ambient air considers the average concentration of a constituent in soil samples, the OSHA permissible exposure limit for that constituent, and a safety factor (typically 10% to 25%). Due to the lack of data, dust monitoring will not be conducted initially. As new site data are collected, and actual dust conditions are observed during field activities, the need for dust monitoring and an associated action level will be re-evaluated. Engineering controls such as using water or plastic sheeting to mitigate dust concerns may be used, as described in the Task Hazard Analysis Worksheets (Appendix A)

Hydrogen Sulfide: Hydrogen sulfide concentrations requiring respiratory protection have been measured during waste material removal actions at the Site. Although hydrogen sulfide is not likely present in subsurface materials, monitoring will be conducted using sorbent tubes. An initial action level of 10 ppm has been established. Measurements of hydrogen sulfide will be taken in the breathing zone of the work area at each sampling location. If concentrations exceeding the action level are measured, work will cease at that location. Workers will move to a upwind location, if possible, and the FPS will continue to monitor the area every five minutes for 15 minutes (three times). If concentrations of hydrogen sulfide do not subside below the action level, the area will be cleared and work at that location will not continue until a program for respiratory protection has been developed.

Exposure monitoring data and Site sample data will be used to continually review the exposure monitoring program. The HASD, Field Investigation Manager, and FSP together may determine that exposure monitoring either be reduced or eliminated. These decisions will be reviewed with the client representative(s) and, if approved, may be implemented during subsequent work activities at the Site.

8.0 SITE CONTROLS

Is the Site securely fenced? The Site is securely fenced, has security cameras, and is monitored by a security firm.

What types of people routinely have access to the site (List):
PBW personnel, other consultants (e.g., Environ), contractors and subcontractors, regulatory personnel (EPA, TCEQ).

The Work Area will be marked with (check any that apply):

X	Traffic cones	**X**	Barricades	**X**	Caution tape	**X**	Signs	**X**	Fence
	Other								

Briefly describe the location of the work area:

For site visits and inspections (Task 1), the entire site is considered the work area. However, there will be no intrusive work performed and therefore there will be no work areas restricted or otherwise identified.

For all intrusive tasks performed at terrestrial locations (Tasks 2, 3 and 4), the work area around the sampling location (or sampling area) will be marked with traffic cones. The traffic cones shall be no nearer than 10 feet from the sampling location if at all possible.

Briefly describe the location of the contamination reduction zone:

A decontamination area will be established at the Site prior to initiation of field activities, the location of which will be selected based upon site conditions at the time. The area will be centrally located. The decontamination area will be the area where all decontamination activities will be performed. These activities generally include (1) decontamination of field equipment; and (2) removal and disposal of PPE. The following decontamination equipment will be provided at the decontamination area:

1) Water supplies (gallon containers, small spray bottles, a large pressurized sprayer)
2) Towels and disposable wipes
3) Brushes
4) Garbage cans and/or drums for disposal of PPE and other potentially contaminated trash
5) Large tubs or small children's swimming pools for decontamination of boots, if necessary
6) Soap (liquid hand soap and Alconox or similar)
7) Plastic sheeting or tarps

A separate area near or within the decontamination area will be constructed for decontamination of large equipment such as drilling rigs, dozers, etc. This area will be bermed and all water/solids will be contained.

Briefly describe the location of the support zone:

The support zone will be established prior to the initiation of field activities, the location of which will be selected based upon site conditions at the time. The support zone will be outside the work areas or decontamination area. The support zone shall be a clean zone and is where meetings and breaks are held. Eating and drinking is allowed in the support zone. Table(s), chairs, shade and drinks will be provided in the support zone. A First Aid Kit will also be available in the support zone. A sign-in/sign-out sheet will be located in the support zone and all personnel will be required to sign in or out when at the Site.

9.0 DECONTAMINATION

EQUIPMENT	DECONTAMINATION PROCEDURE
Emergency decontamination	If a life-threatening situation dictates immediate medical treatment, decontamination will be delayed until the victim's condition is stabilized. If decontamination can be performed without interfering with essential first aid, decontamination will be performed immediately. Decontamination in such instances will be as complete as possible to limit the exposure of the injured person and those responding to the emergency. Any vehicle or person involved in transporting contaminated personnel will be decontaminated as necessary following the emergency response. In some instances, there is an immediate threat to the life and health of an employee who may have been contaminated. Co-workers will need to determine whether or not full decontamination procedures will be followed, or if more limited procedures are preferable. Remember that if complete decontamination is not performed, medical responders shall be advised of this and of the contaminants that may be present.
Personal Hygiene	All on-Site personnel will deposit disposable PPE in a waste container and wash their hands and face whenever leaving the Site and before eating, drinking, smoking, or using restroom facilities. Washing facilities will be provided to all workers.
Equipment Decontamination	All sampling equipment will be thoroughly decontaminated before it is used for sample collection, moved to a "clean" or support area, or removed from the site. This will prevent the migration of contaminants from contaminated to uncontaminated areas. The RI/FS Workplan will include specific procedures to follow for each type of equipment and each sampling activity. High pressure/temperature water cleaning of any heavy equipment will be performed when this equipment is required for a specific field effort. Site workers conducting high pressure/temperature cleaning of equipment will wear full face respirators or goggles with a faceshield, Saravex® or polyethylene coated Tyvek® or splash apron, and gloves. Rubber boots or shoe covers are recommended.

10.0 HANDLING AND STORAGE OF INVESTIGATION DERIVED WASTES

The following sampling-derived wastes are expected to be generated (check all that apply):									
X	Soil cuttings	**X**	Decontamination wash water	**X**	Purged groundwater	**X**	PPE	**X**	Plastic sheeting
X	Equipment (describe): sampling equipment (tubing, bailers, sample barrel liners, etc.), drilling equipment, etc.								
	Other (describe)								

Describe the method of waste storage:

All investigation derived wastes (IDW) will be stored in the work areas or decontamination area until testing indicates its appropriate disposal method and location. An IDW waste analysis plan will be presented in the RI/FS SAP.

11.0 EMERGENCY RESPONSE PLAN

11.1 INTRODUCTION

As a result of the hazards on-Site and the conditions under which the Site characterization will be conducted, the possibility of an emergency situation may potentially exist. Careful consideration has been given to the relative possibility of fire, explosion, or release of vapors, dusts, or gases that could affect personnel or any nearby facilities. Control measures will be employed as necessary to preclude off-Site migration of contaminants.

The FPS is designated as the Project Emergency Coordinator and will implement the emergency plan whenever conditions at the Site warrant such action. He/she will be responsible for ensuring the evacuation, emergency treatment, emergency transport of all site personnel as necessary, and notification of emergency response units and the appropriate management personnel.

11.2 EMERGENCY PROCEDURES

Prior to initiation of field activities, general emergency response procedures should be discussed with all crew members, such as general evacuation routes and locations of safe havens.

In case of injury, call 911, administer first aid immediately and, if necessary, transport to nearest medical facility as soon as possible or call an ambulance. Advise the PBW Project Manager, SSO and Corporate Health and Safety Director as soon as possible of any injury, accident, and property damage or near-miss event.

In the event evacuation is necessary, first shut off all operating equipment, if possible. Proceed in a quick and orderly manner to a safe haven designated by the FPS. In the event of an injury, it may be prudent to go directly to a hospital.

All injuries and accidents will be dealt with in a manner to minimize continued health risk to Site workers:

- First aid or other appropriate initial action will be administered by those closest to the accident or injury. This assistance will be provided in a manner that will assure that those performing the activities are not placed at unacceptable risk.
- All accidents will be reported to, and documented by, the FPS, who is responsible for coordinating the emergency response actions in an efficient, rapid and safe manner.
- Employees will be responsible for conducting themselves in a mature, calm manner in the event of an accident or injury.

In the event of an emergency situation, such as fire, explosion, significant release of contaminants, etc., the FPS will notify Site personnel and initiate Site evacuation procedures. Personnel in all areas will evacuate and assemble in the support zone or other safe haven designated by the FPS. Under no circumstances will incoming personnel or visitors (with the exception of emergency response personnel, see below) be allowed to proceed into the work areas once an emergency has been declared. The FPS will ensure access for emergency equipment and verify that all equipment is shut down. While the safety of all on-Site personnel is being confirmed, emergency response teams will be notified of the emergency and other appropriate personnel and agencies will be notified subsequently.

Emergency contacts and the locations of emergency equipment are listed in the following tables.

CONTACT	PHONE NUMBER
Fire/Rescue:	911
Ambulance:	911
Police: Emergency Non-emergency	911 713-477-1221
Nearest Hospital: Bayshore Medical Center, 4000 Spencer Hwy, Pasadena, TX HOSPITAL DIRECTIONS ARE IN APPENDIX C	713-359-2000
Utility Locator Company: Texas 811	811

EMERGENCY EQUIPMENT	LOCATION
First Aid Kit	In PBW field vehicle.
Fire Extinguisher (ABC type)	In PBW field vehicle.
Cellular Phone	In PBW field vehicle.
Eye Wash	In PBW field vehicle.
Drinking Water	In PBW field vehicle.
Wipes for face and hands	In PBW field vehicle.
Other:	

11.3 MEDICAL EMERGENCIES

If the injury to a worker is chemical in nature (e.g., overexposure), the following first-aid procedures will be instituted:

- Eye Exposure – If contaminated solid or liquid gets into the eyes, wash the eyes immediately, lifting the lower and upper lids. Obtain medical attention immediately. Contact lenses will not be worn when working on-Site.
- Skin Exposure – If contaminated solid or liquid gets on the skin, promptly wash the contaminated skin using soap or mild detergent and water.
- Swallowing – If contaminated solid or liquid has been swallowed, immediately contact the Poison Control Center, give information on the type of material, the amount swallowed, and the expected concentration. Follow the Poison Center's advice for treatment. Obtain medical attention immediately if signs of overexposure develop.
- Breathing – If a person has difficulty breathing, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Obtain medical attention as soon as possible.

All accidents and injuries will be documented by the FPS.

11.4 ADVERSE WEATHER

In the event of adverse weather, the FPS will determine if work can continue without risking the health and safety of site personnel. Factors to be considered in making this determination include:

- Heavy rainfall;
- Potential for heat stress;
- Potential for cold stress;
- Limited visibility;
- Electrical storms; and
- Malfunctioning of monitoring equipment (due to high humidity, etc.).

11.5 INCIDENT INVESTIGATION

Upon receiving a report of an emergency incident, the SSO or FPS will investigate the circumstances surrounding the incident. All incidents will be reported to the PBW USOR Project Coordinator and Corporate Health and Safety Director per the requirements of PBW's Corporate Health and Safety Manual, as well as to the client contacts, as appropriate. A written report will be completed and forwarded to the PBW Corporate Health and Safety Director within 48 hours of the incident.

12.0 CONFINED SPACE ENTRY

Confined space entry is not permitted under this Health and Safety Plan under any circumstance. If entry into confined spaces is necessary, a confined space entry plan and permit system will be prepared and approved by the RI/FS Manager, PBW Corporate HASD, Site Safety Officer, and Client safety officials (if applicable).

13.0 SPILL CONTAINMENT

It is not expected that significant releases will result from the activities covered by this plan. Therefore, this spill containment plan only covers small spills or minor releases.

The FPS will ensure that the appropriate spill control equipment is available to handle small, incidental spills occurring during the field effort (e.g., spill of a liter of acidic preservation solution). This equipment shall include:

- Spill pillows or “pigs”;
- Neutralization chemicals or materials;
- Shovels;
- Heavy-duty plastic trash bags or drums;
- Labels.

The FPS will take actions to control and clean up the spill and will document the incident and provide copies to the SSO and PM. If applicable, corrective actions will be taken to prevent a similar occurrence.

14.0 FALL PROTECTION

Work on ladders or elevated structures more than 6 feet high is not permitted under this HASP. If such work is anticipated, a fall protection plan complying with OSHA standards will be prepared and approved by the RI/FS Manager, PBW Corporate HASD, SSO, and Client safety officials (if applicable).

15.0 REFERENCES

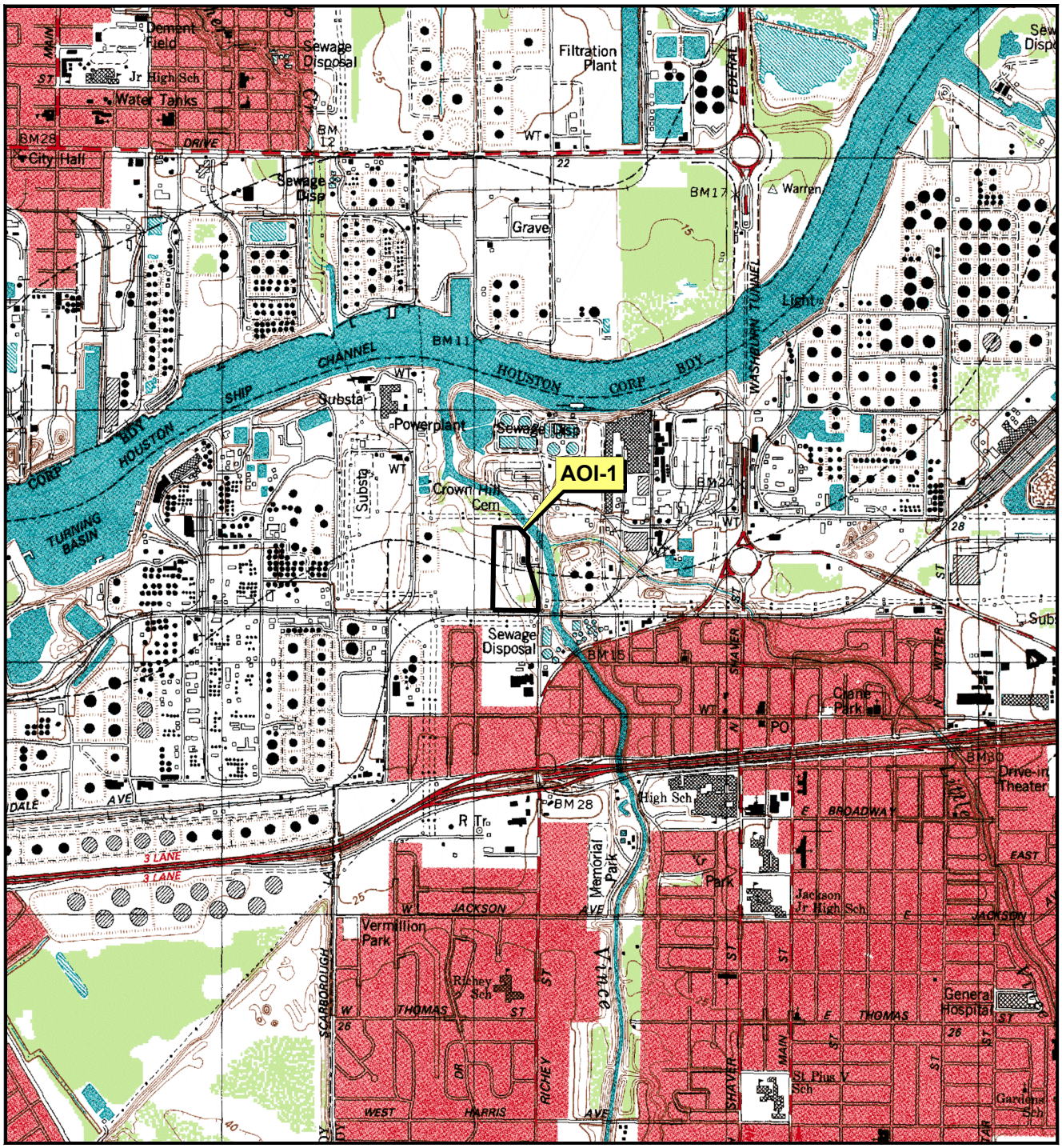
American Conference of Governmental Industrial Hygienists (ACGIH), 2014. Threshold Limit Values and Biological Exposure Indices. 2014.

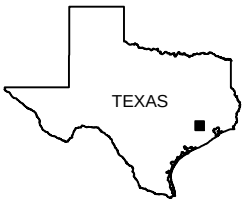
National Institute of Occupational Safety and Health (NIOSH), 2015. Pocket Guide to Chemical Hazards. Accessed online, June 2015.

Pastor, Behling & Wheeler, LLC (PBW), 2015a. Draft Sampling and Analysis Plan (SAP) – Volume I, Field Sampling Plan (FSP), US Oil Recovery Superfund Site, Pasadena, Texas. August 3.

Pastor, Behling & Wheeler, LLC (PBW), 2015b. Draft Sampling and Analysis Plan (SAP) – Volume II, Quality Assurance Project Plan (QAPP), US Oil Recovery Superfund Site, Pasadena, Texas. August 3.

FIGURES





QUADRANGLE LOCATIONS

N

Scale in Feet

0 1000 2000

US OIL RECOVERY SUPERFUND SITE

PASADENA, HARRIS COUNTY, TEXAS

Figure 1

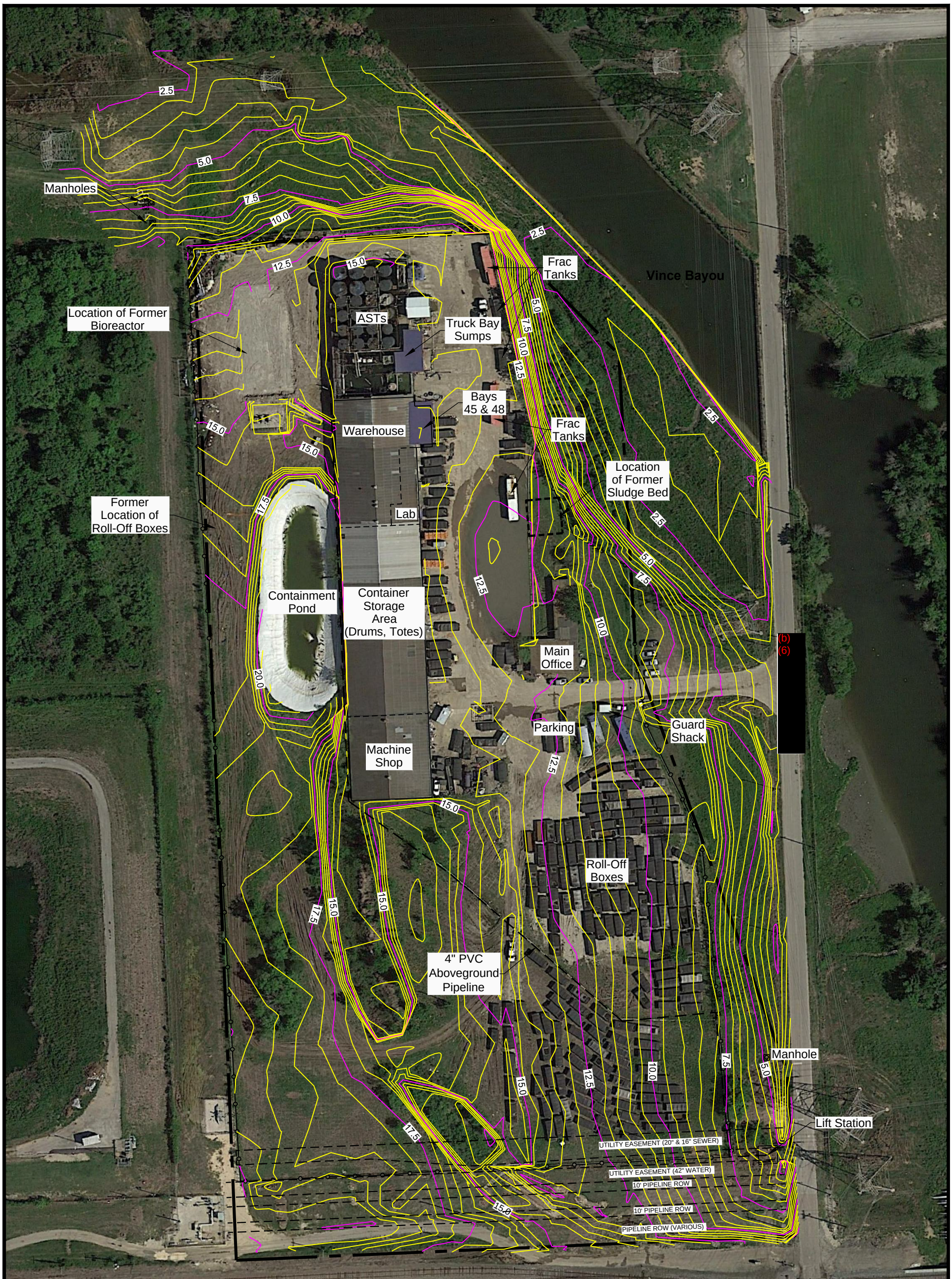
SITE LOCATION MAP

PROJECT: 3333-4-HASP	BY: AJD	REVISIONS
DATE: DEC., 2015	CHECKED: MKW	

PASTOR, BEHLING & WHEELER, LLC

CONSULTING ENGINEERS AND SCIENTISTS

SOURCE:
Base map from www.tnris.gov, Pasadena, TX 7.5 min. USGS quadrangle dated 1982.



EXPLANATION

Approx. Property Boundary

Approx. Security Fence

15.0 Topographic Contours from Survey Conducted in June/July 2013

1. Coordinates based on Texas Coordinate System NAD 83 (2011) (EPOCH 2010.0000), South Central Zone.
2. Elevations based on NAVD88 (GEOID12A)
3. Contour Interval 0.5 ft.

N

Approx. Scale in Feet

0 50 100

Source:
Imagery taken from Google Earth, photography dated April 8, 2014.

US OIL RECOVERY SUPERFUND SITE

PASADENA, HARRIS COUNTY, TEXAS

Figure 2

SITE MAP - AOI-1

PROJECT: 3333-4-HASP	BY: AJD	REVISIONS
DATE: DEC., 2015	CHECKED: MKW	

PASTOR, BEHLING & WHEELER, LLC

CONSULTING ENGINEERS AND SCIENTISTS

APPENDIX A

TASK HAZARD ANALYSIS WORKSHEETS

TASK HAZARD ANALYSIS WORKSHEET

US OIL RECOVERY SUPERFUND SITE (AOI-1)

TASK NO. 1	**TASK DESCRIPTION: Site Visits and Inspections** Project, Regulatory, and Contractor/Subcontractor personnel will be visiting the site to scope future investigations, conduct safety planning, evaluate Site access, evaluate site environmental features, collect information with which to submit cost estimates/bids for certain activities, etc. These activities are broadly described as those that are non-intrusive and that do not require tools or equipment. Personnel without the proper training will not be allowed to perform intrusive activities such as sampling, drilling, well inspections, etc. This task also encompasses the activities performed by professional surveying crews.

TABLE 1. GENERAL INFORMATION

PBW Project Number: 3333	Project Name: US Oil Recovery Superfund Site (AOI-1)
Prepared By: Matt Wickham	Date: 6/11/15
Reviewed By: Eric Pastor	Date: 6/11/15

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart Site	Traffic	See the safe work practices listed in Table 4.
Perform Site Visits and Inspections (accessing by foot any area of the site)	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	All of these hazards can be eliminated. Utilize the specific safe work practices listed in the table below.

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous Animals	
Overhead Lines	Hot Surfaces/Burns	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinch	Drowning	
Dust	Noise	Slip/Trip/Fall		
Excavations/Trenches	Traffic	High Crime Area		
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

SAFE WORK PRACTICES (include for all Potential Hazards identified in Table 2)	
Traffic	Be careful when parking vehicles at the site entrance or within the site fence. Avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70°F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70°F, the following general practices will also be followed: • Fluids will be provided to all site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water. • Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. • In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. • Provide shade, if practical. • A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed. If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50°F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50°F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold

	temperatures, the following procedures will be observed: • Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; • Hot drinks may be provided in some cases; and • Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Slip/Trip/Fall	The site has uneven topography, abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
Dangerous Animals	Dangerous animals may be present at the site (a bobcat has been observed recently). Carry a stick or cane and disturb the brush in front of you when walking in vegetated or obstructed areas. Be aware of your surroundings at all times.
Snakes	Snakes (most likely rattlesnakes) may occur on the site and can be very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart Site	None
Perform Site Visits and Inspections (accessing by foot any area of the site)	None

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Remote Equipment	
Foam	Hay Bales	Wind Screen	Dry Ice	
Sedimentation Basin	Water	Hoses	Inert Gas	
Blowers	Water Truck	Covers	Plastic Sheeting	
Berms	Sprinklers	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

US OIL RECOVERY SUPERFUND SITE (AOI-1)

TASK NO. 2	**TASK DESCRIPTION: Soil and On-Property Sediment Sampling** Collection of soil samples from multiple areas of the Site during the RI/FS. Collection of sediment samples from the areas where shallow ponded water is present at the Site (water depth less than approximately 2 feet). Soil samples collected using either hand equipment (augers, shovels, spades) or from a drilling rig (geoprobe, conventional drilling rig, split-barrel sampler, shelby tube, etc.).

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: US Oil Recovery Superfund Site (AOI-1)
Prepared By: Matt Wickham	Date: 6/11/15
Reviewed By: Eric Pastor	Date: 6/11/15

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart Site	Traffic	See the safe work practices listed in Table 4.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	
Unload or load field equipment	Lifting	
Set up and ensure proper functioning of drilling rig	Electrical, Overhead Utilities, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	
Decontaminate all equipment that will contact samples, including sample barrels, augers, etc. (before and after sampling)	Chemical Exposure, Contact Injury	
Drilling rig operation	Chemical Exposure, Electrical, Overhead Utilities, Underground Utilities, Dust, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall, Noise	
Describe and examine core samples and collect samples	Chemical Exposure, Stick/Puncture/Pinch	
Pack samples for shipment	Chemical Exposure, Lifting, Stick/Puncture/Pinch	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous Animals	
Overhead Utilities	Hot Surfaces/Burns	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinch	Drowning	
Dust	Noise	Slip/Trip/Fall	Contact Injury	
Excavations/Trenches	Traffic	High Crime Area		
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those hazards applicable to this task, develop site-specific safe work practices to address the hazard.

<table>
<tr><th colspan="2">SAFE WORK PRACTICES
(include for all Potential Hazards identified in Table 2)</th></tr>
<tr><td>Chemical Exposure</td><td>Wear appropriate PPE and replace when damaged or worn. When possible, stay upwind of the sampling location. Avoid contact with potentially contaminated soil, cuttings, water, etc. See Section 3.4 of this HASP for more information on specific chemical hazards. Use air monitoring instruments as described in Section 7.0 of the HASP.</td></tr>
<tr><td>Electrical</td><td>Drilling rig has electrical components and wiring. Make sure that drilling rig is operating properly and inspect daily. Repair worn components and wiring. Electrical tools are to be used with a ground fault interrupter. A grounding rod must be used with portable generators. Reportedly, all electrical and gas utilities at the site have been cut off, but confirm with site access contact prior to each field mobilization.</td></tr>
<tr><td>Overhead Utilities</td><td>Check for overhead utilities when raising the drilling rig mast. Identify the voltage of the line and use the following clearance rules:
<table>
<tr><th>Nominal System Voltage of Power Line (kV)</th><th>Minimum Required Clearance (ft)</th></tr>
<tr><td>0 –50</td><td>10</td></tr>
<tr><td>51 – 100</td><td>12</td></tr>
<tr><td>101 - 200</td><td>15</td></tr>
<tr><td>201 – 300</td><td>20</td></tr>
<tr><td>301 – 500</td><td>25</td></tr>
<tr><td>501 – 750</td><td>35</td></tr>
<tr><td>751 – 1000</td><td>45</td></tr>
</table>
A call to a utility locating service is mandatory prior to any drilling or digging at the site, regardless of depth. Call 1-800-DIG-TESS or Texas One Call.</td></tr>
<tr><td>Underground Utilities</td><td>A call to a utility locating service is mandatory prior to any drilling or digging at the site, regardless of depth. Call 1-800-DIG-TESS or Texas One Call. Look for obvious signs of the presence of utilities (fire hydrants, utility boxes, linear features, manholes, etc.). Always pre-probe the location with a steel probe. Drill or dig carefully in the upper ten feet of the surface. In no instance may a drilling location be within five feet of a known underground utility.</td></tr>
<tr><td>Dust</td><td>Wear appropriate PPE and replace when damaged or worn. When possible, stay upwind of the sampling location. Use water as a dust suppressant when excessive dust is generated (but don’t allow contact with the sampled soil).</td></tr>
<tr><td>Heavy Equipment</td><td>Be diligent around heavy equipment, especially mobile equipment. Make sure all</td></tr>
</table>

	personnel are aware before moving equipment. Ensure that backup alarms are present and operable. Keep the workplace tidy. Avoid moving parts and do not remove any machine guarding. Remove snag points. Do not wear loose fitting clothes. When staging equipment, make sure that stacked loads are secure and not creating hazards due to shifting.
Lifting	Use caution when lifting heavy equipment or supplies, and use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible.
Hot Surfaces/Burns	Hot surfaces are present due to friction from drilling operations and possibly from sun. Avoid hot surfaces or wait for the surface to cool before touching or moving. Use cotton gloves if possible.
Noise	Wear ear plugs or muffs. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA). Hearing protection should be worn.
Traffic	Be careful when parking vehicles at the site entrance or within the site fence. Avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70°F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70°F, the following general practices will also be followed: • Fluids will be provided to all site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water. • Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. • In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. • Provide shade, if practical. • A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed. If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50°F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering,

	numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50°F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed: • Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; • Hot drinks may be provided in some cases; and • Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Stick/Puncture/Pinch	Use caution when moving augers or sampling equipment. Use caution when opening sample barrels. Avoid sharp surfaces on drilling rig. Wear cotton or leather gloves when possible. Use caution when using sharp tools and never point a sharp tool toward yourself when cutting.
Slip/Trip/Fall	The Site has uneven topography, abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Keep the workplace tidy and remove all unnecessary equipment promptly, especially around the drilling rig.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
Dangerous Animals	Dangerous animals may be present at the site (a bobcat has been observed recently). Carry a stick or cane and disturb the brush in front of you when walking in vegetated or obstructed areas. Be aware of your surroundings at all times.
Snakes	Snakes (most likely rattlesnakes) may occur on the site and can be very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.
Contact Injury	Stay clear of spray from steam cleaner during decontamination operations. Wear PPE, including goggles or face shield.

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart Site	Traffic	None identified.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Set up and ensure proper functioning of drilling rig	Electrical, Overhead Utilities, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	None identified.
Decontaminate all equipment that will contact samples, including sample barrels, augers, etc. (before and after sampling)	Chemical Exposure, Contact Injury	None identified.
Drilling rig operation	Electrical, Overhead Utilities, Underground Utilities, Dust, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall, Noise	Water to control dust (possibly use fans or blower to control major dust or organic vapor problem) Use plastic sheeting when necessary to prevent contamination of ground.
Describe and examine core samples and collect samples	Chemical Exposure, Stick/Puncture/Pinch	None identified.
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	None identified.

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Remote Equipment	
Foam	Hay Bales	Wind Screen	Dry Ice	
Sedimentation Basin	Water	Hoses	Inert Gas	
Blowers	Water Truck	Covers	Plastic Sheeting	
Berms	Sprinklers	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

US OIL RECOVERY SUPERFUND SITE (AOI-1)

TASK NO. 3	**TASK DESCRIPTION: Groundwater Monitoring Well Installation** Installation of groundwater monitor wells at various locations at the Site during the RI/FS. Also includes the use of other drilling equipment such as cone penetrometer testing (CPT) equipment, rapid optical screening tool (ROST) equipment, etc. Monitoring wells will be installed using an auger, rotary, or sonic drilling rig. This task hazard analysis also includes well development activities.

TABLE 1. GENERAL INFORMATION

PBW Project Number: 3333	Project Name: US Oil Recovery Superfund Site (AOI-1)
Prepared By: Matt Wickham	Date: 6/11/15
Reviewed By: Eric Pastor	Date: 6/15/15

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart	Traffic	See the safe work practices listed in Table 4.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	
Unload or load field equipment	Lifting	
Set up and ensure proper functioning of drilling rig	Electrical, Overhead Utilities, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	
Decontaminate all equipment that will contact monitoring well boring, including sample barrels, augers, etc. (before and after sampling)	Chemical Exposure, Contact Injury	
Drilling rig operation	Chemical Exposure, Electrical, Overhead Utilities, Underground Utilities, Dust, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	
Construct monitoring well	Chemical Exposure, Dust, Lifting	
Develop well	Chemical Exposure, Heavy Equipment, Lifting, Slip/Trip/Fall	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous Animals	
Overhead Utilities	Hot Surfaces/Burns	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinch	Drowning	
Dust	Noise	Slip/Trip/Fall	Contact Injury	
Excavations/Trenches	Traffic	High Crime Area		
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

<table>
<tr><th colspan="2">SAFE WORK PRACTICES
(include for all Potential Hazards identified in Table 2)</th></tr>
<tr><td>Chemical Exposure</td><td>Wear appropriate PPE and replace when damaged or worn. When possible, stay upwind of the drilling location. Avoid contact with potentially contaminated soil, cuttings, water, etc. See Section 3.3 of this HASP for more information on specific chemical hazards. Use air monitoring instruments as described in Section 7.0 of the HASP.</td></tr>
<tr><td>Electrical</td><td>Drilling rig has electrical components and wiring. Make sure that drilling rig is operating properly and inspect daily. Repair worn components and wiring. Electrical tools are to be used with a ground fault interrupter. A grounding rod must be used with portable generators. Reportedly, all electrical and gas utilities at the site have been cut off, but confirm with site access contact prior to each field mobilization. If utilities are re-connected in the future, a lockout-tagout procedure must be developed prior to initiation of any intrusive work.</td></tr>
<tr><td>Overhead Utilities</td><td>Check for overhead utilities when raising the drilling rig mast. Identify the voltage of the line and use the following clearance rules:
<table>
<tr><th>Nominal System Voltage of Power Line (kV)</th><th>Minimum Required Clearance (ft)</th></tr>
<tr><td>0 –50</td><td>10</td></tr>
<tr><td>51 – 100</td><td>12</td></tr>
<tr><td>101 - 200</td><td>15</td></tr>
<tr><td>201 – 300</td><td>20</td></tr>
<tr><td>301 – 500</td><td>25</td></tr>
<tr><td>501 – 750</td><td>35</td></tr>
<tr><td>751 – 1000</td><td>45</td></tr>
</table>
A call to a utility locating service is mandatory prior to any drilling or digging at the Site, regardless of depth. Call 1-800-DIG-TESS or Texas One Call.</td></tr>
<tr><td>Underground Utilities</td><td>A call to a utility locating service is mandatory prior to any drilling or digging at the Site, regardless of depth. Call 1-800-DIG-TESS or Texas One Call. Look for obvious signs of the presence of utilities (fire hydrants, utility boxes, linear features, manholes, etc.). Always pre-probe the location with a steel probe. Drill or dig carefully in the upper ten feet of the surface. In no instance may a drilling location be within five feet of a known underground utility.</td></tr>
<tr><td>Dust</td><td>Wear appropriate PPE and replace when damaged or worn. When possible, stay upwind of the sampling location. Use water as a dust suppressant when excessive dust is</td></tr>
</table>

	generated (but don't allow contact with the sampled soil). Avoid contact with dust from drilling mud additives, filter pack sand (silica), bentonite and Portland cement.
Heavy Equipment	Be diligent around heavy equipment, especially mobile equipment. Make sure all personnel are aware before moving equipment. Ensure that backup alarms are present and operable. Keep the workplace tidy. Avoid moving parts and do not remove any machine guarding. Remove snag points. Do not wear loose fitting clothes. When staging equipment, make sure that stacked loads are secure and not creating hazards due to shifting.
Lifting	Use caution when lifting heavy equipment or supplies, when adding well materials to the well (sand, bentonite), when lifting development pumps or bailers, etc. Use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible. Use machinery for heavy lifts if possible.
Hot Surfaces/Burns	Hot surfaces are present due to friction from drilling operations and possibly from sun. Avoid hot surfaces or wait for the surface to cool before touching or moving. Use cotton gloves if possible.
Noise	Wear ear plugs or muffs when near operating drilling rig or pumps. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA).
Traffic	Be careful when parking vehicles at the site entrance or within the site fence. Avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70°F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70°F, the following general practices will also be followed: • Fluids will be provided to all site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water. • Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. • In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. • Provide shade, if practical. • A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed.

	If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50°F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50°F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed: • Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; • Hot drinks may be provided in some cases; and • Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Stick/Puncture/Pinch	Use caution when moving augers or sampling equipment. Use caution when opening sample barrels. Avoid sharp surfaces on drilling rig. Wear cotton or leather gloves when possible. Use caution when using sharp tools and never point a sharp tool toward yourself when cutting.
Slip/Trip/Fall	The Site has uneven topography, abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Keep the workplace tidy and remove all unnecessary equipment promptly, especially around the drilling rig.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
Dangerous Animals	Dangerous animals may be present at the site (a bobcat has been observed recently). Carry a stick or cane and disturb the brush in front of you when walking in vegetated or obstructed areas. Be aware of your surroundings at all times.
Snakes	Snakes (most likely rattlesnakes) may occur on the site and can be very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.
Contact Injury	Stay clear of spray from steam cleaner during decontamination operations. Wear PPE, including goggles or face shield.

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart	Traffic	None identified.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Set up and ensure proper functioning of drilling rig	Electrical, Overhead Utilities, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	None identified.
Decontaminate all equipment that will contact monitoring well boring, including sample barrels, augers, etc. (before and after sampling)	Chemical Exposure, Contact Injury	None identified.
Drilling rig operation	Chemical Exposure, Electrical, Overhead Utilities, Underground Utilities, Dust, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	Water to control dust (possibly use fans or blowers to control major dust problem). Use plastic sheeting when necessary to prevent contamination of ground.
Construct monitoring well	Chemical Exposure, Dust, Lifting	None identified.
Develop well	Chemical Exposure, Heavy Equipment, Lifting, Slip/Trip/Fall	None identified

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Remote Equipment	
Foam	Hay Bales	Wind Screen	Dry Ice	
Sedimentation Basin	Water	Hoses	Inert Gas	
Blowers	Water Truck	Covers	Plastic Sheeting	
Berms	Sprinklers	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

US OIL RECOVERY SUPERFUND SITE (AOI-1)

TASK NO. 4	**TASK DESCRIPTION: Groundwater Sampling** Collection of groundwater samples from the monitoring wells that will be installed during the RI/FS. Groundwater samples collected using various types of pumps, water-level measurement devices, water quality meters, etc.

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: US Oil Recovery Superfund Site (AOI-1)
Prepared By: Matt Wickham	Date: 6/11/15
Reviewed By: Eric Pastor	Date: 6/11/15

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart Site	Traffic	See the safe work practices listed in Table 4.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	
Unload or load field equipment	Lifting	
Set up and calibrate monitoring instruments	Electrical	
Decontaminate all equipment that will contact groundwater samples, including pumps, tubing, probes (before and after sampling) (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electrical	
Purge well	Chemical Exposure, Electrical	
Collect samples	Chemical Exposure	
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous Animals	
Overhead Lines	Hot Surfaces/Burns	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinch	Drowning	

Dust	Noise	Slip/Trip/Fall		
Excavations/Trenches	Traffic	High Crime Area		
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

SAFE WORK PRACTICES (include for all Potential Hazards identified in Table 2)	
Chemical Exposure	Wear appropriate PPE and replace when damaged or worn. Avoid contact with potentially contaminated soil, cuttings, water, etc. See Section 3.4 of this HASP for more information on specific chemical hazards. Use air monitoring instruments as described in Section 7.0 of the HASP. Minimize contact with the preservatives used for groundwater samples (especially acids such as nitric or hydrochloric) and wear PPE.
Electrical	Sampling equipment may be powered by electricity and caution should be used when using electrical equipment near sources of water. Make sure all equipment is grounded. Avoid standing water. Use caution when using vehicle batteries as a source of power for equipment, e.g., making sure to connect positive and negative equipment leads to the correct lead on the battery.
Lifting	Use caution when lifting heavy equipment or supplies, when lifting pumps or bailers, etc.. Use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible. Use machinery for heavy lifts if possible.
Noise	Wear ear plugs or muffs when near operating pumps. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA).
Traffic	Be careful when parking vehicles at the Site entrance or within the Site fence. Avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70°F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70°F, the following general practices will also be followed: • Fluids will be provided to all site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water.

	• Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. • In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. • Provide shade, if practical. • A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed. If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50°F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50°F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed: • Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; • Hot drinks may be provided in some cases; and • Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Stick/Puncture/Pinch	Use caution when using sharp tools and never point a sharp tool toward yourself when cutting.
Slip/Trip/Fall	The Site has uneven topography, abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Keep the work area tidy.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on Site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the Site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
Dangerous Animals	Dangerous animals may be present at the site (a bobcat has been observed recently). Carry a stick or cane and disturb the brush in front of you when walking in vegetated or obstructed areas. Be aware of your surroundings at all times.
Snakes	Snakes (most likely rattlesnakes) may occur on the site and can be very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very

	sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart Site	Traffic	None identified.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Set up and calibrate monitoring instruments	Electrical	None identified.
Decontaminate all equipment that will contact groundwater samples, including pumps, tubing, probes (before and after sampling) (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electric	Use plastic sheeting when necessary to prevent contamination of ground.
Purge well	Chemical Exposure, Electrical	Use plastic sheeting when necessary to prevent contamination of ground.
Collect samples	Chemical Exposure	Use plastic sheeting when necessary to prevent contamination of ground.
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Remote Equipment	
Foam	Hay Bales	Wind Screen	Dry Ice	
Sedimentation Basin	Water	Hoses	Inert Gas	
Blowers	Water Truck	Covers	Plastic Sheeting	
Berms	Sprinklers	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

US OIL RECOVERY SUPERFUND SITE (AOI-1)

TASK NO. 5	**TASK DESCRIPTION: On-Property Surface Water Sampling** Collection of surface water samples from the areas where shallow ponded water is present at the site (water depth less than 2 feet). Does not involve the use of a boat.

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: US Oil Recovery Superfund Site (AOI-1)
Prepared By: Matt Wickham	Date: 6/11/15
Reviewed By: Eric Pastor	Date: 6/11/15

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart Site	Traffic	See the safe work practices listed in Table 4.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	
Unload or load field equipment	Lifting	
Set up and calibrate monitoring instruments	Electrical	
Decontaminate all equipment (before and after sampling) that will contact samples, including pumps, tubing, automated samplers, probes (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electric	
Access location	Chemical Exposure, Electrical,	
Collect samples	Chemical Exposure	
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous Animals	
Overhead Lines	Hot Surfaces/Burns	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinch	Drowning	

Dust	Noise	Slip/Trip/Fall	Boat Hazards	
Excavations/Trenches	Traffic	High Crime Area		
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

SAFE WORK PRACTICES (include for all Potential Hazards identified in Table 2)	
Chemical Exposure	Wear appropriate PPE and replace when damaged or worn. Avoid contact with potentially contaminated sediment, water, etc. See Section 3.4 of this HASP for more information on specific chemical hazards. Use air monitoring instruments as described in Section 7.0 of the HASP. Minimize contact with the preservatives used for samples (especially acids such as nitric or hydrochloric) and wear PPE.
Electrical	Sampling equipment may be powered by electricity and caution should be used when using electrical equipment near sources of water. Make sure all equipment is grounded. Avoid standing water. Use caution when using vehicle batteries as a source of power for equipment, e.g., making sure to connect positive and negative equipment leads to the correct lead on the battery.
Lifting	Use caution when lifting heavy equipment or supplies, when lifting pumps or bailers, etc.. Use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible. Use machinery for heavy lifts if possible.
Noise	Wear ear plugs or muffs when near operating pumps. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA).
Traffic	Be careful when parking vehicles at the Site entrance or within the Site fence. Avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop. Use parking brake when unloading boat at boat ramp.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70°F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70°F, the following general practices will also be followed: • Fluids will be provided to all site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and

	need to be diluted or consumed along with water. • Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. • In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. • Provide shade, if practical. • A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed. If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50°F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50°F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed: • Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; • Hot drinks may be provided in some cases; and • Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Stick/Puncture/Pinch	Use caution when using the winch to launch the boat and keep fingers clear. Use caution when using sharp tools and never point a sharp tool toward yourself when cutting.
Slip/Trip/Fall	The Site has uneven topography, abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Keep work area tidy at all times.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on-Site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the Site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
Dangerous Animals	Dangerous animals may be present at the site (a bobcat has been observed recently). Carry a stick or cane and disturb the brush in front of you when walking in vegetated or obstructed areas. Be aware of your surroundings at all times.
Snakes	Snakes (most likely rattlesnakes) may occur on the site and can be very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when

	walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart Site	Traffic	None identified.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Set up and calibrate monitoring instruments	Electrical	None identified.
Decontaminate all equipment (before and after sampling) that will contact samples, including pumps, tubing, automated samplers, probes (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electric	Use plastic sheeting when necessary to prevent contamination of ground.
Access location	Chemical Exposure, Electrical	None identified.
Collect samples	Chemical Exposure	Use plastic sheeting when necessary to prevent contamination of ground.
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Remote Equipment	
Foam	Hay Bales	Wind Screen	Dry Ice	
Sedimentation Basin	Water	Hoses	Inert Gas	
Blowers	Water Truck	Covers	Plastic Sheeting	
Berms	Sprinklers	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

US OIL RECOVERY SUPERFUND SITE (AOI-1)

TASK NO. 6	**TASK DESCRIPTION: Marine Sampling** Collection of surface water, sediment, and/or biota samples from Vince Bayou and/or Little Vince Bayou during the RI/FS. Samples may be collected by boat.

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: US Oil Recovery Superfund Site (AOI-1)
Prepared By: Matt Wickham	Date: 6/11/15
Reviewed By: Eric Pastor	Date: 6/11/15

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart Site	Traffic	See the safe work practices listed in Table 4.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	
Unload or load field equipment	Lifting	
Set up and calibrate monitoring instruments	Electrical	
Decontaminate all equipment (before and after sampling) that will contact samples, including pumps, tubing, automated samplers, probes (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electric	
Access location	Chemical Exposure, Electrical, Drowning, Boat Hazards	
Collect samples	Chemical Exposure	
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous Animals	
Overhead Lines	Hot Surfaces/Burns	Inclement Weather	Snakes	

Underground Utilities	Low Light	Stick/Puncture/Pinch	Drowning	
Dust	Noise	Slip/Trip/Fall	Boat Hazards	
Excavations/Trenches	Traffic	High Crime Area		
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

SAFE WORK PRACTICES (include for all Potential Hazards identified in Table 2)	
Chemical Exposure	Wear appropriate PPE and replace when damaged or worn. Avoid contact with potentially contaminated sediment, water, etc. See Section 3.4 of this HASP for more information on specific chemical hazards.
Electrical	Drilling rig has electrical components and wiring. Make sure that drilling rig is operating properly and inspect daily. Repair worn components and wiring. Electrical tools are to be used with a ground fault interrupter. A grounding rod must be used with portable generators. Reportedly, all electrical and gas utilities at the site have been cut off, but confirm with site access contact prior to each field mobilization. If utilities are re-connected in the future, a lockout-tagout procedure must be developed prior to initiation of any intrusive work.
Lifting	Use caution when lifting heavy equipment or supplies, when lifting piston corer or Eckman sampler. Use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible. Use machinery for heavy lifts if possible. Be careful lifting sample coolers from the boat.
Noise	Wear ear plugs or muffs when near loud equipment. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA).
Traffic	Be careful when parking vehicles at the site entrance or within the site fence. Avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop. Use parking brake when unloading boat at boat ramp.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70°F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70°F, the following general practices will also be followed:

	• Fluids will be provided to all site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water. • Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. • In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. • Provide shade, if practical. • A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed. If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50°F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50°F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed: • Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; • Hot drinks may be provided in some cases; and • Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Stick/Puncture/Pinch	Use caution when using the winch to launch the boat and keep fingers clear. Use caution when using sharp tools and never point a sharp tool toward yourself when cutting.
Slip/Trip/Fall	The site has uneven topography, abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Keep work area tidy at all times.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on-Site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the Site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.

Dangerous Animals	Dangerous animals may be present at the site (a bobcat has been observed recently). Carry a stick or cane and disturb the brush in front of you when walking in vegetated or obstructed areas. Be aware of your surroundings at all times.
Snakes	Snakes (most likely rattlesnakes) may occur on the Site and can be very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.
Drowning	Relatively steep slopes and densely vegetated areas exist at the shoreline of Vince Bayou. Be very careful when walking along the shoreline, and always have a partner with you when walking in these areas.
Boat Hazards	Extreme care shall be used when putting the boat into the water at the boat ramp. Always look for pedestrians or obstructions when backing the boat into the water. In no instance will one person launch a boat; a second person is required. Personal flotation devices must be worn at all times by all personnel on boats. Boat operators will have completed the TPWD Boater Education Course. All personnel not driving the boat shall remain seated at all times, except when assisting with launching, anchoring, etc. Be careful not to get caught in anchor lines. Never place hands near or get body parts near an operating boat propeller. Be careful when using the boat winch and keep hands as possible. Be aware of wakes from other vessels such as tugboats, barges and other ship traffic in the Houston Ship Channel. Always yield to larger vessels and sailboats. Be careful when on the sampling platform. Keep equipment stored and work area tidy. Tie down or store all equipment when the boat is moving.

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart Site	Traffic	None identified.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Set up and calibrate monitoring instruments	Electrical	None identified.
Decontaminate all equipment (before and after sampling) that will contact samples, including pumps, tubing, automated samplers, probes (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electric	Use plastic sheeting when necessary to prevent contamination of ground.
Access location	Chemical Exposure, Electrical, Drowning, Boat Hazards, Lifting, Stick/Puncture/Pinch, Slip/Trip/Fall	None identified.
Collect samples	Chemical Exposure	Use plastic sheeting when necessary to prevent contamination of boat surfaces.
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Remote Equipment	
Foam	Hay Bales	Wind Screen	Dry Ice	
Sedimentation Basin	Water	Hoses	Inert Gas	
Blowers	Water Truck	Covers	Plastic Sheeting	
Berms	Sprinklers	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

US OIL RECOVERY SUPERFUND SITE (AOI-1)

TASK NO. 7	**TASK DESCRIPTION: Staff Gauge Installation** Installation of staff gauges to monitor water-level fluctuations in Vince Bayou during the RI/FS.

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: US Oil Recovery Superfund Site (AOI-1)
Prepared By: Matt Wickham	Date: 6/11/15
Reviewed By: Eric Pastor	Date: 6/11/15

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart	Traffic	See the safe work practices listed in Table 4.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	
Unload or load field equipment	Lifting	
Access water areas	Drowning,	
Install staff gauges	Underground Utilities, Noise, Stick/Puncture/Pinch, Drowning	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous Animals	
Overhead Lines	Hot Surfaces/Burns	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinch	Drowning	
Dust	Noise	Slip/Trip/Fall		
Excavations/Trenches	Traffic	High Crime Area		
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

SAFE WORK PRACTICES (include for all Potential Hazards identified in Table 2)	
Underground Utilities	Staff gauges may require digging or hammering of the gauge or gauge supports into the ground. A call to a utility locating service is mandatory prior to any drilling or digging at the site, regardless of depth. Call 1-800-DIG-TESS or Texas One Call. Look for obvious signs of the presence of utilities (fire hydrants, utility boxes, linear features, manholes, etc.). Always pre-probe the location with a steel probe. Drill or dig carefully in the upper ten feet of the surface. In no instance may a drilling location be within five feet of a known underground utility.
Lifting	Use caution when lifting heavy equipment or supplies, and when adding well materials to the well (sand, bentonite). Use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible.
Noise	Wear ear plugs or muffs. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA).
Traffic	Be careful when parking vehicles at the site entrance or within the Site fence. Avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70°F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70°F, the following general practices will also be followed: * Fluids will be provided to all Site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water. * Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. * In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. * Provide shade, if practical. * A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed.

	If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50°F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50°F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed: * Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; * Hot drinks may be provided in some cases; and * Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Stick/Puncture/Pinch	Use caution when installing staff gauges or the supporting structure. Avoid sharp surfaces. Wear cotton or leather gloves when possible. Use caution when using sharp tools and never point a sharp tool toward yourself when cutting.
Slip/Trip/Fall	The Site has uneven topography, abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Be careful on along the banks of Vince Bayou and always work in teams of at least two people. Keep work area tidy at all times.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on-Site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the Site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
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Snakes	Snakes (most likely rattlesnakes) may occur on the Site and can be very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.
Drowning	Relatively steep slopes and densely vegetated areas exist at the shoreline of Vince Bayou. Be very careful when walking along the shoreline, and always have a partner with you when walking in these areas.

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart	Traffic	None identified.
General	Traffic, Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Dangerous Animals, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Access water areas	Drowning	None identified.
Install staff gauges	Underground Utilities, Noise, Stick/Puncture/Pinch, Drowning	None identified.

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Remote Equipment	
Foam	Hay Bales	Wind Screen	Dry Ice	
Sedimentation Basin	Water	Hoses	Inert Gas	
Blowers	Water Truck	Covers	Plastic Sheeting	
Berms	Sprinklers	Sediment Fence		

APPENDIX B

FORMS

PRE-JOB SAFETY MEETING FORM

PASTOR, BEHLING & WHEELER, LLC

GENERAL INFORMATION

Project Name: U.S. Oil Recovery Superfund Site RI/FS (AOI-1)		
PBW Project Number: 3333	Date:	Time:
Presented By:	Signature:	

INFORMATION REVIEWED

Check all items that were reviewed.

	ITEM	DISCUSSION SUMMARY
	Project Background	Work to be performed, safety objectives, site description and conditions
	Project Organization	Safety organization and contacts, client contacts
	Hazard Analysis	Physical/ chemical hazards, measures to address hazards, engineering controls
	Personnel Training	Training requirements (use as an opportunity to verify all training)
	Personal Protective Equipment	Required PPE levels for all work tasks
	Medical Surveillance	Discuss general and site-specific medical surveillance requirements
	Exposure Monitoring	Describe any exposure monitoring to be conducted, actions levels, etc.
	Site Controls	Describe work zones, security issues
	Decontamination Procedures	Describe decontamination areas and procedures for personnel and equipment
	Investigation-Derived Waste	Describe methods and areas to be used for IDW storage
	Emergency Response Plan	Describe emergency procedures, emergency numbers, location of hospital
	Other	Confined space procedures, fall protection, spill containment, if applicable

Discussion/Comments/Follow-up Actions:_____

_____

_____

_____

ATTENDEES

All meeting attendees must sign below.

NAME	SIGNATURE	COMPANY

TAILGATE SAFETY MEETING FORM

PASTOR, BEHLING & WHEELER, LLC

GENERAL INFORMATION

Project Name: U.S. Oil Recovery Superfund Site RI/FS (AOI-1)		
PBW Project Number: 3333	Date:	Time:
Presented By:	Signature:	

TOPICS REVIEWED

Check all items that were reviewed.

	Safety objectives		Safety responsibilities		Work activities for the day
	Newly-recognized hazards		Noise hazards		Decontamination procedures
	Hazard recognition		Air monitoring		Emergency protocol
	Right-To-Know/MSDS location		Slips, trips, and falls		No horseplay
	Open pits, excavations, trenches		Directions to hospital/first aid		Housekeeping
	Vehicle safety and road conditions		Anticipated visitors		Heat stress, cold exposure
	Portable tool safety and awareness		Site security		Backing up hazards
	Overhead utilities		Housekeeping		Dust and vapor control
	Underground utilities		Smoking restrictions		Fire extinguisher locations
	First aid and safety supply location				

Discussion/Comments/Follow-up Actions:_____

_____

_____

_____

ATTENDEES

All meeting attendees must sign below.

NAME	SIGNATURE	COMPANY

SAFETY COMPLIANCE AGREEMENT FORM

PASTOR, BEHLING & WHEELER, LLC

GENERAL INFORMATION

Project Name: U.S. Oil Recovery Superfund Site RI/FS (AOI-1)		
PBW Project Number: 3333	Date:	Time:

SAFETY COMPLIANCE AGREEMENT

I have received a copy of the Site-Specific Health and Safety Plan (the "HASP") for the above referenced project. I have read the HASP and agree to comply with all the health and safety requirements contained therein. I understand that I may be prohibited from working on the project for violating any of the HASP requirements. My signature below indicates that I understand the procedures and restrictions of this plan and agree to abide by them.

If I am a subcontractor, I understand that the PBW HASP provides site-specific safety requirements. It is not intended to replace any general or specific requirements of a subcontractor's safety program. PBW personnel will, to the best of their ability, inform contractors of any potential hazard(s) that has been identified during the field investigations. However, subcontractors will bear the ultimate responsibility for all matters dealing with health and safety in the performance of their appointed work.

PRINT NAME:_____ COMPANY:_____

SIGNATURE:_____ DATE:_____

APPENDIX C

DIRECTIONS TO NEAREST HOSPITAL

Notes

mapquest

Trip to:

4000 Spencer Hwy
Pasadena, TX 77504-1202
5.88 miles / 13 minutes

400 N Richey St, Pasadena, TX 77506-1061

Download Free App

1. Start out going **south** on **N Richey St** toward **W Pitts Ave**. Map — **0.6 Mi** — *0.6 Mi Total*

2. Turn **left** onto **W Pasadena Fwy**. Map — **0.5 Mi** — *1.1 Mi Total*
SHELL SERVICE STATION is on the corner

3. Turn **right** onto **Shaver St**. Map — **3.2 Mi** — *4.3 Mi Total*
Shaver St is 0.2 miles past Memorial Park Dr
If you are on Pasadena Fwy and reach Munger St you've gone a little too far

4. Turn **left** onto **Spencer Hwy**. Map — **1.6 Mi** — *5.9 Mi Total*
Spencer Hwy is 0.1 miles past Kalmer St
Spencer Shell is on the right

5. **4000 SPENCER HWY** is on the **right**. Map
Your destination is 0.1 miles past Bayshore Blvd
If you reach Watters Rd you've gone about 0.1 miles too far

4000 Spencer Hwy, Pasadena, TX 77504-1202

Total Travel Estimate: **5.88 miles - about 13 minutes**

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APPENDIX D

HASP ADDENDA