N62604.AR.001247
NCBC GULFPORT
5090.3a

WORK PLAN FOR SITE 6 FIRE FIGHTING TRAINING AREA NCBC GULFPORT MS
5/1/1995
MORRISON KNUDSEN

DELIVERY ORDER 0002

STATEMENT OF WORK 001

NAVAL CONSTRUCTION BATTALION CENTER

GULFPORT, MISSISSIPPI

WORK PLAN

SITE 6 - FIRE FIGHTING TRAINING AREA

Revision 1, Dated May 1, 1995

Prepared by:

MORRISON KNUDSEN CORPORATION

2420 Mall Drive

Corporate Square I, Suite 211

North Charleston, South Carolina 29406

Prepared For:

SOUTHERN DIVISION

NAVAL FACILITIES ENGINEERING COMMAND

P.O. Box 190010

2155 Eagle Drive

North Charleston, South Carolina 29419-9010

SET ID NO: 42

WORK PLAN - NCBC GULFPORT - GULFPORT, MISSISSIPPI
CONTRACT N62467-93-D-1106
DELIVERY ORDER 0002, STATEMENT OF WORK 001

REVISIONS

SECTION	TITLE	INSTRUCTIONS	REVISION	DATE
	Questions and Answers	Add in front of Work Plan	0	2/15/95
	Work Plan	Re-issued in its entirety	0	2/15/95
Appendix B	Quality Control Plan	Re-issued in its entirety	0	2/15/95
	Questions and Answers	Replace in its entirety	0	4/13/95
	Work Plan	Replace in its entirety	0	4/14/95
Appendix B	Quality Control Plan			
	QC Cover Page	Replace QC Cover Page	0	4/14/95
6.0	Submittals	Replace Submittal Register-located after page B-19	0	4/14/95
10.0	Documentation	Replace page B-33	0	4/14/95
		Replace all Field Inspection Checklists	0	4/14/95
	Work Plan			
	Work Plan Title Page	Replace existing title page	1	5/1/95
Appendix A	**Site Safety and Health Plan**	Replace appendix in its entirety	1	5/1/95
Appendix B	**Quality Control Plan**			
	QCP Title Page	Replace existing title page	1	5/1/95
6.0	Submittals	Replace Submittal Register-located after page B-19	1	5/1/95

WORK PLAN

SITE 6 - FIRE FIGHTING TRAINING AREA

NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

CONTRACT NO. N62467-93-D-1106
DELIVERY ORDER 0002
STATEMENT OF WORK #001

REVISION 1
MAY 1, 1995

Prepared For:

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P. O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, SOUTH CAROLINA 29419-9010

Prepared by:

MORRISON KNUDSEN CORPORATION
2420 MALL DRIVE
CORPORATE SQUARE 1, SUITE 211
NORTH CHARLESTON, SOUTH CAROLINA 29406

QUALITY CONTROL PLAN

NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

SITE 6 - FIRE FIGHTING TRAINING AREA

REVISION 1
MAY 1, 1995

CONTRACT #N62467-93-D-1106
DELIVERY ORDER 0002
Statement of Work 001

Prepared For:

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, SOUTH CAROLINA 29419-9010

Prepared By:

MORRISON KNUDSEN CORPORATION
NAVFAC - SOUTH DIVISION
2420 MALL DRIVE
CORPORATE SQUARE ONE, SUITE 211
NORTH CHARLESTON, SOUTH CAROLINA 29406

SUBMITTAL REGISTER (PART A)		Morrison Knudsen Corporation N. Charleston, SC					SUBMITTAL REGISTER (PART B)							Page 1 of 1
Contract No.: N62467-93-D-1106		Project Title:		U.S. Navy SOUTHDIV ERAC - Region II										
Delivery Order	Submittal No.	Sequence No.	Submittal Type	WBS No.	Submittal Description:									
0002	SD-08	001	SD	33.01.03.14	Remedial Action Plan - NCBC Gulfport		f:\submital\do0002.xls							
Spec. Section No. (a)	Material or Product (b)	Spec. Para. No. (c)	Classif/ Appr by CO (d)	Govt or A/E Reviewer (e)	Trans. Control No. (f)	Planned Submittal Date (g)	(h)	(i)	Date Submitted To PQM (j)	Date Submitted To CO (k)	Date Received By CO (l)	Action By CO (m)	Date Action by CO (n)	Date Received by MK (o)
Delivery Ord.#002, SOW #001	Work Plan, Rev.0 (DRAFT)	Delivery Order 002	G	CO	4324-94-096	12\27\94			12\22\94	12\27\94	12\27\94	R&R	1\30\95	2\02\95
Delivery Ord. #002, SOW #001	Site Safety & Health Plan, Rev.0 (DRFT)	Delivery Order 002	G	CO	4324-94-096	12\27\94			12\22\94	12\27\94	12\27\94	R&R	1\30\95	2\02\95
Delivery Ord.#002, SOW #001	Quality Control Plan Rev.0 (DRAFT)	Delivery Order 002	G	CO	4324-94-096	12\27\94			12\22\94	12\27\94	12\27\94	R&R	1\30\95	2\02\95
Delivery Ord.#002, SOW#001	Work Plan Rev.0 (2/15/95)	Delivery Order 002	G	CO	4324-94-199	2\21\95			2\17\95	2\21\95	2\21\95	R&R	3\21\95	3\21\95
Delivery Ord.#002, SOW #001	QC Plan Rev.0 (2/15/95)	Delivery Order 002	G	CO	4324-94-199	2\21\95			2\17\95	2\21\95	2\21\95	R&R	3\21\95	3\21\95
Delivery Ord.#002, SOW #001	Work Plan Rev.0 (4/14/95)	Delivery Order 002	G	CO	4324-94-270	4\25\95			4\25\95	4\25\95	4\25\95	Approval	4/27/95	4/27/95
Delivery Ord.#002, SOW #001	Site Safety & Health Rev.1 (5/01/95)	Delivery Order 002	G	CO	4324-94-430	5\11\95			5\11\95	5\11\95	5\11\95	Record		

APPENDIX A

TASK SPECIFIC SITE SAFETY AND HEALTH PLAN (SSHP)
FOR
REMEDIATION ACTIVITIES
AT
NAVAL CONSTRUCTION BATTALION CENTER GULFPORT
GULFPORT, MISSISSIPPI

REVISION 1
May 1, 1995

CONTRACT #N62467-93-D-1106
DELIVERY ORDER 0002
STATEMENT OF WORK #001

Prepared For:

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P. O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, SOUTH CAROLINA 29419-9010

Prepared By:

MORRISON KNUDSEN CORPORATION
2420 MALL DRIVE
CORPORATE SQUARE 1 - SUITE 211
NORTH CHARLESTON, SOUTH CAROLINA 29406

TASK SPECIFIC SITE SAFETY AND HEALTH PLAN (SSHP)
FOR
REMEDIATION ACTIVITIES
AT
NAVAL CONSTRUCTION BATTALION CENTER GULFPORT
GULFPORT, MISSISSIPPI

SPECIAL NOTICE

At the time of this writing, this Task Specific SSHP does not include detailed analysis of the Start-Up, Maintenance and Operation of the Groundwater Treatment Facility. A Revision to this SSHP is required, or a separate SSHP on operations and maintenance can be completed, or all safety and health data can be integrated into the MK prepared Operations and Maintenance Manual (O&M) when the facility nears construction completion and all Vendor Operations and Maintenance Manuals are available for review of the procured equipment.

The MK Gulfport Project Manager (PM) has direct responsibility to insure that this task is completed and the document, or its revision is approved by the Health and Safety Manager South Div Office.

The MK Gulfport Project Manager (PM) has direct responsibility to insure that the MK prepared O&M Manual is reviewed and signed off by the Health and Safety Manager South Div Office.

SITE SAFETY AND HEALTH PLAN FOR
REMEDIATION ACTIVITIES AT
NCBC GULFPORT, GULFPORT, MS

TABLE OF CONTENTS

TABLE OF CONTENTS (Continues)

TABLE OF CONTENTS (Continues)

TABLE OF CONTENTS (Continues)

APPENDICES

LIST OF FIGURES

LIST OF TABLES

SECTION 1
SITE DESCRIPTION, CONTAMINANT CHARACTERIZATION AND REFERENCES

1.1 Introduction

This Site Safety and Health Plan (SSHP) describes safety and health requirements for remediation activities at Site 6, a former fire fighting training area located at the Naval Construction Battalion Center (NCBC), Gulfport, Mississippi. This SSHP is consistent with requirements of the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Site Regulations, 29 CFR 1910.120 and 29 CFR 1926.65 along with the U.S. Army Corps of Engineers' *Safety and Health Requirements Manual* EM 385-1-1, October 1992.

This SSHP is applicable to all personnel who enter into work areas described in this SSHP and which are under Morrison Knudsen Corporation (MK) or MK's subcontractors' control.

1.2 Site Description

NCBC Gulfport is located in the western part of Gulfport, Mississippi, in Harrison County. Refer to Reference 1 Section 2.0 for additional background information on the site. Figure 1-1 presents the NCBC Gulfport, Mississippi location. Figure 1-2 presents NCBC layout and site location in the city of Gulfport, MS. Remediation activities will be taking place at and around Site 6, a former fire-fighting training center, located between Fifth Street, Simms Avenue, and Colby Avenue. Figure 1-3 presents the Site 6 remedial system layout map

The scope of work includes the removal of free-phase product and installation of a groundwater treatment system at Site 6. Included are the following tasks:

- Removal of 27 old tlephone poles;
- Installation of groundwater collectory wells, total fluid pumps, controls, and associated pipes and trenches;
- Collection, sampling and containerization of soil borings;

- Installation of the groundwater treatment system, comprised of an oil-water separator and a low profile air stripper or diffused aeration tanks;

- Connection to publicly owned treatment works to dispose of treated effluent;

- Start-up and testing of the system to achieve optimum efficiency; and

Section 3 from Reference 1 provides the engineering details and concept of operations for each of the major sub-system components associated with the remediation.

1.3 Contaminant Characteristics

Groundwater

Eighteen chemicals have been identified at concentrations of concern in the groundwater. Table 1-1 lists these compounds and their maximum concentrations. This information was obtained from Reference 1 Table 2-1.

Table 1-1 Potential Groundwater Contaminants

No.	Contaminant Name	Maximum Groundwater Concentration (parts per billion)
1	Benzene	83
2	2-Butanone (MEK)	80
3	Chloroethane (Ethyl Chloride)	310
4	Chloroform	20
5	Chloromethane (Methyl Chloride)	12
6	1,1-Dichloroethane	4,900
7	1,2-Dichloroethane (Ethylene Dichloride)	1,200
8	1,1-Dichloroethylene (Vinylidene Chloride)	3,100
9	1,2-Dichloroethene (total)	170
10	Ethylbenzene	77
11	Methylene Chloride	95
12	4-Methyl-2-Pentanone (Hexone)	100
13	Tetrachloroethene	32
14	Toluene	340
15	1,1,1-Trichloroethane (Methyl Chloroform)	5,900
16	Trichoroethylene	90
17	Vinyl Chloride	35
18	Xylene (total)	490

Additional information concerning the potential contaminants can be found in Table 2-1. Material Safety Data Sheets (MSDS's) for each of the contaminants are included in Appendix B.

1.4 References

1. *Performance Specification Site 6, Fire-Fighting Training Area Naval Construction Battalion Center Gulfport, Gulfport, Mississippi,* ABB Environmental Services, Inc., Contract N62467-89-D-0317, August 1994.

2. *Safety and Health Requirements Manual,* US Army Corps of Engineers, EM 385-1-1, October 1992.

3. *Pocket Guide to Chemical Hazards,* National Institute for Occupational Safety and Health (NIOSH), 1990.

4. *Limits for Air Contaminants,* Title 29 CFR Part 1910 Section 1000, Table Z-1, July 1, 1993 revision.

5. *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Indices,* American Conference of Governmental Industrial Hygienists (ACGIH), Second Printing, 1993 - 1994.

6. *Accident Prevention Plan For Naval Facilities Engineering Command Southern Division,* Prepared by Morrison Knudsen under contract N62467-93-D- 1 106, May 20, 1994, Revision 0.

7. *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities,* NIOSH/OSHA/USCG/EPA, DHHS (NIOSH) Publication No. 85-115, October 1985.

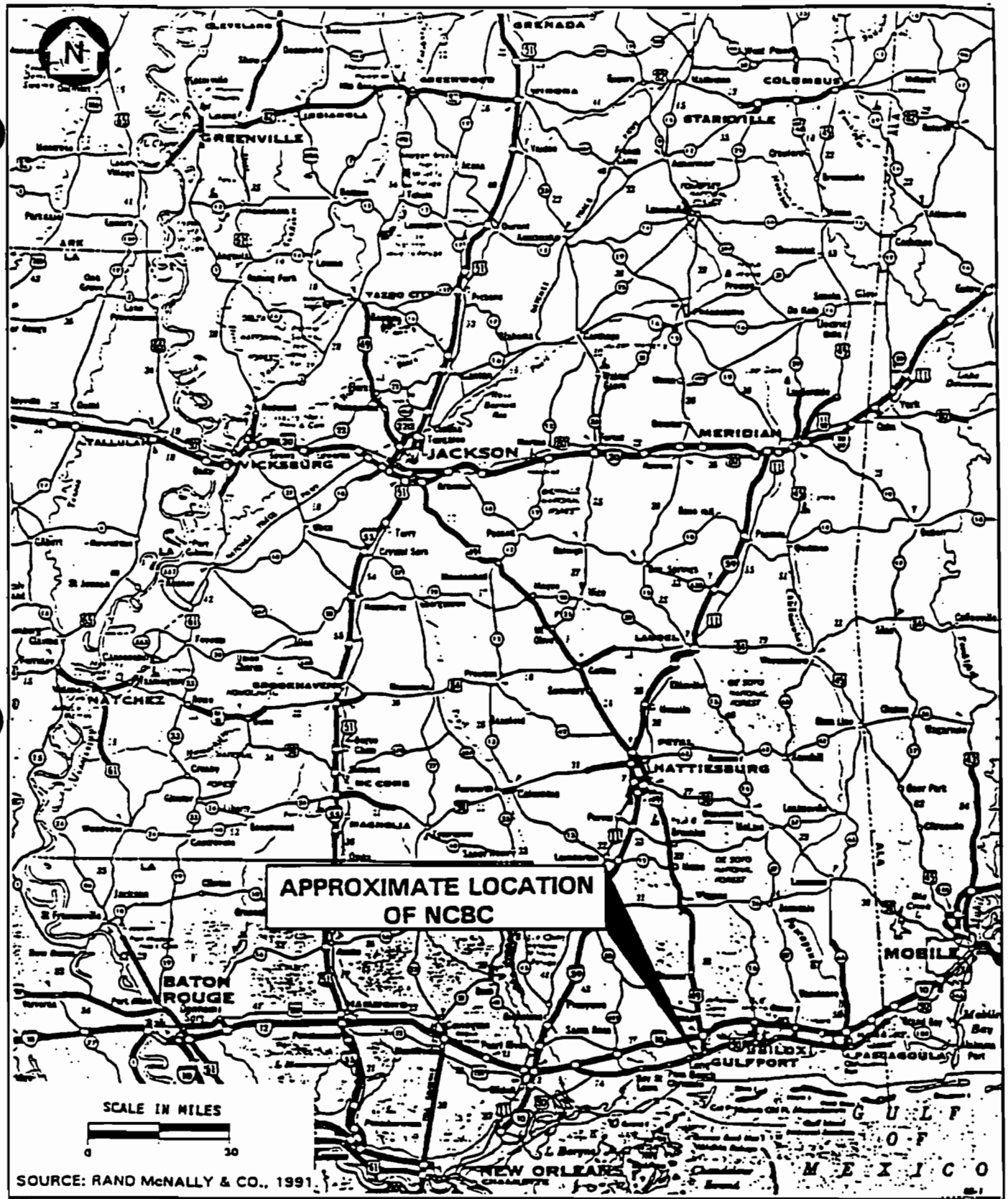
Supporting References

8. *Industrial Hygiene Procedures Manual,* Morrison Knudsen Corporation EC&E Group, Rev.No 0, April 1994.

9. *Safety and Health Program Description for Hazardous Waste Operations,* Morrison Knudsen Corporation, Rev. 1, August 1994.

10. *Safety Manual,* Morrison Knudsen Corporation, MK-Ferguson Group, 1/27/89.

Figure 1-1 NCBC Gulfport, MS, Location



SOURCE: RAND McNALLY & CO., 1991.

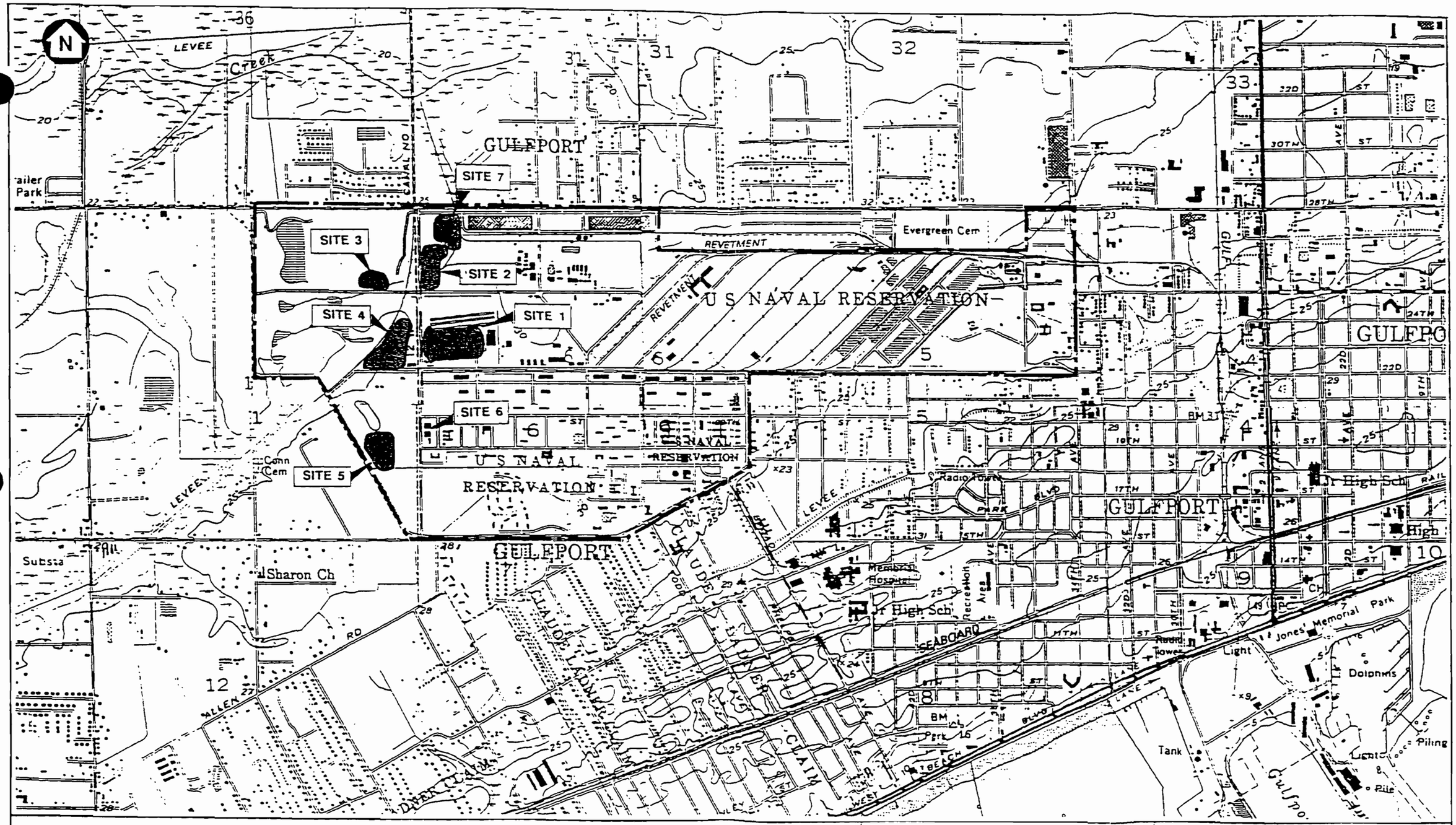
FIGURE 1-1
NCBC GULFPORT, MS, LOCATION

RI/FS HASP

NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI

7528-30

Figure 1-2 NCBC Layout and Site Location



SCALE IN FEET

0 500 1000 2000

SOURCE: USGS QUADRANGLE GULFPORT NW, MISS 1985.

APPROXIMATE SITE AREA

BASE BOUNDARY

MISS

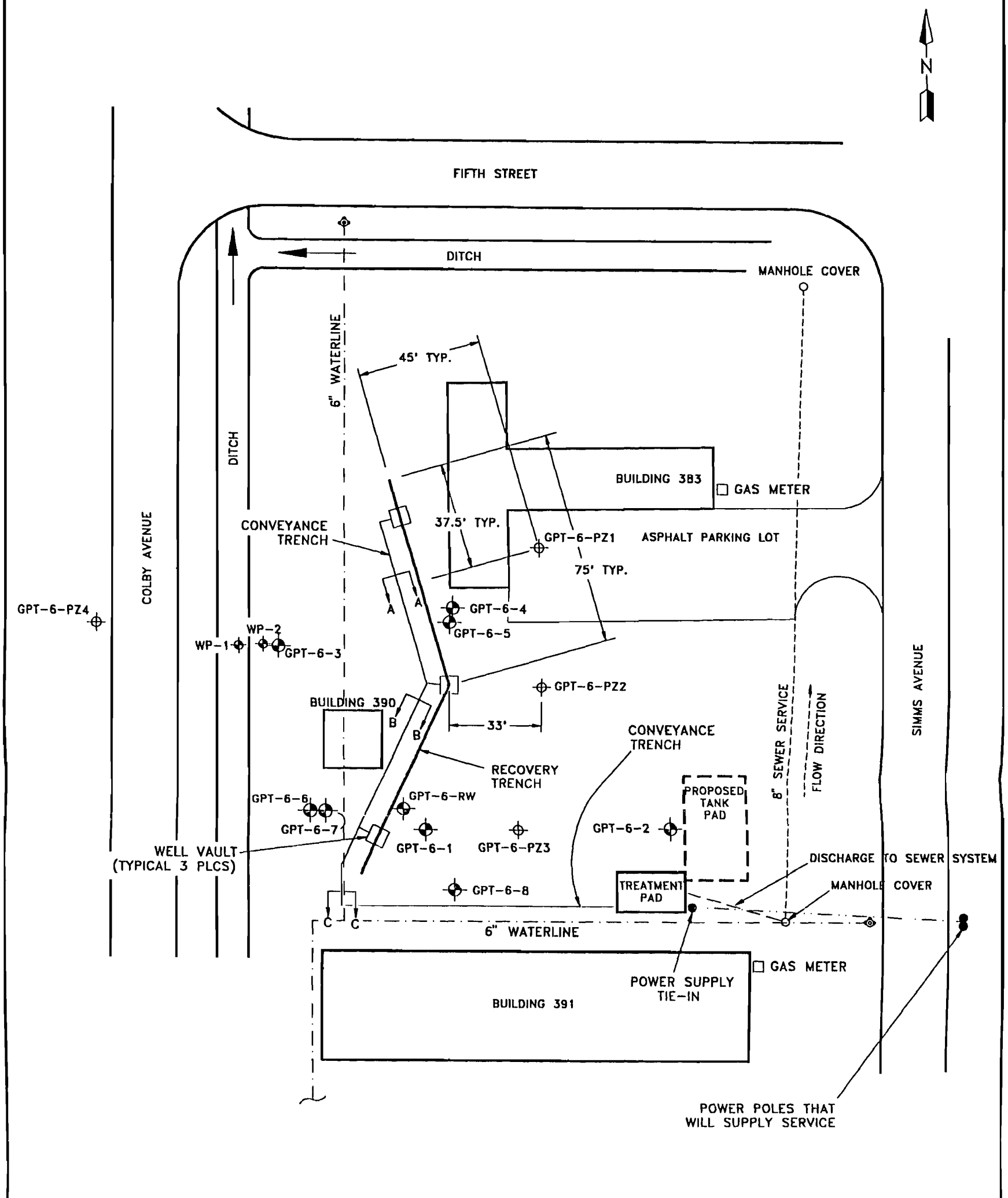
QUADRANGLE LOCATION

FIGURE 1-2
NCBC LAYOUT AND SITE LOCATION

RI/FS HASP

NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI

7528-30



LEGEND

- FIRE HYDRANT
- PROPOSED PIEZOMETER LOCATION
- GPT-6-4 — MONITORING WELL LOCATION (EXISTING)
- GPT-6-RW — RECOVERY WELL LOCATION (EXISTING)
- WP-1 — WELL POINT LOCATION (EXISTING)
- DRAINAGE DITCH
- SURFACE WATER FLOW DIRECTION
- SEWER SERVICE FLOW DIRECTION

NOTES:

PROPOSED TANK PAD MAY BE NEEDED IF EFFLUENT TANKS ARE REQUIRED FOR CONTROLLED FLOW STREAM TO POTW.

0 20 40

SCALE: 1" = 40'

SOURCE: E. PATRICK CASSADY & ASSOC., INC., 1994

FIGURE S-01

SITE LAYOUT

FREE-PHASE PRODUCT REMOVAL DESIGN PHASE

NCBC GULFPORT
GULFPORT, MISSISSIPPI

C:\GULFPORT\PS\SITE6\NCBC\8505.70\FIGS-01\JSL\941024

Figure 1-3 Remedial System Layout Map

NCBC GULFPORT
GULFPORT, MISSISSIPPI

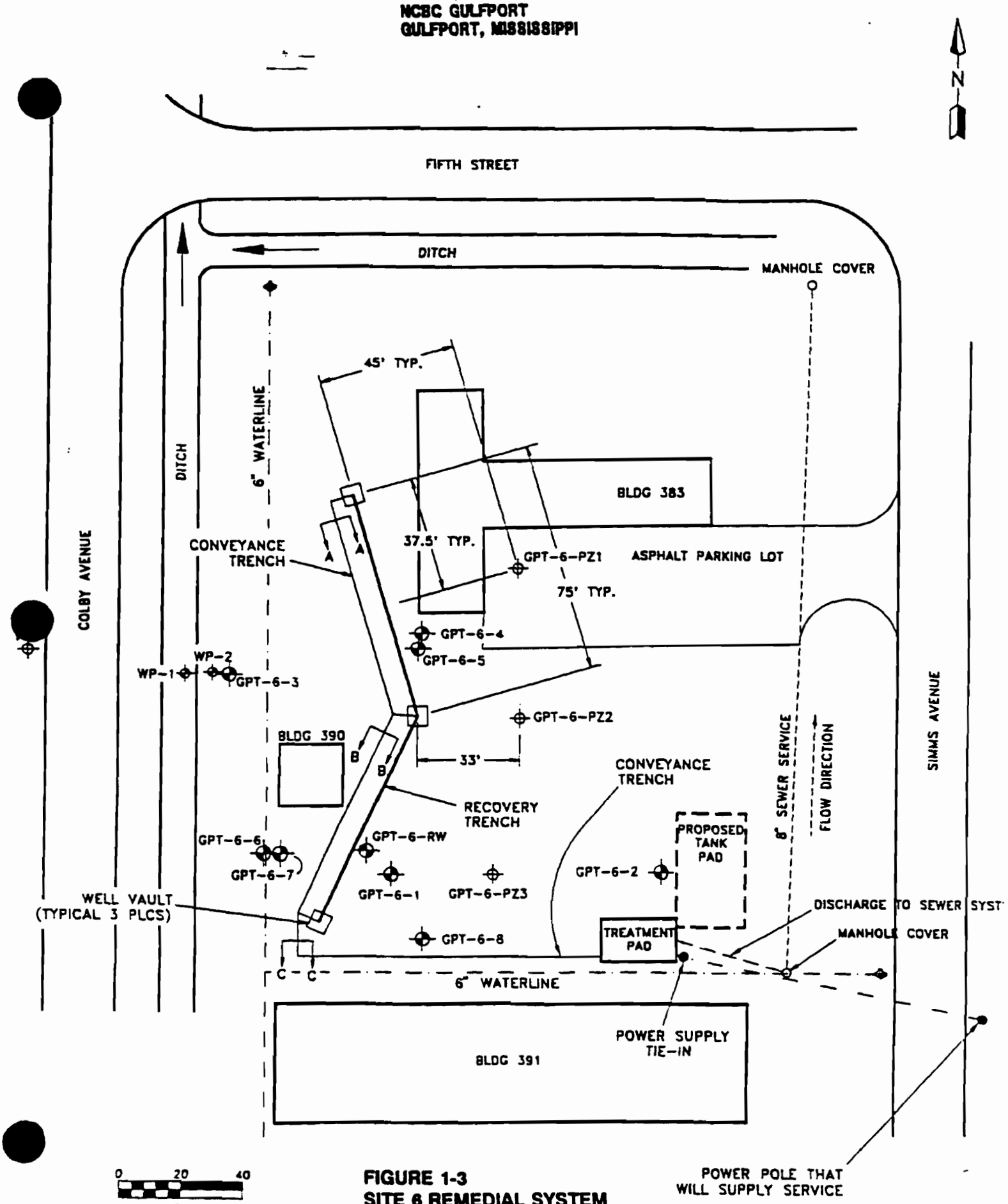


FIGURE 1-3
SITE 6 REMEDIAL SYSTEM
LAYOUT MAP

SECTION 2
SAFETY AND HEALTH HAZARD ASSESSMENT

2.1 Summary

Overall, the potential risk of acute exposure to the chemical contaminants listed in Table 2-1 is considered low. The highest risk chemical contaminants are Benzene, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, and Trichloroethylene. Because of the low vapor pressures, they are not likely to exist in a vapor concentrations greater than the PEL. However, breathing-zone concentrations could be significant if dust control methods used during movement of the soil are not adequate. Approximate three foot excavations for piping and utilities and penetrations for well installations should produce breathing zone concentrations significantly less than the action levels.

Soil contamination encountered during excavation and drilling will potentially produce organic vapors, however, concentrations should be significantly lower than action levels.

The most significant hazards at this project are construction safety hazards associated with heavy equipment, such as soil excavation and penetrations with potential contact with underground utilities; walking and working surfaces; traffic control and eye/head/feet hazards. Other concerns include energy control (electrical and other kinetic energy sources), and contact with overhead electrical lines. Heat stress is also a potential concern, especially when non-pervious PPE is required.

Minimum worker protection will be Level D PPE, as listed in Table 6-1. Dress will be upgraded when conditions warrant, or as directed by the Site Health and Safety Officer.

2.2 Activity Hazard Analyses

Activity hazard analyses have been prepared for each anticipated task in accordance with EM 385-1-1, October 1992[3]. These hazard analyses are contained in Appendix A of this SSHP. Each site activity will be reviewed by supervision prior to start to determine if the prepared hazard analysis adequately addresses the planned activity. If it is found the hazard analysis is not

adequate, additional hazard analysis will be prepared as needed. Pre-job briefing will be conducted with all affected workers.

2.3 Chemical Hazards

The potential chemical contaminants with their routes of exposure, exposure limits and signs/symptoms of overexposure are presented in Table 2-1.

2.4 Construction Safety Hazards

2.4.1 Physical Hazards

The physical hazards associated with the project include the use of heavy equipment such as, dump trucks, backhoes, drill rigs, mechanical equipment such as pumps, pneumatic systems, cutting saws, high voltage electrical lines, heat stress and other adverse weather conditions, and noise. These hazards could cause slips, trips, and falls, cuts, contusions, and lacerations, traffic accidents, electrical shock, fires and explosions, crunching, pinching, injury from falling objects and heat related disorders. Hazards also arise from vehicular traffic in and around the Filling Station during work activities.

2.4.2 Noise

Certain operations may create noise levels that exceed the applicable limits. Hearing protection will be provided for all field personnel and its use is required when noise levels exceed 85 dBa steady state or 140 dBA impulse, regardless of the duration of exposure. A comprehensive Hearing Conservation Program will be implemented when noise levels equal or exceed 85 dBA as an 8 hour time weighted average.

2.4.3 Heat Stress

All employees are to be alert to the signs and symptoms of heat stress. Should any of the following symptoms occur—extreme fatigue, cramps, dizziness, headache, nausea, profuse sweating, pale clammy skin—the employee is to immediately leave the work area, rest, cool off, and drink plenty of cool water. If the symptoms do not subside after a reasonable rest period,

the employee shall notify their supervisor and SSHO and seek medical assistance. The SSHO will be alert to signs of heat stress in site personnel and increase the frequency of breaks and fluid consumption as necessary.

2.4.4 Excavations

Open excavations are a hazard from falling into the excavation and/or side wall collapse while personnel are near or inside the excavation. To minimize these hazards the excavation will be barricaded. The excavation walls will be properly sloped or shored according to OSHA and Corps of Engineers requirements (EM 385-1-1, Section 25) prior to any personnel entry into the excavation. For excavations less than 20 feet in height, the maximum slope shall be 34° measured from the horizontal (1-1/2 horizontal to 1 vertical) unless the sloping or benching system is designed by a registered professional engineer. Excavations greater than 20 feet must be designed by a registered professional engineer. Support systems may be used, but they must be in accordance with manufacturers specifications, limitations, and recommendations or they must be selected from tabulated data designed by a registered professional engineer. Personnel not directly involved in excavation activities will remain at least ten feet away from the edge of the excavation. Such work shall be carefully planned with input from the SSHO as to protective measures and equipment use. Positive identification of underground utilities and services is required. An Excavation and Trenching Permit system shall be used whenever excavation, trenching or penetrations are planned. Figure 2-1 is a sample Excavation and Trenching Permit. The Public Works Department (PWD) on site will provide underground utility locator service. Individuals shall be properly trained prior to initiating work activities. A competent person shall evaluate excavations prior to personnel entry.

2.4.5 Overhead Power Lines

Overhead power lines represent an electrocution hazard. Work conducted in proximity of overhead power lines shall be performed in accordance with the requirements contained in the EM 385-1-1, Section 11.E.

2.4.6 Underground Utilities

Underground utilities represent a fire/explosion hazard, electrocution hazard, and excavation collapsing/filling with water hazard. Underground utilities will be located to the extent possible via historical information, as-built drawings, and through the use of metal detectors and/or other devices such as ground penetrating radar prior to initiating excavation. Positive identification of underground utilities and services is required. An Excavation and Trenching Permit system shall be used whenever excavation, trenching or penetrations are planned. The PWD onsite will provide underground utility locator service. An underground utility locator service that uses ground penetrating radar may be used whenever the validity of As-Built drawings is questionable or the accuracy of utility equipment and its application to a particular job site may be less than adequate.

2.4.7 Fire and Explosion

When the potential for fire and explosion arises, operating heavy equipment and hand held power tools could create fire and explosion emergencies. The equipment and tool operation shall be handled as described in the *Emergency Response Plan and Contingency Procedures, Section 12.*

No hot work or open flames will be allowed in the work area without a "Hot Work Permit". An example Hot Work Permit form is attached as Figure 2-2. If fire or explosion hazards exist, all tools will be of the non-sparking variety and pumps/blowers will be bonded or grounded to minimize hazards associated with static discharge. It is anticipated that concentrations of these substances in fill or soil materials will be sufficiently low so as not to present a fire hazard. However, the detection of fuel products or solvents in fill and soil materials shall be cause to initiate the evaluation for vapors with respect to fire, explosion, and personnel exposure. If concentrations of combustible gases or vapors are above 10% LEL in the work zone, or if an actual fire or explosion has taken place, emergency steps may include evacuation of the work area and notification of the fire department and other appropriate emergency response groups if necessary.

At least one 40 lb or equivalent "BC" fire extinguisher shall be maintained at the work site for fire response. Use of any tool that can be considered an ignition hazard where fire and explosion

hazards may exist is strictly prohibited. Portable power tools shall be explosion proof in accordance with NFPA 70B and 70E, Class 1, Division 1, Group D or otherwise approved for use in potentially explosive atmospheres.

2.4.8 Electrical Hazards, Control of Hazardous Energy (Lockout/Tagout)

There are many ways an employee can come into contact with energized circuits. The most common are with hand held electric power tools, overhead or buried power lines. All overhead and buried power lines will be identified prior to site activities. Ground Fault Circuit Interrupters (GFCIs) will be used as required.

Any system where the potential exists for unexpected energizing, start-up, or release of kinetic or stored energy during servicing and maintenance resulting in injury or damage shall be isolated in accordance with the requirements of EM 385-1-1 Section 12. The job supervisor has the responsibility for energy control. The Department of Public Works on site will provide energy control services.

2.4.9 General Safety Hazards

Other possible safety hazards include the potential for slipping, falling, head trauma, lifting heavy objects, insect and snake bites, etc. All personnel working on the project will wear appropriate PPE, including eye protection, head protection (hard hat) and steel-toed boots as required by the SSHO. At a minimum, Level D protection is required. First aid will be available on site to take care of any minor injuries. Local emergency response organizations shall be contacted to deal with emergency situations more serious than cuts or scrapes.

2.4.10 Traffic and Work Site Control Hazards

Potential hazards from vehicular traffic in and around the work area during work activities will be controlled placing approved barricades and signs around the work area. Suggested types of barricades along with placement and signs will follow the requirements of EM 385-1-1, Section 8 and 29 CFR 1926.

Table 2-1 Potential Contaminants

Potential Contaminant	Description	Exposure Limits	Signs and Symptoms	First Aid
Acenapthene	White needles, orthorhombic bipyramidal needles from alcohol, insoluble in water.	OSHA PEL: 10 ppm (52 mg/m^3) as 8 hr. TWA	Irritating to eyes, skin, & mucous membrane; increased incidence of skin, lung, gastrointestinal, bladder, & urinary tract cancers. In animals: damage to liver & kidney, mild bronchitis, localized inflammation of peribronchial tissue. Toxic effects on blood, lung, & glandular constituents, bronchial epithelium hyperplasia and metaplasia, symptoms of pneumonia.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. If molten chemical contacts skin, immediately flush skin w/large amounts of water. If this chemical, or liquids containing this chemical contact skin, promptly wash contaminated skin w/soap & water. If irritation persists after washing, get medical attention. Move exposed person to fresh air at once. Keep affected person warm & at rest
Alpha-chlordane	Amber colored, viscous liquid w/ pungent chlorine-like odor.	OSHA PEL: 0.5 mg/m^3 as 8 hr. TWA	Blurred vision, confusion, ataxia, delirium, cough, abdominal pain, nausea, vomiting, diarrhea, irritability, tremor, convulsions, anuria, potential occupational carcinogen.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. If molten chemical contacts skin, immediately flush skin w/large amounts of water. If this chemical, or liquids containing this chemical contact skin, promptly wash contaminated skin w/soap & water. If irritation persists after washing, get medical attention. Move exposed person to fresh air at once. Keep affected person warm & at rest
Aluminum	White odorless crystalline powder	5 mg/m^3 as 8 hr. TWA	Irritation eyes, skin, respiratory system.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. Move exposed person to fresh air at once.
Arsenic	Metal: Silver gray or tin white, brittle, odorless, solid, insoluble.	OSHA PEL 10 ug/m^3 as 8 hr. TWA ACGIH TLV-TWA 10 ug/m^3	Dermal, GI disturbances by skin absorption; peripheral neuropathy and respiratory irritant; ingestion causes hyper pigmentation of skin, inhalation causes ulceration of nasal septum.	Irrigate eyes immediately with water. Soap wash skin promptly. Seek medical attention immediately.
Barium	White odorless solids, soluble compounds may be liquid compounds.	OSHA PEL 0.5 mg/m^3 as 8 hr TWA for soluble compounds.	Upper respiratory irritant. Irritant to eyes and skin. Ingestion causes gastroenteritis, muscle spasm.	Irrigate eyes immediately with water. Soap wash skin promptly. Provide respiratory support. Seek medical attention immediately.

Beryllium	Metal: hard brittle, gray-white solid	OSHA PEL 0.002 mg/m^3 as 8 hr TWA	Berylliosis (chronic exposure); anorexia, weight loss, weakness, chest pain, cough, clubbing of fingers,cyanosis, pulmonary insufficiency, irritation eyes, dermatitis, potential occupational carcinogen.	Immediately wash eyes w/large amounts of water. get medical attention immediately. Contact lenses should not be worn. Move exposed person to fresh air at once.
Benzene	Colorless to light-yellow liquid with an aromatic odor. Class IB Flammable liquid.	OSHA PEL 1 ppm as 8 Hr. TWA OSHA 15-min STEL 5 ppm	Irritant to eyes, nose, and respiratory system. Giddiness, headache, nausea, and staggered gait. Fatigue, anorexia and lassitude. Dermatitis. Bone marrow depression.	Irrigate eyes immediately with water. Wash skin promptly with soap and water. Provide respiratory support. Seek medical attention immediately.
2-Butanone (MEK)	Colorless liquid with acetone-like odor. Class IB flammable liquid.	OSHA PEL 200 ppm as 8 Hr. TWA ACGIH 15-min STEL 300 ppm	Irritant to eyes, skin and nose. Dizziness, vomiting, headache, dermatitis.	Irrigate eyes immediately with water. Wash skin with soap and water. Move to fresh air and seek medical attention immediately.
Cadmium	Bulk metal or dark brown powder.	OSHA PEL: .01 mg/m^3 as an 8 HR TWA	Dust may irritate the eyes. Chronic effects of exposure may cause loss of sense of smell, ulceration of the nose, shortness of breath, kidney damage and mild anemia. Exposure to cadmium may also increase the risk of cancer. Medical conditions generally aggravated by exposure include disease of the respiratory track, kidney, prostrate and blood systems.	If inhaled, remove to fresh air. Get medical attention immediately. In case of contact with the eyes, immediately flush with lots of running water for 15 minutes. Get medical attention immediately. In case of skin contact, immediately wash skin with lots of soap and water. Remove contaminated clothing and shoes. Get medical attention immediately.
Calcium	White, odorless powder or colorless crystals.	OSHA PEL 10 mg/m^3 as a 8 hr. TWA	Irritation eyes, skin, respiratory system, cough.	Immediately wash eyes w/large amt of water. Get medical attention immediately Don't wear contact lenses. Wash contaminated skin w/soap & water. Move exposed person to fresh air at once.
Chloroethane (Ethyl Chloride)	Colorless gas or liquid with a pungent ether-like odor. Class IA flammable liquid.	OSHA PEL 1000 ppm as 8 Hr. TWA	Irritant to eyes, skin, and respiratory system. Incoherence, abdominal cramps, cardiac erythema, cardiac arrest, liver and kidney damage.	Irrigate eyes immediately with water. Wash skin with soap and water. Provide respiratory support. Move to fresh air and seek medical attention immediately.

Chloroform	Clear, colorless liquid with pleasant etheric odor. May burn, but does not readily ignite. Forms phosgene gas on combustion.	OSHA PEL 2 ppm as 8 Hr. TWA OSHA Ceiling value of 50 ppm	Irritant to eyes, skin. Dizziness, headache, fatigue, confusion, nausea, liver and kidney damage, potential occupational carcinogen. Can cause olfactory fatigue.	Move to fresh air and call emergency medical care. Irrigate eyes immediately with water. Remove and isolate clothing at site. Wash skin with soap and water. Provide respiratory support if necessary.
Chloromethane (Methyl Chloride)	Colorless gas with a faint sweet odor which is not noticeable at dangerous concentrations. Flammable gas.	OSHA PEL 50 ppm as 8 Hr. TWA OSHA 15-min STEL 100 ppm	Poisonous; may be fatal if inhaled, swallowed, or absorbed through the skin. Contact causes burns to skin and eyes. Dizziness, nausea, vomiting, slurred speech, staggering, liver and kidney damage, potential occupational carcinogen.	Move to fresh air and call emergency medical care. Irrigate eyes or skin immediately with water. Remove and isolate clothing and shoes at site. Provide respiratory support if necessary.
Chromium	Blue white to steel gray, lustrous, brittle, hard solid.	OSHA PEL 1 mg/m^3 8 hr. TWA	Sensitive dermatitis. Histologic fibrosis of lungs.	Irrigate eyes immediately with water. Soap wash skin promptly. Provide respiratory support. Seek medical attention immediately
Cobalt	None Given	OSHA PEL 0.1 mg/m^3 8 hr. TWA	None Given	None Given
Copper	Metal: reddish, lustrous, malleable, odorless, solid	OSHA PEL 1 mg/m^3 ACGIH TLV-TWA 1 ug/m^3	Irritant to the nasal membranes and pharynx; may cause nasal perfucation; eye irritant; metallic taste; dermatitis.	Irrigate eyes immediately with water. Soap wash skin promptly. Provide respiratory support. Seek medical attention immediately.
1,1-Dichloroethane	Colorless, oily liquid with a chloroform-like odor. Class IB flammable liquid.	OSHA PEL 100 ppm as 8 Hr. TWA ACGIH 30-MIN EXCURSION LIMIT 300 ppm	Skin irritant, CNS depression, liver, kidney, and lung damage.	Move to fresh air and call emergency medical care. Irrigate eyes or skin immediately with water. Remove and isolate clothing and shoes at site. Provide respiratory support if necessary.
1,2-Dichloroethane (Ethylene Dichloride)	Colorless, oily liquid with a pleasant odor. Class IB flammable liquid. Odor threshold between 6 and 40 ppm.	OSHA PEL 1 ppm as 8 Hr. TWA OSHA 15-min STEL 2 ppm	Eye, irritant. Dizziness, vomiting, dermatitis, liver and kidney damage, potential occupational carcinogen.	Move to fresh air and call emergency medical care. Irrigate eyes or skin immediately with water. Remove and isolate clothing and shoes at site. Provide respiratory support if necessary.
1,1-Dichloroethylene (Vinylidene Chloride)	Colorless liquid or gas with a mild, sweet, chloroform-like odor. Class IA flammable liquid.	OSHA PEL 1 ppm as 8 Hr. TWA	Irritation to eyes, skin, throat. Dizziness, headache, nausea, dyspnea, liver and kidney disfunction, potential occupational carcinogen.	Irrigate eyes immediately with water. Soap wash skin. Provide respiratory support. Seek medical attention immediately.

1,2-Dichloroethene	Colorless liquid with a slightly acrid, chloroform-like odor. Class IB flammable liquid.	OSHA PEL 200 ppm as 8 Hr. TWA	Irritation to eyes and respiratory system. Central nervous system depression.	Irrigate eyes immediately with water. Soap wash skin. Provide respiratory support. Seek medical attention immediately.
2,4-Dimethylphenol	Creslic Acid or tar acid fraction of coal tar.	Exposure Standards & Regs. - Occupational Permissible Levels: OSHA Standards: Meets criteria for OSHA medical records rule.	Irritation eyes, headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritation bladder, profuse sweating, jaundice, blood in urine, hemoglobinuria, renal shutdown, dermatitis, optical neuritis, corneal damage.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. If molten chemical contacts skin, immediately flush skin w/large amounts of water. If this chemical, or liquids containing this chemical contact skin, promptly wash contaminated skin w/soap & water. If irritation persists after washing, get medical attention. Move exposed person to fresh air at once Keep affected person warm & at rest.
Ethylbenzene	Colorless liquid with an aromatic odor. Class IB Flammable Liquid.	OSHA PEL 100 ppm as 8 Hr. TWA OSHA 15-min STEL 125 ppm	Irritant to eyes, nose and respiratory system. Headache, dermatitis and narcosis.	Irrigate eyes immediately with water. Soap wash skin. Provide respiratory support. Seek medical attention immediately.
Iron	Fine red powder of ferric oxide (usually used in cake form or in paper or cloth)	ACGIH TLV: 5 mg/m^3 as 8 hr. TWA for oxide dusts/fumes and 1 mg/m^3 for salts/solubles.	Irritation eyes, skin, respiratory system.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. Move exposed person to fresh air at once.
Lead	Heavy, ductile, soft gray solid	OSHA PEL 50 ug/m^3 as 8 hr. TWA	Weakness, lassitude, insomnia, facial pallor, anorexia, low weight, malnutrition, anemia, abdominal pain and colitis, constipation, gingival lead line, tremor, irritant to eyes, encephalopathy, hypertension, and nephropathy.	Irrigate eyes immediately w/ water. Soap wash skin promptly. Provide respiratory support. Seek medical attention promptly.
Manganese	Lustrous, brittle, silvery solid.	OSHA PEL 1 mg/m^3 as a 8 hr. TWA	Parkinson's, asthenia, insomnia, mental confusion, metal fume fever: (dry throat, cough, chest tightness, breathing difficulty, rales, flu-like fever); low back pain, vomiting, vague feeling of discomfort, fatigue, kidney damage.	Move exposed person to fresh air at once. Keep affected person warm & at rest. Get medical attention ASAP.

Mercury	Silver-white heavy odorless liquid; appearance & odor vary if organo-alkyl compound present.	ACGIH TLV-TWA of 0.1, 0.01 and 0.025 mg/m^3 depending on the compound.	Cough, chest pain, dyspnea, weakness, GI distress, irritant to eyes and skin.	Irrigate eyes immediately with water. Soap wash skin. Provide respiratory support. Seek medical attention immediately.
Methylene Chloride	Colorless liquid with a chloroform-like odor. Combustible liquid.	OSHA PEL 500 ppm as 8 Hr. TWA ACGIH TLV 50 ppm as 8 Hr. TWA	Irritation to eyes and skin. fatigue, weakness, somnolence, lightheadedness, numbness, tingle limbs, nausea, potential occupational carcinogen.	Irrigate eyes immediately with water. Soap wash skin. Provide respiratory support. Seek medical attention immediately.
2-Methylnaphthalene	Solid monoclinic crystals (crystalline substance) from alcohol	none given	May include facial flushing, fever, headache, skin irritation, corneal damage, nausea, anorexia, hemoglobinuria, hepatocellular injury, convulsions, and coma. Most probable would occur through dermal contact or inhalation.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. If molten chemical contacts skin, immediately flush skin w/large amounts of water. If this chemical, or liquids containing this chemical contact skin, promptly wash contaminated skin w/soap & water. If irritation persists after washing, get medical attention. Move exposed person to fresh air at once. Keep affected person warm & at rest.
2-Methylphenol	White crystals with a sweet tarry odor.	OSHA PEL: 5 ppm (22 mg/m^3) (skin)	Irritation eyes, skin, mucous membrane; central nervous system effects: confusion, depressant/depression, respiratory failure; dyspnea (breathing difficulty), irregular/irregularities rapid respiratory, weakness pulse; eye, skin burns; dermatitis, lung, liver, kidney, pancreas damage.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. If this chemical penetrates clothing, immediately remove clothing, wash contaminated skin w/soap & water. Get medical attention promptly. Move exposed person to fresh air at once. Keep affected person warm & at rest. Get medical attention as soon as possible.
4-Methylphenol	Crystalline solid with a sweet tarry odor.	OSHA PEL: 5 ppm (22 mg/m^3) (skin)	Irritation eyes, skin, mucous membrane; central nervous system effects: confusion, depressant/depression, respiratory failure; dyspnea (breathing difficulty), irregular/irregularities rapid respiratory, weakness pulse; eye, skin burns; dermatitis, lung, liver, kidney, pancreas damage.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. If this chemical penetrates clothing, immediately remove clothing, wash contaminated skin w/soap & water. Get medical attention promptly. Move exposed person to fresh air at once. Keep affected person warm & at rest. Get medical attention as soon as possible.

Table 2-1 Potential Contaminants (continued)

4-Methyl-2-Pentanone (Hexone)	Colorless liquid with a pleasant camphor odor. Class IB flammable liquid.	OSHA PEL 50 ppm as 8 Hr. TWA OSHA 15-min STEL 75 ppm	Irritation to the eyes, skin, and mucous membranes; headache, narcosis, coma; dermatitis; liver and kidney damage.	Irrigate eyes immediately with water. Soap wash skin. Provide respiratory support. Seek medical attention immediately.
Naphthalene	Colorless to brown solid w/ odor of mothballs.	OSHA PEL 10 ppm(50 mg/m$^{3)}$ as 8 hr. TWA	Irritation eyes, headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritation bladder, profuse sweating, jaundice, blood in urine, hemoglobinuria, renal shutdown, dermatitis, optical neuritis, corneal damage.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. If molten chemical contacts skin, immediately flush skin w/large amounts of water. If this chemical, or liquids containing this chemical contact skin, promptly wash contaminated skin w/soap & water. If irritation persists after washing, get medical attention. Move exposed person to fresh air at once. Keep affected person warm & at rest.
Nickel metal and other compounds	Metal: Lustrous, silvery, odorless	OSHA PEL: 1 mg/m^3 as 8 hr. TWA. Nickel Carbonyl: 0.001 ppm	Sensitization dermatitis, allergic asthma, pneumonitis; potential occupational carcinogen.	Immediately flush the contaminated skin with water. If this chemical penetrates the clothing, immediately remove clothing and flush skin with water. Get medical attention promptly. Move the exposed person to fresh air at once. Keep the affected person warm and at rest. Get medical attention as soon as possible.
Phenol	Colorless to light pink crystalline solid w/sweet acrid odor.	OSHA PEL: 5 ppm (19 mg/m^3) as a 8 hr. TWA.	Irritation to eyes, nose, throat, anorexia, weight loss, weakness, muscle ache, pain, dark urine, cyanosis, liver/kidney damage, skin burns, dermatitis, ochronosis, tremor, convulsions, twitching.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. If molten chemical contacts skin, immediately flush skin w/large amounts of water. If this chemical, or liquids containing this chemical contact skin, promptly wash contaminated skin w/soap & water. If irritation persists after washing, get medical attention. Move exposed person to fresh air at once Keep affected person warm & at rest.

Table 2-1 Potential Contaminants (continued)

Phenanthrene	Black or dark brown amorphous residue	OSHA PEL: 0.2 mg/m^3 as 8 hr. TWA	Dermatitis, bronchitis, potential occupational carcinogen.	Immediately wash eyes w/large amounts of water. Get medical attention immediately. Contact lenses should not be worn. If molten chemical contacts skin, immediately flush skin w/large amounts of water. If this chemical, or liquids containing this chemical contact skin, promptly wash contaminated skin w/soap & water. If irritation persists after washing, get medical attention. Move exposed person to fresh air at once Keep affected person warm & at rest.
Selenium	Insoluble	OSHA PEL: 0.2 mg/m^3	Acute Health Effects: Eye contact can cause irritation. the dust or a concentrated mist can irritate the nose (with dryness, nose bleeds), throat and bronchial tubes (with cough, phlegm). Higher exposures can cause headaches, trouble breathing and lung irritation (pneumonitis).	Eye Contact: Immediately flush with large amounts of water for at least 15 minutes. Skin Contact: Remove contaminated clothing. Wash contaminated skin with soap and water. Breathing: Remove the person from exposure.
Tetrachloroethylene	Colorless liquid with a mildly sweet chloroform-like odor. Noncombustible liquid, but decomposes in a fire to hydrogen chloride and phosgene.	OSHA PEL 100 ppm as 8 Hr. TWA ACGIH TLV of 50 ppm as 8 Hr. TWA	Eye, nose, and throat irritant. Nausea, flushed face, vertigo, dizziness, incoherence, headache, skin erythema, liver damage, Potential occupational carcinogen.	Irrigate eyes immediately with water. Soap wash skin promptly. Provide respiratory support. Seek medical attention immediately.
Toluene	Colorless liquid with a sweet, pungent, benzene like odor. Class IB Flammable liquid.	OSHA PEL 100 ppm as 8 Hr. TWA. STEL 150 ppm OSHA Ceiling of 300 ppm, 500 Peak ACGIH TLV of 50 ppm as 8 Hr. TWA.	Fatigue and weakness. Confusion, euphoria, dizziness, and headache. Dilated pupils and water eyes.	Irrigate eyes immediately with water. Soap wash skin promptly. Provide respiratory support. Seek medical attention immediately.
1,1,1-Trichloroethane (Methyl Chloroform)	Colorless liquid with a mild chloroform-like odor. Combustible liquid, but burns with difficulty.	OSHA PEL 350 ppm as 8 Hr. TWA OSHA 15-min STEL 450 ppm	Eye and skin irritant. Dizziness, headache, lassitude, CNS depression, poor equilibrium, dermatitis, liver damage, potential occupational carcinogen.	Irrigate eyes immediately with water. Wash skin promptly with soap and water. Provide respiratory support. Seek medical attention immediately.

Table 2-1 Potential Contaminants (continued)

Trichloroethylene	Colorless liquid with a sweet chloroform-like odor. Class IC flammable liquid, but burns with difficulty.	OSHA PEL 50 ppm as 8 Hr. TWA OSHA 15-min STEL 200 ppm	Eye and skin irritant. Headache, vertigo, visual disturbance, tremors, somnolence, nausea, liver injury, vomiting, , dermatitis, cardiac arrhythmia, potential occupational carcinogen.	Irrigate eyes immediately with water. Wash skin promptly with soap and water. Provide respiratory support. Seek medical attention immediately.
Vanadium	Yellow-orange powder or dark gray odorless flakes dispersed in air.	OSHA PEL 0.05 mg/m$^{3)}$ as 8 hr. TWA	Irritation eyes, skin, throat; green tongue, metallic taste, eczema, cough, fine rales, wheezing, bronchitis, dyspnea (difficulty breathing).	Immediately wash eyes w/large amounts of water. get medical attention immediately. Contact lenses should not be worn. Promptly wash contaminated skin w/ soap and water. If chemical penetrates clothing, promptly remove clothing & wash skin w/ soap & water. Move exposed person to fresh air at once. Keep affected person warm & at rest.
Vinyl Chloride	Colorless gas or liquid with a sweet odor. Flammable gas.	OSHA PEL 1 ppm as 8 Hr. TWA OSHA Ceiling value of 5 ppm in 15-min period. No direct skin contact is allowed.	Skin, eye and respiratory system irritant. Abdominal pain, GI tract bleeding, pallor or cyanosis of extremities, weakness, potential occupational carcinogen.	Irrigate eyes immediately with water. Wash skin promptly with soap and water.Provide respiratory support. Move to fresh air. Seek medical attention immediately.
Xylene	Colorless liquid with aromatic odor. Class IC flammable liquid.	OSHA PEL 100 ppm as 8 Hr. TWA, OSHA 15-min STEL 150 ppm	Dizziness, excitement, drowsiness, incoherence, and staggering gait. Irritant eyes, nose, and throat. Corneal vacuolization. Anorexia, nausea, vomiting, and abdominal pain. Dermatitis.	Irrigate eyes immediately with water. Soap wash skin promptly. Provide respiratory support. Seek medical attention immediately.
Zinc	Insoluble Blue powder; Granular Zinc; Emany Zinc Dust. DUST FORMS EXPLOSIVE MIXTURE WITH AIR IRRITATING & POISONOUS GASES/FUMES PRODUCED IN FIRE. Zinc is a combustible solid.	ACGIH TLV: TWA 5 mg/m^3; STEL: 10 mg/m^3 Zinc Oxide fume; no exposure limits have been established for Zinc, Zinc Powder or Zinc Dust; Dangerous when wet, spontaneously combustible.	Acute Health Effects: Metal particles can irritate the eyes. High exposure to Zinc dust, like any dust, can cause cough with phlegm.	Eye Contact: Immediately flush with large amounts of water for at least 15 minutes. Seek medical attention immediately. Skin contact: Remove contaminated clothing. Wash contaminated skin with soap and water. Breathing: Remove the person from exposure.

Figure 2-1. Excavation and Trenching Permit

MORRISON KNUDSEN CORPORATION

ENGINEERING, CONSTRUCTION, AND ENVIRONMENTAL GROUP

EXCAVATION AND TRENCHING PERMIT

(OSHA Section 1926.650)

DATE:	TIME:	DATE EXPIRES

JOB DESCRIPTION AND LOCATION (Be Specific):

BEFORE TRENCHING AND EXCAVATION

- ☐ Soil Classification
  - ☐ Stable Rock ☐ Type A ☐ Type B ☐ Type C
- ☐ Check For Proximity To Utilities, Buildings, Footing or Pilings and Sources of Vibrations.
- ☐ Owners of Utilities, Services or Transmission Piping, Etc. (Electrical, Telephone, Water, Sewer)
- ☐ Check For Previously Disturbed Ground
- ☐ Adequacy and Availability of All Equipment, Including Personal Protective Gear, Shoring Material, Signs, Barricades and Machinery.
- ☐ Other Known Obstructions (e.g. Footing Concrete Encasement)
- ☐ Allowable Slope.

COMMENTS.

DURING TRENCHING AND EXCAVATION

- ☐ Size of Excavation

  Depth _____ Width _____ Length _____
- ☐ Changing Ground Conditions, Particularly After Rain Fall
- ☐ Monitor For Possible Oxygen Deficiency Or Gaseous Conditions. (Record per IH Manual Procedure 5.0 or equivalent).

  _____

  _____
- ☐ Adequacy Of Shoring And/Or Sloping As Work Progresses.
- ☐ Entrances and Exit Facilities
- ☐ Stairway ☐ Ladders ☐ Ramp
- ☐ Change In Vehicular and Machinery Operation
- ☐ Water Removal Equipment and Operation
- ☐ Adequacy of Portable Trench Boxes or Trench Shields
- ☐ Protective Systems Depth of A Trench Or Excavation Of 5 Feet or More.

Check The Applicable OSHA Appendix Below:

- ☐ B - Sloping and Benching

Maximum Allowable Slopes

Stable Rock	Vertical	(90°)
Type A	3/4:1	(53°)
Type B	1:1	(45°)
Type C	1 1/2:1	(34°)

NOTE: Sloping or Benching For Excavations Greater Than 20 Feet Deep Shall Be Designed By A State Registered Professional Engineer (RPE).

- ☐ C - Timber Shoring For Trenches
- ☐ D - Aluminum Hydraulic Shoring For Trenching
- ☐ RPE - Designed Protection Systems (data must be filed on job-site)

COMMENTS:

SIGNATURES AND DATES

COMPETENT PERSON:	SSHO:	PROJECT MANAGER:
CLIENT REPRESENTATIVE:	CIVIL ENGINEER:	CIVIL SUPERINTENDENT:
EQUIPMENT OPERATOR:	SUBCONTRACTOR REP:	OTHER APPROVAL:

Figure 2-2. Hot Work Permit

MORRISON KNUDSEN CORPORATION

ENGINEERING, CONSTRUCTION, AND ENVIRONMENTAL GROUP

HOT WORK PERMIT

[redacted]ed to:	Responsible Person	Date:
Building:	Area Equipment	Control No
Special Work To Be Done		Time From/To:

Please check appropriate response	YES	NO	N/A
1 Has affected personnel been briefed on job safety & requirements?			
2. Has equipment been properly prepared for this work?			
3. Does other work or processes affect this work?			
4. Has fire detection and/or gas systems been isolated?			
5. Is the work area clean and ready for work to begin?			
6 Has isolation lockout been completed? If so, record lock and tag numbers below.			
7 Has fire watch been assigned with appropriate equipment? Name(s)			

8 Is GAS TEST required? ☐ Yes ☐ No Test Results Percent LEL O_2 H_2S, CO, other toxic	Time ¦ Tester
Continuous ? ☐ Yes ☐ No Total Hydrocarbons Others As Req.	¦

[redacted]marks

Special Instructions ☐ Yes ☐ No	Lock Numbers	Tag Numbers

Job Completed? ☐ Yes ☐ No	Time/Initial	Permit Cancelled (Time)

Endorsements as Required

Area Operations Technician.	Signature/Name.	Time.
Person Doing The Work:		
Job Supervisor/Foreman:		
[redacted]ject Supervisor:		
SSHO (Safety)		

Issu

Ren

Prc

SECTION 3
ROLES AND RESPONSIBILITIES

3.1 Responsibilities/Authorities

This section describes the roles and responsibilities of project personnel with regard to health and safety. Ultimately, responsibility for the health and safety lies with the individual. All personnel must be cognizant of the hazards and the methods of reducing the risk of injury and illness. All personnel will comply with the rules and procedures set forth in this plan and will make project management aware of any conditions which may jeopardize the welfare of project workers and/or the general public. The specific personnel names and telephone numbers of responsible persons are presented in Table 3-1.

3.2 Project Manager

The Project Manager is responsible for the management of all aspects of the project, including health and safety. The Project Manager is responsible for ensuring that all project tasks receive appropriate health and safety review before commencement of field activities and that the necessary equipment and facilities are available to implement the SSHP.

3.3 Job Supervisors

The Job Supervisors are responsible for ensuring that the health and safety aspects for their particular task are addressed. They are responsible for the implementation of the SSHP in the field and for ensuring that all project personnel comply with provisions of the plan. The Job Supervisors are also responsible for notifying the Site Safety Health Officer of any changes in work conditions which may affect the health and safety aspects of the task. The Job Supervisors or designated foreman are responsible to conduct Plan of the Day (POD) meetings, pre-entry briefings, post-job briefs and weekly safety meetings and conduct or insure that other training is completed.

The Job Supervisors must notify the SSHO of all accidents as soon as practical. The Job Supervisor shall conduct an accident investigation and record the results of the investigation on a Supervisor Accident Investigation Report form or equivalent form. Lessons learned from each

accident shall be developed by the Job Supervisor and communicated to employees during pre-entry site briefings and the weekly safety meeting.

3.4 Certified Industrial Hygienist (CIH)

The CIH is responsible for preparation of the Site Safety and Health Plan. The CIH is also responsible for making modifications to the plans and recommending changes to the work tasks if they affect health and safety. The CIH is responsible for ensuring that all required sampling/monitoring is performed and that all required health and safety documentation is maintained. The CIH may assign some tasks to a site Safety and Health Officer for implementation.

3.5 Site Safety and Health Officer (SSHO)

The Site Safety and Health Officer (SSHO) is responsible for the day-to-day implementation of the Site Safety and Health Plan, and verification of compliance with the SSHP and all applicable occupational safety and health rules and regulations. The SSHO has the authority to suspend work at any time if there is an imminent threat to the health and safety of project workers or the general public. The SSHO shall assure the Navy's designated authority at the site is notified immediately of any accident resulting in fatal injury, five or more persons admitted to a hospital and/or property damage in an amount specified by the Navy. The SSHO shall notify the Navy designated authority of all accidents within 24 hours. The SSHO shall assist in the accident investigation effort and shall have final approval authority for accident reports.

3.6 Subcontractors

All subcontractors are required to abide by the requirements of the safety and health plan. They are also required to comply with all applicable and appropriate federal, state, and local laws, standards, and regulations. They must notify the SSHO of all accidents as soon as practical. Subcontractors must maintain records of all first aid recordable, and lost time injuries.

Table 3-1 Personnel Names and Telephone Numbers

Contact	Person or Agency	Telephone
Scott Newman	MK Project Manager	(803) 554-9369
Pat Ryan	MK Environmental Manager	(216) 523-5288
Han Maung	MK Project Engineer	(216) 523-3422
William Piispanen	MK Health Safety Program Manager	(208) 386-5930
Eric Johnson	MK Site Safety and Health Officer	(601)
Art Conrad	SDIV Project Manager	(803) 743-0520
Gordon Crane	Environmental Coordinator	(601) 871-2485
Law Enforcement	NCBC Gulfport Base Security	(601) 871-2102
Law Enforcement	Gulfport Police	(601) 868-5900
Fire Department	NCBC Gulfport Fire Department	911
Rescue Service		911
Poison Control Center		(800) 492-2414
National Response Center		(800) 424-8802
Regional USEPA Emergency Response	USEPA	(800) 414-8802
Hospital (Primary)	Gulfport Memorial Hospital	(601) 865-3120
Hospital (Alternate)	Garden Park Community Hospital	(601) 865-1188

Address and Directions to Gulfport Memorial Hospital.

4500 13th Street, Gulfport, Mississippi 39501

Exit NCBC Gulfport via the main gate and travel south (right) on Broad Avenue approximately 3/8 mile. Hospital is on the left (see figure 1-2).

SSHO to post copy of General Site Map at work site, see Figure 1-2 and highlight route to hospital.

Notify the MK Site Safety and Health Officer of any changes in work conditions which may affect the health and safety aspects of the task. The Job Supervisors or designated foreman are responsible to conduct pre-job briefings and weekly safety meetings and conduct or insure that other training is completed.

The Job Supervisors must notify the SSHO of all accidents as soon as practical. The Job Supervisor shall conduct an accident investigation and record the results of the investigation on a Supervisor Accident Investigation Form.

SECTION 4
TRAINING

4.1 Hazardous Waste Operations Initial Training

All personnel entering a contamination reduction zone or exclusion zone shall have completed the initial 40-Hour Hazardous Waste Operations Safety and Health Training and three days of supervised experience pursuant to 29 CFR 1910.120(e)(3).

4.2 Hazardous Waste Operations Annual Refresher Training

All personnel shall receive eight hours of refresher training annually, pursuant to 29 CFR 1910.120(e)(8), as necessary.

4.3 Hazardous Waste Operations Supervisor/Manager Training

All on-site supervisors and managers as well as subcontractor superintendents and foremen shall receive an additional eight hours of specialized training pursuant to 29 CFR 1910.120(e)(4).

4.4 Site-Specific Training

All personnel shall receive site-specific training prior to entering the site or commencement of work. All site employees and subcontractors, including those working in the support zone, shall receive this training. The Project Supervisor is responsible for this training. Site visitors shall receive site-specific training prior to entering an exclusion zone. This training will cover, but not necessarily be limited to, the following topics.

- Names of site health and safety personnel.
- Safety, health and other hazards present on the site.
- PPE requirements.
- Safe work practices.
- Engineering controls.
- Medical surveillance requirements, including recognition or symptoms and signs which might indicate overexposure to hazards.
- Decontamination procedures.

- Emergency procedures.
- Confined space entry procedure.
- Spill containment plan.
- Requirements of this SSHP.

4.5 Safety Meeting

A safety meeting for all employees and subcontractors shall be conducted by the project supervisor(s) at least weekly and prior to each change in operation. A safety meeting for all MK Project Supervisors and Subcontractor Superintendents and Foremen shall be conducted at least once per month. The monthly meeting is chaired by the Project Manager or construction superintendent with assistance from the SSHO. This training shall be documented to include date, time, personnel in attendance, topics, and instructor.

4.6 Confined Space Entry Training

Not applicable.

4.7 Hazard Communication

All personnel will complete hazard communication training pursuant to 29 CFR 1910.1200 or 29 CFR 1926.59 regarding all potentially hazardous chemicals to which they might be exposed.

4.8 CPR/First Aid

The SSHO and at least one other site worker at each work site shall be certified in basic first aid and CPR by the American Red Cross or equivalent organization.

4.9 Substance-Specific Training

In the event that the OSHA regulations regarding other contaminants or hazards become applicable, substance-specific training pursuant to the subject regulation will be performed for the affected project personnel.

4.10 Plan of The Day (POD) Meetings

POD Meetings shall be held at the beginning of each shift to go over the planned work as well as any safety and quality concerns.

4.11 Pre and Post-Entry Briefings

Pre-entry briefings shall be held for employees prior to their initiating any new or differing site activity and at such other times as necessary to ensure employees are knowledgeable of the plan and activity, hazard analysis, and that the plan and analysis are being followed.

Post-entry briefings shall be held to assure changes in conditions or work methods are promptly reported and addressed. In addition, all incidents will be promptly evaluated and the evaluation results will be communicated to personnel in post-entry briefings and other meetings. Lessons-learned from these evaluations shall be communicated to all affected personnel.

4.12 Recordkeeping

Written records of all required training and briefings shall be maintained on site by the SSHO. These records shall be made available to U.S. Navy personnel upon request.

4.13 Training Requirements Matrix

A training requirements matrix is shown in Table 4-1.

Table 4-1 Training Requirements

Identifier	Location	40 Hr. Haz. Waste	Haz. Waste Annual Ref.	Haz. Waste Supervisor	Weekly Safety Mtg.	Haz. Com.	CPR/First Aid	Site Specific	POD, Pre & Post Entry Brief	Other
Construction	Site 6	X	X	X	X	X	X	X	X	1
Operations and Maintenance	Site 6	X	X	X	X	X	X	X		
reserved										
reserved										

1. Competent person per 29 CFR 1926, subpart P, Excavations.

SECTION 5
MEDICAL SURVEILLANCE PROGRAM

5.1 Summary

All project personnel who work within the exclusion zone for more than three days per month, or are required to use respiratory protection regardless of the time within the exclusion zone, will participate in a medical surveillance program as described in this section.

The medical surveillance program consists of a baseline or initial examination, an annual medical examination, a termination examination, and episodic medical examinations as necessary. Based on the expected short duration of this project, termination medical examinations may not be required as employees will likely have had their initial medical examination within 6 months of job termination. At a minimum, the content of the initial, annual and termination examinations shall consist of the following medical tests and procedures (or as determined by the examining physician):

- Medical and occupation history.
- Complete physical examination.
- Pulmonary function test (FVC and FEV 1.0).
- Complete blood count.
- Audiometry.
- Complete urinalysis.
- SMAC-22 biochemical profile.
- Resting electrocardiogram.
- Creatinine clearance.
- SGPT.
- Vision screen.
- Chest X-ray (PA) (at the direction of the examining physician).

An episodic examination will be required if any worker develops signs or symptoms related to the possible overexposure to hazardous substances or other health hazards, or that the employee has been injured or exposed above the permissible exposure limits or published exposure levels

in an emergency situation. The scope of any episodic examination will be left to the discretion of the examining physician.

A copy of the examining physician's written opinion about the employee's ability to perform work on a hazardous waste site and use respiratory protection, and a statement that the physician has informed the employee of the results of the examination will be kept on site.

The examining physician will be provided with the following information:

- Information on the employee's anticipated or measured exposure levels.
- PPE used or to be used.
- A description of the employee's duties as they relate to the employee's exposures.
- A copy of 29 CFR 1910.120.

5.2 Initial Examination

All personnel who may be exposed to hazardous substances or health hazards at or above the permissible exposure limits (PEL) or, if there is no PEL, above the published exposure levels for 30 days or more, will be required to have an initial medical examination regardless of the use of respiratory protection. Based on the hazard assessments for these site activities, no overexposures are expected.

5.3 Respiratory Medical Qualification

All personnel who are required to wear respiratory protection must have completed an initial medical examination in which the physician determined the individual is medically qualified to perform the anticipated work and wear a respirator.

5.4 Drug Abuse Prevention Program

Morrison Knudsen Corporation is committed to the establishment and maintenance of a safe and efficient work environment for all employees free from the effects of alcohol, illegal drugs, other controlled substances, and prohibited items.

The purpose of the MK Substance Abuse Prevention policy is to establish and administer an effective Substance Abuse Prevention Program to minimize the influence and impact of substance

abuse at all levels of the corporation, and to reduce the exposure of the corporation and its employees to the harmful effects of the abuse of drugs, alcohol, and other addictive substances. The primary objectives of this policy and the operating procedures developed in conjunction with this policy are to:

a. Establish organizational responsibility for the development, control and implementation of the Substance Abuse Prevention Program.

b. Identify minimum program requirements to satisfy governmental, client, and corporate needs.

c. Standardize corporate documentation and reporting procedures.

d. Implement an effective communications network between business units and corporate staff to provide for timely notification of actual/potential problems and to create an environment wherein appropriate controls and procedures can be effectively administered.

This program prohibits the use, possession, concealment, transportation, promotion or sale of the following items or substances on corporation premises*:

- Illegal drugs, designer and synthetic drugs, prohibited drugs and drug-related
- paraphernalia
- Controlled substances such as medications when usage is abused
- Unauthorized alcoholic beverages
- Firearms, weapons and ammunition - except when authorized for security purposes
- Unauthorized explosives
- Stolen property or contraband

NOTE: Corporation premises refer to all property, and work sites, offices, facilities, land, buildings, structures, fixtures, installations, aircraft, automobiles, vessels, trucks and all other vehicles and equipment - whether owned, leased or used.

Employees who violate this policy or the established Substance Abuse Prevention Program will be subject to disciplinary action up to and including termination.

Morrison Knudsen Corporation reserves the right to establish drug and/or alcohol search and screening procedures consistent with applicable local, state and federal laws where deemed necessary.

Substance abuse awareness and control is a management responsibility. Managers and supervisors shall be properly trained in abuse recognition and have authority and responsibility to deal with impaired individuals.

Morrison Knudsen Corporation will participate in and fully comply with any client-imposed substance abuse prevention programs when such programs are a contractual condition. Each employee shall be responsible for notifying operations management of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction.

Where applicable, the corporation shall notify the appropriate federal contracting agency within ten (10) days after receiving notice from an employee or a law enforcement agency of a criminal drug statue conviction for a violation occurring in the workplace.

5.5 Recordkeeping

Arrangements shall be made with the examining physician(s) or others to assure long-term storage of medical records in accordance with 29 CFR 1910.120. Statements by the examining physician(s) attesting to the medical qualification of individual workers shall be maintained at the project site. These statements must not contain the specific results of medical examinations or tests. These statements shall be made available to the SSHO or U.S. Navy personnel upon request.

5.6 Initial Medical Qualifications

A matrix of initial medical qualification requirements is shown in Table 5-1.

Table 5-1 Initial Medical Qualification Requirements

Identifier	Location	Physical Qualified per EM 385-1-1, 01.C	Initial Haz Waste Worker Medical Exam	Respiratory Medical Qualification
Construction	Site 6	X	X	X
Operations and Maintenance	Site 6	X	X	X
Reserved				
Reserved				

SECTION 6
PERSONAL PROTECTIVE EQUIPMENT

6.1 General

In addition to engineering controls and work practices, personal protective equipment (PPE) shall be used to protect personnel from exposure to contaminants which may be encountered during activities on site as warranted. The following guidelines will be followed:

- Respirators and other PPE necessary to protect the health of employees will be provided by their employer.

- Only NIOSH/MSHA-approved respirators will be used.

- The respirator user's medical status will be reviewed before work is performed requiring respirator use.

- Written standard operating procedures governing the use of respirators and other PPE as warranted at the site will be provided.

- Respirators will be assigned to individual employees for their exclusive use and marked to indicate to whom it was assigned, for the duration of this scope of work.

Table 6-1 presents the basic levels of protection.

Table 6-2 lists the minimum PPE level required for each task or operation. If air sampling/monitoring indicates that modification to the levels of protection are warranted, the SSHO is empowered with the authority to authorize the modification based on the guidance provided in Table 6-3.

The PPE has been selected based on the site specific hazards. If conditions change, PPE selection and use shall be reviewed by the SSHO. Personnel will be trained if necessary on the use and limitations of specific pieces of PPE prior to initiation of work by the Project Supervisor with assistance from the SSHO.

PPE will be maintained and stored in accordance with the manufacturer's recommendation and good industrial hygiene practices. Personnel will inspect PPE prior to each use to assure the PPE is clean and good working order. Training will be provided to personnel concerning PPE inspection criteria.

Where needed, PPE donning and doffing procedures will be developed and personnel will be trained on these procedures by the Project Supervisor with assistance from the SSHO.

The SSHO shall conduct evaluations of effectiveness of PPE. Revisions in PPE selection and use will be made as warranted. Supervision in coordination with the SSHO shall address medical considerations, including work limitations due to temperature extremes, when assigning PPE requirements to personnel.

Table 6-1 Selection of Personal Protective Equipment

PPE	Level D	Modified Level D	Level C	Level B
Coveralls or other approved working apparel	Yes	Optional*	Optional	Optional
Chemical-resistant clothing (coveralls; hooded, one- or two-piece chemical-resistant coveralls)		Yes		
Chemical-resistant clothing (coveralls; hooded one- or two-piece chemical splash suit; chemical-resistant hood and apron; disposal chemical-resistant coveralls)			Yes	
Chemical-resistant clothing (coveralls and long-sleeved jacket; one- or two-piece chemical splash suit; disposal chemical-resistant one-piece suit)				Yes
Boots, leather or chemical resistant, protective toe and steel shank meeting ANSI Z41.1 (29 CFR 1926.28(a))	Yes			
Boots (inner), chemical resistant, protective toe and shank meeting ANSI Z41.1 (29 CFR 1926.28(a))		Yes	Yes	Yes
Boot covers (outer), chemical resistant (disposable)		Optional	Optional	Optional
Safety glasses or chemical splash goggles, meeting ANSI Z87.1-1979 for "Industrial Safety Glasses"	Yes	Yes	Yes	
Face shield	Optional	Optional	Optional	Optional
Gloves (cotton/leather)	Optional			
Gloves (inner), chemical resistant		Optional	Yes	Yes
Gloves (outer), chemical resistant		Yes	Yes	Yes
Long underwear		Optional	Optional	Optional
Hardhat	Yes	Yes	Yes	Yes
Pressure-demand, positive pressure, full-facepiece with nose cup, self-contained breathing apparatus (SCBA) or pressure-demand, supplied-air respirator with escape SCBA (MSHA or NIOSH approved)				Yes
Air-purifying respirator, half-face or full face with suitable cartridge (MSHA or NIOSH approved)			Yes	

* Optional requirements to be determined by SSHO based on activity hazard analysis.

Table 6-2 Minimum Personal Protective Equipment Requirements by Task

Site	Activity	PPE
Site 6	Removal of Existing Wooden Poles	Modified Level D PPE, with leather gloves, face shield and/or tyvek, chemical gloves, rubber boots. May be elevated to Level C PPE.
same	Treatment System Construction	Level D PPE initially. May be elevated to Modified Level D or Level C PPE based on direct reading air monitoring.
same	Recovery Trench/Collector Well, PVC Diffusion Pipe and Concrete Vault Installation	Level PPE initially, may be elevated to Modified Level D, with tyvek, chemical gloves and rubber boots in contaminated soil/liquids. May be upgraded to Level C as determined by direct reading instruments & SSHO.
same	Recovery Trench/Collector Well, PVC Diffusion Pipe and Concrete Vault Installation	Level D PPE initially, may be elevated to Modified Level D with tyvek, chemical gloves and rubber boots in contaminated soil/liquids. May be upgraded to Level C based on direct air monitoring and the SSHO.
same	Conveyance Trench, Piping Installation, Pressure Test, Seeding & Fertilization	Level D initially with modifications as necessary.
same	Monitor Well Reconstruction Concrete Placement, Seeding & Fertilization	Level D PPE initially. May be elevated to Level C if contact with contaminated soil/liquids. Modified Level D PPE with respirator and Dust Canisters for fertilizer application.
same	New Monitoring Well Installation, Auguring Borehole, Placement of Silica Sand, Bertricite, Grout, Surge Activities	Modified Level D PPE initially. May be elevated to Level C w/respirator during auguring activities. Level C PPE during placement of silica sand. Modified Level D, w/water resistant clotting during surging of well.
same	Waste Management Activities	Modified Level D PPE, with face shield and water resistant clothing during transfer of contaminated liquids and Drum Decontamination. Modified Level D with tyvek, gloves and booties during work with contaminated soil activities.
same	Decontamination Activities	Modified Level D PPE, with face shield and water resistant clothing.
same	Connection to publically owned treatment works	Level D initially.

Site	Activity	PPE
same	Start-up operations	Level D initially.
same	Operations	Level D
same	Maintenance	Level D with modification as necessary.
same	Sampling Program	Modified Level D.

Table 6-3 Airborne Contaminant Response Criteria

Contaminant	Level	PPE	Monitoring Frequency	Actions Taken
Volatile organic compounds	No more than 5 ppm above background	Level D or modified Level D	Prior to each shift and reentry following 30 minute vacancy or as warranted.	Continue periodic monitoring.
	Greater than 5 ppm above background but less than 10 ppm above background. No benzene detected.	Level D or Modified Level D	At least once every hour, when change in operation occurs, or when requested by workers.	Monitor for benzene. Continue periodic monitoring.
	Greater than 10 ppm above background or benzene detected	To be determined by SSHO	To be determined by SSHO.	Stop work and notify SSHO.
Oxygen, applicable to excavations and confined spaces only.	Less than 19.5%	To be determined by SSHO	To be determined by SSHO.	Stop work, exit area and immediately notify SSHO.
% LEL for any confined spaces, liquid waste containers, or free standing liquids.	Equal to or greater than 10%	To be determined by SSHO as required to control exposures.	To be determined by SSHO.	Stop work, shut off equipment, remove ignition sources if safe to do so, and notify SSHO.

SECTION 7.0
MONITORING/SAMPLING

7.1 General

This section describes the air sampling and air monitoring program performed to evaluate project worker exposure to potentially hazardous airborne materials and to evaluate off-site impacts. The air sampling/monitoring results will be used to:

•Assess worker exposure to potentially hazardous materials with respect to the Permissible Exposure Limit (PEL) for Air Contaminants (Title 29 Code of Federal Regulations, Part 1910.1000) or other published exposure levels.

•Assess the adequacy of engineering controls and respiratory protection.

•Delineate areas where controls or respiratory protection is needed.

•Establish work control zones.

7.2 Air Monitoring

7.2.1 Volatile Organic Compounds

A direct-reading, real-time photo-ionization detection instrument capable of detecting volatile organic compounds (VOCs) will be used whenever excavation and penetration in potentially contaminated areas occurs. Readings will be taken at locations that reflect approximate concentrations of organic vapors and gases in the breathing zone of excavation personnel. Results of the organic vapor and gas monitoring will be documented. If necessary, the level of personal protective equipment used by excavation/penetration personnel will be modified. The direct-reading real-time organic vapor and gas monitoring equipment will be "response checked" according to the manufacturer's instructions prior to use each day, and calibrated by the manufacturer or other qualified personnel yearly. Records of the response check, maintenance and annual calibration will be maintained on site.

Colorimetric indicator tubes will be used at the SSHO's discretion whenever the direct-reading real-time instrument measures breathing zone concentrations of organic gases or vapors exceeding 2 part per million (ppm) greater than background concentrations. The following compounds may be measured by colorimetric indicator tubes: benzene, toluene, xylene, and ethylbenzene. If benzene or other volatiles are detected, the level of PPE will be upgraded as determined by the SSHO.

7.2.2 Airborne Dust

A direct-reading real-time instrument capable of detecting airborne dust (e.g., MIE Miniram) may be used whenever warranted based on visible observations of excessive dusts. Readings will be taken at locations that reflect approximate concentrations of airborne dust in the breathing zone of personnel. Results of the airborne dust monitoring will be documented. If necessary, the level of PPE used by personnel will be modified. The direct-reading real-time monitoring equipment will be "response checked" according to the manufacturer's instructions prior to use each day, and calibrated by the manufacturer or other qualified personnel yearly. Records of the response check, maintenance and annual calibration will be maintained on site. When such monitoring is conducted and results are greater that 10 mg/m^3 (value for total dust concentration containing no asbestos and < 1% crystalline silica) immediate steps will be taken to determine the cause; make changes to site operations; evacuate unprotected personnel and the public, if necessary; and notify agency contact personnel.

7.2.3 Noise Monitoring

Noise monitoring will be performed as warranted at the initiation of each task or operation to determine the sound levels associated with the particular task or operation. Sound levels will be determined at locations that best approximate the sound levels at the ear of potentially affected personnel. Noise monitoring equipment will be "response checked" according to the manufacturer's instructions prior to use each day, and calibrated by the manufacturer or other qualified personnel yearly. Records of the response check, maintenance and annual calibration will be maintained on site.

7.2.4 Combustible Gas/Oxygen Monitoring

Combustible gas/Oxygen monitoring will be performed as warranted at the initiation of each task or operation to determine the concentrations associated with the particular task or operation.

Combustible gas and oxygen concentrations will be determined at locations that best approximate the concentrations in the breathing-zone of potentially affected personnel. Combustible gas/Oxygen monitoring equipment will be "response checked" according to the manufacturer's instructions prior to use each day, and calibrated by the manufacturer or other qualified personnel yearly. Records of the response check, maintenance and annual calibration will be maintained on site.

7.2.5 Heat Stress Monitoring

When temperatures at the site are above 65°F, the wet bulb globe temperature (WBGT) may be monitored to assess the potential for heat stress. Work/rest period will be adjusted according to the guidelines stated in the current edition of *ACGIH Threshold Limit Values for Chemical Substances and Physical Agents*[5]. When the clothing worn differs from the ACGIH standard ensemble such as in the case of workers wearing semipermeable or impermeable, guidelines established in the NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities[9], Section 8 should be consulted. The following is a summary from that document.

When employees are required to wear impermeable chemical protective clothing in temperatures exceeding 70°F, employees shall use the "buddy system" to monitor each other's pulse rate at the start of each rest period. If the pulse rate exceeds 110 beats per minute, the next work period shall be shortened by one-third without shortening the rest period. The pulse rate shall be monitored again at the beginning of the next rest period and if the pulse rate exceeds 110 beats per minute, the work period shall again be shortened by one-third. No employee shall be permitted to continue working in PPE if his or her pulse rate exceeds 110 beats per minute continuously. Table 7-1, reprinted from reference 9 can be used to establish work/rest periods and the frequency of monitoring pulse rates.

Table 7-1 Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers[a]

ADJUSTED TEMPERATURE[b]	**IMPERMEABLE ENSEMBLE**
90°F (32.2°C) or above	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 30 minutes of work
82.5°-87.5°F (28.1°-30.8°C)	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 120 minutes of work

[a]For work levels of 250 kilocalories/hour.

[b]Calculate the adjusted air temperature (ta adj) by using this equation:

ta adj °F = ta°F + (13 x % sunshine).

Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow.

(100 percent sunshine = no cloud cover and a sharp, distinct shadow: 0 percent sunshine = no shadows.)

7.2.6 Perimeter Monitoring

Perimeter monitoring to evaluate emissions of VOCs will be performed periodically during soil excavation. At a minimum, perimeter monitoring shall be performed at two-hour intervals using a direct-reading real-time organic vapor instrument. When such monitoring is conducted and results are 5 ppm higher than background levels of organic vapors, immediate steps will be taken to determine the cause; make changes to site operations; evacuate unprotected personnel and the public, if necessary; and notify agency contact personnel. Perimeter monitoring to evaluate emissions of airborne dust may be performed periodically during soil excavation and chemical stabilization of soils as warranted. When such monitoring is conducted and results are greater

that 1.0 mg/m^3 (10 times less than the TLV-TWA listed in Section 7.2.2), immediate steps will be taken to determine the cause; make changes to site operations; evacuate unprotected personnel and the public, if necessary; and notify agency contact personnel.

7.3 Air Sampling

7.3.1 Organic Compounds

Time-integrated air sampling for aromatic hydrocarbons and poly-nuclear aromatic hydrocarbons (PAHs) using personal air sampling pumps will be performed whenever the real-time monitoring measures concentrations in the personal breathing zone exceeding 5 ppm organic gases or vapors for more than five consecutive minutes. Time-integrated air samples will be collected and analyzed at the SSHO's discretion for aromatic hydrocarbons and PAHs. The air samples will be collected and analyzed in accordance with NIOSH Methods 1501 and 5506 or equivalent methods. The air sampling pump will be calibrated before and after sample collection. Passive dosimeters may be used in place of air sampling pumps. Analysis of all air samples will be performed by an American Industrial Hygiene Association (AIHA) accredited laboratory.

7.4 Air Monitoring and Sampling Requirements

Table 7-2 presents the air monitoring and sampling requirements for each task to be completed at Site 6.

7.5 Recordkeeping and Chain of Custody

The following documentation will be generated as a result of air monitoring:

- All monitoring equipment readings that exceed prescribed action levels will be recorded in the field notebook.
- Monitoring equipment will have daily instrument field checks performed prior use and at periodic intervals.
- All monitoring equipment will have current calibration and maintenance schedules including expiration dates for colorimetric tubes.
- All data concerning calibrations, field checks, and referenced maintenance schedules will be recorded and become part of the project records.
- Daily background readings will be taken in a clean, contaminant-free area near the site and recorded as such.
- Data for each monitoring/sampling occurrence will be recorded, along with the date, time, weather conditions, background levels, sample locations and other relevant information.

Written records of all monitoring will be maintained on site and affected employees will be notified of monitoring results representative of their exposure. Chain-of-custody forms will be properly completed and accompany all collected samples.

Table 7-2 Air Monitoring and Sampling Requirements

Identifier	Task	Monitor						Sample
		VOCs	Dust	Oxygen and % LEL	Perimeter (VOCs /Dust)	Noise	Heat Stress	VOCs
1	Removal of Existing Vertical Wooden Poles		Y		0	Y	O	
2	Treatment System Construction	Y	Y		O	Y	O	O
3	Installation of groundwater collection wells, pumps, controls, and associated pipes and trenches	Y	0	Y	Y	Y	O	Y
4	Conveyance Trench	Y	Y	Y	O	Y	O	O
5	Monitoring Well Reconstruction	O	O		O	Y	O	O
6	New Monitoring Well Installation	O	Y		Y	O	O	O
7	Waste Management Activities	O	O	O	O	O	O	O
8	Decontamination Activities	O	O			O	O	O
9	Collection and contenerization of soil borings	Y	O	O	Y	Y	O	O
10	Connection to publically owned treatment works	O	O	O		O	O	
11	Start-up operations	O			O	Y	O	
12	Operations	O			O	O	O	
13	Maintenance	O		O	O		O	O
14	Sampling Program	O						

Y = Yes
O = Optional at discretion of SSHO

Action Levels

The following breathing-zone action levels listed in Table 7-3 will be used in conjunction with air monitoring. The breathing zone is defined as the workers' waist to forward of the shoulders. Instrument readings should be stable for at least 1 minute.

TABLE 7-3
REQUIRED MONITORING EQUIPMENT AND ACTION LEVELS OF UPGRADING
PERSONAL PROTECTIVE EQUIPMENT (PPE)

EQUIPMENT	READING	ACTION
Combustible Gas Indicator/O_2 Analyzer	<10% LEL	Continue with caution
	>10% LEL	Halt operations and evacuate the area until the readings are below 10% LEL.
	19.5-21% O_2	Continue operations in Level D PPE
	Needle deflects upward and then drops to zero.	Halt operations and evacuate the area until the readings are approximately 20% O_2.
	<15% O_2	Halt operations and evacuate the area until readings are approximately 20% O_2.
	<19.5% O_2	Level B PPE required
	>21% O_2	Halt operations and evacuate the area until readings are approximately 20% O_2.
Photo Ionization Detector	<5 ppm[a]	If background readings are exceeded, benzene will be checked for using a colorimetric tube. If no benzene is present continue operations in Level D PPE. If benzene is greater than 0.5 PPM then upgrade respiratory protection to Level C.
	5-20 ppm	Continue operations in Level C PPE.
	>20 ppm	Level B PPE required.
Visual Dust Monitoring	No visible airborne dust	Continue operations in Level D PPE.
	Visible airborne dust	Use dust suppression methods until visible dust is eliminated.

[a]Readings are above background and sustained in breathing zone for 10 minutes.

SECTION 8
SAFETY AND HEALTH WORK PRECAUTIONS AND PROCEDURES

8.1 General

Operations shall be conducted in a safe manner consistent with the policies and procedures outlined in this SSHP. The number of personnel shall be restricted to the minimum necessary to complete the required work as an administrative control to limit personnel exposures to site chemical hazards.

All project and subcontractor personnel assigned to this project are responsible for following this SSHP, for using safe practices, and for wearing the PPE specified by the SSHO. Project personnel shall report hazards and unsafe conditions and practices to the SSHO. All federal, state and local occupational health and safety regulations must be complied with by project personnel. Violations of project procedures may include disciplinary measures up to and including termination.

8.2 Operations Safety

Policies, procedures, requirements, and specific rules shall be established to ensure the safety of workers during onsite operations as needed.

8.2.1 Weekly Safety Meetings

A safety meeting shall be held weekly, at a minimum. The Construction Superintendent, the SSHO and all personnel working on the project shall attend. During the meeting, the hazards identified in this SSHP and any newly identified hazards shall be discussed. Site-specific procedures and any significant results from personal monitoring should also be discussed. Protective apparel required, emergency procedures to be used, and staff responsibilities will also be reviewed. The meeting is chaired by the Construction Superintendent or the Project Manager assisted by the SSHO.

8.2.2 General Safety Rules/Procedures

- Have multipurpose dry chemical fire extinguisher and shovel available at every site.

- Avoid driving over dry grass that is higher than the ground clearance of the vehicle. Catalytic converters on the undercarriage of vehicles are sufficiently hot to ignite dry prairie grass. Never allow a vehicle with a warm undercarriage to sit in a stationary location over dry grass or other combustible materials.

- Do not eat, drink, smoke, take medications, chew gum or tobacco, or put objects in your mouth while in the exclusion zone or handling samples.

- When on site or handling samples, thoroughly wash hands and, if necessary, face, before eating or putting anything in your mouth (i.e., avoid hand-to-mouth contamination).

- At a minimum, wear hard hats, safety glasses and steel-toed and steel-shanked boots when inside the boundaries.

- Remain a safe distance from the excavation equipment when not involved in operation or monitoring activities.

- Do not under any circumstances enter or ride in or on any backhoe bucket, materials hoist or any other similar device not specifically designed for carrying human passengers.

- Remain aware of your own and other's positions with regard to rotating equipment and be extremely careful when assembling, lifting and carrying items that may cause pinchpoint injuries and collisions.

- Be alert to the symptoms of fatigue and heat stress and their effect on the normal caution and judgment of personnel.

- Use explosion proof sampling equipment and tools when required.

- Use ground fault circuit interrupters with all electrical tools and equipment.

- Stand clear of trenches during excavation. Always approach the excavation from upwind.

- Stand upwind, whenever possible, of excavations and other sites where the soil has been disturbed.

- Be alert to potentially changing exposure conditions as evidenced by perceptible odors, unusual appearance of excavated soils, oily sheen on water, or other evidence of possible contamination.

- Do not enter any excavation or trench greater than four feet in depth unless authorized by a competent person.

- Keep tools and equipment off the ground whenever possible to avoid tripping hazards and the spread of contamination.

- Use the buddy system at all times while operating in the site.

- Use the buddy system for all manual lifting.

- Minimize truck tire disturbance of all stabilized sites.

- Cease all work operations on the site at sunset unless the control zone is adequately illuminated with artificial lighting.

- Attend the prejob safety meeting prior to the start of the work. All team personnel are required to attend.

- Avoid direct contact with contaminated materials unless necessary for sample collection or required observation. PPE shall be worn at all times, as required.

- Do not handle contaminated soil, waste samples or any other potentially contaminated items unless wearing chemical resistant gloves.

- Remove disposable clothing and follow decontamination procedures.

- Always use an appropriate level of personal protection as assigned in the site-specific procedures. Lesser levels of protection can result in otherwise preventable exposure.

Excessive levels of safety equipment can impair efficiency and increase the potential for accidents.

- Maintain a high level of awareness of the limitations in mobility, dexterity and visual impairment inherent in the use of Level B and Level C PPE.

- Establish prearranged hand signals or other means of emergency communication when wearing respiratory equipment, since this equipment seriously impairs speech communication.

- Wear hearing protection if you have to shout to communicate at a distance of three feet in steady-state (continuous) noise or when you expect loud impact noise from certain activities.

8.3 Work Site Practices

No worker may engage in any activity for which the health and safety consequences of his/her actions are unclear (e.g., previously unplanned work) without the approval of the SSHO. If such activities become necessary to complete any phase of the work, a project instruction or procedure shall be developed and followed.

8.4 Hazard Communication

Each employer shall have a written Hazard Communication Program in accordance with OSHA's Hazard Communication Standard, 29 CFR 1910.1200 and applicable State Department of Health Regulations. Employers shall ensure that other employer(s) are notified of workplace hazards where the latter employers may come in contact with these hazards. Material Safety Data Sheets (MSDS) for all hazardous materials in the work area shall be readily available for employees to review. MSDSs for the contaminants suspected to be in the various work sites are contained in Appendix B.

8.5 Excavations

Excavations shall be conducted in accordance with OSHA's Excavation Standard, 1926 Subpart P, and EM 385-1-1, October 1992, Section 25. A competent person must inspect and approve an excavation for personnel entry prior to each work shift or more often as conditions change.

8.6 Pre-Entry Briefings

Prior to initial entry into a contamination reduction zone or exclusion zone, personnel must attend a pre-entry briefing which reviews the requirements of this SSHP and site-specific requirements. A record of attendance at this briefing shall be maintained on the form shown as Figure 8-1. Additional pre-entry job briefings will be conducted if conditions change. The Pre-Entry Briefings are conducted by Project Supervisors.

8.7 Work Site Control

During work activities, and during non-work periods as warranted, personnel responsible for the work shall maintain control of the work area. No unauthorized personnel shall be permitted to enter the work areas unless they meet the requirements of this SSHP and obtain the approval of the SHSO. Violations of the work control must be reported immediately to the SSHO.

Figure 8-1 Pre-Entry Briefing Signature Sheet

Work area(s) to be entered _____.

The following personnel have had a pre-site entry briefing conducted at _____ (time) on _____ (date) at _____ (location), and are familiar with this plan's provisions, and are willing to meet the requirements of this plan.

NAME	SIGNATURE	ORGANIZATION

Printed Name of SupervisorSignatureDate

SECTION 9
SITE CONTROL MEASURES

9.1 Site Work Zones

Where a potential for worker exposure to potentially hazardous substances, safety or health hazards exists, work zones will be established and the flow of personnel and equipment will be controlled. The establishment of work zones will ensure that personnel are properly protected against hazards present in the work area, work activities and contamination are confined to the appropriate areas, and personnel can be located and evacuated in an emergency.

Prior to the commencement of field activities, work zones will be established by the job supervisor with the approval of SSHO as necessary to meet operational and safety objectives. These work zones will be depicted on maps to be posted by the job supervisor near the entrance to the work area. Copies of these work zone maps and all revisions will be retained in Appendix C of this SSHP.

9.1.1 Exclusion Zone

The exclusion zone (EZ) is the area where hazardous substances are present or are expected to occur, or health and safety hazards are present. Entry into this area is limited to personnel required to perform the work and who are wearing the specified PPE. Everyone entering the EZ shall have completed the required health and safety training, and participate in the medical surveillance program as necessary. The boundary of the EZ will be determined for each activity and may change depending on activities and conditions. An exclusion zone will be established to encompass the contaminated area. The exclusion zone will be clearly delineated through the use of signs, barricade tape, fences, or other suitable means. Access control points will be established to regulate the flow of personnel and equipment in an out of the zone and to help verify that proper procedures for entry and exit are followed. The required level of PPE in the EZ will depend on the level and type of contaminants present and the task or activity to be performed, and will be specified in the PPE section of the health and safety plan.

9.1.2 Contamination Reduction Zone

The contamination reduction zone (CRZ) is the transition area between the contaminated area and the clean area. While designed primarily to reduce the possibility of the support zone becoming contaminated or affected by EZ activities, the CRZ is also used for decontamination of personnel and equipment. No personnel or equipment will be allowed to exit the contamination reduction and exclusion zones without being properly decontaminated except in emergency situations. The immediate area around the decontamination pad and decontamination trailer if required will be designated as the CRZ.

9.1.3 Support Zone

The support zone (SZ) consists of all areas outside the exclusion and contamination reduction zones, but within the project site. These areas are used for all site activities which are not limited to the EZ or CRZ equipment and material storage, offices, parking, etc. Logs will be maintained in the SZ recording the names, companies and reason for entry into the CRZ or EZ. The SZ will also serve as the staging area for all activities to be conducted.

9.1.4 Work Zone Controls

Before site operations begin, the SZ site office/decontamination trailer will be identified with signs indicated that all visitors are required to stop and inform site personnel of their presence on site.

Entrances to the CRZ and EZ will be conspicuously posted with signs stating the following:

HAZARDOUS AREA KEEP OUT
DANGER
AUTHORIZED PERSONNEL ONLY
PERSONAL PROTECTIVE EQUIPMENT IS REQUIRED IN THIS AREA

Post signs at the entrance to the CRZ before operations being, stating:

NO SMOKING, DRINKING OR EATING BEYOND THIS POINT

The following requirements will apply to all personnel entering the CRZ or EZ:

- The use of the "buddy system" is mandatory. No one will be allowed to work alone in the CRZ or EZ.

- No smoking, eating, drinking, chewing tobacco or gum, or application or cosmetics within the CRZ or EZ.

The following traffic rules will apply to all motorized vehicles and equipment while on site:

- Equipment carrying waste shall always have the right-of-way.

- The speed limit is 10 mph, or as posted. Exceeding the speed limit is cause for disciplinary action, including removal from the site.

- Personnel will not ride equipment that has not been specifically designed for the transport of personnel.

SECTION 10
PERSONNEL AND EQUIPMENT DECONTAMINATION AND HYGIENE PROCEDURES

10.1 General

All personnel, clothing and equipment leaving an exclusion zone (contaminated or potentially contaminated area) shall be inspected and, if necessary, decontaminated to remove any potentially harmful substances that may have adhered to them. Some equipment/clothing may be disposed of rather than decontaminated. This section gives guidelines regarding the decontamination procedures to be implemented. Details will be described during the site-specific health and safety briefing prior to commencing field operations.

10.2 Personnel Decontamination

Decontamination (decon) stations will be established in the contamination reduction zone. The decon stations will consist of the following, as appropriate:

- Equipment drop.
- Boot wash station (a tub of water and detergent with brushes for cleaning and another tub of water for rinsing).
- Glove wash station (similar to boot wash station).
- Disposable clothing drop. All contaminated or potentially contaminated disposable clothing shall be placed into labeled 6-mil plastic bags for disposal as contaminated waste.
- Washing facilities consisting of water, towels, and soap.

10.3 Equipment Decontamination

All equipment/tools used in the exclusion zone will be inspected for contamination prior to removal from the site. Any equipment/tools with visible contamination will be cleaned prior to removal from the site. A water and detergent solution will be used for highly contaminated equipment, followed by a high-pressure hot water rinse if necessary. All water used during decontamination will be contained for treatment and/or disposal.

10.4 Washing Facilities

A washing facility will be available in the support zone and will consist of water, towels and soap for personnel, as necessary.

10.5 Decontamination Washwater

Equipment and personnel decontamination areas and washing facilities will be designed to allow for collection of all wash/rinse waters. The storage tank will be of sufficient volume to allow for collection and temporary storage of decontamination water/rinse from the CRZ, vehicle decontamination and showers. Decontamination water will be disposed of properly.

10.6 Personal Hygiene

Eating, drinking, or using tobacco or cosmetic products are prohibited in the contamination reduction zone or exclusion zone. Personnel exiting the controlled areas are required to thoroughly wash their hands and face prior to eating, drinking, smoking, or using toilet facilities. Adequate toilet and lunchroom facilities free of contaminants must be made available.

SECTION 11
ON-SITE FIRST AID AND EMERGENCY PROCEDURES AND EQUIPMENT

11.1 First Aid and CPR Training

At least two employees on each shift shall be qualified to administer first aid and CPR. Individuals required to work alone in remote areas shall be trained in first aid. Each subcontractor must have at least one first aid and CPR qualified individual on-site when the subcontractor is at work.

11.2 First Aid and Medical Facility Requirements

A 16-unit first aid kit, at a minimum, shall be maintained at the work site. The location of the first aid kit shall be communicated to project personnel as part of the site-specific training. The phone numbers and locations of emergency contacts and medical facilities shall be posted in the office trailers and at other conspicuous locations, as necessary. The locations and phone numbers of emergency contacts for each facility are listed in Section 3, Table 3-1.

11.3 Report of First Aid Cases

All first aid cases shall be promptly reported to the SSHO. The SSHO shall promptly notify the Navy's designated authority of all injuries.

SECTION 12
EMERGENCY RESPONSE PLAN AND CONTINGENCY PROCEDURES

12.1 General

This section describes a contingency plan to be implemented in the event of injuries, illnesses, accidents, and fires. The contingency plan provides guidelines for the proper response to emergency situations, but the actual response will depend on the situation.
In the event of an emergency, the SSHO will order all personnel to take appropriate action which could include any or all of the following:

- Evacuate the work zone to a safe place of refuge.
- Notify emergency services as identified in Table 3-1.
- Identify the nature and location of the emergency.

12.2 Pre-Emergency Planning

In addition to the guidance provided in this document, task-specific safety meetings will include emergency response pre-planning specific to each task and work site. This training will include:

- Assembly Points. If the work activity may result in a release of hazardous substances, more than one assembly point will be specified to ensure that at least one upwind assembly point is accessible.

- Emergency Response Coordinator. The SSHO, as the onsite emergency response coordinator, will contact the emergency response providers, account for individuals at the assembly point, and plan the appropriate response.

- Evacuation Routes. Routes will be specified as needed.

- Means of Evacuation. The number of personnel that may be evacuated from the work site by various routes will be evaluated.

- Means of Communication. This will include the means of alerting personnel to an emergency at all points in the work site and should consider the soundscreening

potential of hearing protection, distance and noisy equipment when specifying the use of alarms, horns and sirens. The means of communication with emergency response providers will be considered.

- Designation of a location for first aid services.

- Procedures to be followed by employees who remain to operate critical operations.

Emergency response providers (ambulance, fire, police) will be apprised of their responsibilities under this SSHP, and provided with such advance information as necessary to enable them to respond to an emergency expeditiously, while minimizing risk to themselves.

12.3 Responsibilities

The following is a description of personnel roles, lines of authority, and the emergency response communication/notification responsibilities for site personnel.

12.3.1 Site Personnel

It is the responsibility of all site personnel to recognize conditions that have the potential for resulting in a personal injury or damage to property, and to report the condition immediately.

12.3.2 Project Manager

The Project Manager is responsible for assuring adherence to the administrative elements and implementation of the Emergency Response Plan, as referenced in this document. He will evaluate the site's preparedness for emergency responses and identify special conditions which may require additional preparations. He will ensure that necessary equipment and facilities are provided to support this plan.

12.3.3 Certified Industrial Hygienist

The Certified Industrial Hygienist (CIH) is responsible for preparing the Emergency Response Plan (this section of the SSHP typically). The CIH will develop and review the Emergency Response Plan, evacuation plans, and oversee implementation at the site. The CIH will ensure

that supervisors and employees meet the training requirements of the plan and approve the equipment used in the plan. The CIH may designate duties on site to the SSHO.

12.3.4 Site Safety and Health Officer

The SSHO is responsible for direct response actions to emergency situations.

Coordinate with project management to ensure the availability of response equipment and supplies, and initiate drills. Emergency response plans will be evaluated over the course of the project by the SSHO to keep them up-to-date and to ensure that they are applicable and relevant to emergency response organizations.

12.3.5 Subcontractors

All subcontractor personnel will comply with the provisions of this plan and participate in training as required to implement response procedures. All personnel will be cognizant of their work areas and notify their supervisors of hazards at the site.

12.4 Emergency Recognition and Prevention

Site personnel shall be apprised of hazards and life-threatening emergency situations during site-specific training. Means to control hazards and mitigate emergency situations will be addressed at that time.

12.5 Safety Zones

Suitable assembly points will be established at the start of the project by the SSHO to provide a safe point of refuge for site personnel. Additional information will be provided in the site briefing concerning other hazards that may arise at the site.

12.6 Site Security and Control

At all times, base personnel shall be apprised of any emergency and only authorized personnel shall be allowed into the area. As necessary, areas may be cordoned off and access restricted.

12.7 Evacuation Routes

Evacuation routes will be established based on scope of work, location of work and atmospheric conditions. Evacuation routes shall be posted in various locations on the site if necessary. All site personnel will be made aware of evacuation procedures during site-specific training.

12.8 Emergency Decontamination

In the event an employee is injured or becomes ill and requires hospital treatment, the extent of decontamination to be performed will be assessed based on severity of the injury or illness and time delay that decontamination may cause. If the employee has any signs of contamination, the ambulance and hospital staff will be notified of this and the nature of the contamination. NCBC Gulfport has facilities and procedures for gross decontamination of personnel. NCBC Gulfport Emergency Medical Services will be notified of the intended scope of work and the potential for contaminated personnel during mobilization. Reasonable effort will be expended to decontaminate the victim prior to removal from the site.

12.9 Emergency Medical Treatment and First Aid

See Section 11.

12.10 Communications

The SSHO and the Construction Superintendent(s) shall be equipped with two-way radios for communications on site as warranted. Additional communications with outside emergency services will be accomplished through the use of cellular telephones if necessary.

The job supervisor with concurrence from the SSHO, must establish the requirements for radios and/or cellular telephones.

12.11 Critique of Response and Follow-Up

All drills, exercises and actual emergencies shall be critiqued and follow-up corrective actions shall be implemented as needed.

12.12 PPE and Emergency Equipment

Any actions by site personnel pursuant to either a rescue or spill response must be conducted with an understanding of the potential hazards involved and performed while wearing the appropriate personal protective equipment.

Portable fire extinguishers will be used for fire protection in all work and storage areas. Portable fire extinguishers using dry chemical materials must be used in areas where flammable/combustible liquids or gases are stored or used.

12.13 Site Topography, Layout and Prevailing Wind Conditions

Topography, layout and prevailing wind conditions shall be considered in establishing evacuations routes and assembly points.

12.14 Reporting Incidents

All emergencies will be promptly reported to the SSHO. The SSHO will assure that the Navy designated authority is notified promptly.

SECTION 13
LOGS, REPORTS, AND RECORDKEEPING

13.1 Safety and Health Logbook

The SSHO shall maintain a Project Safety and Health Logbook for the duration of work activities at the site. The logbook will contain the following information recorded on a daily basis utilizing the Form shown in Figure 13-1:

- General weather conditions (approximate wind speed and direction, temperature, precipitation, and amount of sun).
- Monitoring/sampling conducted for the day, with results, as appropriate.
- Instrumentation used.
- Level of protection and any special considerations.
- Any problems or unusual situations during the day.
- Activities conducted throughout the day.
- Documentation of any correspondence.
- Number of employees in each area.
- SSHO's signature and date.

Additional records to be kept include calibration data, instrument serial numbers, modifications to established safety and health procedures, and daily safety inspections. Visitors will be registered prior to entering the site. Records of training and site orientations and briefings will be kept.

Figure 13-1

SSHO DAILY LOGBOOK REPORT

Page ___ of ___

Date _____ Report Number _____

Location(s) Work Activity and # Employees: _____

Weather: Wind speed _____ Wind direction _____

Temperature _____ Precipitation _____

Amount sun _____

Monitoring conducted:

Location	Sampled for	Instrument used	Results	Sampled By/Time

Levels of Protection: _____

Problems or Unusual Situations: _____

Correspondence: _____

Other Comments: _____

SSHO Printed Name: _____ Signature _____ Date _____

13.2 Reports

A daily site safety and health inspection report shall be prepared by the SSHO. This report shall identify work activities, safety and health-related deficiencies, and corrective measures. As a minimum the checklist shown in Figure 13-2 shall be completed by the SSHO. All incidents that result in property damage, personnel injuries or illness will be investigated and notification/reporting requirements met per standard MK policy and procedure.

13.3 Recordkeeping

The SSHO shall maintain records of all injuries and illnesses of MK employees incidental to the work in accordance with 29 CFR 1904, including copies of the Worker's Compensation First Report of Injury. The SSHO shall maintain records of all injuries and illnesses of subcontractors incidental to the work, including copies of the Worker's Compensation First Report of Injury. These records will be maintained on the OSHA 200 log or equivalent and will include the number of exposure workhours. A record of all first aid treatments not otherwise recordable shall be maintained and furnished to the Navy's designated authority upon request. The SSHO shall maintain records of employee exposure to potentially harmful toxic materials, harmful physical agents and medical records, in accordance with 29 CFR 1910.120.

Figure 13-2 SSHP DAILY INSPECTION CHECKLIST

Surveillance No. _____

SURVEILLANCE NO:	ACTIVITY:		PROJECT NO:
DATE:	LOCATION:		SURVEYED ORGANIZATION: PRIME:
	SITE/AREA CONTACT:	RESPONSIBLE MANAGER:	SUBTIER:

ITEM NO.	DESCRIPTION OF SURVEYED ITEMS	N/A SAT UNSAT	DESCRIPTION OF DISCREPANCY/ NON-COMPLIANCE	ACT OR COND	CAT	REQUIRED ABATEMENT DATE	CORRECTIVE ACTION TAKEN AND DATE ABATEMENT COMPLETED
	Section 1						
1	Scope of work and site contaminants accurately described?						
	Section 2						
2	Activity hazard analysis prepared for each major work phase? (EM 385-1-1, Section 01.A.09)						
3	All hazards including chemical and physical adequately described?						
	Section 3						
4	Roles and responsibilities described and personnel roster up-to-date?						
	Section 4						
5	All site personnel completed required training?						
6	Training documented and records on site?						
	Section 5						
7	All site personnel completed initial medial qualification?						
	Section 6						
8	PPE available and in good condition?						
9	PPE work per SSHP and/or SSHO direction?						
10	Personnel trained in proper use, limitations, and inspection of PPE?						

FIGURE 13-2 SSHP DAILY INSPECTION CHECKLIST (continued)

Surveillance No. _____

ITEM NO.	DESCRIPTION OF SURVEYED ITEMS	N/A SAT UNSAT	DESCRIPTION OF DISCREPANCY/ NON-COMPLIANCE	ACT OR COND	CAT	REQUIRED ABATEMENT DATE	CORRECTIVE ACTION TAKEN AND DATE ABATEMENT COMPLETED
11	PPE inspected per SSHP?						
12	PPE donning/doffing procedures in place?						
13	Written SOP available describing respirator selection and use?						
	Section 7						
14	Air monitoring conducted per SSHP?						
15	Monitoring equipment properly maintained and calibrated?						
16	Employees notified of monitoring results?						
17	Chain of custody prepared and maintained for all samples?						
	Section 8						
18	Weekly safety meeting held?						
19	Pre entry briefs held? and signature sheet completed?						
20	Haz Com programs in place?						
21	Competent person evaluates excavation?						
22	Personnel responsible for work maintain control of area?						
	Section 9						
23	Work zone maps prepared and updated?						
24	Maps posted near work area and stored in SSHP?						
25	Traffic patterns established and rules observed?						
	Section 10						
26	Inspections performed of all personnel, clothing and equipment leaving exclusion zone?						
27	All materials decontaminated prior to existing contamination reduction zone?						

FIGURE 13-2 SSHP DAILY INSPECTION CHECKLIST (continued)

Surveillance No. _____

ITEM NO.	DESCRIPTION OF SURVEYED ITEMS	N/A SAT UNSAT	DESCRIPTION OF DISCREPANCY/ NON-COMPLIANCE	ACT OR COND	CAT	REQUIRED ABATEMENT DATE	CORRECTIVE ACTION TAKEN AND DATE ABATEMENT COMPLETED
28	Decon stations properly established?						
29	Proper personal hygiene practices observed?						
30	Decon solutions collected and properly disposed of?						
	Section 11						
31	At least two employees on each shift trained in CPR and first aid?						
32	First aid kit at each work site?						
33	All first aid and medical cases promptly reported to SSHO?						
	Section 12						
34	All personnel trained on Emergency Response Plan and Contingency Procedures?						
35	Emergency pre-planning addressed in safety meeting?						
36	List of emergency services/contact is up to date and posted?						
37	Assembly points identified and communicated to employees?						
38	Evacuation routes established and communicated to employees?						
39	Communication methods are adequate						
40	All drills, exercises, and emergencies critiqued?						
41	All emergencies promptly reported to SSHO?						
	Section 13						
42	SSHO maintains project log book?						
43	Daily reports completed by SSHO?						
44	Daily inspections completed by SSHO?						
45	Weekly reports prepared by SSHO?						
46	Records of all injuries and illnesses maintained by SSHO?						

FIGURE 13-2 SSHP DAILY INSPECTION CHECKLIST (continued)

Surveillance No. _____

ITEM NO.	DESCRIPTION OF SURVEYED ITEMS	N/A SAT UNSAT	DESCRIPTION OF DISCREPANCY/ NON-COMPLIANCE	ACT OR COND	CAT	REQUIRED ABATEMENT DATE	CORRECTIVE ACTION TAKEN AND DATE ABATEMENT COMPLETED
	Section 14						
47	Work plans available and up to date?						
48	SOPs developed as needed?						
	Section 15						
49	Two-way radios available per SSHP?						
50	Cellular telephone available as needed?						
51	Emergency alarms available and personnel trained on what actions to take?						
52	Drills and exercises conducted to test communication methods?						
	Section 16						
53	Spill response measures reviewed with personnel?						
54	Suitable quantities of spill supplies available?						
55	Spills promptly reported to SSHO?						
56	Operations arranged to minimize spills?						
	Section 17						
57	Confined space requirements of 385-1-1, Section 06.0.01 followed? Personnel trained?						

Inspection Performed By: _____ Date: _____

Abatement Accepted By: _____ Date: _____

SECTION 14
ON-SITE WORK PLANS

A Site-Specific Work Plan of which this document is designated Appendix A was developed to define the work tasks and identify the work objectives. The means and personnel required to complete the task is identified along with consideration for methods, logistics, quality control/assurance and resources.

At the time of installation and start-up, a Operations and Maintenance Manual (O&M) will be provided. The O&M Manual will also provide the monitoring schedule and instructions for maintaining a site activity log. The O&M Manual will be reviewed by the H&S Manager or the SSHO. Responsible personnel shall conduct daily surveillances of the work activities to ensure the SOPs are followed. All new SOPs or revisions to SOPs shall be reviewed by the SSHO.

SECTION 15
COMMUNICATION PROCEDURES

15.1 Radio Communication

The SSHO and construction supervisors shall be equipped with two-way radios for on-site communications as warranted by the number and proximity of work sites. The SSHO will obtain information on radio unit designation and communication protocols and brief the construction supervisors.

15.2 Telephone

A cellular telephone shall be available for emergency communications if no other telephone is readily available.

15.3 Emergency Alarm

An emergency alarm, such as an air horn, shall be available if necessary at each major work site to warn personnel of an emergency. Personnel shall be trained on what actions they are to take if the alarm is sounded to include evacuation routes and assembly points. During this job, use of audible alarm may not be necessary and voice contact should be all that is necessary for emergency annunciation.

15.4 Drills and Exercises

Drills and exercises shall be conducted to ensure that communication methods are adequate. The SSHO will test the two way communication for confirmation of emergency communication using NCBC recommended protocols. No field exercises are planned at this time.

SECTION 16
SPILL CONTAINMENT PLAN

16.1 General

Spill and release accident scenarios during construction are considered not applicable on this project. However, accidents and uncontrolled releases may occur involving the operational system. Subsystems involved could include process piping, the Oil-Water Separator with recovery storage (approximately 200 gallon), Product Tank (2,000 gallon) and sump water in Air Stripper. The following information will be used by project personnel to respond to and mitigate any releases on the project site.

16.2 Preplanning for Spill Control

Construction activities, but most importantly operational activities will be reviewed for release potential and the capability of on-site personnel to adequately respond. Base personnel will be contacted to determine their capability to respond to various releases. All aspects of the Emergency Response Plan as described in Section 12, will be reviewed by site personnel to ensure adequacy and that resources are available.

MK will cooperate with the base and if necessary; other site contractors; and federal, state and local directors of emergency preparedness and response to ensure a coordinated effort in preparing for a spill emergency, with response plans that are compatible and integrated. MK will review the Bases's Spill Control Plan, meet with site representatives on spill control and assure the SSHP is consistent with site requirements for spill control.

16.3 Spill and Fire Control Materials and Equipment

Prior to the moving or handling of drums (or other containers) containing hazardous materials, salvage drums or containers (approved by the U.S. Department of Transportation) and suitable quantities of proper absorbent materials, neutralizing agents, and fire suppression equipment will be kept available in areas where spills, leaks or ruptures may occur.

Drums and containers used during a clean-up will be appropriate to the hazardous substances they are meant to contain, and will meet the regulations promulgated by DOT, 49 CFR Parts 171-179, OSHA, 29 CFR 1910.120, and EPA 40 CFR 262.

Drums and containers will be inspected for defects and their integrity assured prior to being filled with any non-solid hazardous substance.

A spill of material can be contained with porous or absorbent barriers. Absorbent materials can take several configurations (pillows, sheets, brooms, loose chips, particle beads, and fibers) that may be set in place, or scattered by hand of blower. Preferred sorbents are inert nonreactive clay minerals (neutralizing agents may be added), or specific formulations which provide automatic neutralization or vapor control.

16.4 Spill Control Measures

Stopping the leak or spill at its source may involve turning off pumps or closing valves. Returning a container to an upright position, transferring wastes to other containers, or moving containers to less dangerous locations may, in some circumstances, be possible, but should not be attempted if there is the potential for a skin contact exposure to an unknown or caustic/skin absorbent chemical. Similarly, the patching of an active leak is not advised until a careful evaluation of the operation can be made, and the necessary personal protection and rescue equipment readied.

16.5 Drum, Container, and Tank Handling and Moving Procedures

Drums, containers, and/or tanks of hazardous or flammable substances will not be moved until the requirements for preparations described in a task work plan and SSHP have been completed (i.e., all required equipment and materials are at the work site ready for use, and the employees have been familiarized with their responsibilities, the emergency response procedures, and the potential hazards associated with the contents of the drums and containers).

Work site operations will be organized to minimize the amount of drum or container movement. Each drum or containers will be inspected before it is moved to ensure that it can be picked up without suffering a rupture or puncture, and relocated without having the contents spill or leak.

Unlabeled drums and containers will be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.

Drums and containers under pressure, as evidenced by bulging or swelling, will not be moved until such time as the cause for excess pressure is determined and appropriate containment procedures have been implemented to protect employees from explosion.

Equipment used to handle the drums and containers will be selected, positioned, operated, and maintained to minimize any contact that could rupture, puncture, dent, or drop drums and containers holding hazardous substances.

Equipment used to handle the drums and containers will be selected, positioned and operated to minimize the potential for equipment ignition sources to ignite vapors released from ruptured drums or containers.

Drums and containers that cannot be moved without rupture, leakage or spillage will be emptied into a sound container using a device specified for the material being transferred.

SECTION 17
CONFINED SPACES

No confined spaces are anticipated to be entered during this project. If a confined space must be entered, approved procedures will be implemented prior to entry.

APPENDIX A

ACTIVITY HAZARD ANALYSIS

ACTIVITY HAZARD ANALYSIS		
Activity: Removal of Existing Vertical Wooden Poles	Analyzed by/Date: Johnson 5-5-95	Reviewed by/Date: FJ Petrik 5/10/95

Principal Steps	Potential Hazards	Recommended Controls
1.1 Survey & Barricade Work Area.	Snakes, rodents, insects, slips, trips and falls, struck by objects, struck against objects, etc.	Level D PPE initially. Modified Level D PPE, including leather gloves and leggings, etc., as required as protection from identified hazards.
2.1 Set up heavy equipment for pole removal/excavation.	Overhead electrical, heavy equipment hazards, etc.	Pre-plan work activities, equipment movement, etc. Pre-entry brief for all employees. Competent person supervision of equipment operation. Maintain safe distances or de-energize overhead lines, as needed, in accordance with OSHA 29 CFR 1926 and EM 385-1-1, Section 11. Adequate set up of work area to maintain control of traffic and worker access to a minimum.
3.1 Excavation to remove 30 foot poles.	Underground utilities.	Survey for the presence of underground installations. Protect underground installations, as needed (Lockout/ Tagout, etc.).
3.2 Excavate/remove poles and Backfill.	Excavation Hazards.	Hand excavate within 2 feet horizontally and 5 feet vertically of all underground utilities. Protect excavations in accordance with OSHA 29 CFR 1926, Subpart P (i.e., sloping, shoring, barricades, etc.). Support poles during excavation and removal process.

	Nuisance dust, organics and possible lead contaminants in the soil. Heat Stress.	Level D PPE, initially. Modified Level D PPE, if contact with contaminated soil or free product is anticipated. Level C PPE, with HEPA/ Organic cartridges for respirator depending on direct reading air monitoring. Portable emergency eye wash station maintained in immediate area. Regimented work schedules will be followed to avoid potential heat stress situations.
	Hoisting and Rigging Hazards. Overhead electrical, heavy equipment hazards, struck by hazards, etc.	Same as 2.1 above. Competent person supervision of equipment operation, with qualified operators and riggers. Hoisting and rigging activities will follow requirements in OSHA 29 CFR 1926, Subparts H & N and EM 385-1-1, Sections 15 and 16.
4.1 Separate contaminated pole portion from clean pole segment with power equipment.	Injury from flying debris, extremities, body, etc. Fire hazards. Contamination to skin/clothing.	Modified Level D PPE, including face shield, tyvek, gloves and chemical resistant boots, as determined by the SSHO. Visually inspect for, and do not cut when nails and other objects are suspected to be imbedded in the poles. Maintain power tools with all safety features (i.e., guards, anti-kickback devices, etc.) in place. Maintain two 20- lb. BC Fire Extinguisher in immediate work area.
	Noise from equipment and power tools.	Sound level monitoring will be conducted to determine hearing protection requirements. Hearing protection devices for workers and visitors will be available for use.
	Electrical hazards.	Use proper extension cords and GFCI's for all electrical equipment.

4.2 Decontamination of pole, equipment, and personnel using low pressure wash or hand scrubbing.	Skin/eye contamination.	Modified Level D PPE, with face shield and water resistant coat, boots, pants and gloves required. Avoid personal contact with poles at all times. Equipment and/or hand tools should be used to move poles.
	Migration of contaminated fluids.	Follow decontamination procedures as previously outlined in the Waste Management Plan (i.e., proper set up of Decontamination facility, collection and disposal of potentially contaminated fluids, etc.).
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1.1 Hand Tools	Daily inspections, prior to use. Follow manufactures recommendations.	OSHA 1910.120 - 40 hour training; OSHA 1910.120 - 3 day OJT; OSHA 1910.120 - 8 hour Supervisor training; OSHA 1910.120 - 8 hour refresher training; OSHA Lead Standard; Site Safety and Health Plan; Pre-job Safety Brief; Hazard Communication Training; Respirator use; Excavation Standard; Lockout/ Tagout Standard; Competent Person Training; etc.
1.2 Backhoe, excavator, trencher.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person training for operation of equipment (Qualified Operators). Competent person training - excavations.
1.3 Crane and hoisting and rigging equipment.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person training for operation of equipment and rigging activities (Qualified Operators and riggers).
1.4 Power Tools, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment.

1.5 Low pressure wash with soap solution, other decontamination solutions, scrub brushes, etc.	Daily inspections, prior to use.	Same as 1.1 above. Training to operation of equipment.

ACTIVITY HAZARD ANALYSIS		
Activity: Treatment System Construction	Analyzed by/Date: E Johnson 5-5-95	Reviewed by/Date: FJ Petrik 5/10/95

Principal Steps	Potential Hazards	Recommended Controls
1.1 Survey & Barricade Work Area.	Snakes, rodents, insects, slips, trips and falls, struck by objects, struck against objects, etc.	Level D PPE initially. Modified Level D PPE, including leather gloves and leggings, etc., as required as protection from identified hazards.
1.2 Excavation and Backfill for Equipment Pad.	Overhead electrical, heavy equipment hazards, etc.	Pre-plan work activities, equipment movement, etc. Pre-entry brief for all employees. Competent person supervision of equipment operation. Maintain safe distances or de-energize overhead lines, as needed, in accordance with OSHA 29 CFR 1926 and EM 385-1-1, Section 11. Set up work areas to maintain control of traffic and worker access to a minimum.
	Underground utilities.	Survey for the presence of underground installations. Protect underground installations, as needed (Lockout/Tagout, etc.). Initiate Excavation and Trenching Permit.
	Excavation Hazards.	Hand excavate within 2 feet horizontally and 5 feet vertically of all underground utilities. Protect excavations in accordance with OSHA 29 CFR 1926, Subpart P (i.e., sloping, shoring, barricades, etc.).

	Nuisance dust, organics and possible lead contaminants in the soil. Heat Stress.	Level D PPE, initially. Modified Level D PPE, if contact with contaminated soil or free product is anticipated. Level C PPE, with HEPA/ Organic cartridges for respirator depending on direct reading air monitoring. Maintain emergency eye wash station in immediate area. Regimented work schedules will be followed to avoid potential heat stress situations.
2.1 Equipment Pad Placement/Soil compaction equipment.	Hazards to feet and hands (Repetitive motion injuries).	Same as 1.2. Modified Level D PPE, with metatarsal protection for soil compaction activities. Review job for repetitive motion hazards and supply mechanical equipment to eliminate/ reduce hazards, rotate workers on equipment, etc.
2.2 Rebar Mat Placement	Lacerations, puncture wounds and abrasions. Trip and fall hazards.	Modified Level D PPE, with leather gloves. Rebar caps for exposed rebar. Bend all tie-wire in to avoid cuts and puncture wounds.
2.3 Concrete Placement	Concrete Placement - Protect against chemical burns.	Modified Level D PPE, with face shield, hard toed rubber boots and rubber gloves.
2.4 Electrical Equipment	Electrical hazards.	Utilize ground fault circuit interrupters and maintain electrical equipment in good condition.
3.1 Placement of two 20,000 gallon above ground storage tanks, one 2,000 gallon above ground product storage tank, one oil /water separator, one low profile tray tower air stripper or diffused aeration tank, and one air stripper blower.	Hoisting and Rigging hazards. Overhead electrical, heavy equipment hazards, struck by hazards, etc.	Pre-plan work activities, equipment movement, etc. pre-entry brief for all employees. Competent person supervision of equipment operation, including qualified operators and riggers. Hoisting and rigging activities will follow requirements in OSHA 29 CFR 1926, Subparts H & N and EM 385-1-1, Sections 15 and 16. Maintain safe distances or de-energize overhead lines, as needed, in accordance with OSHA 29 CFR 1926 and EM 385-1-1, Section 11. Adequate set up of work area to maintain control of traffic and worker access to a minimum.

4.1 Electrical Power and Control System Installation.	Repetitive motion injuries, lacerations, etc.	Use licensed, Journeyman Electricians. Modified Level D PPE, for specified electrical work, in accordance with OSHA 29 CFR 1910/1926 and EM 385-1-1. Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., lifting bulk wire, pulling wire, lifting conduit, etc). Train all employees in correct lifting and ergonomic practices.
	Electrical Hazards	Utilize GFCI's and maintain electrical equipment in good condition. Follow lockout/tagout procedures when tying in to current electrical power systems.
5.1 Fence Installation	Repetitive motion injuries, lacerations, etc.	Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., lifting bulk wire, pulling wire, lifting conduit, etc). Train all employees in correct lifting and ergonomic practices.
6.1 Decontamination of Equipment and Personnel.	Skin/Eye Contamination	Modified Level D PPE, with face shield and water resistant clothing (i.e., coat, pants, boots, gloves, etc.).
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1.1 Hand Tools	Daily inspections, prior to use. Follow manufactures recommendations.	OSHA 1910.120 - 40 hour training; OSHA 1910.120 - 3 day OJT; OSHA 1910.120 - 8 hour Supervisor training; OSHA 1910.120 - 8 hour refresher training; OSHA Lead Standard; Site Safety and Health Plan; Pre-entry Brief; Hazard Communication Training; Respirator use; Excavation Standard; Lockout/ Tagout Standard; etc.

1.2 Backhoe, excavator, trencher.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person supervision of equipment operation. Qualified Operators.
1.3 Crane and hoisting and rigging equipment.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person supervision of equipment operation. Qualified Operators and riggers.
1.4 Power tools, concrete vibrators, hand operated tampers, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment.
1.5 Heavy equipment, vehicle operation, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment. Qualified Operators.
1.6 Low pressure wash with soap solution, other decontamination solutions, scrub brushes, etc.	Daily inspections, prior to use.	Same as 1.1 above. Training to operation of equipment.

ACTIVITY HAZARD ANALYSIS		
Activity: Treatment System Construction	Analyzed by/Date: E Johnson 5-5-95	Reviewed by/Date: [illegible] Patel 5/10/95

Principal Steps	Potential Hazards	Recommended Controls
1.1 Survey & Barricade Work Area.	Snakes, rodents, insects, slips, trips and falls, struck by objects, struck against objects, etc.	Level D PPE initially. Modified Level D PPE, including leather gloves and leggings, etc., as required as protection from identified hazards.
1.2 Excavation and Backfill for Equipment Pad.	Overhead electrical, heavy equipment hazards, etc.	Pre-plan work activities, equipment movement, etc. Pre-entry brief for all employees. Competent person supervision of equipment operation. Maintain safe distances or de-energize overhead lines, as needed, in accordance with OSHA 29 CFR 1926 and EM 385-1-1, Section 11. Set up work areas to maintain control of traffic and worker access to a minimum.
	Underground utilities.	Survey for the presence of underground installations. Protect underground installations, as needed (Lockout/Tagout, etc.). Initiate Excavation and Trenching Permit.
	Excavation Hazards.	Hand excavate within 2 feet horizontally and 5 feet vertically of all underground utilities. Protect excavations in accordance with OSHA 29 CFR 1926, Subpart P (i.e., sloping, shoring, barricades, etc.).

	Nuisance dust, organics and possible lead contaminants in the soil. Heat Stress.	Level D PPE, initially. Modified Level D PPE, if contact with contaminated soil or free product is anticipated. Level C PPE, with HEPA/ Organic cartridges for respirator depending on direct reading air monitoring. Maintain emergency eye wash station in immediate area. Regimented work schedules will be followed to avoid potential heat stress situations.
2.1 Equipment Pad Placement/Soil compaction equipment.	Hazards to feet and hands (Repetitive motion injuries).	Same as 1.2. Modified Level D PPE, with metatarsal protection for soil compaction activities. Review job for repetitive motion hazards and supply mechanical equipment to eliminate/ reduce hazards, rotate workers on equipment, etc.
2.2 Rebar Mat Placement	Lacerations, puncture wounds and abrasions. Trip and fall hazards.	Modified Level D PPE, with leather gloves. Rebar caps for exposed rebar. Bend all tie-wire in to avoid cuts and puncture wounds.
2.3 Concrete Placement	Concrete Placement - Protect against chemical burns.	Modified Level D PPE, with face shield, hard toed rubber boots and rubber gloves.
2.4 Electrical Equipment	Electrical hazards.	Utilize ground fault circuit interrupters and maintain electrical equipment in good condition.
3.1 Placement of two 20,000 gallon above ground storage tanks, one 2,000 gallon above ground product storage tank, one oil /water separator, one low profile tray tower air stripper or diffused aeration tank, and one air stripper blower.	Hoisting and Rigging hazards. Overhead electrical, heavy equipment hazards, struck by hazards, etc.	Pre-plan work activities, equipment movement, etc. pre-entry brief for all employees. Competent person supervision of equipment operation, including qualified operators and riggers. Hoisting and rigging activities will follow requirements in OSHA 29 CFR 1926, Subparts H & N and EM 385-1-1, Sections 15 and 16. Maintain safe distances or de-energize overhead lines, as needed, in accordance with OSHA 29 CFR 1926 and EM 385-1-1, Section 11. Adequate set up of work area to maintain control of traffic and worker access to a minimum.

4.1 Electrical Power and Control System Installation.	Repetitive motion injuries, lacerations, etc.	Use licensed, Journeyman Electricians. Modified Level D PPE, for specified electrical work, in accordance with OSHA 29 CFR 1910/1926 and EM 385-1-1. Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., lifting bulk wire, pulling wire, lifting conduit, etc). Train all employees in correct lifting and ergonomic practices.
	Electrical Hazards	Utilize GFCI's and maintain electrical equipment in good condition. Follow lockout/tagout procedures when tying in to current electrical power systems.
5.1 Fence Installation	Repetitive motion injuries, lacerations, etc.	Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., lifting bulk wire, pulling wire, lifting conduit, etc). Train all employees in correct lifting and ergonomic practices.
6.1 Decontamination of Equipment and Personnel.	Skin/Eye Contamination	Modified Level D PPE, with face shield and water resistant clothing (i.e., coat, pants, boots, gloves, etc.).
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1.1 Hand Tools	Daily inspections, prior to use. Follow manufactures recommendations.	OSHA 1910.120 - 40 hour training; OSHA 1910.120 - 3 day OJT; OSHA 1910.120 - 8 hour Supervisor training; OSHA 1910.120 - 8 hour refresher training; OSHA Lead Standard; Site Safety and Health Plan; Pre-entry Brief; Hazard Communication Training; Respirator use; Excavation Standard; Lockout/ Tagout Standard; etc.

1.2 Backhoe, excavator, trencher.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person supervision of equipment operation. Qualified Operators.
1.3 Crane and hoisting and rigging equipment.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person supervision of equipment operation. Qualified Operators and riggers.
1.4 Power tools, concrete vibrators, hand operated tampers, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment.
1.5 Heavy equipment, vehicle operation, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment. Qualified Operators.
1.6 Low pressure wash with soap solution, other decontamination solutions, scrub brushes, etc.	Daily inspections, prior to use.	Same as 1.1 above. Training to operation of equipment.

ACTIVITY HAZARD ANALYSIS		
Activity: Recovery Trench/Collector Well, PVC Diffusion Pipe and Concrete Vault Installation	Analyzed by/Date: Eglinton 5-5-95	Reviewed by/Date: FJ Petrik 5/10/95

Principal Steps	Potential Hazards	Recommended Controls
1.1 Survey & Barricade Work Area.	Snakes, rodents, insects, slips, trips and falls, struck by objects, struck against objects, etc.	Level D PPE initially. Modified Level D PPE, including leather gloves and leggings, etc., as required as protection from identified hazards.
1.2 Recovery Trench	Non-entry Excavation hazards. Underground utility hazards.	No personnel will enter this trench at any time. Survey for the presence of underground utilities. Initiate Excavation and Trenching Permit. Protect underground utilities, as needed (Lockout/ Tagout, shoring systems, etc.). Hand excavate within 2 feet horizontally and 5 feet vertically of all underground utilities. Protect excavations in accordance with OSHA 29 CFR 1926, Subpart P (i.e., sloping, shoring, etc.). Use Class II Perimeter Protection, in accordance with EM 385-1-1, to barricade excavation.
	Contaminated Soil disposal.	Place excavated material on 6-mil HDPE liner. Barricade contaminated soil piles for restricted entry. Transfer material to roll-offs and dispose of as described in the Waste Management Plan. Laborers working with soil transfer require Level C PPE. PPE will be downgraded to Modified Level D by SSHO, as determined by monitoring results.

	Nuisance dust, organics and possible lead contaminants in the soil. Heat Stress.	Level D PPE, initially. Modified Level D PPE, if contact with contaminated soil or free product is anticipated. Level C PPE, with HEPA/ Organic cartridges for respirator depending on direct reading air monitoring. Portable emergency eye wash station maintained in immediate area. Regimented work schedules will be followed to avoid potential heat stress situations.
	Backfilling, Trench collapse. Inhalation hazard (90-95% quartz sand).	Maintain in-place integrity and minimize duration of unsupported trench walls by using the one pass construction method. Level C PPE, with tyvek suits and full-face respirators with HEPA canisters. Engineering controls will also be employed to place silica "WET" into the monitoring well boreholes. SSHO will monitor for dust levels.
2.1 Three Vertical Collector Wells - Installation.	Hoisting and Rigging hazards. Overhead electrical, heavy equipment hazards, struck by hazards, etc.	Pre-plan work activities, equipment movement, etc. Pre-entry Brief for all employees. Competent person supervision of equipment operation, including qualified operators and riggers. Hoisting and rigging activities will follow requirements in OSHA 29 CFR 1926, Subparts H & N and EM 385-1-1, Sections 15 and 16. Maintain safe distances or de-energize overhead lines, as needed, in accordance with OSHA 29 CFR 1926 and EM 385-1-1, Section 11. Adequate set up of work area to maintain control of traffic and worker access to a minimum. Underground utilities. Ensure stability of pole during removal and placement.

3.1 Recovery Trench Cover, PVC lateral diffusion pipe and Concrete Vault Installation.	Excavation hazards. Inhalation hazards.	Same as 1.1 above. Follow MSDS for handling glues and solvents.
	Hoisting and Rigging hazards. Overhead electrical, heavy equipment hazards, struck by hazards, etc.	Same as 2.1 above.
	Repetitive motion injuries, lacerations, etc.	Modified Level D PPE. Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., lifting bulk wire, pulling wire, lifting conduit, etc). Train all employees in correct lifting and ergonomic practices.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1.1 Hand Tools	Daily inspections, prior to use. Follow manufactures recommendations.	OSHA 1910.120 - 40 hour training; OSHA 1910.120 - 3 day OJT; OSHA 1910.120 - 8 hour Supervisor training; OSHA 1910.120 - 8 hour refresher training; OSHA Lead Standard; Site Safety and Health Plan; Pre-entry Brief; Hazard Communication Training; Respirator use; Excavation Standard; Lockout/ Tagout Standard; Competent Person Training; etc.
1.2 Backhoe, excavator, trencher.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person training for operation of equipment (Qualified Operators). Competent person training - excavations.
1.3 Crane and hoisting and rigging equipment.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person training for operation of equipment and rigging activities (Qualified Operators and riggers).

1.4 Power Tools, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment.
1.5 Low pressure wash with soap solution, other decontamination solutions, scrub brushes, etc.	Daily inspections, prior to use.	Same as 1.1 above. Training to operation of equipment.

ACTIVITY HAZARD ANALYSIS		
Activity: Conveyance Trench. Not expected to be deeper than 2 feet.	Analyzed by/Date: 5-5-95	Reviewed by/Date: 5/10/95

Principal Steps	Potential Hazards	Recommended Controls
1.1 Survey & Barricade Work Area.	Snakes, rodents, insects, slips, trips and falls, struck by objects, struck against objects, etc.	Level D PPE initially. Modified Level D PPE, including leather gloves and leggings, etc., as required as protection from identified hazards.
2.1 Trench Excavation	Excavation Hazards, Overhead Electrical, Heavy Equipment Hazards, etc.	Pre-plan work activities, equipment movement, etc. Initiate Excavation and Trenching Permit. Pre-entry Brief for all employees. Competent person supervision of equipment operation. Maintain safe distances or de-energize overhead lines, as needed, in accordance with OSHA 29 CFR 1926 and EM 385-1-1, Section 11. Adequate set up of work area to maintain control of traffic and worker access to a minimum. Use Class III Protection in Barricading the Conveyance Trench, in accordance with EM 385-1-1.
	Underground utilities.	Survey for the presence of underground utilities. Protect and support underground utilities, as needed (Lockout/ Tagout, shoring systems, etc.). Hand excavate within 2 feet horizontally and 5 feet vertically of all underground utilities.

	Nuisance dust, organics and possible lead contaminants in the soil. Heat Stress.	Level D PPE, initially. Modified Level D PPE, if contact with contaminated soil or free product is anticipated. Level C PPE, with HEPA/ Organic cartridges for respirator, depending on direct reading air monitoring. Portable emergency eye wash station maintained in immediate area. Regimented work schedules will be followed to avoid potential heat stress situations.
3.1 Liquid Collection Piping Installation.	Repetitive motion injuries, lacerations, etc.	Modified Level D PPE, with leather gloves. Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., moving pipe, lifting and threading pipe, pipe placement, etc). Train all employees in correct lifting practices.
	Inhalation, Absorption Hazards. Skin/Eye Injury.	Modified Level D PPE, with HEPA/ Organic cartridges, as required, for respirator, depending on direct reading air monitoring, splash goggles/face shield, and chemical resistant gloves.
4.1 Pressure Test	Weakness in pipe, pipe joints contribute to personal injuries during pressure test.	Modified Level D PPE, with face-shield. Pre-plan work activities. Safety orientation for all employees. Barricade area and post warning signs to keep unauthorized personnel out. Competent person to thoroughly inspect all pipe and pipe joints prior to pressure test. Thoroughly depressurize the system prior to completing any repairs.

5.1 Soil/Sand Compaction.	Hazards to feet and hands (Repetitive motion injuries).	Same as 2.1 above. Modified Level D PPE, with metatarsal protection for soil compaction activities. Review job for repetitive motion hazards and supply mechanical equipment to eliminate/reduce hazards, rotate workers on equipment, etc.
6.1 Seeding and Fertilizing.	Skin/Eye contamination or inhalation hazard from organics in topsoil or from fertilizer.	Modified Level D PPE, with organic and/or dust cartridges for respirator during the fertilizer application phase. Utilize dust control methods. Follow manufactures recommendations. Avoid windy conditions. Avoid skin contact.
7.1 Decontamination of Equipment and Personnel.	Skin/Eye Contamination	Modified Level D PPE, with face shield and water resistant clothing (i.e., coat, pants, boots, gloves, etc.).
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1.1 Hand Tools	Daily inspections, prior to use. Follow manufactures recommendations.	OSHA 1910.120 - 40 hour training; OSHA 1910.120 - 3 day OJT; OSHA 1910.120 - 8 hour Supervisor training; OSHA 1910.120 - 8 hour refresher training; OSHA Lead Standard; Site Safety and Health Plan; Pre-entry Brief; Hazard Communication Training; Respirator use; Excavation Standard; Lockout/ Tagout Standard; etc.
1.2 Backhoe, excavator, trencher.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person supervision of equipment operation. Qualified Operators.
1.3 Power tools, concrete vibrators, hand operated tampers, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment.

1.4 Heavy equipment, vehicle operation, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment. Qualified Operators.
1.5 Low pressure wash with soap solution, other decontamination solutions, scrub brushes, etc.	Daily inspections, prior to use.	Same as 1.1 above. Training to operation of equipment.

ACTIVITY HAZARD ANALYSIS		
Activity: Monitoring Well Reconstruction (Well Head Reconstruction).	Analyzed by/Date: Johnson 5-5-95	Reviewed by/Date: FJ Petrik 5/10/95

Principal Steps	Potential Hazards	Recommended Controls
1.1 Survey & Barricade Work Area.	Snakes, rodents, insects, slips, trips and falls, struck by objects, struck against objects, etc.	Level D PPE initially. Modified Level D PPE, including leather gloves and leggings, etc., as required as protection from identified hazards.
2.1 Existing Recovery Well GPT-6-RW: Demolition of steel bumper post and concrete foundations. Excavation.	Flying particles of concrete. Cuts/ Lacerations. Noise.	Modified Level D PPE, with face shield, leather gloves and dust masks. Hearing Protection required during heavy equipment operation and concrete demolition. Use power-ram for concrete demolition.
	Over head electrical, heavy equipment hazards, etc.	Pre-plan work activities, equipment movement, etc. Pre-entry Brief for all employees. Competent person supervision of equipment operation. Maintain safe distances or de-energize overhead lines, as needed, in accordance with OSHA 29 CFR 1926 and EM 385-1-1, Section 11. Adequate set up of work area to maintain control of traffic and worker access to a minimum.
	Underground utilities.	Survey for the presence of underground installations. Protect underground installations, as needed (Lockout/ Tagout, etc.). Initiate Excavation and Trenching Permit.

	Nuisance dust, organics and possible lead contaminants in the soil. Heat Stress.	Level D PPE, initially. Level C PPE, if contact with contaminated soil, dust or free product is anticipated; with combination HEPA/Organic cartridges for respirator, based on results of SSHO direct air monitoring. Portable emergency eye wash station maintained in immediate area. Regimented work schedules will be followed to avoid potential heat stress situations.
2.2 Demolition of existing Steel Protective Casing and Removal of Concrete Pad surrounding the well.	Over head electrical, heavy equipment hazards, etc.	Same as 2.1 above.
	Cuts,lacerations, heavy equipment hazards.	Level D PPE. Demo existing Steel Protective Casing utilizing mechanical shears attached to heavy equipment.
	Flying particles of concrete. Cuts/ Lacerations. Noise.	Same as 2.1 above.
	Nuisance dust, organics and possible lead contaminants in the soil.	Same as 2.1 above.
2.3 Demolition of existing Stainless Steel Recovery Well Blank Pipe.	Over head electrical, heavy equipment hazards, etc.	Same as 2.1 above.
	Underground utilities.	Same as 2.1 above.

	Nuisance dust, organics and possible lead contaminants in the soil.	Same as 2.1 above.
	Cuts,lacerations, heavy equipment hazards. Noise.	Level D PPE. Demo existing Steel Protective Casing utilizing mechanical shears attached to heavy equipment. Hearing Protection required during heavy equipment operation.
2.4 New Monitoring Well Cover Installation. New Concrete Pad Placement.	Cuts,lacerations, heavy equipment hazards, pinch points, Repetitive motion injuries, etc.	Modified Level D PPE, with leather gloves. Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., lifting and handling material, equipment, etc). Train all employees in correct lifting and good ergonomic practices.
2.5 Rebar Mat Placement	Lacerations, puncture wounds and abrasions. Trip and fall hazards.	Modified Level D PPE, with leather gloves. Rebar caps for exposed rebar. Bend all tie-wire in to avoid cuts and puncture wounds.
2.6 Concrete Placement	Protect against chemical burns.	Modified Level D PPE, with face shield, hard toed rubber boots and rubber gloves.
2.7 Backfill, Seed, Fertilize.	Nuisance dust, organics and possible lead contaminants in the soil. Foot and repetitive motion injury.	Same as 2.1 above. The use of hand operated compaction equipment will require metatarsal protection, anti vibration gloves, and hearing protection.
2.8 Decontamination of Equipment and Personnel.	Skin/Eye Contamination	Modified Level D PPE, with face shield and water resistant clothing (i.e., coat, pants, boots, gloves, etc.).

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1.1 Hand Tools	Daily inspections, prior to use. Follow manufactures recommendations.	OSHA 1910.120 - 40 hour training; OSHA 1910.120 - 3 day OJT; OSHA 1910.120 - 8 hour Supervisor training; OSHA 1910.120 - 8 hour refresher training; OSHA Lead Standard; Site Safety and Health Plan; Pre-entry Brief; Hazard Communication Training; Respirator use; Excavation Standard; Lockout/ Tagout Standard; etc.
1.2 Backhoe, excavator, trencher.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person supervision of equipment operation. Qualified Operators.
1.3 Power tools, concrete vibrators, hand operated tampers, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment.
1.4 Heavy equipment, power-ram, vehicle operation, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment. Qualified Operators.

1.5 Low pressure wash with soap solution, other decontamination solutions, scrub brushes, etc.	Daily inspections, prior to use.	Same as 1.1 above. Training to operation of equipment.

ACTIVITY HAZARD ANALYSIS		
Activity: New Monitoring Well Installation	Analyzed by/Date: E Johnson 5-5-95	Reviewed by/Date: FQ Petrel 5/10/95

Principal Steps	Potential Hazards	Recommended Controls
1.1 Survey & Barricade Work Area.	Snakes, rodents, insects, slips, trips and falls, struck by objects, struck against objects, etc.	Level D PPE initially. Modified Level D PPE, including leather gloves and leggings, etc., as required as protection from identified hazards.
2.1 Set-up Temporary Decontamination Pad and Drum Storage Pad.	Environmental Contamination. Storage of Potentially Hazardous Waste.	Constructed of 10-Mil Polyethylene and berm for run-off control. DOT 17-C open-top 55 gallon drums will be used to containerize drill cuttings from the auguring process. Sealable drum lids and labels will be placed on the drums and drums will be stored in the drum staging area.
4.1 Augur Monitoring Well Borehole	Skin/eye contamination. Inhalation hazard. Heat Stress.	Modified Level D PPE, with tyvek suit, gloves and booties. SSHO to conduct air monitoring for organics, lead, etc. Level C PPE will be required, with combination HEPA/Organic canister, if action levels are exceeded. Regimented work schedules will be followed to avoid potential heat stress situations.
	Repetitive Motion Injuries.	Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., material handling, etc). Train all employees in correct lifting and ergonomic practices.

	Overhead electrical, heavy equipment hazards, etc.	Pre-plan work activities, equipment movement, etc. Pre-entry Brief for all employees. Competent person supervision of equipment operation. Maintain safe distances or de-energize overhead lines, as needed, in accordance with OSHA 29 CFR 1926 and EM 385-1-1, Section 11. Adequate set up of work area to maintain control of traffic and worker access to a minimum.
	Underground utilities.	Survey for the presence of underground installations. Protect underground installations, as needed (Lockout/ Tagout, etc.). Initiate Excavation and Trenching Permit.
5.1 Placement of Silica in Monitoring Well Borehole.	Exposure through inhalation or absorption.	Level C PPE, with tyvek suits and full-face respirators with HEPA canisters. Engineering controls will also be employed to place silica "WET" into the monitoring well boreholes. SSHO will monitor for dust levels.
6.1 Well String Placement (i.e., PVC pipe, well end cap, well screen, etc.).	Repetitive motion injuries (i.e., lifting and handling materials, tools, etc.). Nuisance dust, silica, etc.	Level C PPE, with tyvek suits and full-face respirators with HEPA canisters. Maintain dust control methods. SSHO to monitor for dust levels and downgrade PPE requirements based on results. Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., material handling, etc). Train all employees in correct lifting and ergonomic practices.
7.1 Placement of Sodium Bentonite, Portland Cement Grout and more Silica sand.	Exposure through inhalation or absorption.	Same as 5.1 above.

8.1 Placement of monitoring well cover.	Repetitive motion injuries (i.e., lifting and handling materials, tools, etc.).	Same as 4.1 above.
9.1 Well Surge with block assembly or bailers, using air lift and surge techniques. Disposal of water.	Skin/Eye Contamination from chemicals, high or low pH factor, etc., in the water.	Modified Level D PPE, with face shield, water resistant coat, pants, gloves and steel shank/toed rubber boots. Water from each well will be placed in DOT 17-C open-top 55 gallon drums, covered with lids, labeled and placed in a drum storage area prior to treatment in the groundwater treatment system.
9.2 Decontamination of Tools and Equipment	Environmental Contamination.	PPE Same as 9.1 above. Decontamination area set up per Section 10 of the Site Safety and Health Plan.
10.1 Well Collection Pump Installation.	Repetitive motion injuries (i.e., lifting and handling materials, equipment, etc.).	Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., material handling, equipment installation, etc). Train all employees in correct lifting and ergonomic practices.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1.1 Hand Tools	Daily inspections, prior to use. Follow manufactures recommendations.	OSHA 1910.120 - 40 hour training; OSHA 1910.120 - 3 day OJT; OSHA 1910.120 - 8 hour Supervisor training; OSHA 1910.120 - 8 hour refresher training; OSHA Lead Standard; Site Safety and Health Plan; Pre-entry Brief; Hazard Communication Training; Respirator use; Excavation Standard; Lockout/ Tagout Standard; Competent Person Training; etc.
1.2 Well Drilling Equipment	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Competent person training for operation of equipment (Qualified Operators).

1.3 Heavy equipment, vehicle operation, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment. Qualified Operators.
1.4 Power Tools, etc.	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment.
1.5 Low pressure wash with soap solution, other decontamination solutions, scrub brushes, etc.	Daily inspections, prior to use.	Same as 1.1 above. Training to operation of equipment.

ACTIVITY HAZARD ANALYSIS		
Activity: Decontamination Activities	Analyzed by/Date: E Johnson 5-5-95	Reviewed by/Date: FJ Petrak 5/10/95

Principal Steps	Potential Hazards	Recommended Controls
1.1 Decontamination of Personnel/Equipment/Tools	Skin Contamination, Ingestion, Eye injury, Environmental Hazards.	Establish Decontamination Area as outlined in Section 10 of the Site Safety and Health Plan. Modified Level D PPE, with face shield, water resistant coat, pants,gloves, and steel shank/toed rubber boots.
	High Pressure/Low Pressure Water, Steam or hand scrub with detergent.	Visually inspect for signs of contamination, and screen with FID/PID for organic vapors. Clean until contaminant levels are less than the environmental background. Pumping equipment and associated hoses will be flushed with water and detergent, followed by a water rinse.
1.2 Decontamination of Sampling Equipment	Same as 1.1 above.	All non-disposable equipment (i.e., hand auger, steel spoons, etc.) will be decontaminated by manual scrub with Alconox soap solution, plus water wash; Tap water rinse; Distilled/Deionized water rinse; 10% Nitric Acid rinse (for metals only); or Distilled/Deionized water rinse; Isopropanol rinse (for organics only); and Air dry. NOTE: MSDS' must be obtained, PPE provided and training conducted for any new chemical introduced at the site.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1.1 High or Low pressure wash with soap solution, other decontamination solutions, scrub brushes, etc.	Daily inspections, prior to use.	OSHA 1910.120 - 40 hour training; OSHA 1910.120 - 3 day OJT; OSHA 1910.120 - 8 hour Supervisor training; OSHA 1910.120 - 8 hour refresher training; OSHA Lead Standard; Site Safety and Health Plan; Pre-entry Brief; Hazard Communication Training; Respirator use; Excavation Standard; Lockout/ Tagout Standard; Competent Person Training; etc. Training to operation of equipment.
1.2 Industrial Hygiene Equipment	Daily inspections, prior to use.	Same as 1.1 above.

ACTIVITY HAZARD ANALYSIS		
Activity: Waste Management Activities	Analyzed by/Date: Edman 5-5-95	Reviewed by/Date: FJ Petrel 5/10/95

Principal Steps	Potential Hazards	Recommended Controls
1.1 Waste Management	Waste Stream Generation (i.e., Soils from Drill Cuttings and trench excavation; Liquids and sludge from well development and decontamination water; Personnel Protective Equipment (PPE) and Inert waste or construction debris.	Refer to the Waste Management Summary Table on page 22 of the Gulfport Work Plan and Appendix "E", Hazardous Waste Management Plan, for storage, handling and disposal requirements.
2.1 Drum Handling/Storage	Repetitive motion injuries, lacerations, etc.	Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards (i.e., transfer and handling of barrels, etc). Train all employees in correct lifting and ergonomic practices.
	Spills, personnel and environmental hazards, etc.	Liquids/Sludge, Modified Level D PPE, with face shield, water resistant coat, pants, gloves, and steel shank/toed rubber boots. Soils, Modified Level D PPE, with tyvek suit, gloves and booties. Locate Drum and Roll-Off Staging Area(s) down wind, away from drainage ditches, traffic flow of base vehicles and construction areas. Segregate potentially contaminated material from uncontaminated material.

3.1 Transportation of Containerized Solid Wastes.	Environmental Hazards. Repetitive motion injuries, lacerations, etc.	Modified Level D PPE, with leather gloves. Review job for ergonomic hazards and supply mechanical equipment to eliminate/reduce hazards in transfer and handling of barrels from storage areas to vehicles. Train all employees in correct lifting and ergonomic practices.
4.1 Liquid Wastes - transfer to the Ground Water Treatment System - When Operational	Spills, environmental hazards, personnel hazards, etc.	Liquids/ Sludge, Modified Level D PPE, with face shield, water resistant coat, pants, gloves, and steel shank/toed rubber boots. Inspect drums prior to movement away from protected storage area to ensure proper seal. Maintain spill containment tools and material and trained personnel to handle any spills.
4.2 Drum Decontamination	Spills, environmental hazards, personnel hazards, etc.	Modified Level D PPE, with face shield, water resistant coat, pants, gloves, and steel shank/toed rubber boots. Decontaminate drums with potable rinse water. Transfer rinsate to the oil/water separator for treatment by the system. Maintain spill containment tools and material and trained personnel to handle any spills.

5.1 Excavated Soil - Temporary Storage	Environmental hazards/Personnel hazards.	Temporary stockpile of excavated soil will be on 6-mil polyethylene for drainage of excess water or free product. This area will be located down wind, away from drainage ditches, traffic flow of base vehicles and construction areas. The excavated soil and the drainage area will be covered by the polyethylene to protect it from the elements of nature. The drainage area will be bermed and sloped toward the trench to control run-on, run-off and drainage of the excavated soil. Initial monitoring will be conducted to determine exposure levels. Modified Level D PPE, with tyvek suit, gloves and booties.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1.1 Hand Tools, Carts, etc.	Daily inspections, prior to use. Follow manufacturers recommendations.	OSHA 1910.120 - 40 hour training; OSHA 1910.120 - 3 day OJT; OSHA 1910.120 - 8 hour Supervisor training; OSHA 1910.120 - 8 hour refresher training; OSHA Lead Standard; Site Safety and Health Plan; Pre-entry Brief; Hazard Communication Training; Respirator use; Excavation Standard; Lockout/ Tagout Standard; Competent Person Training; etc.
1.2 Power Tools	Daily inspections, prior to use. Follow manufacturers recommendations.	Same as 1.1 above. Training and experience in operating equipment.
1.3 Vehicles and Motorized Equipment	Daily inspections by operator, prior to use. Follow manufactures recommendations.	Same as 1.1 above. Training and experience in operating equipment. Qualified Operators.

1.4 Decontamination tools and equipment.	Daily inspections, prior to use.	Same as 1.1 above. Training to operation of equipment.

APPENDIX B

MATERIAL SAFETY DATA SHEETS

Benzene, 2-Butanone, Chlorethane, Chloroform, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, 1,2-Dichloroethene, Ethylbenzene, Methylene Chloride, Hexone, Tetrachloroethene, Toluene, 1,1,1-Trichloroethylene, Vinyl Chloride, Xylene

APPENDIX C

WORK ZONE MAPS

(Maps to be developed as necessary)