



THE MEMPHIS DEPOT TENNESSEE

ADMINISTRATIVE RECORD COVER SHEET

AR File Number _______892

SOURCE AREAS

REMEDIAL ACTION HEALTH AND SAFETY PLAN

Defense Depot Memphis, Tennessee

Prepared for:



Defense Logistics Agency



:

Air Force Center for Environmental Excellence Contract FA8903-04-D-8722 Task Order No. 0031



engineering-environmental Management, Inc.

May 2007 Revision 0



17 October 2007

Mr. Brian Renaghan AFCEE Contracting Officer's Representative AFCEE/EXA 3300 Sidney Brooks Brooks City-Base, Texas 78235-5112

Reference: FA8903-04-D-8722-0043 CDRL A007

Subject:Source Areas Remedial Action Health and Safety Plan, Revision 0Defense Depot Memphis Tennessee

Dear Mr. Renaghan:

engineering-environmental Management, Inc. (e^2M) is pleased to provide the *Source Areas Remedial* Action Health and Safety Plan, Revision 0 as the Final Health and Safety Plan (HASP) to be implemented under Task Order 43. The HASP was prepared under Contract FA8903-04-D-8722-0031 for remedial actions to be carried out at Defense Depot Memphis, Tennessee (DDMT) and outlines the procedures necessary to ensure a safe working environment under the conditions expected to be encountered.

The HASP is submitted as required by Contract Data Requirement A007 for Task Order 43.

If you need additional information please contact me at 404-237-3982 or tholmes@e2m.net. We appreciate the opportunity to support the Air Force Center for Engineering and Environment and the Defense Logistics Agency.

Best regards, engineering-environmental Management, Inc.

homos C Halmer

Thomas C. Holmes Project Manager

cc: Michael Dobbs, DES-DDC-EE Linda Bryant, AFCEE/ACW Glen Turney, e²M

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HEALTH and SAFETY PLAN (HASP)

for the

| Project Name: | Remedial Action at Defense Depot Memphis, Tennessee |
|-------------------|---|
| Project Location: | Defense Depot Memphis, Tennessee |
| Project No.: | 3202-031-01-01 |

This HASP, which must be kept on site, addresses the health and safety hazards of each task for this project, including the requirements and procedures for worker protection (per 29 the Code of Federal Regulations [CFR] 1910.120). The Site Health and Safety Officer (SHSO) can change or amend this document only with agreement from the e2M Health and Safety Manager. The SHSO must initial any change made to the HASP at the relevant section and document the amendment date below.

Prepared by: Steven Herrera

e²M Managing Office: <u>San Antonio, TX</u>

Approved by:

5/21/07 DATE SHSO

5/21/07 PROJECT MANAGER DATE

CORPORATE CERTIFIED SAFETY 5/31/07 DATE

PROFESSIONAL

Date(s) of ______ Amendment(s): _____

All site workers shall read this HASP. A pre-entry briefing conducted by the SHSO shall be held prior to initiating this project. All applicable sections of this HASP shall be reviewed during this briefing. The SHSO shall review the information covered in the pre-entry briefing meeting with any worker not in attendance at the initial meeting prior to commencing work. Brief meetings will be held at the beginning of each workday to discuss important safety and health issues concerning tasks performed on that day. A brief description of topics discussed in the meetings shall be documented in the Field Logbook. After reading the HASP and attending a pre-entry briefing, workers shall sign the following acknowledgment statement:

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I have read and understand the information set forth in this HASP. I have also attended a pre-entry briefing. I agree to perform my work in accordance with this HASP.

| NAM | DE D | ATE | NAME | DATE |
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LIST OF ACRONYMS

| AFCEE | Air Force Center for Environmental Excellence |
|------------------|---|
| BPM | beats per minute |
| BRAC | Base Realignment and Closure |
| CEHNC | United States Army Engineering and Support Center, Huntsville |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| COPC | chemical of potential concern |
| CSP | Certified Safety Professional |
| CWM | chemical warfare material |
| dBA | decibels A-weighted |
| °C | degrees Centigrade |
| °F | degrees Fahrenheit |
| DDMT | Defense Depot Memphis, Tennessee |
| DLA | Defense Logistics Agency |
| e ² M | engineering-environmental Management, Inc. |
| EPA | U.S. Environmental Protection Agency |
| FU | Functional Unit |
| HSM | e2M Health and Safety Manager |
| HASP | Health and Safety Plan |
| LTM | Long Term Monitoring |
| MACTEC | MACTEC Engineering and Consulting Inc. |
| MI | Main Installation |
| MSDS | Material Safety Data Sheet |
| O&M | Operations & Maintenance |
| OSHA | Occupational Safety and Health Administration |

LIST OF ACRONYMS (continued)

| OU | Operable Unit |
|-------|--|
| РАН | polynuclear aromatic hydrocarbons |
| PC | project coordinator |
| PCBs | polychlorinated biphenyls |
| PCE | tetrachloroethene |
| РСР | pentachlorophenol |
| PID | Photoionization Detector |
| ppm | parts per million |
| PPE | personal protective equipment |
| SHSO | Site Health and Safety Officer |
| SVOCs | Semi-volatile organic compounds |
| TCE | Trichloroethylene |
| TDEC | Tennessee Department of Environment and Conservation |
| VOC | Volatile organic compound |
| WBGT | Wet Bulb Globe Temperature |

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1.0 SITE DESCRIPTION AND CHARACTERIZATION

This Health and Safety Plan (HASP) addresses activities associated with remedial action (RA) activities to be carried out at Defense Depot Memphis, Tennessee (DDMT) and outlines the procedures necessary to ensure a safe working environment under the actual conditions that may be encountered. This HASP is intended as a practical approach to the activities in light of the potential occupational and public health hazards. engineering-environmental Management, Inc. (e²M) was retained by the United States Air Force Center for Environmental Excellence (AFCEE) under Contract No. FA8903-04-D-8722 Task Order 0031 to conduct Source Area RA activities at Defense Depot Memphis, Tennessee (DDMT). This HASP may be upgraded/downgraded, as appropriate, in light of actual site conditions, after consultation with and approval by the Corporate Certified Safety Professional (CSP).

This Plan applies to all personnel who may need access to active work areas during the project. It serves as a minimum guideline for protective measures. Individual contractors or employers may elect to implement more stringent measures for their own workers.

On-site personnel, including regulatory agency personnel, client personnel and visitors are expected to be familiar with, and comply with the provisions of this Plan. FAILURE TO COMPLY WITH THE PROVISIONS OF THIS PLAN MAY RESULT IN REMOVAL FROM THE ACTIVE WORK AREAS, AND/OR THE PROJECT, AT THE DISCRETION OF THE PROJECT MANGER OR SITE HEALTH AND SAFETY OFFICER.

This Health and Safety Plan is designed as part of an overall Health and Safety Program. It is specifically intended that this Plan function as the implementation of any corporate policies and procedures set forth for the various employers involved at the site. If, in any instance, there is a conflict between this Plan and any employer's Corporate Health and Safety Program, the more stringent requirement shall apply to the work.

This Health and Safety Plan (H&SP) was developed from existing *Site Safety and Health Plans* (MACTEC, 2004 and e²M. Inc., 2006). Additional RA plans are being developed for Dunn Field. Addenda to this H&SP will be incorporated as necessary

1.1 SITE LOCATION AND HISTORY

The DDMT is located in the south-central section of Memphis in Shelby County, Tennessee (Figure 1-1) at latitude 35°05'11" and longitude 89°59'18". The following is the site address:

Defense Depot Memphis, Tennessee 2163 Airways Boulevard Memphis, Tennessee 38114

The DDMT comprises of 642 acres in two areas: the Main Installation (MI) and Dunn Field. The MI consists of 578 acres bordered by Airways Boulevard to the east, Perry Road to the west, Ball Road to the south and Dunn Road to the north. The MI is developed and contains most of the buildings and material storage yards for the facility. At the time of closure in 1997, there were approximately 118 buildings, 26 miles of railroad tracks and 28 miles of paved streets at the DDMT. Approximately 126 acres were used for covered storage space and approximately 138 acres are used for open storage space. Dunn Field is located just to the north, across Dunn Road from the northwest quadrant of the MI. Dunn Field consists of 64 acres of mostly undeveloped land that was historically used for storage of bauxite and fluorspar and for waste disposal.

1.1.1 Installation History and Mission

The 642 acres of the DDMT were used for agriculture (cotton) until purchased by the U.S. Army in 1940. The initial mission and function of the DDMT was to provide stock control, storage, and maintenance services for the Army Engineer, Chemical and Quartermaster Corps. The installation was originally named Memphis General Depot, but has also been known as Memphis Quartermaster Depot, Memphis Army Service Forces Depot and Memphis Army Depot. During World War II, the DDMT served as an internment center for 800 prisoners of war and performed supply missions for the Signal and Ordinance Corps. From 1963 until closure on September 30, 1997, the DDMT was a principal distribution center for the Defense Logistics Agency (DLA) (formerly the Defense Supply Agency) for shipping and receiving a variety of materials including hazardous substances (pesticides, swimming pool chemicals, firearm cleaning and rust preventative chemicals), textile products, food products, electronic equipment, construction materials, and industrial, medical and general supplies. The DDMT received, warehoused and distributed supplies common to all U.S. military services in the southeastern United States, Puerto Rico and Panama. Approximately four million line items were received and shipped by the DDMT annually. The DDMT shipped approximately 107,000 tons of goods a year (CH2M Hill, 1995).

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Activities at the MI included storing and shipping various materials and industrial supplies (e.g., hazardous materials). Several hazardous materials commonly used or stored at the MI during its operational period included: flammables, solvents, petroleum/oil/lubricants, paints, pesticides, herbicides, wood treating products, oxidizers, corrosives, and reactive. Types of past activities that led to the presence of hazardous materials in the environmental media at the facility included pesticide application, painting and sandblasting, vehicle maintenance, and hazardous material handling and storage. Other historical activities in open and enclosed storage areas included storing transformers with polychlorinated biphenyls (PCBs), storing and using pesticides/herbicides, and treating wood products with pentachlorophenol. These activities resulted in the presence of solvents, metals, pesticides, and other less frequently detected chemicals in the surface soil, surface water, and sediment above background concentrations CH2M Hill, 2001).

At Dunn Field, the initial disposal activities took place during the 1940s; mustard-filled German bomb casing and mustard-contaminated items (railcar wood, clothing, etc) were neutralized and buried. During the 1950s, Chemical Agent Identification Sets were allegedly disposed of and buried at Dunn Field at Site 1 in the Disposal Area portion of Dunn Field (USATHAMA, 1981). A search of the archived records indicated that the remains of destroyed (burned or detonated) explosive ordnance consisting of military souvenirs, such as tear gas agents, canisters, and smoke grenades, were occasionally buried in pits in the Disposal and Stockpile Areas. In addition, other chemicals were buried in Dunn Field. Use and disposal of unknown quantities of chlorinated lime, super tropical bleach, and calcium hypochlorite is documented at Dunn Field. Food stocks, paints/thinners, petroleum/oil/lubricants, acids, herbicides, mixed chemicals, and medical waste were also reportedly destroyed or buried in pits and trenches at Dunn Field (USACE, 1995). Chemical warfare material (CWM) was buried in the Disposal Area of Dunn Field. Removal action were performed at the CWM sites in 2000 and 2001 and the area was reported to be cleared of CWM and exploded ordnance.

1.1.2 Regulatory Background

The DDMT facility is classified as a Superfund Site under the Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (CERCLA) Section 120 (Federal Facilities) and was placed on the National Priorities List in October 1992. The DDMT has conducted environmental investigations and plans to conduct further environmental investigations under the requirements of the CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan. To assist further investigations at the DDMT, representatives of the DDMT, the CEHNC, U.S. Environmental Protection Agency (EPA) and Tennessee Department of Environment and Conservation (TDEC) divided the facility into four potential Operable Units (OUs), and seven Functional Units (FUs) based on similar historical use for conducting baseline risk assessments. The MI is divided into three OUs (2 through 4) and six FUs (1 through 6 with facility-wide groundwater being FU-7). OU-2 is located in the southwestern quadrant of the MI area of the DDMT and is characterized as an industrial area where maintenance and repair activities took place. OU-3 is located in the southeastern quadrant of the MI area and contains the entire southeastern watershed and golf course. OU-4 is located in the north-central section of the MI area where material storage took place.

Dunn Field, located north of the MI and identified as OU-1, is the only known and documented burial area on the DDMT. To assist investigations at Dunn Field, the DDMT's contractors divided it into three exposure areas. The local reuse authority, originally the Memphis Depot Redevelopment Agency and now the Depot Redevelopment Corporation, further subdivided the DDMT property into parcels and further divided parcels into subparcels to delineate buildings and CERCLA sites.

1.1.3 Past Response Actions

For the MI, interim actions have been taken to remove soils containing pesticides, PCBs, and pentachlorophenol (PCP) surrounding the MI Housing Area, cafeteria (Building 274), and PCP dip vat area (Building 737), respectively. An additional removal action for surface soils containing metals and polynuclear aromatic hydrocarbons (PAHs) near the southwest corner of the MI (FU3) was completed in August 2000. Those interim actions at the MI are described in the Main Installation ROD (CH2M Hill, 2001).

At Dunn Field, a groundwater extraction system began operation in November 1998, as an interim remedial action for groundwater. The extraction system was installed to provide source reduction and hydraulic control, thereby reducing off-site migration of groundwater contaminants. However, as discussed in the Dunn Field RI report (CH2M Hill, 2002), groundwater capture zones for recovery wells are not complete and contaminated groundwater is able to pass through the hydraulic containment system. The *Five Year Review* for Dunn Field (CH2M HILL, 2003b) concluded that, while over 300 pounds of volatile organic compounds (VOCs) have been removed from groundwater by the IRA from 1998 to 2002, the extraction system does not provide adequate control over groundwater flow and the spread of contaminants of concern in the fluvial aquifer from the western perimeter of Dunn Field.

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In March 2001, remedial actions took place to address the potential storage of CWM and was documented in the *Final Chemical Warfare Material Investigation/Removal Action Report* (UXB, 2001). Approximately 914 cubic yards of mustard contaminated soil were excavated, transported, and disposed offsite. In addition, twenty-nine bomb casings were recovered from the site. The *Dunn Field ROD* (CH2M Hill, 2004) provides additional information regarding the selected remedies (extraction and offsite disposal, soil vapor extraction, zero valent iron injection, and permeable reactive barrier) and the locations of historic disposal areas.

1.2 FIELD WORK SUMMARY

Source Areas RA activities will occur in phases and are to include the following activities:

- Removal of soil/rubble pile;
- Drilling and development groundwater monitoring wells;
- Abandonment of existing site monitoring wells;
- Groundwater sampling;
- Sampling and disposal of investigation-derived waste (IDW);
- Excavation;
- Construction of conventional soil vapor extraction (SVE) system;
- Operation and maintenance (O&M) of SVE system including vapor sampling;
- Soil, soil vapor, and groundwater sampling associated with drilling, site characterization, excavation soil confirmation sampling, and SVE operations; and
- Mobilization activities in preparation of remedial activities including site survey and construction of temporary accedes roads for site access.



2.0 KEY PERSONNEL AND HEALTH & SAFETY RESPONSIBILITIES

Table 2.1 describes health and safety responsibilities for key project personnel. The resume for the e2M Health and Safety Manager, Rob Klawitter, is included in Attachment 1.

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TABLE 2.1

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KEY PERSONNEL HEALTH AND SAFETY RESPONSIBILITIES AND REQUIREMENTS

| HEALTH & SAFETY MANAGER (HSM) Rob Klawiter | PROJECT MANAGER (PM) Tom Holmes and TASK LEADER Steven Herrera | SITE HEALTH & SAFETY OFFICER (SHSO) Kevin Sedlak | FIELD TEAM LEADER David Wineman and FIELD STAFF/ | PROJECT TRAINING PERSONNEL AND OBSERVERS |
|--|---|--|--|--|
| Responsibilities: | Responsibilities: | Responsibilities: | Responsibilities: | Responsibilities: |
| Approve Site Health and | See that personnel receive this | Implement HASP; report to the Project | Be familiar with and | Be familiar with and |
| Safety Plan (HASP) and | plan, are aware of its provisions, | Manager for action if any deviations from | abide by the HASP | abide by the H&SP |
| Amendments | and are aware of the potential | the anticipated conditions exist; and | Notify the SHSO of any | Notify the SSHO of |
| Verify that corrective actions | hazards associated with site | authorize the cessation of work at site | special medical | any special medical |
| recommended on Incident | operations, are instructed in safe | investigations if necessary | conditions (e.g., | conditions (e.g., |
| Response Form have been | work practices, and are familiar | Update the SHSO (Attachment 9) | allergies) | allergies) |
| implemented | with emergency procedures, and | summary after the completion of each | Immediately report any | Immediately report |
| | these actions are documented | task. | accidents and/or unsafe | any accidents and/or |
| | Determine that appropriate | Confirm that prior to a hazardous waste | conditions to the SHSO | unsafe conditions to |
| | monitoring and personnel | site visit, site personnel meet the proper | No individual shall go | the SSHO |
| | protective equipment are available | medical requirements and have the health | on site where he/she | Not allowed in PPE |
| | Monitor the Field Logbooks to | and safety training to qualify them to | does not have the | restricted areas |
| | ensure the health and safety work | perform their assigned tasks. Identify all | required safety training | Must be under |
| | practices are employed | site personnel with special medical | Requirements: | supervision of project |
| | Coordinate with SHSO so that | conditions. | | personnel during |
| | emergency response procedures are | Conduct pre-entry briefing and tailgate | • 40 nour ceruitcanon | training and/or |
| | implemented | safety meetings | Annual 8 hour retresher | observation activities |
| | Ensure corrective actions | Verify that all monitoring equipment and | training | |
| | recommended on Incident | personal protective equipment (PPE) is | • I wo employees with | Kequirements: |
| | Response Form are implemented | operating correctly according to | TIPST and and CPK | HAZCUM training |
| | | manufacturer's instructions and such | uaining Eret de te 4 M I E 4 Ded | |
| | | equipment is utilized by on-site personnel. | FIELD LEAN LEADER | |
| | | Calibrate or verify calibration of all | WIII nave all ol the | |
| | | monitoring equipment and record results. | | |
| | | Implement site emergency and follow-up | | |
| | | procedures | • Will act as | |
| | | Will assign SHSO duties to the Field | representative for the SHSO | |
| | | I cam Leager when not on-site | | |
| | | Requirements: | | |
| | | HAZWOPPER 40 hour certification | | |
| | | Annual 8 hour refresher training | | |
| | | 8 hour supervisor training | | |

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3.0 HAZARD ANALYSIS

Pertinent site information (e.g., records of chemicals used, records of disposal) and previous sampling data (e.g., ground water, soil, sediment) have been reviewed to determine the contaminants of concern for this project. Tables 3.1 and 3.2 are lists of constituents that are evaluated during the groundwater monitoring field events. However, an evaluation of the historic analytical results shows that few constituents are considered to be persistent at potentially elevated levels. Attachment 2 contains Contaminant Fact Sheets for the primary constituents of concern (tetrachloroethene [PCE] and trichloroethene [TCE]) at the MI and Dunn Field as described in the Main Installation Record of Decision (CH2M HILL, 2001) and Memphis Depot Dunn Field Record of Decision, (CH2M HILL, 2004), respectively. In addition, the Contaminant Fact Sheet for Vinyl Chloride is provided. The COCs at Dunn Field include arsenic, antimony, 1,1,2,2- tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, cis-1,2-dichlorothene, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromodichloromethane, carbon tetrachloride, chloroform, 1,1-dichloroethene, methylene chloride, dibromochloromethane, PCE, 1,2dichloroethene, trans-1,2-dichloroethene, TCE, vinyl chloride, and PAHs. However, an evaluation of the analytical results shows that few constituents are considered to be persistent at elevated levels. For simplicity, the Contaminant Fact Sheets for arsenic, antimony, PAHs, carbon tetrachloride, PCE, TCE and breakdown products including, 1,1,2,2-tetrachloroethane, cis-1,2-dichlorothene, 1,1-dichloroethene, and chloroform (Jacobs, 2004) are included as Attachment 2.

A hazard analysis (Attachment 3), including chemical (health, fire, and reactive), physical, and biological hazards, has been conducted for each task associated with this project per 29 Code of Federal Regulations (CFR) 1910.120(c). Health hazards shall be evaluated using air-monitoring equipment (Section 7.0) and controlled by implementing PPE (Section 9.0). Fire, reactive, physical, and biological hazards shall be controlled by utilizing Specific Safe Work Practices (Section 6.5).

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TABLE 3.1 Analytical Constituents Main Installation

Parameters

1,1,1-Trichloroethane 1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethene 1.2-Dichloroethane 1,2-Dichloroethene 1,2-Dichloropropane 2-Butanone (MEK) 2-Hexanone (MBK) 4-Methyl-2-pentanone (MIBK) Acetone Benzene Bromodichloromethane Bromoform Bromomethane Carbon disulfide Carbon tetrachloride Chlorobenzene

Chloroethane Chloroform Chloromethane cis-1,2-Dichloroethene cis-1,3-Dichloropropene Dibromochloromethane Ethylbenzene m,p-Xylenes Methylene chloride o-Xylene Styrene Tetrachloroethene Toluene Trans-1,2-Dichloroethene Trans-1,3-Dichloropropene Trichloroethene Vinyl acetate Vinyl chloride tert-Butyl Methyl Ether

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TABLE 3.2 Analytical Constituents Dunn Field

PARAMETERS

VOCs

1,1,1-Trichloroethane 1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,2-Dichloroethane 1,2-Dichloropropane 2-Butanone (MEK) 2-Hexanone (MBK)

4-Methyl-2-pentanone (MIBK) Acetone Benzene

2,4,5-Trichlorophenol 2,4,6-Trichlorophenol 2,4-Dichlorophenol 2,4-Dimethylphenol 2.4-Dinitrophenol 2,4-Dinitrotoluene 2,6-Dinitrotoluene 2-Chloronaphthalene 2-Chlorophenol 2-Methylnaphthalene 2-Methylphenol (o-cresol) 2-Nitroaniline 2-Nitrophenol 3,3'-Dichlorobenzidine 3-Nitroaniline 4,6-Dinitro-2-methylphenol 4-Bromophenyl phenyl ether 4-Chloro-3-methylphenol 4-Chloroaniline 4-Chlorophenyl phenyl ether 4-Methylphenol (p-cresol)

Bromoform Bromomethane Carbon disulfide Carbon tetrachloride Chlorobenzene Chloroethane Chloroform Chloromethane

Bromodichloromethane

cis-1,2-Dichloroethene cis-1,3-Dichloropropene Dibromochloromethane

SVOCs

4-Nitroaniline 4-Nitrophenol Acenaphylene Acenapthene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Benzoic acid Benzyl alcohol bis(2-Chloroethoxy)methane bis(2-Chloroethyl)ether bis(2-Chloroisopropyl)ether bis(2-Ethylhexyl)phthalate Butylbenzylphthalate Chrysene Dibenzo(a,h)anthracene Dibenzofuran Diethylphthate

Ethylbenzene m,p-Xylenes Methylene chloride o-Xylene Styrene Tetrachloroethene Toluene trans-1,2-Dichloroethene trans-1,3-Dichloropropene

Trichloroethene Vinyl acetate Vinyl chloride

Dimethylphthalate Di-n-butylphthalate Di-n-octylphthalate Fluoranthene Fluorene Hexachlorobenzene Hexachlorobutadiene Hexachlorocyclopentadiene Hexachloroethane Indeno(1,2,3-cd)pyrene Isophorone Naphthalene Nitrobenzene N-Nitrosodi-n-propylamine N-Nitrosodiphenylamine Pentachlorophenol Phenanthrene Phenol Pyrene

METALS

Aluminum Antimony Arsenic Barium Beryllium Cadmium Calcium Chromium Cobalt

Iron Lead Magnesium Manganese Nickel Potassium Selenium Silver

Copper

Sodium Thallium Vanadium Zinc Mercury

4.0 WORKER TRAINING

Table 4.1 will be used to summarize the training experience of the project field team with respect to 29 CFR 1910.120(c), 29 CFR 1910.38, and 29 CFR 1910.1200 and an updated copy will be maintained in the site office. Training for additional project field team members will be added to Table 4.1 as individuals are identified. Training certificates for designated project field team members will also be held at the site office.

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TABLE 4.1

TRAINING/MEDICAL SURVEILLANCE/RESPIRATORY PROTECTION RECORDS

| | | _ | | | _ | _ | | |
|---|------|-------|---|------|-------|---|------|--|
| Respirator Brand (if applicable) | Name | | u | | | | | |
| Respirator Fit Test (If applicable) | Date | Ĩ | | | | | | |
| Medical Surveillance (if applicable) | Date | | | | | | | |
| First Aid/CPR* (if applicable) | Date | Ę | | | | | | |
| Confined Space Entry (if applicable) | Date | | | | | | | |
| Hazard Comm. | Date | | | | | | | |
| 8-Hour Refresher (latest) | Date | | | | | | | |
| 8-Hour Supervisor (if applicable) | Date | | | | | | | |
| 40-Hour Initial | Date | | | | | | | |
| NAME | | | | | | | | |

rrogram. *At least one worker must be trained in First Aid/CPR and should be included in the company's Blood-borne Pathogen The SHSO will maintain the training and medical surveillance medical records. 7

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5.0 MEDICAL SURVEILLANCE

Table 4.1 will also be used to indicate project team members who participate in the company's Medical Surveillance Program [29 CFR 1910.120(f)]. A working copy of this table will be maintained by the SHSO. All workers who could potentially be exposed to concentrations of contaminants above the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits for 30 days per year or more must be included in the Medical Surveillance Program. Additional project team members will be added to Table 4.1 (which will be held at the site office) as individuals are identified. Training certificates and certification of fitness for designated project team members are also maintained by the SHSO.

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6.0 SITE CONTROL AND ACCIDENT PREVENTION

Site control procedures, as required by 29 CFR 1910.120(d), will be implemented before the start of site tasks to control worker exposures to contaminants.

6.1 WORK ZONES

Work zones (i.e., exclusion zone, contaminant reduction zone, and support zone) will be determined at the site by the SHSO and will vary depending on the site activity to be performed. It is anticipated that the work zones will be defined relative to the location of the work activity, i.e. around the groundwater sampling area, SVE construction area, soil excavation, etc. In general, the exclusion zone is generally defined as the area directly surrounding the well or location which may be contaminated by site operations. If encountered, contaminated material will remain inside the exclusion zone during the RA activity. The contaminant reduction zone shall serve as a buffer between the exclusion zone and the support zone and is intended to prevent the spread of contaminants from work areas. The support zone shall consist of a staging area in the non-contaminated or clean area. A short discussion on work zones associated with individual RA activities is provided in the subsections below.

6.1.1 Exclusion Zone

The active work area during work in and around excavations will be considered the Exclusion Zone. The Exclusion Zone will be modified, as necessary, depending on RA activities. It is anticipated that the exclusion zone during drilling activities will be defined as an approximate 5-foot radius surrounding the sampling area. During excavation activities, it is anticipated that the exclusion zone will extend beyond the excavation limits and be large enough to allow the movement of equipment and stockpiling of excavated material Barricades and/or warning tape, temporary construction fence, or other such measures will demarcate such areas. Access to these zones will be limited to authorized personnel with the appropriate protective equipment, who have met the training and medical requirements appropriate for their level of work effort and protection

6.1.2 Contaminant Reduction Zone

The contaminant reduction zone shall serve as a buffer between the exclusion zone and the support zone and is intended to prevent the spread of contaminants from work areas. All personnel working in the A temporary wash pad will be constructed for equipment decontamination, as necessary, to collect wash water for disposal. Facilities for personnel decontamination will be located adjacent to the active work area. Personal protective equipment cleaning and storage areas will be included in the Decontamination Zone.

6.1.3 Support Zone

The support zone shall consist of a staging area in the non-contaminated or clean area. The Support Zone will be located adjacent to, and upwind (if possible) of the Decontamination Zone. Eyewash bottles, first aid kit, fire extinguishers, toilet facilities, potable water for the workers, and emergency communications will be maintained in the Support Zone

6.2 BUDDY SYSTEM

A buddy system shall be implemented during all RA activities with the exceptions noted below. Separation between sampling team members is allowed during sampling activities (SVE soil vapor and groundwater sampling), provided line of sight and voice communications are maintained. Single personnel may complete O&M activities associated with the fluvial SVE system with the approval of the Field Team Leader

6.3 SITE ACCESS

Currently site access is not controlled. Site workers will be able to enter and leave the site when needed. The H&SP will include Material Safety Data Sheets (MSDS's) for products brought on-site for use in the sampling effort. Products will be stored in a manner consistent with manufacturer's recommendations while on-site to avoid incidental spilling. Spilled material will be promptly and appropriately recovered with wastes properly disposed. Spills will be recorded in team leaders log book.

6.4 COMMUNICATIONS

On-site communications will be conducted through the use of:

| Х | Verbal |
|---|----------|
| | v vi our |

| Two-way radio <u>X</u> | Horn |
|------------------------|------|
|------------------------|------|

X Cellular phone _____ Siren

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X Hand signals ____ Other: _____

Off-site communications will be conducted through the use of:

- <u>X</u> Cellular phone
- Pay phone: Location
- ____ Other:

6.5 SAFE WORK PRACTICES

General safe work practices to be implemented during work activities at this site are included in Table 6.1. Specific Safe Work Practices (Attachment 4) that workers shall follow while on the site have been developed for each hazard associated with each task as identified in Attachment 3.

6.6 ACCIDENT PREVENTION

Instructing respective employees in safe work practices and emergency procedures is the responsibility of the SHSO. Adherence to the H&SP and to standard safety operating procedures and practices described above shall be required of all personnel on site in order to minimize the risk of accidents resulting in injury or excessive chemical exposure.

TABLE 6.1

GENERAL SAFE WORK PRACTICES

- Minimize contact with excavated or contaminated materials. Do not place equipment on the bare ground. Use plastic sheeting and work tables. Do not sit or kncel on potentially contaminated surfaces.
- Smoking, eating, or drinking after entering the work zone and before decontamination will not be allowed. Use of illegal drugs and alcohol are prohibited.
- Practice good housekeeping. Keep everything orderly and out of potentially harmful situations.
- Use of contact lenses on site will not be allowed within the exclusion zone.
- In an unknown situation, always assume the worst conditions.
- Be observant of your immediate surroundings and the surroundings of other team members. It is a team effort to notice and warn of impending dangerous situations. Withdrawal from a hazardous situation to reassess procedures is the preferred course of action.
- Conflicting situations may arise concerning safety requirements and working conditions and must be addressed and resolved rapidly by the SHSO and PM to relieve any motivation to circumvent established safety policies.
- Unauthorized breaches of specified safety protocol will not be allowed. Workers unwilling or unable to comply with the established procedures will be discharged.

7.0 OPEN EXCAVATION AREAS

Site personnel shall remain at least 2 feet back from the sidewall top of an excavation. The site excavations will exceed five feet in overall depth and excavation sidewalls will be appropriately sloped or benched to assure slope stability and prevent cave-ins. The walls will be sloped no greater than 3/4:1 (horizontal:vertical). The soil conditions will be evaluated by the Competent Person and the slopes will be adjusted, as necessary, in light of the actual field conditions.

All excavations will be inspected at least daily by the designated Competent Person to assure the continued integrity of the excavations. Documentation of these inspections shall be maintained in the daily project logs.

All open excavations where active work has been suspended will be marked with warning tape, or be surrounded by orange mesh fencing.

Any obviously uneven terrain that poses a tripping hazard will be filled in or otherwise protected to prevent injury. Likewise, cleared walkways will be established around any debris and equipment on the ground, to minimize any tripping/contact hazard.

8.0 AIR MONITORING PLAN AND RESPIRATORY PROTECTIVE UPGRADES

Environmental monitoring with a photoionization detector (PID) will be conducted during drilling, intrusive activities, excavation, and sampling events where potential exposures to VOCs exist. All monitoring equipment will be calibrated at least daily by monitoring personnel and according to manufacture's instructions. Record of calibration will recorded in the field daily log book.

In addition to the air monitoring for the volatile constituents, airborne dust measurements will be used as an indicator for application of water as a dust/vapor suppressant, and modification of work techniques to minimize dust generation.

8.1 BREATHING ZONE MEASUREMENTS/ACTION LEVELS

Air monitoring will be conducted in the workers' breathing zones utilizing a Photoionization Detector (PID) or Flame Ionization Detector (FID) during all intrusive activities. The PID or FID will be calibrated at the beginning of each work shift according to manufacturer's recommendations. All calibrations will be documented and become part the permanent project file.

A list of action levels is provided below and will be utilized in upgrading the workers' respiratory protection, and in controlling airborne emissions on site. These action levels are considered to be very conservative, in light of the anticipated concentrations of vinyl chloride, dichlorethyleneene and other compounds; the accuracy of the instruments used to measure airborne concentrations; and the rated protection factors of the respirators to be utilized on site. Also, the Action Levels are based upon 5-minute averages as opposed to 8-hour averages used for the PELs, or the 15-minute averages used for Short Term Exposure Limits.

If a PID reading of 0.5 parts per million (ppm) or greater above background levels is maintained for 1 minute or more in the breathing zone, then detector tubes for vinyl chloride will be utilized to determine the air contaminant is vinyl chloride and its concentration (see Table 8.1). If peaks of 5 ppm or greater occur in the breathing zone, then detector tubes for carbon tetrachloride and chloroform will be utilized to determine if they are present and at what concentration. The air monitoring action guidelines presented in Table 8.1 are protective of airborne exposure for trichloroethene and tetrachloroethene.

TABLE 8.1

| * PID (ppm) | AND / OR | Vinyl Chloride (ppm) | Carbon Tetrachloride | Chloroform (ppm) | Action | PPE |
|----------------|-------------|----------------------------|-------------------------|---------------------|--|------------|
| < 0.5 | | | | | Continue PID | Modified D |
| 0.5 - 5 | AND | <0.5 | | | Continue PID and Use DT | Modified D |
| 5 – 25 | OR | 0.5 - <5 | 5 – 25 | 5 - 50 | Notify SHSO, Continue PID and Use DT | Level C |
| > 25 | OR | > 5 | > 25 | > 50 | Stop Work, Notify SHSO | |

AIR MONITORING ACTION GUIDES

*Sustained 1 minute or more above background levels

DT - Detector Tubes

Although vinyl chloride is not a persistent constituent throughout the MI and Dunn Field, it was chosen as an indicator constituent because it is more volatile than the other chlorinated solvents present at the site and has a low exposure threshold. If the vinyl chloride detector tube readings are less than 0.5 ppm (and the PID reads from 0.5 to 5 ppm), then workers can remain in modified Level D PPE with periodic detector tube monitoring. If the PID reading is from 5 to 25 ppm OR the individual constituent detector tube readings exceed their unprotected thresholds (0.5 ppm for vinyl chloride, 5 ppm for carbon tetrachloride, or 5 ppm for chloroform), then upgrade to Level C PPE, notify the SHSO or designee and continue periodic detector tube monitoring. If the detector tube reading is greater than 5 ppm for vinyl chloride, 25 ppm for carbon tetrachloride or 50 ppm for chloroform, work will be stopped until the SHSO can make further evaluations. At PID readings greater than 25 ppm, personnel will stop work immediately and notify the SHSO.

The AFCEE Contracting Officer's Representative will be notified if sustained PID readings of greater than 5 ppm are documented at the site. If PID breathing zone concentrations are maintained below 5 ppm, the frequency of PID monitoring may be reduced to 15-minute intervals. Air monitoring equipment, frequency of readings and action guidelines are summarized in Attachment 5. If respiratory protection is up-graded to full-face respirators or if evacuation occurs, the SHSO must notify e²M's RHSO.

8.2 WORK DUST MONITORING

At Dunn Field, SVOCs and metals are also considered to be COCs. Table 3-3 presents a list of the COCs that are analyzed for during the sampling event. Since, SVOCs and metals cannot be monitored with a PID, it is important to monitor dust levels in order to reduce the potential exposure to chemicals. In order to reduce the potential exposure to chemicals at Dunn Field, the dust levels at the site will be monitored visually. Dust suppression measures (i.e., water spray) will be utilized when there is visible dust in the air. Breathing zone conditions are not expected to reach sustained concentrations such that Level C PPE will be required. However, full-face respirators will be on site if needed. Provisions for supplied air operations are not included in this HASP, and workers will evacuate the Exclusion Zone if such conditions occur.

In addition to the air monitoring for the volatile constituents, airborne dust measurements will be used as an indicator for application of water as a dust/vapor suppressant, and modification of work techniques to minimize dust generation.

8.3 WORK AREA DUST MONITORING

Dust monitoring will be conducted during excavation activities. Dust monitoring will be completed wising a MiniRams or DataRam instrument. Dust monitoring will be performed in accordance with the table below.

| Dust Action levels | Action to be Taken | |
|---|--|--|
| 5 milligram per cubic meter (mg/m ³) (Total Dust) | Initiate additional dust control measures until airborne particulate levels are reduced. | |

8.4 PERSONAL EXPOSURE MONITORING

Personal exposure monitoring is required by the vinyl chloride, benzene and methylene chloride standards. Representative exposure monitoring will be implemented for the areas where contamination is known to be present. All exposure monitoring will be conducted in accordance with the requirements of each applicable regulation, and the National Institute of Occupational Safety and Health (NIOSH) methods. All sampling equipment will be calibrated before and after sampling, and sampling data will be recorded. A laboratory accredited by the American Industrial Hygiene Association (AIHA) will analyze all personal exposure samples. The air monitoring results will be reviewed by the Corporate CSP for determination of appropriate changes in protection levels. All exposure monitoring must be performed and/or overseen by a qualified person experienced and trained in the field of Industrial Hygiene.

All monitoring results will be communicated in writing to the employees, and verbally to all site personnel during tailgate safety meetings. If the monitoring indicates exposures in excess of the Permissible Exposure Limits, the work area action levels and protection levels may be adjusted.

8.5 UNKNOWN CONTAMINATION

All site personnel will be instructed to watch for areas of soil discoloration, other visible signs of contamination such as oil sheens on water, and odors in the work areas. In addition, all site personnel will be advised to observe other site personnel for symptoms or signs of exposure as a possible indicator of exposures to unknown contamination.

If unknown contamination is encountered, all work in that location will cease until an evaluation of the contamination can be made. The area should be isolated and the contamination covered with plastic sheeting until evaluation is complete. Site personnel will move off the affected area, and work may proceed in a location away from the suspect area, at a distance deemed suitable by the HSO where exposure to the suspect materials should not occur.

8.6 PERIMETER AIR MONITORING

Perimeter monitoring will be completed during disturbance of contaminated soils. The monitoring will include the items described below.

Background monitoring prior to the start of construction activities. The monitoring will occur on
one day during the week prior to excavation, using Summa Canisters and USEPA Method TO-14.
Three locations around the site will be chosen for the background monitoring. One sample
location for the background monitoring will be the predominant downwind fence-line location
nearest the residences to the east of the work area.

- Real-time VOC monitoring using a PID or FID. Monitoring will occur at various locations around the site perimeter throughout the workday. Readings will be concentrated primarily at the current downwind location, but will include other perimeter locations;
- Real-time dust monitoring using MiniRams or DataRams. The perimeter dust action level will be set to 1 mg/m³;

If chemical odors at the site perimeter are noted by site personnel, water spray or odor masking materials may be employed to minimize migrating odors.

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9.0 COLD/HEAT STRESS

The SHSO will confirm that project personnel have the necessary training to prevent personal injury due to heat and cold, as dictated by weather conditions. The SHSO will also monitor ambient conditions at the site. This monitoring shall commence when the ambient environmental temperature exceeds 70 degrees Fahrenheit (°F) or falls below 40°F.

9.1 COLD STRESS

Fatal exposures to cold among workers have almost always resulted from exposures involving failure to escape from low environmental air temperatures or from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is the fall in the deep core temperature of the body. The deep core temperature should not fall below 36 degrees Centigrade (°C) (96.8°F). Lower body temperatures will likely result in reduced mental alertness, reduction in rational decision-making capability, loss of consciousness, or death.

Mild to severe pain in the extremities may be the first early warning of cold exposure. During exposure to cold, maximum severe shivering develops when the body core temperature has fallen to 35°C (95°F). Useful physical and mental work is limited when severe shivering occurs. Since prolonged cold exposure at temperatures well below freezing can lead to dangerous hypothermia, whole body protections must be provided. If work activities are performed in temperatures below 40°F, adequate insulating clothing to maintain core temperature must be worn by all workers. All workers should be aware of the effects of wind chill on exposed skin. The higher the wind speed, the lower the perceived air temperature in the work area.

9.2 HEAT STRESS

Heat stress can be a major hazard for field personnel, especially those wearing PPE. Depending upon the ambient conditions and the work being performed, onset of heat stress can be rapid.

Early signs of heat stress include heat rash, heat cramps (muscle spasms), discomfort and drowsiness. Continued heat stress can result in heat exhaustion, with symptoms including pale, cool, moist skin; heavy perspiration; dizziness; nausea; and fainting.

Extreme heat stress can result in heat stroke, as body temperature regulation fails and the body temperature rises to critical levels. Symptoms of heat stroke include red, hot, usually dry skin; absence of or reduced perspiration; nausea; dizziness and confusion; strong; rapid pulse; and coma. Measures to prevent the occurrence of heat stress consist of acclimatization; avoiding overprotection; training and monitoring of personnel wearing PPE; scheduling of work and rest periods; and frequent replacement of fluids.

Ambient monitoring for heat stress prevention will commence when the temperature exceeds 70°F. In addition, all field personnel will be provided rest breaks. The break areas shall be situated so that personnel may remove the chemical-protective clothing (if applicable), rest in a shaded area, and drink cool fluids. Working within protective clothing, such as may be required for this project, places a significant physiological stress upon the worker. For this reason, workers are anticipated to perform work in modified Level D PPE. The personnel and environmental measurements described below will be conducted for all field personnel on this project.

During hot working conditions, rest breaks shall be established based upon the results of physiological monitoring combined with environmental factors measured using a Wet Bulb Globe Temperature index (WBGT). WBGT values are calculated using the following equations:

1. Outdoors with solar load: WBGT = 0.7 NWB + 0.2 GT + 0.1 DB

Indoors or outdoors with no solar load: WBGT = 0.7 NWB + 0.3 GT
where: WBGT = Wet Bulb Globe Temperature
NWB = Natural Wet Bulb Temperature
GT = Globe Temperature
DB = Dry Bulb Temperature

The determination of WBGT will be performed by the SHSO, using a Heat Stress Monitor containing a black globe thermometer, a natural wet-bulb thermometer, and a dry-bulb thermometer. The WBGT and the Permissible Heat Exposure Threshold Limit Values from the TVLs and BEIs (Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices), ACGIH, 2003, will be used to determine the Work-Rest schedule. The Permissible Heat Exposure Threshold Limit Values are for workers not wearing chemical protective clothing (i.e., Tyvek).
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Water and electrolyte replacement beverages will be available on ice in the field. Drinking enough fluids will be stressed by the SHSO while in the field on hot days. The work/rest regimen will follow the moderate unacclimatized workload category on the table represented below from ACGIH:

| | | | Work Load | d Category | | |
|----------------------------------|-------------|--------------|-------------|-------------|---------------|-------------|
| | | Acclimatized | | U | Jnacclimatize | d |
| Work-Rest Regimen | Light | Moderate | Heavy | Light | Moderate | Heavy |
| Continuous | 29.5 (85.1) | 27.5 (81.5) | 26.0 (78.8) | 27.5 (81.5) | 25 (77) | 22.5 (72.5) |
| 75% Work- 25% Rest, each hour | 30.5 (86.9) | 28.5 (83.3) | 27.5 (81.5) | 29 (84.2) | 26.5 (79.7) | 24.5 (76.1) |
| 50% Work- 50% Rest, each hour | 31.5 (88.7) | 29.5 (85.1) | 28.5 (83.3) | 30 (86) | 28 (82.4) | 26.5 (79.7) |
| 25% Work- 75% Rest, each hour | 32.5 (90.5) | 31.0 (87.8) | 30.0 (86) | 31 (87.8) | 29 (84.2) | 28.0 (82.4) |

[Values given in °C and (°F) WBGT]

WBGT – Wet Bulb Globe Temperature

If symptoms of heat stress are exhibited by workers, the pulse rate will be monitored during all tasks (as deemed appropriate by the SHSO). Action guidelines are as follows:

• Pulse rate: Determine normal resting pulse rate prior to start of work. Monitor pulse rate as soon as possible at beginning of rest period. If the rate exceeds the determined normal resting pulse rate by 40 beats per minute (BPM), shorten the next work period by one-third without changing the rest period. If the pulse rate is greater than 40 BPM above the resting pulse rate at the start of the next rest period, shorten the following work cycle again by one-third. Repeat until pulse rate at beginning of rest period is less than 40 BPM above resting pulse rate.

The PPE Protective Equipment Per Task and the PPE Assessment and Certification Form for the protection required for each task is provided in Attachment 6. Groundwater sampling activities are anticipated to be performed in modified Level D. During intrusive activities (drilling, soil sampling, well installation) Level D PPE with outer protective garments (i.e., Tyvek), will be required. PPE levels shall be indicated in the Field Logbook.

The use of Tyvek type protective garments will be required during all intrusive activities (i.e. drilling) to reduce personnel exposure to chemicals. However, if the site manager and SHSO believe there is an extreme risk of danger from heat-related incidents as opposed to chemical exposure, protective outer garments may be made optional. The decision to proceed without Tyvek will be decided by the site manager and SHSO and recorded in the logbook.

The use of appropriate PPE in conjunction with site entry, safety, and decontamination procedures will reduce the potential for worker exposure to hazardous substances present at the site. A PPE program established in accordance with 29 CFR 1910.120(g)(5) and 29 CFR 1910.134 will be implemented. The level of protection to be used during field work at the site will be determined based on conditions indicated by previous investigations at the site, and actual site conditions encountered and anticipated. Field personnel must be prepared to upgrade their PPE if an unexpectedly hazardous situation is encountered.

If respirators are worn, workers must adhere to the company's Respiratory Protection Program. Record of workers' respirator tests will be kept on site. Beards (e.g. facial hair interfering with the respirator seal) are not allowed when respirators are worn.

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11.0 DECONTAMINATION

PPE shall be decontaminated as per 29 CFR 1910.120(k). The decontamination procedures, equipment, and decontamination solution required for each task are provided in Attachment 7. Disposable PPE shall be double bagged and screened with a PID. If the screening indicates that the level of contamination in the waste container (i.e., trash bag) is less than 10 ppm, the wastes will be placed in a municipal landfill. If the PID levels are greater than 10 ppm, the wastes may be tested further to evaluate other disposal options.

12.0 EMERGENCY RESPONSE

The following emergency response information is provided as per 29 CFR 1910.120(j).

12.1 SITE MAP

The Regional Medical Center is the closest Level 1 hospital with Emergency Room facilities prepared to treat potential traumas. It is approximately 7 miles from the study area and can be reached as follows:

- From FRONT GATE: Proceed left (North) Airways Blvd
- Turn left (North-West)on US 78
- Turn right (North) on I-240
- Take the Union Avenue West Ramp
- Turn Right onto Union Avenue
- Turn right onto S. Pauline Street
- Turn Left onto Jefferson Avenue

12.2 EMERGENCY CONTACTS

A list of contacts and telephone numbers for the applicable local off-site emergency responders is provided in Table 12.1. The nature of the site work and contaminants of concern should be reviewed with the off-site responders before work begins on this project. Each on-site vehicle used for sampling activities will contain a copy of the hospital directions, hospital map, and contact information.

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Figure 12-1

ROUTE TO REGIONAL MEDICAL CENTER

DDMT



TABLE 12.1

EMERGENCY CONTACTS

| NAME | TELEP | HONE | |
|-----------------------------------|----------------|--------------|--------------|
| | NUM | BERS | |
| | OFFICE | HOME | CELL/PAGER |
| FIRE DEPARTMENT: | 911 | | |
| | | | |
| HOSPITAL: Regional Medical Center | (804) 320-3911 | | |
| | | | |
| POLICE DEPARTMENT: | 911 | | |
| | | | |
| SITE HEALTH AND SAFETY OFFICER: | 210-348-6000 | 210-639-9719 | 210-639-9719 |
| Kevin Sedlak | <u> </u> | | |
| DLA CLIENT CONTACT: | 717-770-6950 | | |
| Mike Dobbs | | | |
| AFCEE CLIENT CONTACT: | 210-536-5261 | | |
| Chris Hobbins | | | |
| PROJECT MANAGER: | 404-237-3982 | 404-237-0932 | 404-295-3279 |
| Thomas Holmes | | | |
| PROJECT TASK LEADER | 916-852-7792 | | 916-642-5074 |
| Steven Herrera | | | |
| HEALTH & SAFETY MANAGER: | 303-754-7200 | | 303-748-6615 |
| Rob Klawiter | *204 | | |
| PROGRAM MANAGER: | 210-348-6000 | | 210-317-5448 |
| Glen Turney | | | |
| EPA RPM | 404-562-8553 | | |
| Turpin Ballard | | | |
| TDEC RPM | 901-368-7916 | | |
| Evan Spann | | | |
| DEPOT REDEVELOPMENT CORP. | 901-942-4939 | | |
| Jim Covington or G.C. Glance | <u> </u> | | |
| OTHER: Ambulance | 911 | | |
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12.3 EMERGENCY RESPONSE EQUIPMENT

The following emergency response equipment is required for this project and shall be readily available in each on-site vehicle used for sampling activities.

| <u> X </u> | Field First Aid Kit | | |
|------------------|---------------------|----------|----------|
| <u>X</u> | Fire Extinguisher | | Type A |
| | | | Type B |
| | | | Type C |
| | | <u>X</u> | Type ABC |
| <u>X</u> | Eyewash | | |
| | SCBA | | |
| | Shower | | |
| <u> X </u> | Other: Respirator | | |

12.4 COMMUNICATION

The emergency response communication system for the site is:

| <u>X</u> | Verbal | |
|---------------------|---|----------------------------------|
| | Two-way radio | |
| <u>_X</u> | Cellular telephone | |
| <u>_X</u> | Hand signals: | |
| Hand gripping three | oat | |
| Grip partner's wris | st or both hands around waist | Leave area immediately |
| Hands on top of he | ead | |
| Thumbs up | | OK, I am all right, I understand |
| Thumbs down | ••••••••••••••••••••••••••••••••••••••• | No, negative |
| <u>_X</u> | Horn | |
| | Siren | |
| | Other: | |

12.5 EMERGENCY RESPONSE PROCEDURES

In the event that an on-site emergency develops, the basic procedures delineated in Table 12.2 are to be followed immediately. The Accident, Injury and Reporting Policy (Attachment 8) details procedures for reporting accidents so as to ensure accurate record keeping and provide information for the investigation process.

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Within 48 hours after an emergency response, the First Report of Accident form provided in Attachment 8 shall be completed by the SHSO, who will submit copies to the HSM.

TABLE 12.2

EMERGENCY PROCEDURES

- The SHSO (or alternate) should be immediately notified via the on-site communication system. The SHSO assumes control of the emergency response.
- The SHSO notifies the Project Manager and client contact of the emergency. The SHSO shall then contact the HSM.
- If applicable, the SHSO shall notify off-site emergency responders (e.g. fire department, hospital, police department, etc.) and shall inform the response team as to the nature and location of the emergency on-site.
- If applicable, the SHSO evacuates the site. Site workers should move to the guard station at the front gate (See Site Map).
- For small fires, flames should be extinguished using the fire extinguisher. The Memphis Fire Department will be notified in the event of a large fire.
- In an unknown situation or if responding to toxic gas emergencies, appropriate PPE, including SCBAs, should be donned.
- If chemicals are accidentally spilled or splashed into eyes or on skin, use eyewash and/or shower.
- If a worker is injured, first aid shall be administered by certified first aid provider.
- Before continuing site operations after an emergency involving toxic gases, the SHSO shall don a SCBA and utilize appropriate air monitoring equipment to verify that the site is safe.
- An injured worker shall be decontaminated appropriately.
- After the response, the SHSO shall follow-up with the required company reporting procedures, including the First Report of Accident Report (Attachment 8).

13.0 CONFINED SPACE ENTRY

<u>Yes</u> <u>No</u> The task(s) for this project involve confined space entry.

<u>_X</u>_

14.0 SPILL CONTAINMENT

| Yes | <u>No</u> | The task(s) for this project involve drum/tank/container sampling, excavation, transportation, etc. |
|----------|-----------|---|
| <u>X</u> | | This task is specific to IDW sampling and analysis. |

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15.0 HAZARD COMMUNICATION

The following procedures shall be followed for all chemicals brought on site (e.g., decontamination solution, sample preservatives, etc.):

Chemical containers (primary and secondary) shall be correctly and clearly labeled with the name of the chemical and the hazard(s) associated with that chemical (e.g. flammable, corrosive, etc.).

Workers have received training on the hazards of these chemicals as indicated in Table 4.1.

An MSDS for each chemical to be utilized during sampling should be readily available at the site office.

| Alconox | pH 4 Buffer |
|---------------------------------|---|
| Gasoline | pH 7 Buffer |
| Hydrochloric Acid (HCl) | pH 10 Buffer |
| Isobutylene | Sodium Hydroxide (NaOH) |
| Methanol | Sulfuric Acid (H ₂ SO ₄) |
| Liqui-nox | Turbidity Standards |
| Nitric Acid (HNO ₃) | Zinc Acetate |

When chemicals are used on site, workers must adhere to the company's Hazard Communications Program (29 CFR 1910.1200).

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16.0 RECORD KEEPING

At the end of the project, the following items shall be maintained in the project file:

- X HASP
- X Incident Response Form (if applicable)
- <u>X</u> SHSO Summary (Attachment 9)
- <u>X</u> PPE Assessment and Certification Forms
- X Tailgate Safety Meetings Documentation

17.0 DDMT BACKGROUND REFERENCE DOCUMENTS

- CH2M Hill, 1995. Generic Remedial Investigation/Feasibility Study Work Plan, Defense Distribution Depot Memphis.
- CH2M Hill, 2001. Memphis Depot Main Installation Record of Decision Revision 2. Prepared for the U.S. Army Engineering and Support Center, Huntsville. February 2001.
- CH2M Hill, 2002. Memphis Depot Dunn Field Remedial Investigation Report. Prepared for the Defense Logistics Agency and presented to U.S. Army Engineering and Support Center, Huntsville, Alabama. July 2002
- CH2M HILL, 2003a. Long-Term Groundwater Monitoring Plan. Prepared for the U.S. Army Engineering and Support Center, Huntsville. October 2003.
- CH2M HILL, 2003b. Memphis Depot Dunn Field Five Year Review Revision 2. Prepared for the U.S. Army Engineering and Support Center, Huntsville. January 2003.
- CH2M HILL, 2003c. Memphis Depot Dunn Field Record of Decision Revision 1. Prepared for the U.S. Army Engineering and Support Center, Huntsville. November 2003.
- CH2M HILL, 2001. Groundwater Interim Remedial Action, Defense Depot Memphis, Tennessee, Operations and Maintenance Plan," Amendment 3 (August 28, 2001) prepared by CH2M Hill.
- CH2M HILL, 2004. Final Memphis Depot Dunn Field Record of Decision, Prepared for the U.S. Army Engineering and Support Center, Huntsville, November 2004.
- CH2M HILL, 2007. Memphis Depot Dunn Field Source Areas Final Remedial Design Revision 4. Prepared for the Defense Logistics Agency. April 2007.
- e2M, Inc. 2007a. Memphis Depot Fluvial Soil Vapor Extraction Remedial Action Work Plan– Revision 0. Prepared for the Defense Logistics Agency. January 2007
- e2M, Inc. 2007b. Memphis Depot Dunn Field Source Loess/Groundwater Remedial Action Work Plan Revision 0. Prepared for the Defense Logistics Agency. March 2007.
- Jacobs, 2004. Semi-Annual Groundwater Quality Report (Year Five, Second Half) for the Groundwater Interim Remedial Action at Dunn Field. Prepared for Mobile District Corps of Engineers. Jacobs Federal Programs. January 2004
- MACTEC, 2004. Site Safety and Health Plan, Revision 0. Prepared for the Defense Logistics Agency. April 2004.
- MACTEC, 2005a. Base Realignment and Closure (BRAC) Cleanup Plan, Version 8, Revision 1. Prepared for the Defense Logistics Agency. March 2005.
- MACTEC, 2005b. Remedial Action Work Plan, Main Installation, Defense Depot Memphis Tennessee, Revision 1. Prepared for the Defense Logistics Agency. July 2005.

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- U.S. Army Corps of Engineers (USACE), Huntsville, 1995. Archives Search Report Findings. Memphis Defense Depot, Memphis, Tennessee. Defense Environmental Restoration Program for Department of Defense Sites. Ordnance and Explosive Waste. Chemical Warfare Materials. January 1995.
- U.S. Army Toxic and Hazardous Materials Agency (USATHMA), 1981. Installation Assessment of Defense Depot Memphis, Tennessee. Report No. 191. Chemical Systems Laboratory, Environmental Technical Division, Installation Restoration Brach, Aberdeen Proving Ground, Maryland.
- UXB International, Inc., December 2001. Final Chemical Warfare Material Investigation/Removal Action Report.



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ATTACHMENT 1 HEALTH AND SAFETY MANAGER RESUME

Robert H. Klawitter, Jr., CSP, REM Health and Safety Manager

Education: B.S./Safety Management/1985

Professional Certifications: Certified Safety Professional (CSP), April 2004 Registered Environmental Manager (REM), March 2002

Years with e²M: 7 Years with other firms: 10 Years of DoD Experience: 7

Specialized Training: Certified Infrastructure Preparedness Specialist, 2005 Office Ergonomics, 1997 DuPont Behavior Based Safety, 1995

Experience Summary:

Mr. Klawitter has 17 years of comprehensive environmental, occupational safety and health experience, including eight years within a corporate environment working with all organizational levels from plant employees through Senior Vice Presidents. He has managed large, complex, multi-disciplinary environmental, health and safety programs and projects worldwide and has extensive knowledge and expertise in regulatory compliance. As e²M's Corporate H&S Director, Mr. Klawitter ensures compliance with relevant Occupational Safety and Health Administration (OSHA) regulations, develops training programs and policy required by pertinent OSHA regulations, and conducts site inspections of various worksites. Mr. Klawitter has conducted and/or managed over 300 health and safety compliance assessments at manufacturing facilities worldwide, as well as over 150 federal facilities in 25 states and territories of the United States. In addition, Mr. Klawitter has conducted and/or managed over 50 environmental compliance assessments at federal and state facilities in 16 states and territories of the United States.

Project Experience:

NOAA, Agency-wide (1999-Present). As Program and Project Manager, Mr. Klawitter assists NOAA in implementing their NOAA Environmental Compliance and Safety Assessment System (NECSAS). This includes organizing, scheduling, staffing, conducting and reporting of environmental, health and safety assessments throughout the United States and its territories. NECSAS Assessments encompassed 13 different protocols outlined in TEAM Guide, and 50 different health and safety protocols outlined in the USSH Guide in addition to applicable local and state regulations. Assessments were accelerated, using a state-of-the-art Assessment Manager computer program specifically developed for the NECSAS Program, typically with 10-15 facilities assessed and a draft report produced in a one-week time frame. Mr. Klawitter has managed, conducted, and/or drafted reports for Health, Safety and Environment (HS&E) assessments at over 150 facilities in the following states and/or U.S. territories; Alaska, California, Colorado, Connecticut, Florida, Guam, Hawaii, Illinois, Indiana, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Missouri, North Carolina, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, and Washington. In addition, Mr. Klawitter has assisted in the development of NOAA's Web-Hosted Assessment Manager (WHAM). This integrated, web-based compliance assessment tracking system incorporates NOAA established business rules and quality control throughout the reporting process, while tracking findings to closure with the use of the internet.

Pacific Air Forces (PACAF): Environmental Safety and Occupational Health Compliance and Management Program (ESOHCAMP) (2006-present). As Project Manager, Mr. Klawitter assisted PACAF ESOHCAMP management in the organization and staffing of PACAF ESOHCAMP's at Kadena AB Japan, Hickam AFB Hawaii, and Misawa AB Japan, and completed assessments as part of the ESOHCAMP team at Kadena and Misawa Air Bases. Mr. Klawitter also assisted with management and staffing of the 2006 Yokota Internal ESOHCAMP. The ESOHCAMP assessments encompassed 13 different environmental protocols outlined in both the Japan Environmental Governing Standards (JEGS) and US Team Guide. Hickam AFB Hawaii included state and local regulatory standards as part of the ESOHCAMP. In addition, 13 safety and occupational health and safety protocols were assessed.

Defense Supply Center Richmond, Virginia (DSCR) (2006). As Project Manager for the Environmental Compliance Evaluation (ECE), Mr. Klawitter assisted the DSCR in implementing their ECE program. This included organizing, scheduling, staffing, conducting and reporting of environmental assessments for the DSCR ECE. The ECE assessment encompassed 13 different protocols outlined in TEAM Guide in addition to applicable local and state regulations. Assessments were accelerated, using a state-of-the-art Assessment Manager computer program specifically developed for the completion of compliance assessments. Mr. Klawitter worked with DSCR Environmental staff to track open findings to closure and developed a Final Summary Report for the DSCR historical record of the 2006 ECE.

Department of Commerce, Herbert C. Hoover Building (2003). Mr. Klawitter managed organized, scheduled, staffed, and completed an environmental, health and safety assessment at the Department of Commerce (DoC), Herbert C. Hoover Building (HCHB) in the District of Columbia. Assessors evaluated 1.8 Million square feet of office space, photo processing operations, industrial printing operations, and maintenance shops. In addition, the DoC HCHB is home to the National Aquarium. The DoC Assessments encompassed 13 different protocols outlined in TEAM Guide, and 33 different health and safety protocols outlined in the AGSH Guide in addition to applicable local and state regulations. Assessments were accelerated, using a state-of-the-art Assessment Manager computer program. The site assessment portion of the project was completed in a one-week time-frame and the draft report produced within 3 weeks of departure.

United States Coast Guard (USCG), Various Facilities (2004). As Program and Project Manager, Mr. Klawitter assisted the USCG in implementing their Environmental Compliance Evaluation (ECE) program at two USCG facilities (Support Center (SUPCEN) Elizabeth City, Virginia and the Integrated Support Center (ISC) Portsmouth, Virginia. This included organizing, scheduling, staffing, conducting and reporting of environmental assessments for the two assessments. ECE assessments encompassed 13 different protocols outlined in TEAM Guide in addition to applicable local and state regulations. Assessments were accelerated, using a state-of-the-art Assessment Manager computer program specifically developed for the completion of compliance assessments.

U.S. Army National Guard; Environmental Compliance Assessments, Various Facilities Nationwide (1999-Present). Mr. Klawitter has been involved with over 100 environmental compliance assessments at various U.S. Army National Guard facilities throughout the continental United States as field project manager, QA/QC manager and/or assessment team lead. Assessments encompassed 13 different protocols outlined in TEAM Guide in addition to applicable local and state regulations including the evaluation of the following environmental management programs: asbestos, aboveground and underground storage tanks, hazardous waste storage and disposition, occupational health and safety, stormwater discharge permitting, and air permitting. Assessments were accelerated, using the state-of-theart WINCASS III computer program specifically developed for the National Guard ECAS/EPAS Program, typically with 50 facilities assessed and draft reports produced in a one week time-frame. Over 100 assessments have been conducted in the following states: Alaska, Colorado, Florida, Louisiana, Missouri, Montana, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, and Washington. **Centers for Disease Control and Prevention (CDC), Agency Wide (1999-2002).** As Program and Project Manager, Mr. Klawitter assisted CDC in implementing their Environmental Compliance Audit (ECA) program. This included organizing, scheduling, staffing, conducting and reporting of environmental assessments throughout the United States and its territories. ECAS assessments encompassed 13 different protocols outlined in TEAM Guide in addition to applicable local and state regulations. Assessments were accelerated, using a state-of-the-art Assessment Manager computer program specifically developed for the CDC ECA Program, typically with 1-5 facilities assessed and draft report produced in a one to three-day time frame. Mr. Klawitter has managed, conducted, and/or drafted reports for environmental assessments at over 10 facilities in the following states and/or U.S. territories: Alaska, Colorado, Georgia, Ohio, Pennsylvania, Puerto Rico, Washington, and West Virginia.

Guam Army National Guard (GUARNG); Emergency Action/Fire Prevention Plan and Fire Extinguisher Training, Barrigada, Guam (2002 & 2006). Mr. Klawitter developed the Emergency Action-Fire Prevention Plan for the GUARNG in 2002 and completed an update to this program in 2006. This plan included the development of facility specific emergency response procedures and fire prevention inspection procedures. In addition, Mr. Klawitter developed facility drawings identifying emergency evacuation routes and locations of all fire extinguishers. Mr. Klawitter also conducted OSHA required emergency action/fire extinguisher training for GUARNG personnel.

Peterson AFB Ozone Depleting Substances (ODS) Management Plan (2004). Mr. Klawitter managed the inventory of all ODS used and stored at Peterson AFB and the development of an ODS Management Action Plan for the elimination of Class I and Class II ODS's from Peterson AFB in accordance with the timelines established in Executive Order 13148.

Schriever AFB Ozone Depleting Substances (ODS) Management Plan (2006). Mr. Klawitter managed the inventory of all ODS used and stored at Schriever AFB and the development of an ODS Management Action Plan for the elimination of Class I and Class II ODS's from Schriever AFB in accordance with the timelines established in Executive Order 13148.

Lead Based Paint Management Plan, Fort Sill, Oklahoma (2003). Mr. Klawitter managed the development of a Lead Based Paint (LBP) Management Plan for Fort Sill where the handling of lead-containing substances presents a risk of being exposed to lead through inhalation or ingestion. The LBP Management Plan established the process for compliance with Lead Exposure in construction (29 CFR 1926.62) and Lead Exposure in general Industry (29 CFR 1910.1025) as it applies to work involving lead containing substances and work involving the disturbance of lead-based paint.

Johns Manville (JM) Corporation, Corporate (1991-1999). As a Senior Industrial Hygienist/Safety Engineer, Mr. Klawitter conducted industrial hygiene, safety and health audits at JM plants worldwide ensuring compliance with applicable Federal, state, and local regulations. Mr. Klawitter coached plant safety coordinators and employees in behavior-based auditing techniques, and assisted plant management with program development, implementation and maintenance. Mr. Klawitter served as a resource/expert on safety compliance and interpretation of local, state, federal and international regulations, in addition to JM policies. He conducted pre-acquisition safety and health evaluations, evaluated plant policies and programs related to industrial hygiene, safety and occupational health, and then developed recommendations for plant and corporate management. Mr. Klawitter has managed, conducted, and drafted reports for industrial hygiene, safety and health audits at approximately 90% of existing JM manufacturing locations worldwide.

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ATTACHMENT 2 CONTAMINANT FACT SHEETS

ATTACHMENT 2

CONTAMINANT FACT SHEET

| | | | | | HEALTH HAZARD DATA | | | | |
|--|--------------------|-----------------------------------|---|--------------------------------------|--|--|--|----------------------------|----------------------------|
| | | Color: Physical State: | <u>Silver-grey or tin-</u> Solid X Liquid | white | Carcinogen: OSHA X IARC X NTP X ACGH X | Source | TWA (units) | STEL (units) | C (units) |
| CONTAMINAN' FACT SHEET | | Odor: | Gas | ess | NIOSH Xerran Xeran Xerran Xerran Xerran Xerran Xerran Xerran Xerran Xerran Xera | OSHA PELs | 0.01 тө/т ³ | | |
| Chemical Name: Arsenic CAS Number: 7440-38-2 | | Odor Threshold: Vapor Density: | NA | | Signs/Symptoms of Acute Exposure Respiratory irritation, GI disturbances Dermatitis | ACGiH TLVs | 0.01 mg/m ³ | | |
| Synonyms: Arsenia | | Ionization Poten IDLH: | tial (IP): NA 5 mg | /m² | | NIOSH RELs | | | 0.002 тg/т ³ |
| | AIR MOI | VITORING | | | PERSONAL PROTECTIVE EQUIPMENT | FIF | RE/REACTIVI | ΤΥ ΒΑΤΑ | |
| Type | Brand/Model No. | Catibrations Method/Media | Relative Response or Conversion Factor | Meter Specific Action Level | Recommended Protective Clothing Materials: Suits Any chemical-resistant Gloves Any chemical-resistant | Flash Pount: LEL/UEL: Ere Extinguishi Dry Chemical Water Spray | NA NA / NA Media: X | Foam CO ₂ | ×× |
| Not Applicable | | | | | Boots Any chemical-resistant Service Limit Concentration (ppm) ⁻ NA | Incompatibilities Strong oxidizen Hydrogen gas o form the highly | s. bromine az san react with toxic gas ars | ride arsenic to ine. | |
| | | | | | MUC 1/2 Mask APR = TWA × 10 = <u>0.05 mg/m³</u> MUC Full-Face APR = TWA × 10 = <u>0.05 mg/m³</u> | | | | |
| Checked by: Emmet F. Curt | is | | Date: 12/5/03 | | | | | | |
| | | | | | 2003 by MACTEC Engineering & Cons | sulting, Inc. | | - | |

עסטים אידאר ובר בחקווהפרזחק א Consulting, וחכ. Judgement and knowledge of on-site hazards should be used in selecting PPE appropriate to the contantinant exists. Professional likely to be exposed.

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ATTACHMENT 2

CONTAMINANT FACT SHEET

| | | | | | HEALTH HAZARD DATA | | | | |
|--|-------------------------------------|--|---|--------------------------------------|---|--|----------------------------------|-------------------------|--------------|
| | | Color: Physical State: | Colorless Solid Liquid X | | Carcinogen: OSHA IARC X NTP ACGIH X | Source | TWA (units) | STEL (units) | C (units) |
| CONTAMINAN FACT SHEET | | Odor: | Gas Ether | -like | NIOSH X Skin absorbable: <u>yes X no X</u> Skin corrosive yes no <u>X</u> | OSHA PEL | 10 ррт | | 25 ppm |
| Chemical Name: Carbon Tetrachloride CAS Number: 56-23-5 | | Odor Threshold: Vapor Density: | <u> 140 -</u> 6.3 <u>g</u> | - 584 ppm /L | Signs/Symptoms of Acute Exposure: Irritates eyes and skin, central nervous system depression, nausea, vomiting, drowsiness, dizzinesss and incoherence. | ACGIH TLVs | 5 ppm | 10 ppm | |
| Synonyms: Tetrachloromethane carbon chloride carbon tet, Freon 10, Halon 14 | | Ionization Potent IDLH: | ttal (IP): 1145 200 F | 7 eV opm | | NIOSH RELs | | 2 ppm | |
| | AIR MO | NITORING | | | PERSONAL PROTECTIVE EQUIPMENT | FIR | E/REACTIV | ITY DATA | |
| Type | Brand/Model No. | Calibrations Method/Media | Relative Response or Conversion Factor | Meter Specific Action Level | Recommended Protective Clothing Materials: Suits Barricade, Responder, PE/EVAL, Viton Gloves Polyvinyl atcohol (do not use in water), Nitrile, Viton | Flash Point: _ LEL/UEL: <u>^</u> <u>Fire Extinguishir</u> Dry Chemical _ Water Spray _ | NA VA / NA Ng Media. X | Fоат СО ₂ | NA X |
| DIA | Microtip 10.6 eV | lsobutylene 100 ppm | 0.06 | 0.3 | Boots Nitrile | Incompatibilities | :41 | | |
| | | | | | Service Limit Concentration (ppm) 1000 | Chemically - act aluminum Forn exposed to flam | tive metals, ns phosgen le | gas when | |
| | | | | | MUC 1/2 Mask APR=TWA x 10= 25 ppm MUC Full-Face APR=TWA x 10= 25 ppm | | | | |
| Checked by: Emmet F. Cur | tis | | Date: 12/5/03 | | | | | | |
| Note: The recommended proto knowledge of on-site hazards s | active clothing r should be used | materials assumes t in selecting PPE ap | that potential for d opropriate to the c | direct contact | 2003 by MACTEC Engineering & Cons by splashing, dust inhalation, or other means) with the of the contaminant (trace vs percentage) to which the ir | ulting, Inc. contaminants exis idividual is likely to | its. Professi be exposed | onal judgme 1. | nt and |

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Remedial Action Health and Safety Plan Defense Depot Memphis, Tennessee **ATTACHMENT 2**

CONTAMINANT FACT SHEET

| | | | | | HEALTH HAZARD DATA | | | | |
|--|--------------------|-----------------------------------|---|--------------------------------------|---|---|-----------------------------------|-----------------|-----------------|
| | | Color: Physical State: | Colortess Solid Liquid X | | Carcinogen: OSHA IARC X NTP X ACGIH X | Source | TWA (units) | STEL (units) | C (units) |
| CONTAMINAN | E. | Odor. | Gas Swer | et, ethereal | NIOSH X NIOSH X NIOSH X NIOSH X NIOSH X NIO X Skin absorbable: Yes no X Skin corrosive: Yes no X | DEL PEL | | | 50 ррт |
| Chemical Name: Chloroform CAS Number: 67-66-3 | | Odor Threshold: Vapor Density: | 133 4.9 g | - 276 ppm <u>//</u> | Signs/Symptoms of Acute Exposure: Dizziness, mental dullnes, nausea, disorientation, headache, fatigue, anesthesia, irritation of eyes and skin. | ACGIH TLVs | 10 ppm | | |
| Synonyms: Methane trichloride Trichloromethane | | Ionization Poten IDLH: | ttal (IP): 114. | 2 eV ppm | | NIOSH RELs | | 2 ррт | |
| | AIR MOI | NITORING . | | | PERSONAL PROTECTIVE EQUIPMENT | FIR | E/REACTIVI | TY DATA | |
| Type | Brand/Model No. | Calibrations Method/Media | Relative Response or Conversion Factor | Meter Specific Action Level | Recommended Protective Clothung Materials: Suits Barncade, Responder, PE/EVAL, Trellchem, Tychem Gloves Polyvinyl atcohol (Do not | Flash Point: _ LEL/UEL: _ <u>Fire Extinguishi</u> i | NA VA / NA Ng <u>Media:</u> | | |
| QLA | HNU 11 7 eV | Isobutylene 100 mm | 0.315 | 3 15 | use in water). Teffon, Viton Boots | Dry Chemical Water Spray | NA NA | Foam CO2 | V N V |
| Detector Tube | Dräeger 6728861 | 2-10 ppm | 0.7 | 1.4 ppm | Service Limit Concentration (ppm): 1000 | Strong caustics strong oxidizes | chemically | - active meta | s, |
| | | | | | MUC 1/2 Mask APR=TWA x 10= <u>50 ppm</u> MUC Full-Face APR=TWA x 10= <u>50 ppm</u> | | | | |
| Checked by: Emmet F. Cur | tis | | Date: 12/5/03 | | | | | | |
| | | | | | 2003 by MACTEC Engineering & Cons | ulting, Inc. | | | |

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

Remedial Action Health and Safety Plan Defense Depot Memphis, Tennessee

ATTACHMENT 2

CONTAMINANT FACT SHEET

| | | | | | HEALTH HAZARD DATA | | | | |
|---|---------------------|-----------------------------------|---|--------------------------------------|---|---|-----------------------|-------------------------|--------------|
| | | Color: Physical State: | colorless Solid Lìquid X | | Carcinogen: OSHA IARC NTP ACGIH | Source | TWA (units) | STEL (units) | C (units) |
| CONTAMINAN FACT SHEET | F | Odor: | Gas X | (above 89°F) roform-like | NIOSH <u>X</u> Skin absorbable: <u>yes no X</u> Skin corrosive: yes no <u>X</u> | OSHA PEL | | | |
| Chemical Name: 1,1-Dichloroethene CAS Number: 75-35-4 | | Odor Threshold: Vapor Density: | 4 0 4 | ppm g/L | Signs/Symptoms of Acute Exposure: Irritation of skin and eyes, dizziness, headache, nausea, drunkeness and anesthesia. | ACGIH TLVs | 5 PPM | | |
| Synonyms: Vinylidene chloride 1,1-Dichloroethylene (1,1-DCE | | Ionization Poten IDLH: | tial (IP): 10.0 1,2-DCE 1000 | 00 eV nown 0 ppm | | NiOSH RELs | Lowest Feasible | | |
| | AIR MOI | NITORING | | | PERSONAL PROTECTIVE EQUIPMENT | | REACTIVIT | TY DATA | - |
| Type | Brand/Model No. | Calibrations Method/Media | Relative Response or Conversion Factor | Meter Specific Action Level | Recommended Protective Clothing Materials: Suits | Flash Point: LEL/UEL: | (-2'')F 6.5%/15.5% | | |
| | | | | | Gloves Teflon, Polyvinyl Alcohol (do not use in water) | <u>Fire Extinguish</u> Dry Chemical Water Spray | <u>ng Media:</u> | Foam CO ₂ | ×× |
| Оld | Microtip 10.6 eV | Isobutylene 100 ppm | 66.0 | 4.95 | Boots Teflon | <u>Incompatibilitie</u> | 6 | | |
| QIA | HNu 10.2 eV | Isobutylene 100 ppm | 0.64 | 3.2 | | Aluminum, sun | light, air, copp | ber, heat | |
| | | | | | Service Limit Concentration (ppm). 1000 | | i | | |
| | | | | - | MUC 1/2 Mask APR=TWA x 10= 25 ppm MUC Full-Face APR=TWA x 10= 25 ppm | | | | |
| Checked by: Emmet F. Cur | tis | | Date: 12/5/03 | | | | | | |
| | | | | | 2003 by MACTEC Engineering & Const | ulting, Inc. | | | |

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

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CONTAMINANT FACT SHEET

| | | - | | | HEALTH HAZARD DATA | | | | |
|--|--------------------|------------------------|-----------------|--------------|---|---|------------------------|--------------|-------------|
| | | Color: | Colorless | | Carcinogen: OSHA | Source | AWT (ation) | STEL | C (inte) |
| | | Physical State: | Solid | | IAKC | | (silin) | (ennin) | (uma) |
| | | | Liquid X | | ACGIH | | | | |
| | | | Gas | 1 | Skin absortable: ves no X | OSHA | | | |
| CONTAMINA EACT SHEE | ۲+ | Odor: | ਸੱਹ | oroform-like | Skin corrosive: yes no X | PELS | 200 ppm | | |
| | | Odor Threshold: | 0 08 | 3-17 ppm | Signs/Symptoms of Acute Exposure: | | | - | |
| Chemical Name: 1,2-Dichtoroethylene 156-59- 225 Nimbre 50 0 156- | 2, 50 5 | Vapor Density | 3.35 | <u>ş</u> g/L | Irritant to eyes and respiratory system, CNS, depression | ACGIH TLVs | 200 ppm | | |
| Synonyms: | C-00- | Ionization Potent | tial (IP): 9 65 | s eV | | | | | |
| Acetylene dichloride, cis -Acetylene dichloride, trans-Acetylene dichloride. | | IDLH. | 100 | 0 ppm | | NIOSH RELs | 200 ppm | | |
| | AIR MOI | NITORING | | | PERSONAL PROTECTIVE EQUIPMENT | FIR | E/REACTIVI | ΓΥ DATA | |
| Type | Brand/Model | Calibrations | Relative | Meter | Recommended Protective Clothing Materials: | Flash Point: | 36-39°F | | |
| | °N N | Method/Media | Response or | Specific | Suits Teflon, Viton, PE/EVAL, Barricade CPF3 Tochem | LEL/UEL: 5.(| 5% / 12.8% | | |
| | | | Factor | Level | Responder | | | 1 | |
| | | | | | Gloves Viton, Teflon, Polyvinyl Alcohol (do not use in water) | <u>Fire Extinguish</u> Dry Chemical Water Sorav | Ing Media: X | Foam CO, | ×× |
| | Microtip 10 6aV | Isobutylene 100 pnm | 1 45 | 290 | Boots Teflon, Viton | Incompatibilitie | | I | |
| <u>-</u> | | | | | | Strong oxidizer hvdroxide. copi | s, strong alkal oer | is, potassiu | ا د |
| | i | | | | Service Limit Concentration (ppm) 1000 | | | | |
| | | | | | MUC 1/2 Mask APR = TWA × 10 = 1000 ppm MUC Full-Face APR = TWA × 10 = 1000 ppm | | | | |
| Checked by: Emmet F. C | urtis | | Date: 12/5/03 | | | | | | |
| | | | | | 2003 by MACTEC Engineering & Con: | sulting, Inc. | | | |

Note. The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminant exists. Professional judgement and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

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ATTACHMENT 2

CONTAMINANT FACT SHEET

| | | | | | HEALTH HAZARD DATA | | | | |
|--|-------------------|-----------------------------------|---|--------------------------------------|--|---|-----------------------|-------------------------|--------------|
| | | Color: Physical State: | <u>Black or dark-brr</u> Solid <u>Resi</u> Liquid | aub | Carcinogen: OSHA IARC X NTP X ACGIH X | Source | TWA (units) | STEL (units) | C (units) |
| CONTAMINAN FACT SHEET | Ľ. | Odor: | Gas NA | | NIOSH X Skin absorbable: yes X no Skin corrosive: yes X no | OSHA PELs | .0.2 mg/m³ | | |
| Chemical Name: Polycyclic Aromatic Hydrocarbc CAS Number: 12-90-00 | suo | Odor Threshold: Vapor Density: | NA 10 | ۵/۲ | Signs/Symptoms of Acute Exposure: Dermatuts, bronchitts | ACGIH TLVs | 0 2 mg/m ³ | | |
| Synonyms: Coal tar pitch volatiles (CAS 65996-93-2) | | Ionization Poten IDLH: | tial (IP): NA 80 π | g/m³ | | NIOSH RELs | 0.1 mg/m ⁵ | | |
| | AIR MO | NITORING | | | PERSONAL PROTECTIVE EQUIPMENT | 414 | REACTIVIT | Y DATA | |
| Type | Brand/Model No | Calibrations Method/Media | Relative Response or Conversion Factor | Meter Specific Action Level | Recommended Protective Clothing Materials: Suits Tyvek Gloves Nitnle or Neoprene | Flash Point: LEL/UEL: <u>Fire Extinguish</u> Dry Chemical Water Spray | NA NA Xedia: | Foam CO ₂ | ×× |
| Not Applicable | | | | | Boots | Incompatibilitie Strong oxidizer | م اەن | | |
| | | | | | Service Limit Concentration (ppm). NA | | | | |
| | | | | | MUC 1/2 Mask APR = TWA x 10 = <u>1 ma/m</u> ³ MUC Full-Face APR = TWA x 10 = <u>1 ma/m³</u> | | | | |
| Checked by: Emmet F. Curt | tis | | Date: 12/5/03 | | | | | | |
| | | | | | 2003 by MACTEC Engineering & Consu | utting, Inc. | | | |

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists. Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the contaminant (trace vs percentage) to which the individual is likely to be exposed.

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ATTACHMENT 2

CONTAMINANT FACT SHEET

| | | | | | HEALTH HAZARD DATA | | | | |
|--|---------------------|-----------------------------------|------------------------------|-------------------|--|---|---------------------------------|--------------------------------|--------------|
| | i k | Color: Physical State: | colortess Solid Viouid | | Carcinogen: OSHA IARC NTP ACGIH X | Source | TWA (units) | STEL (units) | C (units) |
| CONTAMINAI FACT SHEE | | Odor | Gas | roform-like | NIOSH Xer Xer Xer Xer Xer Xer Absorbable: Yes no Xer | OSHA PEL | 100 ppm | | 200 ppm |
| Chemical Name: Tetrachloroethene CAS Number: 127-18-4 | | Odor Threshold: Vapor Density: | <u>47 p</u> <u>6.8 g</u> | bm J/L | Signs/Symptoms of Acute Exposure: Irritation of eyes, nose, and throat; nausea: flushing of the face and neck; vertigo: dizziness; incoherence; | ACGIH TLVs | 25 ppm | 100 ррт | |
| Synonyms: tetrachloroethyfene Perchloroethyfene (Perc) | | Ionization Poteni IDLH: | tial (IP): 9.32 | eV ppm | headache, sleepiness, and skin irritation | NIOSH RELS | Lowest Feasible | | |
| | AIR MON | ITORING | | | PERSONAL PROTECTIVE EQUIPMENT | 11 | RE/REACTIVI | ПҮ ДАТА | |
| Type | Brand/Model No. | Calibrations Method/Media | Relative Response or | Meter Specific | Recommended Protective Clothing Materials. Suits Teffon, Viton, CPF3, | Flash Point: | NA NA / NA | | |
| | | | Factor | Level | Barneaue, responder, Trelichem, Tychem Viton, Teffon, and Polyvinyl Alcohol (do not use in (water) | ELUCLL. Fire Extinguist Dry Chemical Water Spray | | Foam CO ₂ | \times |
| QId | Microtip 10.6 eV | Isobutylene 100 ppm | 1.04 ppm | 26 ppm | Boots Nitrile Rubber | Incompatibilitie | es: | · | |
| Old | HNu 10.2 eV | Isobutylene 100 ppm | 0.86 | 21.5 ррт | | Strong oxidize caustic soda, : | rs, chemically sodium hydrov | -active metal dde, and pota | sh Bh |
| Detecor Tube | Drager 8101 501 | 2 - 40 ppm | | 25 ppm | Service Limit Concentration (ppm): 1000 | | | | |
| | | | | | MUC 1/2 Mask APR=TWA x 10= 125 ppm MUC Full-Face APR=TWA x 10= 125 ppm | | | | |
| Checked by: Emmet F. Cu | rtis | | Date: 12/5/03 | | | | | | |
| | | | | | 2003 by MACTEC Engineering & Con | sulting, Inc. | | | |

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminants exists Professional judgment and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed.

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ATTACHMENT 2

CONTAMINANT FACT SHEET

| | | | | | ΗΕΑLTH ΗΑΖΑRD DATA | | | | |
|--|-------------------------------------|---------------------|---|--------------------------------------|--|---|--------------------------------|-----------------|--------------|
| - Julie | <u></u> | Color: | Colorless to pale | yellow | Carcinogen: OSHA IARC | Source | TWA (units) | STEL (units) | C (units) |
| | | Physical State: | Solid Liquid | | NTP ACGIH X | | (cum) | (ciiin) | (unus) |
| | | | Gas | | NIOSH X Skin absorbable: <u>yes X no </u> | OSHA | 5 ppm | | |
| CONTAMINAN FACT SHEET | <u> </u> | Odor: | Chlor | roform-like | Skin corrosive [.] yes no <u>X</u> | PEL | | | |
| | | Odor Threshold: | | 0.5 ppm | Signs/Symptoms of Acute Exposure: | | | | |
| Chemical Name: 1,1,2,2-Tetrachloroethane | | Vapor Density: | | AN | Vomiting; abdominal pain; tremors; jaundice: hepatitis: liver tenderness: | ACGIH TLVs | 1 ppm | | |
| CAS Number: 79-34-5 | | | | | dermatitis; kidney damage | | | | |
| synonyms: Acteviene tetrachloride: | | Ionization Poten | 11a1 (1P); | 11.10 eV | a se a guerra de la companya de la c | HSCIN | 1 000 | | |
| symmetrical tetrachloroethane | | IDLH: | | 100 ppm | | RELS | | | |
| | | | | ſ | | | | - | |
| | AIR MO. | NITORING | | | PERSONAL PROTECTIVE EQUIPMENT | FIR | E/REACTIVI | TY DATA | |
| Type | Brand/Model | Calibrations | Relative | Meter | Recommended Protective Clothing Materials: | Flash Point | ٩N | | |
| | No. | Method/Media | Response or | Specific | Suits Tychem, Teflon, Barricade | • | | | |
| | | | Conversion | Action | | LEL/UEL: | NA / NA | | |
| | | | Factor | Level | | - - - - | : | | |
| | | · · · · · | | | Gloves Letion, Viton, Polyvinyl alchohol (Do | Dry Chemical | n <u>q Media:</u> X | Foam | x |
| | | | 4 | | not use in water) | Water Spray | × | ŝ | |
| DID | 11 7eV | 100 ppm | 0.48 | 108 | Boots Letton, Viton | Incompatibilitie: | id | | |
| | | | | | | Strong caustics active metals su | ; chemically ich as: zinc a | | |
| | | | | | Service Limit Concentration (ppm): 1000 | magnesium pov | vders, sodium | n, and | |
| | | | | | | potassium; fum | ing sulfuric ac | bid | |
| | | | | | MUC 1/2 Mask APR=TWA x 10= 5 ppm MUC Fuil-Face APR=TWA x 10= 5 ppm | | | | |
| Checked by: Emmet F. Cur | tis | | Date: 12/16/03 | | | | | | |
| | | | | | 2003 by MACTEC Engineering & Consu | Iting, Inc. | | | |
| Note. The recommended prot knowledge of on-site hazards: | ective clothing r should be used | in selecting PPE ap | that potential for c opropriate to the c | direct contact (I soncentration o | by splashing, dust inhalation, or other means) with the in the contaminant (trace vs percentage) to which the in | contaminants exis dividual is likely t | sts. Professio o be exposed | onal judgmen | t and |

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CONTAMINANT FACT SHEET

| | | | | | HEALTH HAZARD DATA | | | | : |
|---|--------------------|-----------------------------------|---|--------------------------------------|--|--------------------------------------|--|---------------------------|--------------|
| | | Color: Physical State: | Colortess Solid Lıquid X | | Carcinogen: OSHA IARC NTP ACGIH | Source | TWA (units) | STEL (units) | C (units) |
| CONTAMINA FACT SHEET | 5. | Odor: | Gas Chło | roform-like | NIOSH X Skin absorbable: <u>yes no X</u> Skin corrosive: yes no <u>X</u> | OSHA PELs | 100 ррт | | 00 ppm |
| Chemical Name: Trichloroethene CAS Number: 79-01-6 | | Odor Threshold: Vapor Density: | 821 4.5 <u>6</u> | ppm J/L | Signs/Symptoms of Acute Exposure: Imtant to eyes and skin, headache nausea, vomiting, dermatitis, vertigo, visual disturbance, fatigue, giddiness, | ACGIH TLVs | 50 ppm | 100 ppm | |
| Synonyms: Ethylene trichloride, TCE, Trichloroethylene, Tritene | | Ionization Poten IDLH: | tial (IP): 9.45 1000 |) ppm | sleepiness | NIOSH RELs | 25 ppm | | |
| | AIR MOI | NITORING | | | PERSONAL PROTECTIVE EQUIPMENT | FIR | E/REACTIVI | ΓΥ DATA | |
| Type | Brand/Model No. | Calibrations Method/Media | Relative Response or Conversion Factor | Meter Specific Action Level | Recommended Protective Clothing Matenals: Suits Viton, PE/EVAL, Tychem, Barricade, Trelichem, Tefton, Responder Viton, Tefton Polyvinyl alcohof (do not | Flash Point: | Unknown 5 / 10.5% ng <u>Media:</u> | Alcohol re Foam | sistant X |
| Qid | Microtip 10.6eV | Isobutylene 100 ppm | 0 92 | 23 | Boots Teffon, Viton | water opray Incompatibilities | < | $\sum_{i=1}^{n}$ | < |
| | HNu 10.2eV | Isobutylene 100 ppm | 05.0 | 22.5 | | Strong caustics active metals (si | and alkalis, c uch as bariur | hemically- n, lithium, | |
| Detector Tube | Drager 6828541 | 2 - 5 0 ppm | | 25 | Service Limit Concentration (ppm): 1000 | sodium, magnes | sium, titaniun | ı, and berylli | (Lin |
| | | | | | MUC 1/2 Mask APR = TWA × 10 = 250 ppm MUC Full-Face APR = TWA × 10 = 250 ppm | | | | |
| Checked by: Emmet F. Cui | tis | | Date: 12/5/03 | | | | | | |
| | | | | | 2003 by MACTEC Engineering & Cons | ulting, Inc. | | | |

Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhaliation, or other means) with the contaminant exists. Professional judgement and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed

ATTACHMENT 2

CONTAMINANT FACT SHEET

| | | | | | HEALTH HAZARD DATA | | | | |
|--|--------------------|-----------------------------------|---|--------------------------------------|---|---|--|-----------------------------|--------------|
| | ~ | Color: Physical State: 4 | Colorless Solid Liquid X | below 7 ⁰ F | Carcinogen: OSHA X IARC X NTP X ACGIH X | Source | TWA (units) | STEL (units) | C (units) |
| CONTAMINAN FACT SHEET | | Odor | Gas X | sant | NIOSH X NIO | OSHA PELs | 1 0 ppm | | 5.0 ppm |
| Chemical Name: Vinyt Chloride CAS Number: 75-01-4 | | Odor Threshold: Vapor Density: | <u>10-2</u> 2.15 | 0 ppm g/L | Signs/Symptoms of Acute Exposure: Weakness, abdominal paın, frostbite paleness or blueness of extremeties | ACGIH TLVs | 1.0 ppm | | |
| Synonyms: Chloroethene, chloroethylene, ethylene monochloride, VC, monochloroethene | | Ionization Potent IDLH: | ttaf (IP): 9.99 Not I | eV Determined | | NIOSH RELs | Lowest Feasible | | |
| | AIR MOI | NITORING | | | PERSONAL PROTECTIVE EQUIPMENT | | IRE/REACTIVI | ΤΥ ΒΑΤΑ | - |
| Type | Brand/Model No. | Calibrations Method/Media | Relative Response or Conversion Factor | Meter Specific Action Level | Recommended Protective Clothing Materials: Suits Tychem, Teflon Gloves Teflon, Tychem Nitrile Rubber | Flash Point: LEL/UEL: <u>3</u> Fire Extinguish Dry Chemical Water Spray | NA 6% / 33% <u>Ing Media:</u> X | Foam CO ₂ | ×× |
| OId | Microtip 10.6eV | Isobutylene 100 ppm | 0.67 | 0.67 | Boots Nitrile Rubber, Teflon | Incompatibilitie | <u>.</u> | | |
| CId | HNu 10.2eV | Isobutylene 100 ppm | 0.32 | 0.32 | | Lopper, oxidiz iron, steel (pol | ers, auminum, /merizes in air, | peroxides, sunlight, or | |
| Q | HNu 11 7 eV | Isobutytene 100 ppm | 0.78 | 0.78 | Service Limit Concentration (ppm) ⁻ | heat unless sta iron and steel | abilized by inhib n presence of n | oltors). Attack noisture | <u> </u> |
| Detector Tube | Drager 6728061 | 0.5 - 3 ppm | | 1 0 ppm | MUC 1/2 Mask APR = TWA x 10 = 5 ppm MUC Full-Face APR = TWA x 10 = 5 ppm | | | | |
| Checked by: Emmet F. Cu | rtis | | Date: 12/5/03 | | | | | | |
| | | | | | 2003 by MACTEC Engineering & Cons | sulting, Inc. | ta Darfocolana | , | |

ŭ Note: The recommended protective clothing materials assumes that potential for direct contact (by splashing, dust inhalation, or other means) with the contaminant exists. Profess judgement and knowledge of on-site hazards should be used in selecting PPE appropriate to the concentration of the contaminant (trace vs percentage) to which the individual is likely to be exposed. Ì

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ATTACHMENT 3 HAZARD ANALYSIS PER TASK(S)

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| | | HAZARD ANALYS | IS PER TASK | | |
|--------------------------|--|---|--|----------------------------|---|
| HAZARD | INSTALLING MONITORING AND SVE/VMP WELLS | EARTH MOVING AND EXCAVATION ACTIVITES/ | GROUND- WATER, VAPOR AND SOIL SAMPLING | SVE SYSTEM CONSTRUCTION | SVE OPERATIONS AND MAINTENANCE ACTIVITIES * |
| I. CHEMICAL HAZARI | DS | | | • | |
| Inhalation | Х | Х | | X | Х |
| Skin absorption | Х | Х | | Х | Х |
| Ingestion | Х | Х | | Х | Х |
| Injection | | | | | |
| Fire | Х | | | Х | Х |
| Reactivity/Explosivity | | | | | |
| II. PHYSICAL HAZARI | DS | | | | |
| Heat Stress | Х | Х | Х | Х | Х |
| Cold Stress | Х | Х | Х | Х | Х |
| Noise | Х | Х | | Х | Х |
| Radiation | | | | | |
| Slipping/Tripping/Fallin | Х | Х | Х | Х | Х |
| Electrical Hazards | Х | Х | х | Х | Х |
| Adverse Weather | Х | Х | Х | Х | Х |
| Other: Water Related | | | | . | |
| II. BIOLOGICAL HAZA | ARDS | | | - | |
| Snakes | Х | Х | Х | Х | Х |
| Insects | Х | Х | Х | Х | Х |
| Poisonous Plants | Х | Х | Х | Х | Х |
| Medical Waste Hazards | | | | | |
| Other: | | | | | |

*O&M Activities include SVE and VMP well head repairs, maintenance on blowers, heat exchangers and other componenets.

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ATTACHMENT 4 SPECIFIC SAFE WORK PRACTICES PER TASK(S)

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| SPECIFIC SAFE WORK | Name of Job: | | JSA No. | 01 of 01 | Date: | X New |
|--|---------------------------------------|--|---------------------------|------------------------------|--|---|
| PRACTICES | Defense Depot Memohis. Tennesse | | <u> </u> | age <u>01</u> 01 <u>01</u> | 10/01/100 | Revised |
| JOB SAFETY ANALYSIS | Title of person who |) does job: | Field Superv | isor: | Analysis by: | |
| Groundwater, Soil Vapor, and Soil Samuling | Field Sampler | | Kevin Sedlak | | Steven Herrera | |
| Company/Organization: | Plant/Location: Memobis TN | | Department: DDMT Field | Team | Reviewed by: Tom Holmes | |
| e-MI, IIIC. Docusional and/or recommended | ATT GUIDDINATAT | | | | Approved by: | |
| Required and/or recommended Personal Protective Equipment: Hard ha | t, steel-toe boots, saf | ety glasses, hearing | protection | | Glen Turney | |
| Sequence and Description of Basic | c Job Steps | Potential | Hazards | i | Recommended Acti | ion or Procedure |
| 1). Travel to and from job site | 1). / | Vehicle accident | | | . Employees should follow licy | $v e^2 M$ vehicle operation |
| 2). Set-up traffic control to alert the tra- monthing in or near the Right-of-Way | iveling public 2). S if applicable | Struck by moving ve | ehicle | 2) al | . Wear traffic safety vest to ert to oncoming street/highv | o increase visibility and be way traffic |
| 3) Off-load sampling equipment 1001s and | supplies 3). I | Back injuries | | 3) | . Utilize proper lifting tech | niques |
| 4). Hazard communication and recognition | 4). are | Not knowing whe located. | re emergency | facilities 4) | . Identify area medical fauutes and phone numbers | cilities, emergency travel |
| 5). Moving equipment on site | 5).5 | Struck by moving v | ehicle | 5) dt al | Utilize signs/flags to con uring road crossings; use l arms on heavy equipment | trol street/highway traffic heavy equipment backing |
| 6). General sampling duties at the job site | 6A) & p | . Struck by debris c otential falls | or equipment; s | lips, trips 6. pe bi | A). Proper training of p resonal protection equipme oots, safety glasses, glov ousekeeping on drill rig | ersonnel; use of proper ent (Hard hats, steel toe ves, etc.); maintain site |
| | (B) | . Back injuries | | 9 | 3). Utilize proper lifting tec | chniques |
| | 6C) ligh | . Weather extrem- trning | es: heat, cold | , rain & 6 | Wear appropriate cloth scessary breaks; awarene ghtning; wait out hazardous | ning; consume fluids, take ss of the potential for situations |
| | (D) |). Outdoor safety: bi | iological hazar | ds 6 | D). Watch-where-you-step; | wear protective clothing |
| | (EE) | . Electrical shock | | 0 50 8 | E). Employee should be enerator before unplugg specially during rain events | careful to turn off the ing the electrical cord |
| | (F) | . Exposure to chem | nicals of conce | | F). Wear appropriate persond monitor breathing air etector. | onal protective equipment r with a photoionization |
| Date of field verification and validation | Na | mes of personnel t | hat completed | field verifica | tion and validation: | |

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| SPECIFIC SAFE WORK Name | e of Job: | JSA No. | Date: X New |
|--|---|-----------------------------------|--|
| PRACTICES Mem | nse Depot phis, Tennessee | 2 Page <u>01</u> of <u>05</u> | 2 04/15/07 Revised |
| JOB SAFETY ANALYSIS Title Operations and Maintenance of Techn SVE System | of person who does job: nician/ Staff Engineer | Field Supervisor: Kevin Sedlak | Analysis by: Steven Herrera |
| Company/Organization: Plant e ² M, Inc. | t/Location: phis, TN | Department: DDMT Field Team | Reviewed by: Tom Holmes |
| Required and/or recommended Personal Protective Equipment: Hard hat, wat | ter or comparable refreshm | ients, heavy gloves, | Approved by: Glen Turney |
| Sequence and Description of Basic Job | Steps Poten | tial Hazards | Recommended Action or Procedure |
| 1). Drive to and from job site. | 1). Vehicle acciden | lt. | 1). Employees should follow e ² M vehicle operation policy. |
| 2). Climbing on elevated surfaces. | 2A). Fall from ladd | ler. | 2A). Employees should be properly trained in ladder safety. Ensure equipment is in proper working order and implemented correctly. |
| | 2B). Fall from elev | ated surface. | 2B). Employees should be properly trained in fall protection standards. Always be aware of surroundings and use good judgment. Employee should be properly equipped with proper footwear to prevent slipping and proper eyewear to prevent "snow" blinding and discrientation. |
| 3). Turn electricity off to SVE system or apprections of the system. | plicable 3). Electrical shock | | 3). Employees should be properly trained in electrical hazards and proper operation of system in accordance with the O&M Manual. |
| 4). Implement lock-out tag-out procedures | 4). Another employ | ee restarting the system. | Employees should be properly trained and equipped for lock-out tag-out procedures. |
| 5). Remove guards, hatches, manways, etc. | 5A). Debris in eyes | s while removing parts. | 5A). Employees should were ANSI Z87.1 approved protective eyewear while performing work. |
| | 5B). Employee cu parts. | uts hands while removing | 5B). Employees should wear heavy gloves or other approved methods of hand protection. |
| | 5C). Employee cu parts. | uts knees while removing | 5C). Employees should were knee pads while performing specific duties. |

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| SPECIFIC SAFE WORK PRACTICES JO Operations and Maintenance for SVE System | OB SAFETY ANALYSIS | Page <u>02</u> of <u>02</u> |
|--|--|---|
| 6). Perform inspections/evaluate/replace parts needing repairs. | 6A). Debris in eyes while performing repairs. | 6A). Employees should were ANSI Z87.1 approved protective eyewear while performing repairs. |
| | 6B). Employee cuts hands while performing repairs. | 6B). Employees should wear heavy gloves or other approved methods of hand protection. |
| | 6C). Employee cuts knees while performing repairs. | 6C). Employees should wear knee pads while performing specific duties. |
| | 6D). Noise hazards | 6D). Blowers and other mechanical equipment may operated at elevated noise levels. Wear personal hearing protection when working in areas of elevated noise levels. |
| | 6e). Back injuries | 6E). Utilize proper lifting techniques |
| | 6E). Exposure to elevated temperatures while performing maintenance to blowers or other SVE equipment while in control room. | 6E). Use Buddy System while performing maintenance; keep hydrated (especially during summer months); monitor other personnel for heat stress symptoms. |
| | 6F). Unguarded moving equipment (blowers) | Unprotected blowers and fan may entangle workers clothing and cause injury. Guard all moving and rotating equipment. Inform workers that all such equipment must be operated with guards in place. Train personnel in the entanglement hazards and do not wear loose-fitting clothing. |
| | 6G). Asphyxiation | 6G). Employees should be properly trained in confined space entry and air monitoring. Always be aware of surroundings and use good judgment. Employee should be properly equipped with body harness and life line. |
| | 6G). Exposure to chemicals of concern | 6G). Wear appropriate personal protective equipment and monitor breathing air with a photoionization detector. |
| 8). Replace guards, hatches, manways, etc. | 8A). Debris in eyes while removing parts. | 8A). Employees should were ANSI Z87.1 approved |

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| | | protective eyewear while performing work. |
| | 8B). Employee cuts hands while removing | 8B) Employees should wear heavy gloves or other |
| | parts. | approved methods of hand protection. |
| | 8C). Employee cuts knees while removing | 8C). Employees should were knee pads while |
| | parts. | performing specific duties. |
| 9). Re-energize the system and check out operation of | 9). Electrical shock. | 9). Employees should be properly trained in electrical |
| newly modified system. | | hazards and proper operation of system in accordance |
| • | | with the O&M Manual. |
| 10). Clean-up and depart site. | 10). Slip, trip, and fall hazards | 10). Employee should leave the site with no trash or |
| • | | debris from maintenance related activities which might |
| | | cause a hazard for future operation and maintenance |
| | | personnel. |
| Date of field verification and validation: | Names of personnel that completed field verifi | cation and validation: |

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| SPECIFIC SAFE WORK | Name of Job: | | JSA No. | Dozo () of () | | Date: | New |
|---|----------------------|-------------------------|-----------------|----------------------------|-------------|-------------------------------------|-----------------------|
| PRACTICES | Memphis, Tenne | essee | <u> </u> | rage <u>ui</u> ui <u>u</u> | <u></u> | | Revised |
| JOB SAFETY ANALYSIS | Title of person | who does job: | Field Superv | /isor: | | Analysis by: | |
| Drilling/ Well Installation/ | Field Geologist | | Kevin Sedlak | | | Steven Herrera | |
| ADAILUUILIUUU | Plant/Location | | Denartment | | | Reviewed hv. | |
| company or gamzauon. e ² M, Inc. | Memphis, TN | | DDMT Field | Team | | Tom Holmes | |
| Required and/or recommended | | | | | | Approved by: | |
| Personal Protective Equipment: Hard ha | it, steel-toe boots, | , safety glasses, heari | ing protection, | tyvek | | Glen Turney | |
| Sequence and Description of Basi | c Job Steps | Potent | ial Hazards | | Reco | ommended Action of | r Procedure |
| 1). Travel to and from job site | | 1). Vehicle accident | | | 1). Driven | s complete e ² M Driving | Safety Training; |
| | - | - - | .1.1.1 | | compily wi | | i guidellites |
| 2). Set-up traffic control to alert the traveli | ng public when | 2). Struck by movin | ig venicle | | Z). Wear t | rathe safety vest to increa | ase visibility and be |
| working in or near the Right-of-Way | | | | | alert to on | coming street/highway tra | attic |
| 3). Off-load drilling equipment, tools and s | upplies | 3A). Struck by mov | ing vehicle | | 3A). Be al | ert to oncoming street/hig | ghway traffic |
| | | 3B). Back injuries | | | 3B). Utiliz | ce proper lifting technique | SS |
| 4). Hazard communication and recognition | | 4). Overhead and | d undergroun | d utilities: | 4). Identi | fy utility locations pri | ior to mobilizing; |
| | | electrical, gas, comi | munications, w | ater, etc. | interview | property owners and/or | employ a private |
| | | | | | utility loc | ator; drill at adequate e | offsets from utility |
| | | | | | locations; | identify area medical fa | acilities, emergency |
| | | | | | travel rout | es and phone numbers | |
| 5). Moving equipment on site | | 5A). Struck by mov | ing vehicle | | 5A). Util | ize signs/flags to cont | trol street/highway |
| | | | | | traffic du | ring road crossings; use | e heavy equipment |
| | | | | | backing al | arms on drill rig | |
| | | 5B). Falling trees & | : limbs | | 5B). Use | of proper personal pro | stection equipment; |
| | | - | | | maintain a | ı safe distance from drill r | ig |
| 6). Site clearing | | 6). Cut by chain sav | v & struck by d | lebris | 6). Proper | training of personnel for | r chain saw use; use |
| | | | | | of proper | · personal protection et | quipment (hardhat, |
| | | | | | safety glas | sses, gloves, ear protection | n, etc.) |

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| SPECIFIC SAFE WORK PRACTICES JC Drilling/Monitoring Well Installation/Abandonmer | DB SAFETY ANALYSIS | Page 02 of 02 |
|---|---|---|
| 7). General drilling duties at the job site | 7A). Struck by debris or equipment; slips, trips & potential falls | 7A). Proper training of personnel; use of proper personal protection equipment (Hard hats, steel toe boots, safety glasses, gloves, etc.); maintain site housekeeping on drill rig |
| | 7B). Back injuries | 7B). Utilize proper lifting techniques |
| | 7C). Weather extremes: heat, cold, rain & | 7C). Wear appropriate clothing; consume fluids, take |
| | lightning | necessary breaks; awareness of the potential for |
| | | lightning; wait out hazardous situations |
| | 7D). Outdoor safety: biological hazards | 7D). Watch-where-you-step; wear protective clothing |
| | 7E). Exposure to chemicals of concern | 7E). Wear appropriate personal protective equipment |
| | | and monitor breathing air with a photoionization |
| | | detector. |
| Date of field verification and validation: | Names of personnel that completed field veri | ication and validation: |
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Safety traffic during road crossings; run with 4-way flashers 2). Wear traffic safety vest to increase visibility and be 5B). Always have a spotter in place while backing any vehicle operation 4A). Identify area medical facilities, emergency travel 5A). Utilize signs/flags to control street/highway and headlights at all times. Ensure large equipment has functioning back-up alarms. Provide workers and spotters in the vicinity of operating heavy equipment Approach equipment from front **Recommended Action or Procedure** 3A). Be alert to oncoming street/highway traffic Revised 1). Drivers complete a defensive Driving New alert to oncoming street/highway traffic 3B). Utilize proper lifting techniques × Training; comply with e2M and within view of operator. Analysis by: Steven Herrera routes and phone numbers Reviewed by: Tom Holmes Approved by: Glen Turnev with orange vests. 04/15/07 Date: and all vehicles. guidelines 8 5A). Struck by moving vehicle or heavy Page <u>01</u> of 4A). Struck by construction equipment/ DDMT Field Team Field Supervisor: Kevin Sedlak Department: **Potential Hazards** Personal Protective Equipment: Hard hat, steel-toe boots, safety glasses, hearing protection 3A). Struck by moving vehicle JSA No. 2). Struck by moving vehicle 5B). Backing over obstacles 4 1). Vehicle accident 3B). Back injuries Title of person who does job: equipment. Field Geologist/Site Safety excavator Memphis, Tennessee Plant/Location: Name of Job: Defense Depot 2). Set-up traffic control to alert the traveling public when Memphis, TN Sequence and Description of Basic Job Steps Supervisor 3). Off-load injection equipment, tools and supplies 4). Hazard communication and recognition SAFE WORK **JOB SAFETY ANALYSIS** working in or near the Right-of-Way **Required and/or recommended** 1). Travel to and from job site Engineering-environmental 5). Moving equipment on site Company/Organization: **Excavation Activities** Management, Inc.. **PRACTICES** SPECIFIC

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| SPECIFIC SAFE WORK PRACTICES J(Excavation Activities | DB SAFETY ANALYSIS | Page <u>02</u> of <u>02</u> |
|--|--|--|
| 6). Excavation of Contaminated Material | 6A). Utility contact hazards. | 6A). Ensure personnel are trained in the hazards of excavating in the vicinity of underground or overhead utilities. Properly identify all underground and above ground (i.e. overhead power lines) by contacting local utilities and public work authorities. Once utilities are located, careful excavation by backhoe may be allowed. |
| | 6B). Slip, trip and falls | 7B). Be aware of surroundings and avoid shortcuts. Mark/barricade all open excavation with caution tape or orange mesh fencing. |
| | 6C)Excavation cave-in | 6C) Slope/bench all excavations to assure slope stability and prevent cave-ins. The soil conditions will be evaluated by the Competent Person and the slopes will be adjusted, as necessary, in light of the actual field conditions. Expect all excavation daily to ensure continued integrity. |
| | 6D). Weather extremes: heat, cold, rain & lightning 6E). Outdoor safety: biological hazards | 7D). Wear appropriate clothing; consume fluids, take necessary breaks; awareness of the potential for lightning; wait out hazardous situations 7E). Watch-where-you-step; wear protective clothing |
| | 6F). Exposure to chemicals of concern | 7E). Wear appropriate personal protective equipment and monitor breathing air with a photoionization detector. Perform dust monitoring per site HSAP. |
| Date of field verification and validation: | Names of personnel that completed field verif | ication and validation: |

| | | | | | | ſ |
|---|--------------------------------------|------------------------|--------------------|-------------------------|--|-----|
| SPECIFIC SAFE WORK | Name of Job: | Sr | 3A No. | | Date: X New | |
| PRACTICES | Jetense LJepot Memphis. Tennesser | 0 4 | rage <u>ur</u> o | 70 1 | U4/12/U/ Revised | |
| JOB SAFETY ANALYSIS | Fitle of person who | does job: Fi | eld Supervisor: | | Analysis by: | |
| SVE System Construction F Activities | ield Geologist/Site | Safety Ke | evin Sedlak | | Steven Herrera | |
| Company/Organization: | Plant/Location: | De | epartment: | | Reviewed by: | |
| Engineering-environmental | Memphis, TN | ī | DMT Field Team | | Tom Holmes | |
| Management, Inc | | | | | | |
| Required and/or recommended | | | | | Approved by: | |
| Personal Protective Equipment: Hard hat, | steel-toe boots, safe | ety glasses, hearing J | protection | | Glen Turney | |
| Sequence and Description of Basic | Job Steps | Potential | Hazards | Rec | ommended Action or Procedure | |
| 1). Travel to and from job site | 1). | Vehicle accident | | 1). Drive | rs complete a defensive Driving Safe | ŝty |
| | | | | Training; guideline: | comply with e2M vehicle operati s | on |
| 2). Set-up traffic control to alert the traveling | g public when 2). | Struck by moving ve | ehicle | 2). Wear | traffic safety vest to increase visibility and | be |
| working in or near the Right-of-Way | | | | alert to or | coming street/highway traffic | |
| 3). Off-load injection equipment, tools and su | upplies 3A) |). Struck by moving | vehicle | 3A). Be a | lert to oncoming street/highway traffic | |
| • | 3B) |). Back injuries | | 3B). Utili | ze proper lifting techniques | |
| 4). Hazard communication and recognition | 4). | Struck by con | struction equipmen | t/ 4). Identi | fy area medical facilities, emergency trav | /el |
| | exc | avator | | routes and | I phone numbers | |
| 5). Moving equipment on site | [5 A) |). Struck by moving | vehicle | 5A). Uti | lize signs/flags to control street/highw | ay |
| | | | | traffic du | ring road crossings; run with 4-way flashe | ers |
| | | | | | | |
| | 5B) |). Backing over obsta | acles | 5B). Alw and all ve | ays have a spotter in place while backing a hicles. | лу |
| 6). General construction activities | (V9 |). Electrical hazards | | 6A). All | electrical work is to be completed | by |
| | | | | competen | t personnel. Ensure proper lockout/tago | Jut |
| | | | | procedure | ss are used prior to the start of work. | |
| | (B) |). Struck by debris | or equipment; Slip | s, 6B.) Pro | per training of personnel; use of prop | Эcг |
| | trip | s, and falls | | personal | protection equipment (Hard hats, steel t | joe |
| | | | | boots, se | fety glasses, gloves, etc.); maintain si | ite |
| | | | | housekee | ping. Be aware of surroundings and avo | bid |
| | | | | shortcuts. | Ensure large equipment has functioni | ng |
| | | | | back-up | alarms. Provide workers and spotters in t | þe |

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| | | vicinity of operating heavy equipment with orange vests. Approach equipment from front and within view of operator. |
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| SPECIFIC SAFE WORK PRACTICES JC SVE Construction Activities | JB SAFETY ANALYSIS | Page 02 of 02 |
| 6.) General construction activities (continued) | 6C). Weather extremes: heat, cold, rain & lightning | 6C). Wear appropriate clothing; consume fluids, take necessary breaks; awareness of the potential for lightning; wait out hazardous situations |
| | 6D). Noise hazards | 6D). Wear personal hearing protection when working in areas of elevated noise levels. |
| | 6E). Outdoor safety: biological hazards 6F). Exposure to chemicals of concern | 6E). Watch-where-you-step; wear protective clothing 6F). Wear appropriate personal protective equipment and monitor breathing air with a photoionization detector. |

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ATTACHMENT 5

AIR MONITORING EQUIPMENT, FREQUENCY OF READINGS, AND ACTION GUIDELINES PER TASK(S)

ATTACHMENT 5

AIR MONITORING EQUIPMENT/FREQUENCY OF READINGS/ACTION GUIDELINES TASK(S): <u>All Activities Scheduled for DDMT</u>

| <u>x</u> Explosimeter Brand/Model No. <u>Neotronics</u> Monitoring Frequency: <u>Continuously</u> (for intrusive drilling activities only) | | <u>x</u> Oxygen Me Brand/Model Monitoring Fro (for intrusive dr | ter No. <u>Neotronics</u> equency: <u>Continuously</u> illing activities only) | X [*] Photoionization Detector Brand/Model No.: <u>Micro tip</u> Monitoring Frequency: <u>Continuously</u> | |
|---|--|--|---|--|---|
| Source Reading (% LEL) | Action | <u>Source</u> <u>Reading</u> (%) | <u>Action</u> | Breathing Zone Reading (ppm) | Action |
| <u>1</u> to <u>10</u> | Continue with caution | <u><19.5</u> | Stop work. Evacuate the area. | <u>0</u> to <u>0.5</u> | Modified Level D PPE |
| 210 | area. If action levels continue to be exceeded, contact HSO. | <u>19.5</u> to <u>23.5</u> | Continue to work with caution | <u>>0.5</u> to <u><5</u> | Check with detector tubes (See DT below) |
| | | <u>>23.5</u> | Stop work. Evacuate the area. | <u>>5</u> to <u><25</u> | Use Level C PPE and check with detector tubes (See DT below) |
| | | | | Note: <u>>25 ppr</u> SHSO prior to co | n stop work, notify ontinuing work. |
| <u>X</u> Chemical Detector Tube Brand/Model No.: <u>Drager (chloroform)</u> Monitoring Frequency: <u>Every positive</u> | | X Chemical I Brand/Model N (vinyl chloride) Monitoring Fra | Detector Tube o.: <u>Drager</u> equency: <u>Every</u> positive | <u>X</u> * Chemical Detector Tube Brand/Model No.: <u>Drager</u> (carbon tetrachloride) | |
| detection on PID (0.5 ppm above background sustained for 1 minute) | | detection on background sus | <u>PID (0.5 ppm above</u> tained for 1 minute) | Monitoring Fre positive detectio above backgrou minute) | quency: <u>Every</u> <u>n on PID (0.5 ppm</u> and sustained for 1 |
| Breathing Zone Reading Action (ppm) | | Breathing Zone Reading (ppm) | Action | Breathing Zone Reading Action (ppm) | |
| <u>0</u> to <u><5</u> | Modified Level D PPE | <u>0</u> to < <u>0.5</u> | Modified Level D PPE | <u>0</u> to <u><5</u> | Modified Level D |
| <u>5</u> to <u><50</u> | Level C and notify SHSO | <u>0.5</u> to < <u>5</u> | Level C PPE and notify SHSO | <u>5</u> to <u><25</u> | Level C PPE and notify SHSO |
| Note: > 50 ppm s | stop work, notify SHSO. | Note: > 5 ppm s | top work, notify SHSO. | Note: > 25 ppn SHSO. | n stop work, notify |

Mark equipment required for this task with "X"

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ATTACHMENT 6

PERSONAL PROTECTIVE EQUIPMENT PER TASK(S)

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PPE ASSESSMENT AND CERTIFICATION FORMS

ATTACHMENT 6 PERSONAL PROTECTIVE EQUIPMENT TASK(S): All Activities on site

| X *MODIFIED LEVEL | D· | *LEVEL C | |
|---|---------------|---|-----------------------------------|
| EQUIPMENT | MATERIAL/TYPE | EQUIPMENT | MATERIAL/TYPE |
| REQUIRED: | | REQUIRED: | |
| . Cafate hande (abaaa | | Full-facepiece, air-purifying, canister- | Organic Vapor/DM (Cartridge type) |
| - Safety poussings | | Chemical-resistant clothing (overalls and | Tyvek, Tychem, CPF |
| shields • Hard hat – if overhead hazards exist | | long-sleeved jacket hooded, one- or two- | |
| Chemical-resistant gloves | Nitrile | chemical-resistant one-piece suit) | |
| • Tyvek (if temperature conditions allow) | | Inner and outer chemical-resistant gloves Chemical-resistant safety boots/shoes | Unter-Nitrile/Neoprene |
| · I V NOLLOO | | • Hard hat | |
| • Coveralls | | OPTIONAL: | |
| Chemical-resistant clothing | | | |
| Work Gloves Escape mask | | Coverans Disposable boot covers | Nitrilc/Rubber |
| • Face shield | | Face shield | |
| Hearing Protection | | • Long cotton underwear | |
| OTHER. | , | | |
| OHLAN. | | OTHER: | |
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| * Mark initial level of protection with "X" | | | |

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PPE ASSESSMENT AND CERTIFICATION PART 1: ASSESSMENT AND SELECTION

Date: 04/15/07

| Description of process, task or operation: | | | | | | | | |
|---|---|--|----------------------|-----------------------------|--|---------------------------------------|------------------------------|----------------|
| Monitoring well installation and abandonment; groundwater, soil vapor, soil monitoring; construction/excavation activities; and O&M SVE system. | | | | | | | | |
| Des | cription of engineering and administrative co | ntrois | to be used: | | | | | |
| Fm | a hat, salety glasses, steel-toe boots, tyvek, hittin | C giuv | | | | | | |
| Sam | ployee(s) affected by this assessment. | rformi | ng repairs) | | | | | |
| Eve | /Face Protection: | | ig repaire) | YES | NO | | COMMENTS | |
| | Potential for flying objects? | | 1.1.00 | 1 | | | | |
| | Potential for chemical splash hazard? | | | V. | | Minimal due to | low flow sampling | |
| | Potential for airborne dust? | | | V. | | | | |
| | Potential for glare problems? | | | | 1 | | | |
| | Welding cutting torch work? | | | i | J. | | | |
| | Laser use? | | | i | 1 | | | |
| | Potential of pressure release? | | 16727 E | | 1 V | | n | |
| | Other eve or face hazard(s)? | | Lares - | 7 | | Miscellaneous | auinment | |
| | Eve/Face Protection Required? | | ····· | | | If yes, indicate | selection below | |
| 1 | Safety glasses with side shields | | Welding goggles - | lens shac | le → | | Welding helmet – lens sh | ade -+ |
| Y | Safety gogglet - unvented | | Welding shield - h | ens shade | | | | . |
| | Safety goggles - indirect venting | les – indirect venting | | ens shade | | | 1 | |
| | Safety goggles – vented | goggles – mareet venting Laser safety glasse | | | be the gla | asses and identify | person who selected the glas | ses: |
| | Faceshield with selection above Other (describe): | | | | | | | |
| | Describe conditions of use: | | | | | | | |
| Foo | ot/Lower Leg Protection: | | | | NO | | COMMENTS | |
| | Potential for handling or carrying heavy object | s? | - | V | | | | |
| | Potential for heavy objects to roll over foot? | | | 1 | | | | |
| | Potential for heavy objects to fall on foot? | | | 1 | | | | |
| | Potential to step on sharp objects? | | | V | | | | |
| | Uneven terrain or other potential twist hazards | ? | | V V | 1 | | | |
| | Use of chain saw or machete? | • | | 1 V | {·····= | | | |
| | Work in poisonous snake area? | | | t-j- | | | | |
| | Other hazards to feet or lower leg? | | • | <u> </u> | 1 | | · · · - | |
| | East/Lawar Lag Protection required? | | | | <u> </u> | If yes, indicat | e selection below - multi- | ple selections |
| | Foot/Lower Leg Protection required? | | | Ŷ | | Indicate multiple requirements | | |
| | Safety toe shoes Chemical resistant | | | hoots o | bots – specify type: Snake boots or legg | | | |
| 1 | Safety toe boots Chemical resistant | | | 00013 - 3 | Cut resistant chaps or le | | | gings |
| | Penetration resistant soles Champed resistant | | | t overboots - specify type: | | | Chain saw blade jamming | g chaps |
| | Metatarsal guards Chemical resistant | | | overboots – specify type: | | | Welders' quick removal t | poots |
| | Electrical protective | <u> </u> | Ice slip resist clam | p– or pul | l-ons | | | |
| | Other (describe): | | | | | | | |
| | Describe conditions of use: | | | | | · · · · · · · · · · · · · · · · · · · | CONDUENTS | |
| Hai | nd Protection: | | | YES_ | | | COMMENTS | |
| | Potential for contact with liquid chemicals? | | | <u> </u> | <u> </u> | | | |
| | Potential for contact with dry chemicals? | | | | Γ Υ · | | · · · · · · · | |
| | Work with vibrating equipment? | | | | <u> </u> | | | |
| | Welding, cutting or torch work? | | | <u> </u> | <u> </u> | _ | | |
| | Work with open blade knives? | | | ↓ V | | <u> </u> | | |
| | Potential for cuts, abrasions, blisters, etc? | | | <u> </u> | | | | |
| | Other potential hand hazard(s)? | | | V. | | Maintenance a | tivities | |
| | Hand Protection Required? | | | Ń | L <u> </u> | If yes, indicate | selection below | ···· |
| | Cotton work gloves | | Chemical resist glo | oves – spe | ec below | by material and the | ickness or make and model | |
| \checkmark | Leather work gloves | ↓_√_ | Nıtrile | | | V | Butyl | |
| | Cut resist – specify | ļ | Neoprene | | | | Other - specify | |
| | Welding gloves | ┨─── | Polyvinyl chloride | | | | - Specific make and model | : |
| | Vibration protective | | Polyvinyl alcohol | | | | | |
| | Other (describe): | | | | | | | |
| | Describe conditions of use: | | | | | | | |

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PPE ASSESSMENT AND CERTIFICATION

| Ski | n and Body Protection: | | | VES | NO | 1 | COMMENTS |
|---|--|-------|---------------------------------------|------------|---------------------------------------|---------------------|--|
| | Potential for contact with hauid chemicals? | | | | | | COMMENTS |
| | Potential for contact with dry chemicals? | | | N N | | | |
| Potential for exposure to non-ionizing radiation? | | | | | | | |
| Potential for exposure to ionizing radiation? | | | | <u> </u> | | | |
| Potential for exposure to other skin/hody hazards? | | | | <u>v</u> | | | |
| | Skin/Bady Protection Doquirod? | 15 (| | N N | | 16 | |
| 1 | Lincosted Tuyak® (Intrusing Activities) | | High wighther | <u> </u> | | Tryes, indicate | selection below |
| <u> </u> | Coated Twork® | | High Visibility | - | | | Nomex® |
| | Saraney | | weider s outerwea | <u>.r</u> | | | Other heat/fire resist – specify |
| | Other (describe): | | | | | | İ |
| | Describe conditions of use: | | | | | | |
| Re | spiratory Protection: | | · · · · · | YES | NO | I | COMMENTS |
| | Are airborne contaminants anticipated? | | | 120 | | | COMMENTS |
| | | | | <u> </u> | | Known in soil | and groundwater/to be monitored in air In |
| | Are levels and types of contaminants known?* | | | N | | the field | |
| If known, do they exceed Action Levels or Company established | | | | | · · · · · · · · · · · · · · · · · · · | | |
| Exposure Limits? | | | | N N | | | |
| | Respiratory Protection Required? | | | | | If yes, indicate | e selection below check all that apply |
| L | 1/2 facepiece Continuous flow re | | | gulator | | | SCBA emergency escape - spec |
| \checkmark | Full facepiece: Monitor with PID and follow Pressure demand r | | | egulator | | | minimum time |
| | upgrade procedures in H&S Plan, if required Pressure demand r | | | | | | |
| | Hood or helmet - select one Air line - compres | | | sor syster | n | | |
| | Powered air purifying respiratory (PAPR) Air line – bottle (c | | | ascade) sy | ystem | | Air purifying emergency escape |
| | Type of air purifying cartridge: SCBA – spec min | | | mum tim | e | | Type of air purifying cartridge: |
| V | V Other (describe): Monitor with PID and follow upgrade procedures in H&S Plan of required | | | | | | |
| Describe conditions of use: | | | | | | | |
| * D | etermine by monitoring or predictive calculations | s? B | v whom and when? | - | | | |
| He | ad Protection: | | , anomana anen. | VES | NO | - <u> </u> | COMMENTS |
| _ | Will construction activities take place? | | | 110 | | | COMMENTS |
| - | Potential for falling objects? | | ··· · · · · · · · · · · · · · · · · · | , V | | | |
| | Will work take place at levels above other perso | onne | ? | | 1 | | |
| Potential for side impact? (If Yes, select Class II below) | | | low) | | 1 V | | ······· |
| Will work take place in heat or cold? | | | | | | · ···· | |
| | Head Protection Required? | | | V V | | If ves. indicate | e selection below |
| \checkmark | V Class I Class II | | | · | | | Other (describe): |
| Describe conditions of use: overhead hazards present | | | | | | | |
| He | aring Protection: | | | YES | NO | | COMMENTS |
| | Sound level measured during peak operations: | | | | √ | | dBA |
| | Eight hour time weighted average (TWA): | | | | | | dBA |
| 1 | Other hazard(s) to hearing? | | | 1 | | Pcak levels w | ill exceed acceptable levels during drilling |
| ┣— | nataro(b) to houring: | | | <u> </u> | l | or SVE blowe | r operation |
| I | Hearing Protection Required? | | | 1 | <u> </u> | If yes, indicate | e selection below |
| | Minimum acceptable Noise Protec | tion | Rating (NRR) | l | | ∐ dB | |
| ⊢ ^ | Inserts (During drilling operations only) | | Muffs | | | | Combined |
| | Otter (desembe): | | | | | | |
| | Describe conditions of use: | | | | | | |
| PA | RT 2: CERTIFICATION | | | | | | |
| <u> </u> | | | | | | | |
| | | | | | Date | : 12/6/03 | |
| The | e undersigned has performed a hazard assessmen | t and | evaluation for the ta | ask(s) des | scribed o | n the first page of | of this form on the date shown above. The |
| рег | sonal protective equipment selected for use shall | be b | ased on this hazard a | ssessmen | t and eva | luation unless ov | verridden by another hazard assessment and |
| cva | luation performed and certified at a later date. | | | | | | - |
| 1 | | | | | | | |
| 1 | | | | | | | |
| | · · · · · · · · · · · · · · · · · · · | | · | | | | |
| L | Name | | | | | | Signature |
| | | | | | | | |

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ATTACHMENT 7

DECONTAMINATION PROCEDURES & EQUIPMENT PER TASK(S)

ATTACHMENT 7.1

DECONTAMINATION PROCEDURES & EQUIPMENT

Task(s) Drilling, Installation and Sampling Activities

Decontamination Solution: Detergent and Water

| | LEV | ELC |
|------------|---|---|
| Station 1: | Equipment Drop | Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area. |
| Station 2: | Outer Garment, Boots, and Gloves Wash and Rinse | Scrub outer boots, outer gloves, and splash suit with decon solution or detergent water. Rinse off using copious amounts of water. If suit is disposable, deposit in double bag plastic liner. |
| Station 3: | Outer Boot and Glove Removal | Remove outer boots and gloves. Deposit in container with plastic liner. |
| Station 4: | Canister or Mask Change | If worker leaves exclusion zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers are donned, joints are taped, and worker returns to duty. |
| Station 5: | Boot, Gloves and Outer Garment Removal | Boots, chemical resistant splash suit, and inner gloves are removed and deposited in separate containers lined with plastic. |
| Station 6: | Face Piece Removal | Facepiece is removed. Avoid touching face with fingers. Facepiece is deposited on plastic sheet |
| Station 7: | Field Wash | Hands and face are thoroughly washed. Shower as soon as possible. |

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ATTACHMENT 7.2

DECONTAMINATION PROCEDURES & EQUIPMENT

Task(s) Drilling, Installation and Sampling Activities

Decontamination Solution: Detergent and Water

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|------------|--|---|
| Station 1: | Equipment Drop | Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area. |
| Station 2: | Outer Garment, Boots, and Gloves Wash and Rinse | Scrub outer boots and outer gloves with decon solution or detergent water. Rinse off using copious amounts of water. If using disposable outer boots and protective garment (i.e. Tyvex) remove and double bag for disposal. |
| Station 3: | Outer Boot and Glove removal | Remove boot lines (if applicable) and gloves. Deposit in container with plastic liner. |
| Station 4: | Field Wash | Hands and face are thoroughly washed. Shower as soon as possible. |

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ATTACHMENT 8

ACCIDENT, INJURY AND REPORTING POLICY

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Accident Response, Reporting and Investigation

CONTENTS

- 1. **REGULATIONS**
- 2. INTRODUCTION
- 3. **RESPONSIBILITIES**
- 4. TREATMENT OF WORK-RELATED INJURIES
- 5. REPORTING REQUIREMENTS
- 6. **REPORTING PROCEDURES**
- 7. WORKER'S COMPENSATION
- 8. REPORTING TO OUTSIDE AGENCIES
- 9. RECORDKEEPING AND EMPLOYEE ACCESS TO RECORDS
- **10. ACCIDENT AND INJURY INVESTIGATIONS**

1. REGULATIONS

- 29 CFR 1904, Recordkeeping and Reporting Occupational Illnesses and Injuries
- Federal OSHA Injury & Illness Recordkeeping Guidelines, Regulations and Forms
- <u>8 CCR 342 Reporting Work-Connected Fatalities and Serious Injuries</u>
- <u>U.S. Army Corps of Engineers (USACE) Safety and Health Requirements Manual (EM-385-1-1), November, 2003</u>

2. INTRODUCTION

This procedure covers the process of providing the required treatment of work-related injuries, and reporting accidents to ensure the proper payment of benefits to the employee, provide accurate information for OSHA injury and illness recordkeeping, and for the accident investigation process.

3. **RESPONSIBILITIES**

- Employees must verbally report all accidents, injuries, and chemical exposures to their supervisor (or directly to the appropriate emergency number, depending on the severity of the accident).
- Supervisors or an alternate are responsible for reporting these incidents, including filling out the appropriate forms, to the Corporate Health & Safety Director and Human Resources. Supervisors may utilize the <u>Accident Reporting Checklist</u> to guide them through this process.
- The Corporate Health & Safety Director is responsible for tracking all work-related accidents, injuries, and exposures, and for initiating, assisting in and following up on accident investigations.
- Human Resources is responsible for reporting accidents to the insurance company and assuring the appropriate paperwork is filed to ensure payment of benefits and appropriate filing for claims.
- The Safety Committee is responsible for assisting in and reviewing accident investigations, and assuring that the necessary hazard controls identified through the investigation process are implemented.

4. TREATMENT OF WORK-RELATED INJURIES

It is the intent of e^2M that all employees suffering a work-related injury receive prompt and competent medical treatment.

If an accident occurs at a jobsite, all work in the immediate area should cease. With the exception of controlling the hazards of the area and stabilizing the injured employee(s), the accident scene must not be disturbed until a complete investigation of the incident has been completed. Upon notice to OSHA, it is very likely that OSHA personnel will respond to the jobsite to conduct an investigation. The Corporate Office must be notified if an OSHA investigation is initiated. The procedures for an OSHA inspection are outlined in Inspections section of this Program.

For non-life threatening injuries and first aid cases, treatment shall be provided at designated clinics or a hospital emergency room if a clinic has not been selected. In a field situation, all specified decontamination procedures must be followed prior to leaving the site unless the decontamination procedures themselves may worsen the employee's injuries. Transportation of an injured employee to the clinic or hospital shall be provided by the senior management representative or designated employee.

For life-threatening injuries, emergency medical personnel or other designated ambulance service shall be contacted. In field situations, decontamination procedures should only be performed under the direction of the emergency services personnel. Information regarding the contamination must be provided to the emergency service personnel upon their arrival at the site. This information will be available in the site-specific Health and Safety Plan (HSP) or the health and safety summaries for the site.

Designated clinics and hospitals shall be chosen for each site by the health and safety staff prior to commencement of work on site. Phone numbers, addresses, and routes from the site will be provided in the HSP or the health and safety summaries for the site, and verified before work begins.

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5. **REPORTING REQUIREMENTS**

Any incident or accident which has the potential to result in liability on the part of the corporation must be reported to a project supervisor or corporate officer. The corporate office must be notified within 24 hours of the accident or loss for the following circumstances:

- Injury of a company employee, including exposures to chemicals, hazardous waste, or infectious agents;
- Injury or exposure of a subcontractor's employee;
- Injury or exposure of a client's employee;
- Injury of a member of the general public due to work activities;
- Damage to property including land, equipment, buildings, or other possessions;
- Damage to equipment which exceeds \$500;
- Any motor vehicle accident, regardless of fault, involving a company vehicle, rental vehicle, or personal vehicle while the employee is acting in the course of employment. All vehicle accident reports must be accompanied by a police report, unless the police refuse to respond to the scene of the accident; and
- "Near miss" accidents in which injury or property damage was only narrowly avoided.

6. **REPORTING PROCEDURES**

- 1. When an accident occurs, employees must notify a supervisor (or call the appropriate emergency number directly, depending on the severity of the injury).
- 2. Employees and supervisors should give immediate care according to their level of training.
- 3. The supervisor coordinates with medically-trained persons (first-aid trained personnel or paramedics) to arrange for transport of any victims to the closest hospital or clinic. The injured employee may not transport themselves to a treatment facility.
- 4. If the injured person refuses medical care, they must fill out a Refusal of Medical Care form.
- 5. All accidents must be reported to the Corporate Health & Safety Director as soon as possible after the incident occurs.
- 6. If the accident involves a fatality, serious injury (loss of consciousness, compound fracture, head injury, disfiguring injury, serious burns, amputation, etc.), or hospitalization other than for observation, the supervisor must call the Corporate Health & Safety Director and/or the President/CEO immediately after the accident (OSHA must be notified within 8 hours in these cases). If in doubt, call the CHSD. If the Director is not immediately reachable, the call should go to the any of the Corporate Officers/Business Unit Managers (BUM) starting with the employees own BUM first.
- 7. The supervisor fills out the First Report of Injury form and forwards it to the Director no later than 24 hours after the accident by either e-mailing the form, hand delivering the form, or faxing and mailing hard copies the same day. Subcontractors may use their own form, as long as it meets OSHA first report requirements.

- 8. The CHSD will review the form, contact the supervisor, and forward a copy to Human Resources so that worker's compensation insurance carrier documentation can be completed if applicable. The First Report of Injury form serves as support for the OSHA 300 log described below.
- 9. Human Resources works with the employee to complete the Employee's Claim for Workers' Compensation Benefits form, as necessary. The employee must mail or fax the form to the corporate office, who forwards a copy to the insurance company.
- 10. The supervisor must forward all medical treatment information received to the corporate office.

17.1 7. WORKER'S COMPENSATION

Payment for treatment of work-related injuries is provided under Worker's Compensation insurance, as employee medical insurance policies specifically exclude work-related injuries. As noted above, the employee must send the Employee's Claim for Workers' Compensation Benefits form to the office in order to receive benefits. Workers compensation policy information is available from the corporate office.

8. **REPORTING TO OUTSIDE AGENCIES**

All reporting to outside agencies, with the exception of emergency notification to first responders (such as the fire department and ambulance), and employee complaints to OSHA, will be coordinated through the Corporate Health and Safety Director.

In the event of a fatality or serious injury of an employee, the occurrence must be reported to OSHA as soon as possible. Serious injuries include injuries which may result in disfigurement or disability. For Federal OSHA, reporting occurs when there is a fatality or hospitalization of 3 or more employees. These reports must be made as soon as possible and no later than 8 hours after the occurrence of the accident.

The procedure for OSHA reporting will be for the jobsite Project Manager, Health and Safety Officer, or other supervisor to contact the Corporate Office as soon as possible upon occurrence of a reportable incident. This reporting must occur immediately after stabilization of the situation and obtaining care for the injured employee(s). The Corporate Health and Safety Director or other corporate Officer will notify the OSHA office nearest the worksite where the incident occurred. The verbal notification should be followed-up by a FAX notification for documentation purposes. Failure to notify OSHA as soon as possible, but in not more than 8 hours from the time of the incident, may result in an OSHA citation and fines.

Outside agency reporting for other incidents, such as hazardous material spills, is outlined in the Emergency Response Program.

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9. RECORDKEEPING AND EMPLOYEE ACCESS TO RECORDS

Accident and illness recordkeeping is detailed in the <u>Recordkeeping Program</u>. All records and access will be maintained in accordance with the OSHA standard covering these items.

9.1. OSHA LOG OF OCCUPATIONAL INJURIES (OSHA 300 FORMS)

An OSHA Log of Occupational Injuries (<u>300 Form</u>) for the corporation will be maintained by the CHSD. This log includes all injuries requiring more than first aid treatment and all illnesses. The log must be current within six days of an accident. For established worksites, this Log is maintained by the Site Health & Safety Officer (SHSO). In the corporate office, it is maintained by the Corporate Health & Safety Director. A completed Log must be posted at each established site and at the corporate office from February 1 – April 30 of the year following the year for which the Log is completed. Injuries or illness on transient worksites are included on the corporate Log.

9.2. RECORDS RETENTION

In general, all employee exposure records are retained for at least 30 years. Employee medical records must be maintained for 30 years beyond the last day of employment. The OSHA 300 Log and First Reports of Injury must be maintained for at least 5 years.

9.3. ACCESS TO RECORDS

Employees or their designated representative may obtain access to these records upon written request to the corporation. These records must be made available to an OSHA inspector if requested during an inspection.

10. ACCIDENT AND INJURY INVESTIGATIONS

10.1. PURPOSE AND GOALS

The purpose of the investigation process is to examine the factors which caused an accident or exposure and to prevent further occurrences, but **not** to affix blame. Effective corrective actions will result from application of an unbiased, professional approach to accident investigation.

All accidents, even those which do not cause injury, illness, or property damage, should be investigated. These "near misses" often indicate the presence of hidden hazards, faulty procedures, or unsafe acts which may cause loss in the future.

The accident investigation should identify:

- What the employee was doing just before and at the time of the accident
- What other personnel were doing nearby before and at the time of the incident that may contribute to the event
- The unsafe acts and conditions that caused or contributed to the accident
- The corrective measures that have been or will be taken to prevent similar accidents in the future

If the investigation identifies an imminent hazard that cannot be corrected immediately, interim procedures for safeguarding employees must be adopted.

10.2. INVESTIGATION TEAM

Incident, accident and exposure investigations will be conducted by the Project Manager, Supervisor or SHSO, with support from the Corporate Health and Safety staff and/or members of the Safety Committee selected by the CHSD, and other personnel selected on the basis of their technical knowledge of the job or task involved.

10.3. DOCUMENTATION

Investigations must be documented on the <u>Accident Investigation form</u>, and must be completed within one week of the accident, unless additional data (i.e., laboratory results) are pending.

10.4. ACCIDENT INVESTIGATION PROCESS

The following process should be used during the accident investigation process to produce pertinent and usable information:

- 1. Visit the accident scene as soon as possible while evidence is fresh, and before witnesses forget important details.
- 2. Interview witnesses:
 - Talk with anyone who has knowledge of the accident, even if they did not actually witness it.
 - If possible, interview the injured worker or witnesses at the scene of the accident and "walk" them through a re-enactment.
 - Interview injured workers and witnesses one at a time. All interviews should be conducted as privately as possible.
 - Take signed statements in cases where facts are unclear or there is a potential for controversy.
- 3. Examine the workplace for factors associated with the incident.
- 4. If a third party or defective product may have contributed to the accident, save any evidence to be used in claims proceedings; it could be critical to the recovery of claims costs.
- 5. Document details graphically, using sketches, diagrams, and especially photos. Take measurements where appropriate.
- 6. Review relevant records such as training, equipment and area inspections, monitoring, etc.
- 7. Focus on causes and hazards. Develop an analysis of what happened, how it happened, and how it could have been prevented. Determine what caused the accident itself, not just the injury.
- 8. Determine all root cause(s) of the accident/exposure. Most accidents involve more than one contributing factor, and all of these factors must be identified in order to implement all of the necessary corrective actions.
- 9. Devise a corrective action plan to prevent the accident/exposure from recurring, which includes all of the identified corrective actions.
- 10. Record the findings and proposed corrective actions taken on the Accident Investigation form.
- 11. Review the accident and proposed actions with the Safety Committee and any affected employees.
- 12. Corrective actions should be implemented according to the procedures outlined in the <u>Hazard</u> <u>Abatement and Control Program</u>.
- 13. Publicize broader implications of the investigation to the rest of the employee population through employee meetings, postings on bulletin boards, and/or memos

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| FIRST REPOR | COFACCIDENT |
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| engineering-environmental Management, | Inc FAX TO: : (303) 721-9202 |
| Project Site Date of in | cident Time of incident Hrs. at work before incident |
| Location of incident / Supervisor | Date incident became restricted duty or lost-time |
| Job title of injured Employee Name. | Body part injured Nature of injury |
| Type of accident | Severity class of incident |
| Lost Rest.'d OSHA Time Duty Recordable | Severe Mod. Minor 1 2 3 |
| SEQUENCE OF EVENTS | Describe the physical situation plus pertinent events before, during, and after the incident. |
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| APPARENT CAUSES | List causes that appear to have directly contributed to the incident – unsafe acts and conditions. |
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ROOT CAUSES

List causes that appear to have directly contributed to the incident – unsafe acts and conditions.

IMMEDIATE ACTIONS TAKEN

List actions that will successfully prevent recurrence, as understood at this early stage of the investigation.

LONG TERM CORRECTIVE ACTIONS TAKEN

List actions that will successfully prevent recurrence, taking into consideration the root cause of the accident.

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DIAGRAM

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ATTACHMENT 9 SHSO SUMMARY l

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ATTACHMENT 9

SHSO SUMMARY

To be completed by SHSO following completion of each phase of field work.

During the work covered by this H&SP, there were:

(check one)

____No violations of the Safety Plan provisions and no incidents involving injury, illness or personnel contamination.

____The following violations of the Safety Plan provisions or incidents involving injury, illness or personnel contamination occurred. (*Provide details of type of violation or incident, who was involved, circumstances, and first aid or medical treatment required*).

If violation or incident occurred, describe corrective actions taken to prevent recurrence.

Project/Task Name:

Project/Task Number:

Dates in Field:

Signature:

(SHSO) Date:



