

HEALTH & SAFETY PLAN
Interim Corrective Measure Plan – SVE Construction
Operation and Maintenance Plan

Exide Technologies
2700 South Indiana Street
Vernon, California
Project No. 1324.012

February 23, 2009

Exide Technologies
2700 South Indiana Street
Vernon, California 90023

Advanced GeoServices Corporation (AGC)
1055 Andrew Drive
West Chester, PA 19380

PREPARED BY

E2 Environmental, Inc.
15375 Barranca Parkway, Suite F-106
Irvine, California 92618-2207



Ute Smith
Health & Safety Director

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- C Potential Physical Hazards and Required Control Measures
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1 Introduction

The following site specific Health and Safety Plan (HASP) has been prepared for the interim measure soil vapor extraction (SVE) to be conducted at the Exide Company Site located at 2700 South Indiana Street in Vernon, California (Figure 1). It has been developed to cover the anticipated site conditions and work activities that may be encountered during site remediation. The work activities include work by E2 Environmental, Inc. (E2 Environmental) employees, or contractors hired by, and working under the supervision of E2 Environmental. This HASP does not include workers or other contractors hired by the State of California Department of Toxic Substances Control (DTSC), or any other agency.

The plan was developed in accordance with the requirements of the following documents:

- E2 Environmental's *Illness and Injury Prevention Plan (IIPP)*;
- E2 Environmental's Codes of Safe Practice;
- Environmental Protection Agency's *Protecting Health and Safety at Hazardous Waste Sites: An Overview*; and
- Code of Federal Regulations Title 29, Parts 1900 to 1910, and 1926.

The plan is also based on information found in the following documents:

- *Revised Interim Corrective Measure Work Plan—SWMU-11 for Exide Technologies*, prepared by Advanced GeoServices Corporation and E2 Environmental, Inc.; and
- *Site Specific Health and Safety Plan for Exide Technologies*, prepared by E2 Environmental, Inc.

2 Site Background

The Site is located at 2700 South Indiana Street in the City of Vernon, California, as shown on Figure 1. The property occupies a total area of approximately 15 acres, which is bounded by 26th Street towards the north and Bandini Boulevard (Bandini) towards the south. There is a 1.5±-acre parcel with approximately 190 feet (ft) of frontage along the north side of Bandini and 345 ft of frontage along the east side of Indiana Avenue, which is occupied by the Main Office Building. The remaining 13.5±-acre parcel extends along the west side of Indiana Avenue between Bandini and 26th Street (a distance of approximately 900 ft) and includes the active manufacturing areas. The 13.5±-acre parcel has approximately 1,000 ft of frontage along Bandini and 450 ft of frontage along 26th Street (Figure 2).

The Site is an operating battery recycling facility and is characteristic of the heavy industrial nature of the facility and surrounding land uses. Pavement, buildings, and structures almost cover the entire facility with a small grassy area near the Main Office Building, a few small isolated areas of landscaping or exposed soil being the exceptions. The Site is relatively flat with an average elevation of 175 to 180 ft above mean sea level (amsl) and topography that generally slopes from the northwest to the southeast. Notable landmarks include the Main Office Building (east of Indiana Avenue), the existing smelter building (near the intersection of Indiana Avenue and

26th Street), and the lined impoundment north of Bandini. A concrete-lined flood channel bisects the Site in a north-south direction, and a railroad right-of-way intersects the Site in an east-west direction, as shown on Figures 1 and 2.

Site operations from 1922 through 1973, included a battery breaking process for the purpose of recovering lead from lead-acid batteries, production of lead sheeting, the production of zinc alloys, and the manufacturing of extruded metal components. Accounts of the original operations indicate that the smelting and other metals processing activities took place in the Smelter Area (AGC, 2006b). Slag and waste acid produced by the operations were reportedly placed in SWMU-1 and -6 through 1973, prior to the time NL took control and operated the Site as stated above.

In 1982, the facility was the subject of a major modernization and reconstruction project that resulted in construction of the main smelter and battery breaking operations. The lined storm water retention basin was constructed in 1984.

SWMU-11 includes the old mixed-metals extrusion building (OMME) that was situated to the west of the engineering building (Figure 2). The building was approximately 10,000 square ft in size. The process performed in this area included the extrusion of metal bars and stock into various shapes. The building has been removed and the area is now paved with asphalt. It is unknown exactly when operations were started in this location; however, the mixed-metal operations were ceased in approximately 1978. During the operation of this unit, trichloroethene (TCE) was applied to metal bars as a cooling medium in the extrusion process. Existing ground water monitoring wells in the OMME area have detected dissolved TCE concentrations in the range of 120 to 5,500 micrograms per liter ($\mu\text{g/l}$) since 1986. In addition, TCE concentrations have been detected in ground water monitoring well MW-15 located hydrologically downgradient in the parking lot across South Indiana Street (Figure 2) in the range of 89 to 1,600 $\mu\text{g/l}$. The highest observed TCE soil vapor result observed in SWMU-11 during the Phase 2 RFI was 220 $\mu\text{g/l}$ at a depth of 5.0 ft in SSVP-7.

Subsurface environmental investigations began at the Site in 1984. The abbreviated list below shows documents that pertain to activities at the Site regarding subsurface environmental characterization.

Periodic ground water monitoring has been ongoing at the Site since 1996.

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Table 2-1 Observed Chemicals—SWMU-11

Chemical Compound		Maximum Concentration
<u>C.A.S. No.</u>	<u>Petroleum Hydrocarbons</u>	<u>Max. Concentration in Vapor (µg/l)/Water (µg/l)/Soil (µg/kg)</u>
71-43-2	Benzene	0.3/Unknown/ 1.1
108-88-3	Toluene	0.9/Unknown/0.78
100-41-4	Ethylbenzene	0.4 / Unknown / <1
1330-20-7	Xylenes (o-, m-, p- isomers)	1 / Unknown/ <2.1
	<u>Halogenated Solvents</u>	<u>Max. Conc. in Vapor (µg/L)/Soil(mg/kg)/Ground Water (µg/L)</u>
540-59-0	1,2-Dichloroethylene	0.3 / 50 / <1.1
127-18-4	Tetrachloroethylene	2.8 / 36 / <1.1
79-01-6	Trichloroethene (TCE)	220 / 3,600 /130
	<u>Metals</u>	<u>Max. Concentration in Soil (mg/kg)/Groundwater (µg/L)</u>
7439-92-1	Lead (and inorganic lead compounds)	459 / 774
7440-66-6	Zinc	1,690 / 21,300
7440-47-3	Chromium	13.9 / Unknown
--	Thallium	1.6 / Unknown
10022-31-8	Barium	111 / Unknown
7439-97-6	Mercury	0.219 / Unknown
7440-36-0	Antimony	0.931 / Unknown
	<u>Semi-Volatile Organics</u>	Maximum Concentrations in Soil (mg/kg)/Groundwater (µg/L)
--	PAHs (poly-nuclear aromatic hydrocarbons)	<0.05 / Unknown
--	Chrysene	<0.05 / Unknown
91-20-3	Naphthalene	<0.05 / Unknown
--	Phenanthrene	<0.05 / Unknown
--	Fluorene	<0.05 / Unknown
--	Fluoranthene	<0.05 / Unknown

Notes: All metals concentrations indicated are elemental concentrations

NA Not available
ND Not detected
n.o.s. Not Otherwise Specified

3 Key Personnel

The following E2 Environmental personnel have been designated to carry out health and safety job functions:

Project Manager	Ute Smith
Health and Safety Officer	Ute Smith
Site Safety Officer	Bob Dadfar
Work Party	To be determined.
Subcontractors	To be determined.

The following sections outline responsibilities and levels of authority for personnel conducting field activities at the site. Project personnel will be instructed as to their site-specific responsibilities in a project meeting before field activities begin.

3.1 Project Manager

The Project Manager is responsible for ensuring that this HASP is prepared, reviewed, authorized, and implemented. The Project Manager will not initiate field activities until this HASP has been approved and assigned personnel have received the required level of specific health and safety instruction. The Project Manager will consult with the Health and Safety Director and Site Safety Officer (SSO) if revision of this HASP is required. The Project Manager is responsible for the overall health and safety performance and compliance with applicable regulations and is the senior level contact in the event of a site emergency.

Additionally the Project Manager will ensure that health and safety activities are conducted according to HASP requirements and company policies and procedures. The Project Manager will refrain from initiating field activities until the site-specific HASP is complete.

3.2 Health and Safety Officer

The Health and Safety Officer will prepare, review, and authorize this HASP and any subsequent revisions to the plan. The Health and Safety Officer will assist with the implementation of the HASP and provide project support on health and safety issues. The Health and Safety Officer will consult with the Project Manager if revision of this HASP is required. The Health and Safety Officer will verify field personnel training, medical surveillance, and respirator fit-test requirements. The Health and Safety Officer will advise the Project Manager regarding industrial hygiene concerns, interpretation and evaluation of analytical exposure data, and other safety-related issues, as needed.

3.3 Site Safety Officer

The Site Safety Officer (SSO) will implement this HASP in the field. The SSO authority and responsibilities include, but are not limited to, the following:

- Briefing site personnel before work begins each day (Tailgate Meeting) regarding the contents of this HASP and authorized revisions of this HASP, including potential hazards, safe work practices, required Personal Protective Equipment (PPE), and emergency procedures.
- Maintaining a copy of this HASP at the site.
- Ensuring that specified PPE is available and worn as specified under this HASP by personnel working at the site.
- Controlling access to the exclusion zone and/or work areas as defined.
- Establishing emergency evacuation routes and designated meeting places in advance of each work activity and communicating this information during the daily safety briefing.

- Coordinating emergency response at the site (e.g., directing evacuation, or summoning emergency assistance).
- Conducting site work area inspections on a regular basis.
- Maintaining field documentation, including daily safety briefing attendance sheets, air monitoring data, and work area inspection results.
- Notifying the Project Manager immediately regarding any health and safety problems or emergencies.
- Assigning an alternate SSO if the designated SSO will be absent.
- Halting activities when unsafe conditions or work practices exist at the site.

Notifying the Health and Safety Officer of changes in site conditions or in the scope of field activities.

3.4 Work Party

Members of the work party are required to comply with health and safety requirements presented in this HASP and in their corresponding company health and safety manuals. The responsibilities of the work party members include, but are not limited to, the following:

- Reading this HASP, their company health and safety manual, Injury and Illness Prevention Program (IIPP) and observing their company Codes of Safe Practice.
- Participating in daily safety meetings and site-specific training.
- Implementing safe work practices and good personal hygiene for hazardous waste operations.
- Maintaining PPE in good working condition.
- Responding to site emergencies, if necessary, directing evacuation or summoning emergency assistance.

3.5 Subcontractors

The subcontractor's management is responsible for assigning specific tasks to their employees, directing those activities, and for ensuring that their employees are properly trained and are in compliance with applicable OSHA regulations. The subcontractor's management will provide qualified employees and allocate sufficient time, materials, and equipment to safely complete activities in accordance with this HASP.

Subcontractors hired by E2 Environmental shall operate under the health and safety procedures outlined in this plan. If the specific task(s), associated hazards and mitigation measures for the specific task are not described in this HASP, the subcontractor may use their own HASP, or assist E2 Environmental in preparing an addendum to this HASP. The safety requirements in any HASP prepared by a subcontractor must be at least as stringent as those contained in this HASP. In the event of a conflict between E2 Environmental's HASP and the subcontractor's HASP, prior to DTSC approval, the E2 Environmental HASP will take precedence. In either

event, the subcontractor's HASP or E2 Environmental's HASP addendum must be submitted to the DTSC for review and approval.

Hazards not listed in this or E2 Environmental's HASP, but known by the subcontractor or known to be associated with a subcontractor's specialty, must be identified and addressed during the daily safety briefing prior to beginning work. The SSO has the authority to remove the subcontractor and cease site operations whenever a subcontractor is operating in an unsafe manner.

4 Anticipated Work Activities

The remedial actions at the Exide Site will the following field tasks:

- Installation of vapor extraction wells.
- Installation of a skid-mounted soil vapor extraction system.
- Operation and maintenance of the soil vapor extraction system.

The following sections describe the specific field activities that will be performed as part of the above tasks. Potential hazards, where possible, are described. Detailed descriptions of the hazards and control measures are provided in Sections 5, 6, and 7. Most work activities will be performed in Level D PPE. Level C will also be worn if the need is indicated by air monitoring as described in Section 8.

4.1 Vapor Extraction Well Installation

Several vapor extraction and vapor monitoring wells will be installed through the existing asphalt cap into the contaminated soils. Installation of these wells will require a drill rig and will result in the production of potentially contaminated drill cuttings. Workers will also potentially be exposed to vapors and contaminated dust while working on the drill rig. Cuttings will be stored in 55-gallon drums or roll-off bins for disposal.

4.2 SVE System Installation

Installation of the soil vapor extraction system is comprised of several sub-tasks. These include:

- Construction of a pipe network to convey the soil vapor to the treatment system. The pipes will be 2-inch diameter PVC. The pipes will be joined using solvent cement. The piping system will be installed in trenches below ground. In discussions with Oatey (PVC cement manufacturers), studies under worst-case conditions (e.g., plumbing installation in an unventilated crawl space), concentrations of Total Hydrocarbons (THC), Methyl Ethyl Ketone (MEK), Methanol, and Acetone were less than half the PEL/Threshold Limit Value (TLV). The installation of the SVE is outdoors. Installers will be equipped with chemical resistant gloves and eye protection. Installers will be instructed to stay upwind of the joint while being cemented to minimize potential exposure and to keep the adhesive container closed when not in use.
- The trenches will be backfilled and paved at the surface to match existing pavement.

- Delivery and set-up of the skid mounted extraction and treatment units.
- Connection of the system to the site electrical system.
- Installation of temporary fence around SVE treatment compound.

4.3 SVE System Operation and Maintenance

The soil vapor extraction system will be used to remove vapor phase contaminants from the soil beneath the site. The system includes a vacuum blower to extract the soil gas, a gas/liquid separator vessel (knock-out pot), and a granular activated carbon adsorption unit (which filters the contaminants from the air).

Operation and maintenance of the SVE system will expose workers to various potential physical and chemical hazards. These potential hazards include operating machinery, lubricating fluids, and electricity. Potential hazards also include contaminants vapors and spent carbon.

Weekly sampling of the influent and effluent vapors are required to monitor the performance of the SVE system. To minimize the potential for worker exposure, all sampling performance ports will be equipped with shut-off valves. Air sampling will be performed using a sampling pump with vacuum chamber and tedlar bags, or evacuated Summa canisters. The samples will be collected using Teflon tubing connected to the sample ports. The sampling equipment will be set up prior to opening the sampling port valve, ensuring that vapors are not released into the atmosphere.

5 General Site Safety Procedures and Requirements

The procedures and precautions presented below are general and apply to all E2 Environmental's supervised personnel regardless of the task to be performed.

- Each day prior to the performance of any field activity, the SSO will review the site-specific HASP with all involved personnel. The meeting will focus on the specific task(s) to be performed, contaminants likely to be encountered and the current physical condition of the site and work areas. Personnel will indicate an understanding of the HASP requirements and agree to accept and comply with the conditions contained herein by printing, signing, and dating the Daily Safety Procedures Acknowledgement Sheet (Attachment A) on a daily basis.
- Individuals entering the work area under the supervision of E2 Environmental and after conclusion of the one-time daily safety meeting will be approached by the SSO. They will be directed to read the HASP and indicate understanding, acceptance, and compliance of HASP requirements by printing, signing, and dating the Daily Safety Procedures Acknowledgement Sheet (Attachment A). Individual questions or concerns should be directed to the SSO.
- Individuals refusing to sign the HASP will be prohibited from entering work areas under the supervision of E2 Environmental.
- E2 Environmental supervised personnel must be aware of project-related traffic. Additionally, project personnel will be advised that non-E2 Environmental supervised

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personnel and traffic may be present on-site. These individuals and associated traffic will be excluded from E2 Environmental supervised work areas.

- Aboveground and below ground structures may be present on-site. A complete, daily review of the site conditions is necessary prior to beginning any activity. Underground Service Alert and (Client) will be notified of any subsurface intrusive activity and the location of such work.
- To avoid vehicle collisions with above-ground structures, all drivers must walk completely around their vehicles and observe locations of all structures prior to moving any vehicle.
- Any unsafe condition or safety concern should be brought to the attention of E2 Environmental's acting SSO. A SSO will be designated for each phase of the project and he/she will be identified to all personnel during the daily safety meetings. If there is a change of the SSO during the project, the change will be addressed during the daily safety meeting.
- Level D personal protective equipment (PPE) is required when performing any field work (on or off-site) related to the project. Level D protection at a minimum consists of long pants, steel-toe boots, hard hat and safety glasses.
- Any work requiring E2 Environmental employees to be greater than six feet from the ground requires fall protection. E2 Environmental's Health and Safety Director will approve the fall protection devices on a case by case basis.
- ***E2 Environmental will not be responsible for providing or approving fall protection relating to subcontractor activities.***
- E2 Environmental supervised personnel will not enter an excavation (four feet or deeper below the surrounding grade) at any time. Further, no E2 Environmental employee shall approach within two feet of the edge of any excavation of such depth.
- No personnel may enter any confined space.
- No smoking is allowed on-site. No eating and drinking will occur within designated exclusion zones.
- All ancillary activities will be located upwind of activities that might potentially release contaminated materials into the atmosphere. The upwind direction will be determined by a flag or other wind-direction indicating device mounted no less than four feet above the ground surface.

All work that will be performed at the site, including construction and SVE system operation and maintenance activities, will be performed during daylight hours. A permanent outdoor floodlight will be installed in the SVE system enclosure, and will illuminate the entire compound. The light will be equipped with a motion sensor and nighttime sensor for security against vandalism and theft.

6 Chemical Hazard Evaluation

Suspect chemical hazards and corresponding permissible exposure limits (PELs), air quality monitoring, respiratory protection action levels, and personal air monitoring are discussed in the following sections.

6.1 Suspect Substances

VOCs (primarily TCE) and metals have been identified as potential on-site contaminants which may be encountered during work activities. Exposure to many of these substances is regulated by the Occupational Safety and Health Administration (OSHA) at both the State and Federal levels. Where available, Cal-OSHA PELs are presented in the following tables, otherwise Fed-OSHA PELs are shown. In addition, the National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) publishes recommended exposure levels (RELs and TLVs, respectively) and ceiling exposure limits. The OSHA PELs, RELs, TLVs, ceiling exposure limits and Immediately Dangerous to Life and Health (IDLH) concentrations (when available) for these substances in air are presented in the following tables.

**Table 6-1 Permissible and Recommended Exposure Limits
Petroleum Hydrocarbons**

C.A.S. No.	Compound	I.D.L.H. Conc. (PPMV)	OSHA PELs (ppmv)			NIOSH RELs (ppmv)			ACGIH TLVs (ppmv)		
			8-Hour TWA	STEL	Ceiling	10-Hour TWA	STEL	Ceiling	TWA	STEL	Ceiling
71-43-2	Benzene	500	1*	5*	25	0.1	NA	1a	10	NA	NA
100-41-4	Ethyl benzene	800	100*	100*	125*	100	125	NA	100	125	NA
108-88-3	Toluene	500	50*	150*	500*	100	150	NA	50	NA	NA
1330-20-7	Xylene (o-,m-, p- isomers)	900	100*	150*	300*	100	150	NA	100	150	NA

Notes: Concentrations are in parts per million by volume (ppmv) in air unless otherwise specified.

Abbreviations are: PEL = permissible exposure limit (8-hour TWA); REL = recommended exposure limit (10-hour TWA unless specifically otherwise stated); TLVs= Threshold Limit Values; (8-hour TWA) TWA = time weighted average; STEL = short term exposure limit (15-minute TWA unless specifically otherwise stated); NA = currently no available concentration for compound in question.

a Based on 15-minute TWA.

b Value based on 10 minutes.

* PEL and STEL are promulgated by Cal-OSHA in California Code of Regulations (CCR) Title 8 § 5155.

‡ Concentrations are mg/m³.

6.1.1 Hazardous Characteristics of Petroleum Hydrocarbons

Benzene

A colorless to light-yellow liquid with an aromatic odor. It reacts with strong oxidizers, fluorides and perchlorates. Exposure may cause irritation or the eyes, skin and nose. Symptoms of exposure include giddiness, headache, nausea, staggered gait, and fatigue. Benzene has been found to be a carcinogen (leukemia).

Toluene

A colorless liquid. Inhalation of 200 ppm for 8 hours may cause impaired coordination and reaction time. Higher acute exposures may cause narcosis and intoxication. Concentrations of 200-500 ppm induce headache, nausea, eye irritation, loss of appetite, loss of coordination and reduce reaction time. Symptoms usually cease following removal from exposure

Ethylbenzene

Colorless liquid with an acrid odor. Reacts with oxidizers, peroxides, high moisture and strong alkalis. Exposure may cause irritation of the eyes, skin and respiratory system. Has been shown to cause tumors of the fore-stomach in animals.

Xylenes

A colorless liquid. Vapors cause headaches and dizziness. Liquid irritates the skin and eyes. If taken into lungs, causes severe coughing, distress and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache and coma; can be fatal. Kidney and liver damage can occur.

**Table 6-2 Permissible and Recommended Exposure Limits
Halogenated Volatile Organic Compounds (HVOCs)**

C.A.S. No.	Compound	I.D.L.H. Conc. (PPMV)	OSHA PELs (ppmv)			NIOSH RELs (ppmv)			ACGIH TLVs (ppmv)		
			8-Hour TWA	STEL	Ceiling	10-Hour TWA	STEL	Ceiling	TWA	STEL	Ceiling
540-59-0	1,2-Dichloroethylene	1000	200*	NA	NA	200	NA	NA	200	NA	NA
127-18-4	Tetrachloroethylene (PCE)	150	25*	NA	300*	0.4	NA	NA	25	100	NA
79-01-6	Trichloroethylene (TCE)	1000	35*	200*	300*	25	NA	2	50	100	NA

Notes: Concentrations are in parts per million by volume (ppmv) in air unless otherwise specified.

Abbreviations are: PEL = permissible exposure limit (8-hour TWA); REL = recommended exposure limit (10-hour TWA unless specifically otherwise stated); TLVs= Threshold Limit Values; (8-hour TWA) TWA = time weighted average; STEL = short term exposure limit (15-minute TWA unless specifically otherwise stated); NA = currently no available concentration for compound in question.

a Based on 15-minute TWA.

b Value based on 10 minutes.

* PEL and STEL are promulgated by Cal-OSHA in California Code of Regulations (CCR) Title 8 § 5155.

d Based on 15-minute TWA.

e Lowest feasible concentration

‡ Concentrations are mg/m³.

6.1.2 Hazardous Characteristics of Halogenated and Non-Halogenated VOCs
cis-1,2-Dichloroethylene

An odorless organic liquid. Short-term exposure can potentially cause central nervous system depression. Long-term exposure can potentially cause liver, circulatory, and nervous system damage at levels above the MCL.

Tetrachloroethylene (PCE)

A colorless, non-flammable liquid with an “ether” odor. High concentrations cause drowsiness, stupor, loss of consciousness and difficulty in breathing. Vapors may irritate the eyes, nose and throat. Skin contact may cause rash (contact dermatitis).

Trichloroethylene (TCE)

A colorless liquid with a chloroform like odor. Is chemically reactive with strong caustics and alkalis and chemically active metals such as barium, lithium, sodium, magnesium and beryllium. Ingestion may cause tremors, nausea and vomiting. The vapors irritate the eyes and skin. Skin contact may cause rash. Additional symptoms of exposure may include vertigo, visual disturbance, fatigue and giddiness.

**Table 6-3 Permissible and Recommended Exposure Limits
Metals & Other Substances**

C.A.S. No.	Compound	I.D.L.H. Conc. (mg/m ³)	OSHA PELs (mg/m ³)			NIOSH RELs (mg/m ³)			ACGIH TLVs (mg/m ³)		
			8-Hour TWA	STEL	Ceiling	10-Hour TWA	STEL	Ceiling	TWA	STEL	Ceiling
7440-38-2	Arsenic	5	0.01*	NA	NA	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	50	0.5*	NA	NA	0.5	NA	NA	0.5	NA	NA
7440-47-3	Chromium	250	0.5*	NA	NA	0.5	NA	NA	0.5	NA	NA
7440-48-4	Cobalt	20	0.05*	NA	NA	0.05	NA	NA	0.02	NA	NA
7440-50-8	Copper	100	0.1*, 1a	NA	NA	0.1,1a	NA	NA	0.1,1a	NA	NA
1309-37-1	Iron oxide	2500	5*	NA	NA	5	NA	NA	5	NA	NA
7439-92-1	Lead	100	0.05*	NA	NA	<0.1	NA	NA	0.15	NA	NA
7439-97-6	Mercury	10d	0.01*, 0.05*e	NA	0.1	0.01, 0.05e	0.03f	0.01g	0.1, 0.01, 0.025h	NA	NA
7440-02-0	Nickel	10	1,1a	NA	NA	0.015b	NA	NA	1, 0.01a	NA	NA
1314-62-1	Vanadium (as V ₂ O ₅)	35	0.05	NA	0.5, 0.1i	NA	NA	0.05j	0.05	NA	NA
7440-66-6	Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: Concentrations are in parts per million by volume (ppmv) in air unless otherwise specified.

Abbreviations are: PEL = permissible exposure limit (8-hour TWA); REL = recommended exposure limit (10-hour TWA unless specifically otherwise stated); TLVs= Threshold Limit Values; (8-hour TWA) TWA = time weighted average; STEL = short term exposure limit (15-minute TWA unless specifically otherwise stated); NA = currently no available concentration for compound in question.

a The first value is for metal and insoluble compounds, the second value is for soluble compounds

b Value based on 10 minutes.

- * PEL and STEL are promulgated by Cal-OSHA in California Code of Regulations (CCR) Title 8 § 5155.
- c The first value is for metal and insoluble compounds, the second value is for soluble compounds
- d Vapor concentration
- e The first value is for alkyls, the second is for mercury vapor
- f Value is for alkyls only
- g Aryl and inorganic only
- h The first value is for aryls, the second for alkyls, and the third for inorganic forms including metallic mercury vapor
- i the first value is for dust, the second for fumes
- j Based on 15-minute TWA.

6.1.3 Hazardous Characteristics of Metals

Lead

Adsorbed either through inhalation of dust or ingestion of water soluble forms, lead deposits in blood and soft tissues initially and is eventually deposited in bone. Lead has numerous effects, especially on the unborn fetus or pregnant women. Long-term exposure can lead to stomach, kidney, heart, liver and nervous system effects.

Zinc

When heated, it emits zinc oxide, which can cause symptoms of throat dryness, cough, weakness, generalized aches, fever, nausea, and vomiting. Zinc oxide dust is virtually innocuous and there is no cumulative effect of the inhalation of zinc oxide fumes.

Mercury

Mercury is a silvery white, odorless liquid. Exposure to mercury can cause eye and skin irritation and induce coughing. Symptoms of mercury exposure include irritability, headaches, and gastrointestinal disturbance. Mercury affects the central nervous system and kidneys after exposure.

Available material safety data sheets (MSDS) for the site contaminants are included as Attachment B. For naturally occurring substances such as elemental metals and chemicals whose source is unknown, and/or for which no MSDS is available, the above referenced exposure information is presented to satisfy employee hazard communication (HAZCOM) requirements.

7 Physical Hazard Evaluation

Physical hazards associated with site activities include, but are not limited to, the following:

- Underground and overhead utility lines (please note: Underground Service Alert and Client representatives will be notified of all work locations and activities prior to work commencement);
- Electrical hazards associated with equipment and local power supply;

- Heavy equipment associated with cutting, hollow stem-auger drilling, grading equipment, heavy equipment and soil sampling, and excavation activities;
- Fire (at a minimum, one ABC-rated fire extinguisher must be available at all times per 40 CFR Part 1926.150(c));
- Equipment falling from overhead;
- Local area traffic; and
- Noise (hearing protection will be available).

Potential physical hazards at the site and the required control measures are listed in Attachment C.

7.1 Medical Hazards

- Chemical exposures (Section 6).

Chemical vapors may be irritating to the eyes, nose and throat. If a person becomes dizzy, experiences eye irritation or nausea, they must be removed from the area.

- Heat cramps, stroke and exhaustion (especially if in Level C protection).

Heat Cramps Symptoms and Signs - Severe muscle cramps (usually in the legs or abdomen), exhaustion, sometimes dizziness or periods of faintness.

Heat Stroke Symptoms and Signs - Rapid shallow breathing, weak pulse, cold and clammy skin, heavy perspiration, total body weakness, dizziness that may lead to unconsciousness.

Heat Exhaustion Symptoms and Signs - Deep breaths then shallow breathing, rapid strong pulse, then rapid weak pulse, dry hot skin, dilated pupils; loss of consciousness (possible coma); seizures or muscular twitching may be seen.

Required action for heat cramps, stroke and exhaustion

- _ Call for medical attention (call 911).
- _ Move person to nearby cool place.
- _ Allow person to rest.
- _ Provide water for the person, let them drink under their own power (note: do not administer water to an unconsciousness person).
- _ If person becomes unconsciousness, cool the person by removing clothing and wrapping in wet towels and sheets, pour water over the these wrappings. Ensure emergency medical attention is on its way.

The necessity for personal heat stress monitoring will be evaluated by the SSO based on the activity to be performed and existing weather and site conditions. Additionally, the SSO will utilize employee observations and professional judgment as a basis of the need for such monitoring.

- Electrical shock and/or burns (call 911).
- Sunburn (UVa/UVb exposure - wear sunscreen).
- Insect and snake bites (call 911).

7.2 Other Hazards

Other hazards may be identified at a job-specific location. Each area will be evaluated for any site-specific hazard prior to the daily safety meeting. If a specific hazard is identified it shall be addressed during daily safety meetings.

- Be aware of the public and their natural curiosity. Ensure that unauthorized personnel are not allowed on-site at any time.
- The site is inside an operating facility to process recycled lead-acid batteries. Access to the site is frequently occupied by men, materials, and equipment related to the handling of recycled batteries. Caution and frequent communication with Exide management must be employed to at all times to ensure that the site work does not conflict with Exide's operations

Field personnel and subcontractors shall be briefed on all identifiable site-specific hazards in daily safety meetings.

7.3 Drilling Hazards

The Project Manager or SSO will be present during all drilling operations to ensure that appropriate levels of protection and safety procedures are employed. The proximity of chemical, water, sewer and electrical lines, and underground storage tanks will be identified before any drilling or excavating is attempted.

Proper containment practices will be employed in regard to the drill cuttings produced during operations. The location of safety equipment and evacuation procedures will be established prior to initiation of operations. The use of hard hats, eye protection, gloves, and safety boots will be required during drilling or excavation operations. All contaminated equipment (e.g., augers, sampling equipment, drill pipe, etc.) will be placed on plastic liner material when not in use or when awaiting cleaning.

Monitoring will be performed continuously by the SSO during drilling. A flame ionization detector (FID) and /or photoionization detector (PID) will be utilized to monitor the breathing zone, the borehole, and geological samples. Drill cuttings will also be monitored. A combustible gas indicator (CGI) will be used to monitor the Lower Explosive Limit (LEL) at excavations and boreholes for the presence of combustible gases. Safety glasses and hearing protection will be worn at all times.

Recommended Drill Rig Safety Guidelines

- Drill rig maintenance and safety is the responsibility of the drilling operator. The following information is provided as general guidelines for safe practices on the site:
- No food or beverage will be consumed or stored in the operational area.

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- Inspect the route of travel before moving drill rig off-road. Note rocks, trees, erosion, and uneven surfaces.
- Remove all passengers from the cab before moving drill rig onto rough or sloped terrain.
- Engage multiple drive power trains (when available) on rig vehicle when mobilizing off-road.
- Travel directly up or down grade on slopes when feasible. Avoid off-camber or traverse approaches to drill sites.
- Approach changes in grade squarely to avoid shifting loads or unexpected unweighting.
- Use a spotter (person at grade) to provide guidance when vertical and lateral clearance is questionable.
- Use hand brakes and chock rig wheels when grades are steep.
- Lower rig mast when traveling off-road.
- Secure all loads to rig prior to off-road mobilization.
- Locate overhead and buried utilities prior to drilling operations.
- Observe overhead and buried utilities prior to drilling operations.
- Treat overhead electrical lines as if they were energized.
- Contact appropriate utilities agency to manipulate a deactivated overhead service in areas that interfere with drilling operations. Do not attempt to handle utilities.
- Note wind speed and direction to prevent overhead utility lines from contacting rig derrick. Allow at least 20 feet clearance between rig mast and utility lines.
- Contact appropriate utility agencies to survey, mark, and flag locations of buried utility lines.
- Use geophysical techniques, or equivalent, to locate buried utility lines.
- Stabilize and level each work site prior to drill rig set-up.
- Maintain orderly housekeeping on and around the drill rig.
- Store tools, materials, and supplies to allow safe handling by drill crew members. Proper storage on racks or sills will prevent spreading, rolling or sliding.
- Avoid storage or transportation of tools, materials or supplies within or on the drill rig derrick.
- Maintain working surfaces free of obstructions or potentially hazardous substances.
- Store gasoline only in containers specifically designed for such use.
- Wear eye protection when shipping, chiseling, or breaking materials that present a risk of flying objects.

- Inspect wire, rope, hoisting hardware, swivels, hooks, bearings, sheaves, guidelines, rollers, clutches, and brakes for the following:
 - abrasions
 - breaks
 - wear
 - fatigue
 - corrosion
 - jamming
 - kinking
- Avoid the suspension of loads when hoist is unattended.
- Prevent hoisting loads directly over field personnel.
- Restrict hoisting operations during unfavorable environmental conditions such as rain or high winds.
- Maintain safe hand distance from hoisting equipment (e.g., wire rope hooks, pinch points) when slack is reduced.
- Begin auger borings slowly with the drive engine operating at low revolutions per minute.
- Establish a communication system between driller, helper, and geologist for responsibilities during drilling operations.
- Engage auger to power coupling as recommended by manufacturer.
- Restrict contact with Power Coupling or auger during rotation.
- Prevent placing hands or feet under auger during rotation.
- Prevent placing hands or feet under auger sections during hoisting over hard surfaces.
- Avoid the removal of spoil cuttings with hands or feet.
- Assure drill rig is in neutral and the augers are not rotating before cleaning augers.
- Use clean water for the final rinse of reusable equipment.

An area approximately 30 feet in diameter around the drill rig and associated operations will be partitioned off with OSHA "CAUTION" tape or equivalent. Under no circumstances shall anyone enter the work zone without the authorization from the Site Safety Officer. This shall include client, utility, and regulatory representatives.

8 Air Quality Monitoring

During site activities, including but not limited to soil sampling, drilling, excavation, or any other intrusive activity, Volatile Organic Compound (VOC) emissions will be monitored with a

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Photoionization Detector (PID) Organic Vapor Meter (OVM) calibrated to a benzene standard (isobutylene). Monitoring of the breathing space and excavated material during drilling activities will be performed at 15-minute intervals or whenever odors are sensed. The times and concentrations encountered during monitoring will be recorded on the appropriate air quality monitoring log (Attachment D). Equipment operation manuals will be available on-site.

Personal air monitoring equipment will be calibrated at the beginning of each work day. The PID will be calibrated according to the manufacturer's procedures. Calibration results will be recorded in a calibration log that will be kept on-site at all times. When personal air monitoring equipment does not calibrate correctly, a replacement device will be obtained prior to start of daily work. On at least a monthly basis, each air monitoring device will be sent to a certified maintenance facility.

A Rae Systems Mini-Rae PID equipped with an 11.7 electron volt (eV) lamp will be used for real time screening for VOCs. The 11.7 eV lamp has a high response factor for the primary VOCs of concern. The response factor chart from Rae Systems is included with this HASP (Attachment F).

Based on the available analytical data documented during previous investigations, we have identified benzene as our "target compound". Simply stated, the target compound is the compound with the lowest permissible (PEL) or recommended exposure limits (REL) of the volatile organic compounds previously encountered at the site. Since the OVM provides only a summary reading of all organic vapors present in the sampled gases, E2 Environmental believes that a sustained reading (15-minutes) of 2.5 ppm (half of the Cal-OSHA STEL for benzene) above the background levels, as determined by the perimeter survey, will mandate the donning of respiratory protection equipment.

A CGI will be used to monitor site conditions for combustible gases associated with VOCs and SVOCs at the site. Excavation and drilling activities (boreholes) will be monitored every 15 minutes or when a change in conditions occurs, e.g. detectable odor, change in drill cuttings, etc. An action level of 10% or greater of the lower explosive limit will trigger a stop work order and initiation of engineering controls, e.g. explosion-proof ventilation equipment.

Prior to initiating work activities, a perimeter survey will be conducted using the OVM in order to establish baseline VOC air concentration levels.

Precautionary procedures which shall be taken during the field investigation are summarized in the table below:

Table 8-1 Action Levels and Procedures

Time or Action Level	Action
Initial site arrival	Perimeter survey with PID OVM
During site investigation activities	OVM monitoring at 15-minute intervals or when odors sensed
CGI ¹ ≥ 10% of LEL	Stop Work; contact Health and Safety Officer.
OVM > 2.5 ppm over background	Stop work; Don Respirators (half-face) evaluate need for Level C Dermal Protection and evaluate the need for methane specific monitoring
OVM > 5 ppm over background	Stop work; Evaluate need for engineering controls to reduce vapor concentrations, work will not proceed until vapor concentrations are reduced or properly fitted full-face respiratory protection is provided.
OVM > 25 ppm over background	Stop work; Re-evaluate need for engineering controls to reduce vapor concentrations, work will not proceed until vapor concentrations are reduced or properly trained personnel with supplied air respiratory protection equipment are available.

8.1 Rationale for Respiratory Protection Action Levels

A concentration of 5 ppm benzene vapor would need to be present in the breathing space for 15 minutes to meet or exceed the Cal-OSHA STEL of 5 ppm for that compound. E2 Environmental has conservatively specified a 2.5 ppm total organic vapor concentration over background as the action level which requires the donning of respirators. Even if the 2.5 ppm total organic vapor reading consisted exclusively of benzene, employee exposure would still be limited to 2.5 ppm, half of the ACGIH STEL. To approach the Cal-OSHA PEL TWA of 1 ppm for benzene, employees wearing the required properly fitted half-face respirators would need to be exposed to 10 ppm (over background) benzene for a continuous 8-hour period. A Rae Systems UltraRae Specific PID for benzene will be used to characterize background and site activity concentrations for the purpose of evaluating the action level and respiratory protection requirements at the site. Further, it is highly unlikely that the total organic vapor concentrations indicated by the OVM will consist of pure benzene, as the highest concentration measured in soil gas is only 0.1 ppmv. Thus we believe the action levels presented above provide an adequate level of respiratory protection.

8.2 Personal Air Quality Monitoring

The necessity for personal air quality monitoring equipment will be evaluated by the SSO based on breathing space air quality monitoring with the OVM and professional judgment. Should personal air quality monitoring be performed, published OSHA and/or NIOSH sampling and analytical methods will be used.

¹ Combustible gas instrument (CGI) will be used to determine the lower explosive limit (LEL) for boreholes and any other subsurface activity.

9 Personal Protective Equipment

We will initially be using Level D PPE, including: long pants, steel-toed boots, hard hat and safety glasses. Chemical-resistant gloves are required when handling ground water and soil samples or performing equipment decontamination. Hearing protection will be worn when working in close proximity to drilling rigs or otherwise as necessary. Employers will provide (their respective employees) a complement of dermal and respiratory protective equipment (available on-site at all times). Modified Level D PPE is simply Level D protection with the addition of chemical-resistant gloves and splash resistant Tyvek coveralls. Level C PPE will consist of splash resistant Tyvek coveralls, nitrile steel-toed/shank boots, chemical-resistant gloves, hard hat, safety glasses, and half-face Air Purifying Respirators (APR) fitted with organic vapor or combination organic vapor/acid gas cartridges, with a combination HEPA filter.

The use of Level D PPE will be supplemented with chemical resistant gloves when handling soil or ground water samples. Modified Level D dermal protection will be required when necessary to prevent contact of contaminated material with exposed skin surfaces. Upgrade from modified Level D PPE to Level C PPE (modified Level D PPE with the addition of nitrile steel-toed/shank boots and Half Face Respirator) will be mandated at the discretion of the SSO, in accordance with Sections 7.1 of this HASP. Every effort will be made to minimize dermal, inhalation and ingestion exposure to suspected contaminants.

In lieu of conducting a noise survey due to the short construction period, hearing protection with a minimum noise reduction rating (NRR) of 29 will be required at the work site at all times. The types of hearing protection devices with a NRR of 29 or greater include the E-A-R Classic earplug (NRR 29), Howard Leight laser Lite Earplug (NRR 30), and the Howard Leight thunder 29 earmuff (NRR 29). Based on previous noise surveys for heavy equipment use, this level of protection is no more than adequate. Note that the SVE blower exhaust is equipped with a muffler, so the blower operates at a very low noise level.

E2 Environmental is not responsible for providing any respiratory or dermal PPE equipment, as described herein, to subcontractor employees. Subcontractor employees working under this HASP must arrive on-site with their assigned half-face (and/or full-face) respiratory protective equipment, spare organic vapor or combination organic vapor/acid gas cartridges. Additionally, subcontractors will have available to their employees at all times PPE meeting Level C requirements as described above.

The SSO will be responsible for ensuring all personnel are prepared to initiate the PPE requirements outlined in this section.

9.1 Respiratory Protection Upgrade Guidelines

In the event air quality monitoring mandates the use of respiratory protection (OVA > 50 ppm) work operations will be shut down and the following will occur:

- All personnel as directed by the SSO will inspect their half-face respirators, clean as necessary, ensure proper function and don.

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- All personnel shall perform both negative and positive pressure respirator fit-tests. If a respirator failure is noticed, it shall be immediately reported to the SSO and the defective respirator repaired or replaced.
- In the event a repair or replacement cannot be made, the affected employee shall be removed from the work area until such time as a properly functioning and fitting respirator has been acquired.
- Each employee shall ensure that his/her individual respirator is equipped with organic vapor chemical cartridges or organic vapor/acid gas chemical cartridges with replacement cartridges available (on-site).
- Once all employees have donned respiratory protection (and if necessary Level C dermal protection) and indicate to the SSO that all PPE is in place and properly functioning, work operations will resume.
- Air quality monitoring will continue as described in Section 8.
- If it is determined that half-face respirators are not adequate for the vapor concentrations recorded (i.e., OVA \geq 100) work shall cease and the appropriate respiratory protection obtained and/or engineering controls implemented. The SSO will ensure only appropriately trained persons wearing properly fitted respiratory protection will be utilized in continued operations.
- At a minimum, air-purifying cartridges must be disposed of at the end of each shift.

Respirators protect the wearer from inhaling toxic contaminants. Different respirator systems provide different levels of protection. Protection factors (PF) for different respiratory protection devices are presented below:

Table 9-1 Selected Respirator Protection Factors

Type of Respirator	*Protection Factor (PF)
Air Purifying - Half-Face	10x
Air Purifying - Full-Face	50x
Supplied Air Pressure Demand Full-Face (Airline)	2,000x
Self-Contained Breathing Apparatus (Positive Pressure)	10,000x

* Protection factors for the respirator types presented above were assigned by OSHA (OSHA Handbook Guidelines).

A PF is the ratio of the contaminant concentration of the outside ambient atmosphere to that of the concentration inside of the respirator face piece. Protection factors may be used to calculate the Maximum Use Limit (MUL) of a properly fit-tested respirator. E2 Environmental only requires that subcontractors and employees be equipped with properly fitted half-face respirators. Thus, our maximum protection factor is 10 times (10x).

Utilizing this information and having stated that 2.5 ppm (over background) is our initial respiratory action level based upon our target compound, benzene (i.e., the contaminant which has the lowest PEL or REL of the contaminants identified as likely to be encountered at the site),

we can calculate the MUL of the half-face respirator used in an atmosphere where the PEL (8-hour TWA) is 1 ppm. MULs for several respirator types are presented below:

Table 9-2 Site-Specific MULs by Respirator Type

Type of Respirator	*MUL (PPM) as read from the FID OVA
Air Purifying - Half-Face	10
Air Purifying - Full-Face	50
Supplied Air Pressure Demand Full-Face (Airline)	2,000
Self-Contained Breathing Apparatus (Positive Pressure)	10,000

Review of the above table shows that the half-face respirator has a MUL of 10 ppm (assuming a 10 ppm vapor concentration is present continuously for an 8-hour period). Thus, if total organic vapor readings exceed 10 ppm, work would cease and would not resume until a detailed evaluation of the exposure situation has been made. The evaluation may recommend use of respiratory protection with a higher PF, implementation of engineering controls to reduce or eliminate the exposure hazard, or a combination of these two procedures. If the MUL of the half-face respirator is exceeded, work will cease until a remedy for the exposure has been decided upon and implemented.

9.2 Air Purifying Respirator Limitations

All site workers are reminded that air-purifying respirators (APRs) are subject to several important limitations.

- Be sure the respirator is properly fitted and positive and negative fit-tested. Improperly sealed and fitted respirators provide little or no protection.
- Be sure that the appropriate chemical cartridge is installed within the respirator. Improperly installed or chosen chemical cartridges will provide inadequate or no protection.
- Chemical breakthrough of a cartridge can occur. The breakthrough rate varies by individual breathing rate, chemical concentration in the atmosphere and a multitude of other environmental and individual factors. All personnel must replace their chemical cartridge when breakthrough is suspected. *At a minimum the chemical cartridge will be replaced each day during work which requires respirator use.*

APRs provide no protection in oxygen deficient atmospheres.

10 Designated Work Areas

To control unauthorized access of the public or unsupervised workers to any E2 Environmental supervised work area, an exclusion zone will be set up to surround the supervised activity. The exclusion zone will consist of temporary barriers and absolutely no unauthorized personnel will be allowed within the exclusion zone. PPE as designated in Section 9 will be required and no eating, drinking, or smoking shall be allowed in designated work areas. Exclusion zones will be maintained and relocated as necessary.

10.1 Sanitation Facilities

To maintain a comfortable and safe work environment for following items/facilities will be available for use at all time. Unless otherwise specified, the these items/facilities will be stored in the staging area that will be determined prior to work or kept with the Site Safety Officer.

- Drinking water - Drinking water kept on a dispenser.
- Eye wash facilities – Individual eye wash kits.
- Portable Restroom – maintained on a regular schedule.

11 Decontamination Procedures

Decontamination procedures will be performed within a designated exclusion zone using a portable decontamination station. The portable decontamination station will consist of three decontamination buckets and associated ancillary equipment (brushes, etc.). These stations will be maintained within the exclusion zone. If necessary, a self-contained steam cleaning unit may be provided. Appropriate receptacles for disposal of miscellaneous equipment, PPE, and decontamination water and rinsate will be provided. Decontamination procedures are presented below:

11.1 Personnel

- Chemical-resistant gloves shall be worn when handling soil or ground water.
- Personnel leaving the exclusion zone will wash, rinse, and remove gloves and wash hands and face in clean water using soap.
- If wearing Level C dermal and respiratory protection, prior to exiting the exclusion zone personnel will wash, rinse, and remove gloves and boots. Remove Tyvek and place in plastic trash bag. Wash hands and face in clean water using soap.
- Respirators will be cleaned and sanitized prior to each use. E2 Environmental will provide a sanitizing agent such as MSA Cleaner-Sanitizer II for this purpose.

11.2 Equipment

- Equipment decontamination will be performed as detailed in the SOPs.

11.3 Other Personnel Protective Procedures

- There will be no eating or drinking within the exclusion zone.
- Smoking is not allowed within designated work areas.
- Personnel are requested to drink plenty of fluids, a drinking station will be provided and maintained outside the exclusion zone.
- Facial hair which obstructs the proper fit of respiratory protection is not allowed.

- Chemical-resistant gloves will be worn during the performance of any sampling (soil, water, or vapor) procedure.

12 Disposal Procedures

Purge and decontamination or other fluids will be placed in DOT-rated 17H 55-gallon liquid tight-drums or collected directly into vacuum vehicles. All containers will be appropriately labeled *each day* prior to leaving the site. Each work location will be thoroughly cleaned at the end of each work day. All garbage, debris, and soil will be placed in sealed, appropriately labeled containers each day. Equipment remaining on-site overnight will be stored in a neat, safe, and secure fashion.

13 Site Security and Site Control

Access to the site will be controlled by a gate located at the east side of the facility. The gate will be kept locked during non-working hours, and when supervision is absent.

All work at the site is expected to be conducted during the daylight hours between 7:00 a.m. and 7:00 p.m. with the maximum hours to be worked not anticipated to exceed 12 hours.

14 Training and Medical Surveillance

All site personnel, including subcontractors, will have successfully completed a 40-hour, and annual 8-hour refresher course in health and safety for hazardous waste site operations in accordance with 29 CFR 1910.120 and will have been determined to be physically fit and capable of wearing respiratory protection by a medical doctor on an annual basis before being permitted to work at the site. The corporate Health and Safety Director will be responsible for personnel document verification and follow-up activities related to accident loss reports submitted by the Project Manager.

Personnel with special personal health conditions which prohibit compliance with any or all parts of the HASP will not be allowed within E2 Environmental supervised work areas.

15 Emergency Response Plan

Potential site emergencies include, but are not limited to, fire, earthquake, heat stroke, and other physical or chemical injuries that require immediate medical attention. The SSO or designated alternate will respond to on-site emergencies, direct site evacuation, and summon emergency assistance as necessary.

15.1 Pre-emergency Planning

Emergency contacts and telephone numbers, and the hospital route will be readily available at the site. A place of refuge and/or emergency meeting place will be announced by the SSO at the daily safety meeting. The SSO will designate the upwind meeting place. Should evacuation be necessary, field personnel will meet at the designated meeting place for a head count. Plans for a

safe and effective response to potential emergencies will be developed by the SSO before daily field activities begin. Pre-emergency planning includes reviewing the emergency response plan with site personnel and inspection of emergency response equipment and supplies.

15.2 Personnel Roles, Lines of Authority, and Communication

In the event of an emergency, the SSO must be notified. The SSO is responsible for responding to the immediate emergency situation. The initial response includes, but is not limited to, notifying on-site personnel, evacuating the area, and notifying the appropriate emergency response authorities, as needed. The SSO shall contact the Project Manager. The Project Manager shall notify the Health and Safety Director that an emergency situation has occurred. All field personnel present at the site have the authority and responsibility for reporting a site emergency.

15.3 Emergency Recognition and Prevention

Emergencies will be minimized through proper supervision, employee training, and site management. The impact of the emergency situation will be minimized to the extent possible.

15.4 Emergency Signals

In the unlikely event that an emergency situation occurs, all work activities at the site will cease. Notification of an emergency situation will be signaled by sounding an on-site vehicle horn. If verbal communication is difficult, impractical or impossible, the following hand/body emergency communication signals will be used:

<u>Signal</u>	<u>Meaning</u>
Hands Clutching Throat:	Can't Breath/Choking
Hands on Top of Head:	Need Assistance
Thumbs Up:	OK/I'm all right/I understand
Grip another persons wrist or both hands on another persons wrist:	Leave area immediately

If an emergency occurs in the exclusion zone and personnel are wearing PPE greater than Level D, PPE will be doffed prior to exiting the exclusion zone and personal decontamination procedures as described in Section 8 will be implemented. If the emergency is life threatening, decontamination may not be appropriate.

15.5 Safe Distances and Places of Refuge

In an emergency, field personnel should stay calm and summon help as needed. Wind socks or ribbons will be visible to field personnel in the work area to indicate wind conditions. If

evacuation is necessary, field personnel should leave the work area immediately by the shortest route possible, and assemble at a predetermined location upwind of the work area activities. The assembly point will be determined by the SSO in conjunction with the on-site subcontractors in advance of each work activity. The assembly location depends on work area and wind direction, and may vary from day to day. This assembly point will be at a safe distance from the emergency situation. In the event that refuge must be taken, the SSO will direct personnel to that location. Field personnel must not re-enter the work area until the SSO has instructed that it is safe to do so.

15.6 Emergency Site Security and Control

In the event of an emergency, the SSO or designated alternate will control access and traffic to the work zones. The SSO is responsible for maintaining emergency site security.

15.7 Site Evacuation Route

A map showing the site emergency evacuation route will be provided and/or posted prior to beginning field work. If an emergency requires evacuation, the SSO will alert field personnel by sounding a vehicle horn or other alarm. Field personnel will immediately leave the work area through the predetermined evacuation route. The SSO will conduct a head count of evacuated field personnel to ensure that everyone is accounted for.

When working in areas such as parking lots or between buildings, equipment and vehicles must be located to provide both sufficient room for safe working practices and several escape routes in case an emergency requires evacuation.

15.8 Contingency Procedures

Life-threatening incidents, such as fire, explosion, or a hazardous material spill or release, may warrant evacuation. All persons should be removed from the affected area immediately in accordance with the site emergency evacuation route. Medical assistance should be obtained if necessary. All on-site personnel should immediately be notified of the emergency situation. The local fire department will be contacted to assist in a fire or spill.

15.8.1 Fire Protection and Prevention

Fire extinguishers will be maintained on site in accordance with 40CFR Part 1926.150 (d). All trained field personnel are authorized to use a fire extinguisher if the fire is an incipient phase fire. Smoking is not permitted in designated work areas. Open flames and spark-producing equipment are prohibited in areas where flammable liquids or gases are used or may be generated. Open flames are prohibited within 75 feet of points where flammable liquids or gases may accumulate. Only Factory Mutual/Underwriters Laboratories-approved containers will be used for handling flammable combustible liquids in quantities greater than 1 gallon. An electrical bond must be maintained between containers when flammable liquids are being transferred, and equipment must be grounded. Any rags or other waste material soaked with

combustible or flammable liquid must be disposed of in a closed container. Heavy equipment and vehicles will each be equipped with a fire extinguisher.

15.8.2 Materials Spill

All field personnel are authorized to contain hazardous material spills by immediate diking and clean-up only if the spill was created by project operations and involves investigation derived materials. Equipment and work areas will be maintained in clean, proper working order. Caution will be exercised during field activities to prevent spilling materials generated during field activities. In the event that project-generated materials are spilled, response actions must be initiated by first contacting the SSO. Proper PPE and spill clean-up materials will be available on-site.

Hazardous materials spills will be contained by immediate diking using spill clean-up materials present on-site. Containment of spills by field personnel during field operations is limited to those materials generated during field work performed by project personnel, including soil sampling. Project personnel are not authorized nor are they trained for hazardous materials response to contain spills of other materials on-site. Field personnel are instructed to call the client contact and/or emergency response number if they witness a spill of hazardous materials other than that generated during project field activities.

15.8.3 Earthquake

Any personnel inside a building during an earthquake should remain indoors and take cover under a desk, in a doorway, or against an inside wall. Personnel should stay away from windows and light fixtures. If outdoors, personnel should move to an open, clear area away from buildings, tanks, heavy equipment, above-ground piping, and power lines.

15.9 **Emergency Decontamination Procedures**

In the event of chemical exposure requiring decontamination, personnel should remove contaminated clothing, rinse skin with large amounts of water and seek medical attention.

15.10 **Emergency Medical Treatment and First Aid**

One person on site will be CPR and first aid trained. In the event of personal injury or illness, professional medical assistance should be summoned as appropriate.

First aid equipment and supplies, will be accessible at all times. Professional ambulance services will be used to provide prompt medical attention and transportation. A portable fire extinguisher will be available at all times.

15.11 **Emergency Alerting and Notification Procedures**

Should an accident occur in the field, the nearest appropriate facility (i.e., medical facility, fire department, police department) will be notified immediately. Due to the close proximity of the hospital (approximately 1 mile from the site), E2 Environmental will rely on professional

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medical service providers for response to medical emergencies. Though individuals with first aid/CPR training may be present on-site the presence of such individuals is not required by this HASP. General procedures are as follows:

- In the event of fire or other emergency dial 911.
- Get medical attention for the injured person immediately.
- Notify the SSO, Project Manager, and the injured person's personnel office.
- Prepare an incident report. The Project Manager is responsible for its completion and submittal to the Health and Safety Director and the Client's Corporate personnel office within 24 hours.
- The SSO will assign duties and coordinate with emergency response personnel as required.

It is anticipated that the only possibility of material spill will involve liquid or soil derived or generated during site activities (soil and/or purge water). However to ensure appropriate legal reporting requirements relating to a reportable quantity (RQ) material release the National Response Center (NRC) should be contacted. Additional emergency assistance for handling material releases can be obtained by calling CHEMTREC. The phone numbers are:

National Response Center (NRC).....1-800-424-8802
CHEMTREC.....1-800-424-9300

15.12 Route to Hospital

Nearest Hospital **Los Angeles Community Hospital**
4081 East Olympic Boulevard
Los Angeles, California
Switch Board (323) 267-0477

To reach the hospital exit the facility and head south on Indiana St. and turn right on Bandini Blvd. Turn right onto S. Downey Rd. (S. Downey Rd. becomes S. Grande Vista Ave.). Turn right onto S. Lorena St. and turn right again onto E. Olympic Blvd. The hospital is on the left of E. Olympic Blvd. Approximate driving distance is 2.77 miles. A map with the directions from the site to the hospital is provided in Figure 15-1.

Figure 15-1 Site Location Map

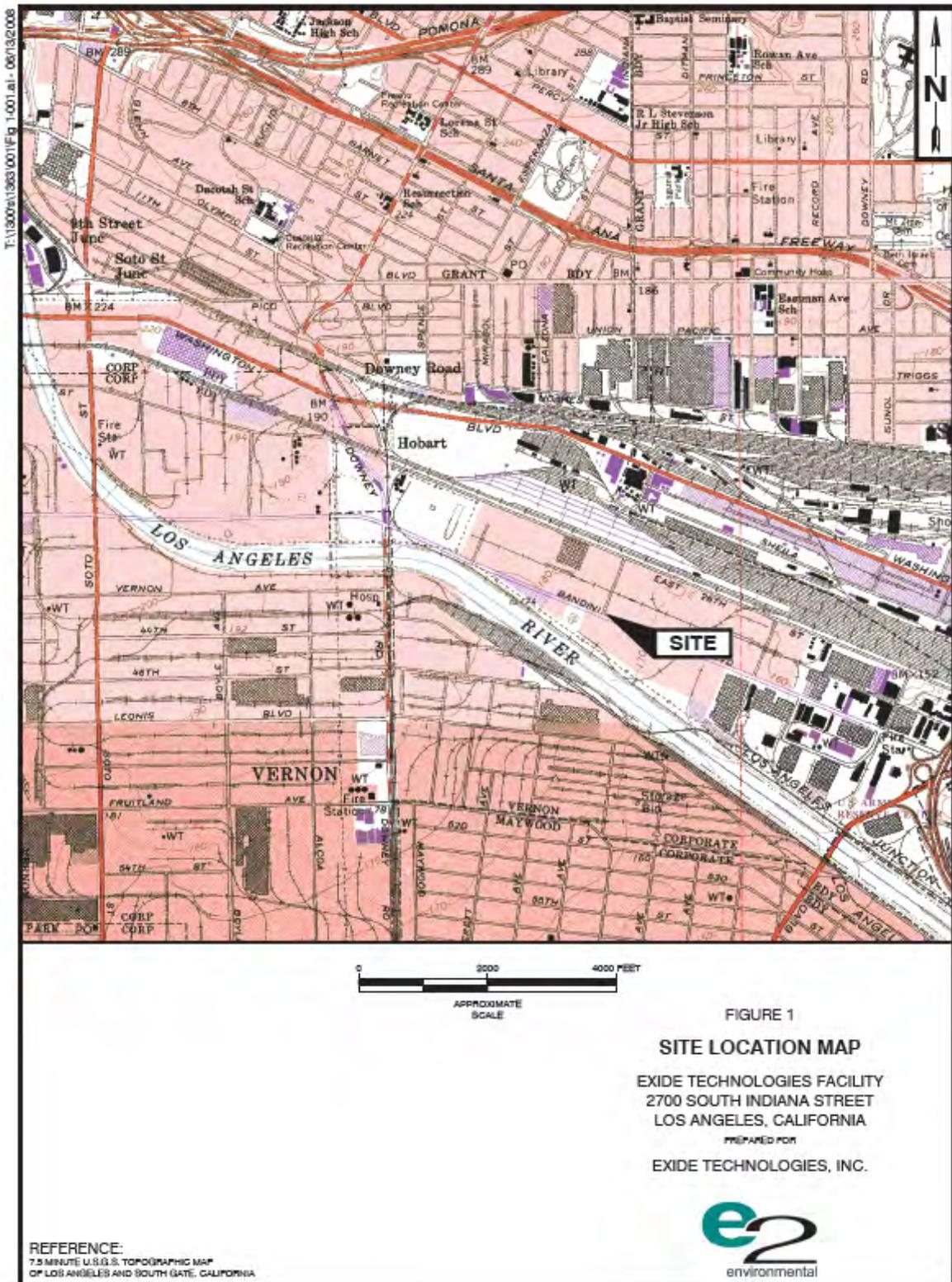
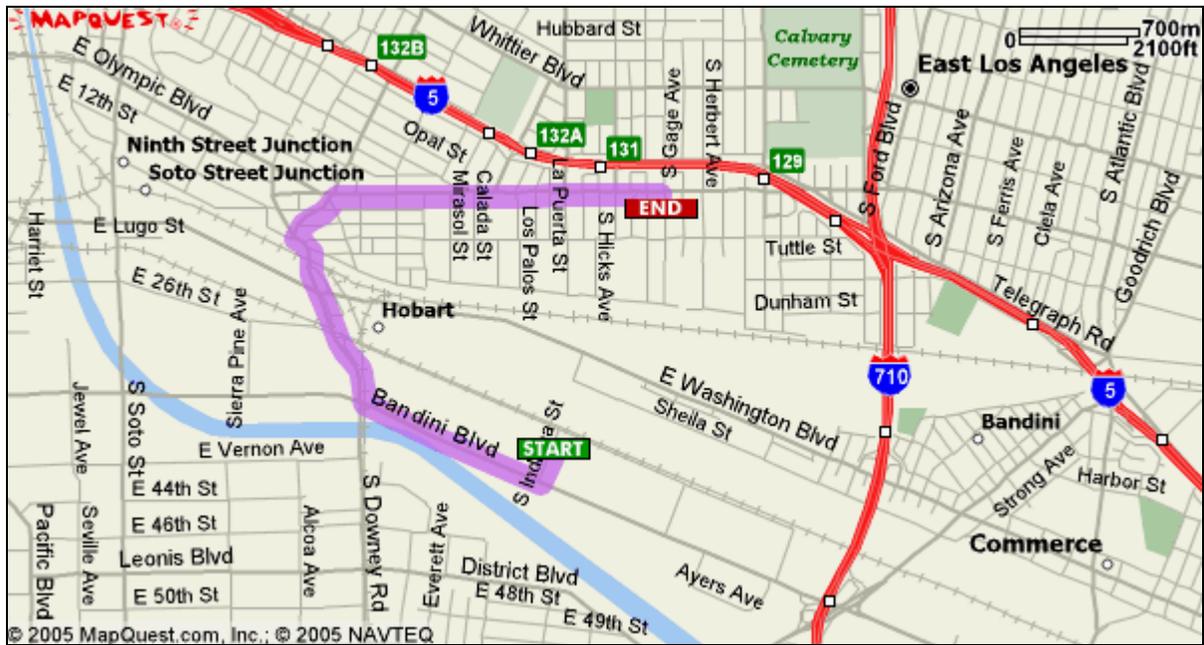


Figure 15-2 Hospital Location Map

Total Estimated Travel Time: 6 minutes

Los Angeles Community Hospital
4081 East Olympic Boulevard
Los Angeles, CA

Total Estimated Distance: 2.77 miles



1. Start out going SOUTH on S INDIANA ST toward BANDINI BLVD. <0.1 miles
2. Turn RIGHT onto BANDINI BLVD. 0.6 miles
3. Turn RIGHT onto S DOWNEY RD. 0.4 miles
4. S DOWNEY RD becomes S GRANDE VISTA AVE. 0.2 miles
5. Turn RIGHT onto S LORENA ST. 0.2 miles
6. Turn RIGHT onto E OLYMPIC BLVD. 1.1 miles
7. End at 4081 E Olympic Blvd, Los Angeles, CA 90023-3330 US

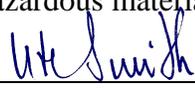
Health and Safety Plan

Company	Name	Number	Fax
E2 ENVIRONMENTAL 15375 Barranca Parkway, Suite F-106 Irvine, California 92618	Ute Smith Project Manager	Office:(949) 453-8085 Cell: (949) 246-4002	(949) 453-0733
Exide Technologies	Ed Mopas	Office: (323) 262-1101 ext. 259 Cell: (323) 200-7320	NA

16 Acknowledgement and Understanding

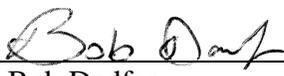
This health and safety plan was prepared by the undersigned, having successfully completed OSHA standard 29 CFR 1910.120 40-hour hazardous materials health and safety training.

Health and Safety Officer



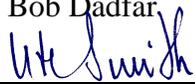
Ute Smith

Site Health and Safety Officer



Bob Dadfar

Project Manager



Ute Smith