03.05-05/15/96-00544

FINAL
WORK PLAN
FOR
TANK CLOSURE, SWMU #45 AT
U.S. NAVAL STATION,
ROOSEVELT ROADS, PUERTO RICO

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Atlantic Division
Naval Facilities Engineering Command
6500 Hampton Boulevard
Building A (South East Wing) 3rd Floor
Norfolk, Virginia 23508

Prepared by:

OHM Remediation Services Corp.
Northeast Region
200 Horizon Center Boulevard
Trenton, New Jersey 08691-1904

Reviewed by:

Gary Shirley
Project Manager

John P. Franz, P.E.
Program Manager

May 15, 1996
Delivery Order 0090
OHM Project 17780WP

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

1.1 SITE BACKGROUND 1-1
1.2 PROJECT OBJECTIVES 1-1
1.3 SCOPE OF WORK 1-2
1.4 SCHEDULE 1-2

2.0 MOBILIZATION AND SITE SETUP 2-1

2.1 CLEAR AND GRUB 2-1
2.2 INTAKE SEAL 2-1
2.3 PRETREATMENT UNIT (PU) 2-1

3.0 BREACHING AND SEALING PROCEDURES 3-1

3.1 INTAKE COOLING LINE(S) 3-1
3.2 OUTLET COOLING LINE 3-1

4.0 PRETREATMENT UNIT 4-1

4.1 SYSTEM DESIGN 4-1
4.2 INSTALLATION 4-2
4.3 OPERATION 4-2

5.0 UNDERGROUND STORAGE TANK BACKFILL 5-1

6.0 DECONTAMINATION PROCEDURES 6-1

6.1 PERSONNEL DECONTAMINATION 6-1
6.2 EQUIPMENT DECONTAMINATION 6-1
6.3 UNDERGROUND STORAGE TANKS (UST) 6-1
6.4 COOLING WATER LINES 6-1

7.0 SITE RESTORATION 7-1

8.0 DEMOBILIZATION 8-1

TABLES
TABLE 1.1 SCHEDULE
TABLE 4.1 EFFLUENT DISCHARGE CRITERIA

FIGURES
FIGURE 2-1 SITE LOCATION MAP (BAKER ENVIRONMENTAL)
FIGURE 2-2 UST AND TUNNEL LOCATION PLAN (BAKER ENVIRONMENTAL)
FIGURE 4.1 PROCESS FLOW DIAGRAM

APPENDICES
APPENDIX I - HEALTH AND SAFETY PLAN
APPENDIX II - SAMPLING AND ANALYSIS PLAN
APPENDIX III - EROSION AND SEDIMENT CONTROL PLAN
APPENDIX IV - QUALITY CONTROL PLAN
APPENDIX V - TRANSPORTATION AND DISPOSAL PLAN

1.0 INTRODUCTION

OHM Remediation Services Corp. (OHM) is pleased to present the Work Plan for the Tank Closure, Solid Waste Management Unit (SWMU) #45, Naval Station Roosevelt Roads, Puerto Rico. This Work Plan is prepared under the Department of Navy, Atlantic Division, LANTDIV RAC Contract No. N62470-93D-3032, Delivery Order 0090. The Work Plan describes the elements required to decontaminate two underground storage tanks and three below surface cooling lines, treat and dispose of an estimated 517,000 gallons of waste water and, transport and dispose of an estimated 38,000 gallons of sludge.

1.1 SITE BACKGROUND

SWMU #45 is located in the Forrestal Area of the Naval Base, north of the base landfill and adjacent to the Forrestal Sewage Treatment Plant. Baker Environmental Figures 2-1 and 2-2 show broad and detailed site location information, respectively. Building 38, a former Power Plant and subsequent transformer storage location, located next to SWMU #45, is considered a potential source for the existing PCB contamination.

The site consists of two "Bomb Proof" underground storage tanks which formerly held and supplied fuel for the Power Plant (Bunker "C" fuel). Also included are three cooling lines (two intake and one outlet). The total volume of the three lines equal approximately 374,000 gallons of saline water and 28,000 gallons of sludge, with a total run of approximately 1,675 linear feet.

Past evidence of visible oil emanating from the cooling lines and contaminating beaches prompted several investigations and subsequent UST draining.

Recent studies provided analytical results supporting this Interim Corrective Measure Action for the site. Analytical data demonstrates that all contaminants are below RCRA and TSCA limits with exception of the outlet cooling line, and, except for Aroclor 1260 and Bunker C fuel, meet the National Pollutant Discharge Elimination System (NPDES) acceptance criteria for the Forrestal Sewage Treatment Plant. A premobilization sampling and analytical event will be conducted during the week of May 6, 1996, as described in more detail in the Sampling and Analysis Plan (SAP), Appendix II, to define the current level of contamination.

1.2 PROJECT OBJECTIVES

The primary objectives for this project include the following:

- Conduct premobilization sampling to verify existing analytical data and identify missing analytical parameters as listed in the NPDES variance request for treated water discharge to the Forrestal Sewage Treatment Plant (see Table 4.1)
- Clean and decontaminate two USTs and three tunnels
- Treat contaminated water in an on-site pretreatment unit to comply with the sewage treatment plant's discharge criteria
- Collect and containerize generated sludge, perform SW 846 analysis including PCB (see Table 7.2) on every 100 cubic yards of material, transport it to the U.S. Mainland and dispose of the sludge in full accordance with EPA RCRA/TSCA regulations
- Restore site prior to demobilization

1.3 SCOPE OF WORK

This project will require the treatment of contaminated water utilizing an on-site water pretreatment unit (PU) constructed and maintained by OHM. The PU will be designed to treat contaminated water and meet the discharge criteria based on NPDES variance request for the Forrestal Sewage Treatment Plant. The PU will operate at a production rate of 30 gpm, producing approximately 42,000 gallons a day. The total estimated volume of contaminated water to be treated, 517,000 gallons, will commence with 100,000 gallons from the two USTs and continue with the cooling lines.

Simultaneously, breach and seal operations will begin with the two intake cooling lines, followed by the outlet line. The PU will operate continuously, treating contaminated water removed from the USTs and cooling lines, and all biodegradable cleaning liquid generated from the cleaning operations. The duration of waste water treatment for all generated liquids is five weeks, which includes periodic maintenance of the PU system.

Upon receipt of acceptable analytical results, the USTs will be backfilled in-place with a low density concrete mixture, and manways capped and sealed. The cooling lines, after cleaning operations are analytically confirmed, will be sealed at the breach locations, and all manholes will be capped and sealed.

After satisfactory analytical results are received, water processed through the PU will be pumped to the Forrestal Sewage Treatment Plant for final treatment and disposal. Pumped, collected and containerized sludge will be analyzed in batches of 100 cubic yard quantities. The fully EPA RCRA/TSCA waste characterized sludge will be transported to the mainland for disposal in full compliance with EPA RCRA/TSCA regulations.

The following will be accomplished at the conclusion of this remediation project:

1. Two Bunker "C" contaminated USTs pumped and cleaned, backfilled with low density, water impermeable concrete, and capped and sealed

2. Three cooling lines pumped and cleaned, with existing flow control gates permanently sealed, using cement (poured in place) at two locations for each of the lines, including all manways capped and sealed with precast concrete covers

3. Approximately 517,000 gallons of water from the USTs and cooling lines treated and upon analytical verification of meeting NPDES levels, discharged to the Forrestal Treatment Plant for final disposal

4. Approximately 38,000 gallons of EPA waste characterized sludge transported to the U.S. Mainland for disposal at a fully EPA/State permitted disposal facility

5. All analytical for pre-mobilization sampling, operation sampling (sludge, influent and effluent samples) and post-cleaning verification samples will be fully EPA waste characterized (SW 846) by a preapproved LANTDIV laboratory

6. Demobilization after complete site restoration

1.4 SCHEDULE

The attached schedule, Table 1.1, forecasts an on-site project duration of eight weeks, excluding a two day confirmatory sample and analysis study. The preconstruction meeting is scheduled for May 21, 1996, with actual on-site construction activities scheduled to commence the following week.

2.0 MOBILIZATION AND SITE SETUP

The first week of this project will consist of clearing and grubbing, construction of the pretreatment unit (PU) and sealing the intake cooling lines in Puerca Bay.

2.1 CLEAR AND GRUB

The contractor will clear and grub only the bare minimum area to facilitate this operation. An adequate footprint to contain the PU, five 50,000 gallon OHM storage pools and one 50,000 gallon influent pool, an office and storage trailer and an estimated eight lined sludge rolloffs (two on site at any one time), will be required. This activity will occur in, near and around the UST location. Utmost caution will be exercised to limit mangrove disturbance. The organic material removed via this activity (shrubs) will be chipped, mulched and staged on site.

2.2 INTAKE SEAL

The dual intake line will be sealed at two locations for each line. The Puerca Bay extremity will be sealed using a wooden form with quick set cement. The location is at the furthest extremity of the repaired walkway, once a functional gate valve. The second seal location, also at a former gate valve location, is approximately 10 feet North by North East of the concrete pad surrounding Building 38 and will be sealed using the same procedure as above. OHM will verify the effectiveness of this approach by pumping the intake water thru the PU system after sealing the Puerca Bay extremity and prior to sealing the inland gate valve location, attaining a dry (sludge) situation within 5 days of pumping. Daily water level readings will be kept to insure soundness of this approach.

2.3 PRETREATMENT UNIT (PU)

The skid mounted treatment system will be constructed during this preparatory effort with a construction duration estimated at five days. The PU will continuously operate (24 hours/day, 7 days a week) at a nominal rate of 29 to 30 gallons per minute, treating approximately 42,000 gallons a day. The duration of this operation is estimated at five weeks with scheduled down time for maintenance. Based on the analytical data provided, the unit is designed to remove organics only, focusing on chlorobenzene, Aroclor 1260, total petroleum hydrocarbons (TPH) and heavy fuels (silver and methylene chloride in blank). Storage of treated water will be accomplished via five 50,000 gallon OHM portable pools. This inordinately large treated water storage requirement is due to the lengthy analytical turnaround time of 5 days for Biological Oxygen Demand (BOD) as dictated by the Forrestal Treatment Plant's NPDES acceptance criteria. Detailed information on the PU's physical and technical information is contained in Section 4.0.

3.0 BREACHING AND SEALING PROCEDURES

The intake cooling lines should not require additional breaching activities to seal the lines as discussed in Sections 2.2 and 3.1. The outlet cooling line will be breached at three locations using a backhoe to uncover the lines, followed by a concrete saw and backhoe ram to breach them. Once the three lines have been pumped, cleaned and analytically verified (PCB<50ppm and TPH<100 ppm), all manways and breached locations will be capped, sealed and backfilled.

3.1 INTAKE COOLING LINE(S)

The dual intake cooling lines will be sealed at two formerly functional gate valve locations located at: (1) end of the recently repaired walkway and (2) approximately 10 feet North by Northeast of the concrete pad surrounding Building 38. Sealing operations for both extremities will consist of wooden frames and quick setting cement (wooden frames to be removed upon completion).

3.2 OUTLET COOLING LINE

The outlet cooling line will be uncovered and breached at three locations: (1) near Building 38 (edge of concrete pad), (2) 150 feet south of the second manway (near former incinerator) and (3) near Building 1936, the former Boiler Building. These locations will afford maximum cleaning accessability with the proposed cleaning method.

4.0 PRETREATMENT UNIT

4.1 SYSTEM DESIGN

The pretreatment unit (PU) is based on preliminary analytical data and is subject to change based on analytical results of premobilization sampling.

The temporary PU is designed to treat water from two 50,000 gallon reinforced concrete USTs, the cooling water outflow tunnel that runs from Building 38 to Ensenada Honda, and the two cooling water intake tunnels that connect Building 38 to Puerca Bay. The system also provides treated water for backwashing of the multi-media filters and is capable of receiving the wastewater from the backwashing cycle. The system is designed to treat approximately 30 gallons per minute (gpm) of wastewater and meet the NPDES discharge standards for Volatile Organic Compounds (VOCs), Semivolatile Organic Compounds (SVOCs), and pesticides/PCBs. Treated water will be discharged to the Forrestal Sewage Treatment Plant. The anticipated contaminants and their influent and effluent concentrations in water are listed in Table 4.1.

The treatment system will consist of a pre-filter, one 50,000-gallon pool for collection of the contaminated streams, a multi-media filter, two sets of duplex bag filters, one set upstream and another downstream of the multi-media filters, a granular activated carbon bed, five 50,000-gallon pools for collection of treated water prior to discharge to Forrestal Sewage Treatment Plant and two (2) chemical feed metering pumps (hexameta phosphate and sulfuric acid). Clorox will be added to treated water pools to prevent any biological activity during 5-day BOD testing. The process flow diagram is shown in Figure 4.1.

Any free product in the USTs and tunnels will be removed prior to pumping the water out for treatment. Three-inch diesel powered trash pump will be used to transfer wastewater from the USTs and tunnels to the first 12,000 gallon pool (equalization tank).

The equalization tank will collect wastewater from the USTs, tunnels, multi-media filter backwashing, and decontamination of equipment. The tank will be covered to reduce fugitive emissions and have sufficient residence time for larger suspended solids to settle by gravity to the bottom. If oil sheen is observed in the tank, it will be removed using oil-absorbent materials such as oil booms and/or pads prior to the treatment.

The equalization tank will be provided with a three-inch electrical submersible pump to process the water through the pretreatment unit. The submersible pump will be positioned a few inches above the tank bottom in order not to disturb the settled solids and prevent emulsification of any oil which might be transferred from the USTs and tunnels. The process equipment will be connected with three-inch hoses.

The equalization tank content will be pumped through one of two bag filters (Rosedale Model 8 or equal) which will be installed in parallel. The wastewater flow will be diverted to the spare filter when the pressure drop across the first filter indicates that the bag is dirty and needs to be changed. The filter bags will be rated for 25 microns to remove suspended solids larger than 25 microns prior to the multi-media filter.

The water from the bag filter will be sent to the multi-media filter through a 3-inch hose to remove suspended solids larger than 10 micron. The multi-media filter will be 152 cubic foot vessel (6'10" dia x 8'2" high) or equal. Two multi-media filters will be installed in parallel to provide an uninterrupted service. The media will consist of anthracite coal and various grades of sand and gravel. During the operation, when the pressure drop through the multi-media filter indicates that the filter is dirty, the flow will be diverted to the second filter and the first filter will be backwashed at approximately 60 gpm for 20-30 minutes with the treated water using a 3' submersible pump. The backwash water will be sent back to the equalization tank. Both vessels will be ASME certified for 80 psi pressure.

The effluent from the multi-media filter will then be filtered through the second bag filter (Rosedale Model 8 or equal) to remove suspended solids to below 5 micron prior to the carbon adsorption unit. There will be two identical bag filters installed in parallel to provide uninterrupted service. When the bag in the primary filter becomes dirty, the flow will be diverted to the stand-by filter, the dirty bag in the first filter will be replaced and the filter placed in the stand-by position.

The effluent from five micron bag filter will be treated through the carbon adsorption cell to remove any volatile and semi-volatile organic compounds present in the water. The vessel will be ASME certified for 80 psi pressure containing 8,000 pounds of activated carbon and capable of treating 30 gpm of contaminated water. Hexameta phosphate will be added to the influent line of the carbon cell at a regulated rate to prevent caking of the top layer of carbon due to salt water. The pH of effluent from the carbon cell will be tested with a pH meter at the carbon filter discharge line and adjusted by in-line injection of sulfuric acid prior to the activated carbon bed. Hexameta phosphate and sulfuric acid addition rates will be determined during the startup of the treatment system.

The effluent from the carbon filter will be collected in five 50,000 gallon pools which will provide sufficient storage capacity during the 5-day requirement for BOD analysis. The water will be discharged from each pool to the Forrestal Sewage Treatment Plant only after analytical testing indicates compliance with the discharge criteria. The treated water will be pumped out from the approved tank using a three-inch submersible pump. The pump discharge line will be valved such that recycle back to the equalization tank can be also accomplished in case the tank content is not in compliance with the discharge parameters. Sampling and analysis of the pretreatment unit's effluent is detailed in the Sampling and Analysis Plan (Appendix II).

Treated water will also be used for multi-media filter backwash and decontamination of the equipment during site demobilization.

4.2 INSTALLATION

Prior to the placement of treatment system components on site, a heavy duty 60 mil HDPE liner will be installed and bermed with hay bales to contain water and process leaks.

OHM personnel will install the equipment including process piping and instrumentation. A local electrician will provide necessary electrical hook-ups to power pumps and other miscellaneous electrical equipment.

4.3 OPERATION

OHM will operate the water treatment equipment continuously 24 hours per day, 7 days per week until conclusion of the project.

OHM will monitor weather closely and make provisions to minimize the possibility of the berm overflowing. In the event of high precipitation or storm events the area will be dewatered and the water will be treated in the water treatment system.

Wastewater treatment system will be modified should any of the site or process conditions change.

5.0 UNDERGROUND STORAGE TANK(S) BACKFILL

Upon receipt of analytical verification for UST clean levels (PCB<50ppm, TPH<100ppm), backfill operations will commence. An inert, low density concrete mixture will be poured into the UST's. The duration of this operation is four days to allow for proper cure duration between lifts. All manways and the pump pit entrance will be sealed with watertight seals upon completion.

6.0 DECONTAMINATION PROCEDURES

In general, accepted UST and sewer cleaning methods will be implemented. The contractor will use a manpower intensive approach for the UST and an equipment intensive approach for the cooling lines.

6.1 PERSONNEL DECONTAMINATION

A decontamination trailer will be used for personnel decontamination. The decontamination trailer is provided with potable water. Decontamination water will be collected and transferred to the water treatment system.

6.2 EQUIPMENT DECONTAMINATION

All heavy equipment coming into contact with contaminated soils or water will be decontaminated using a 2,500 psi pressure washer prior to mobilization. Portable decontamination pads will be used for decontamination of equipment. Decontamination water will be collected and transferred to the water treatment system. Small tools contaminated with Bunker "C", will be decontaminated with diesel fuel followed with detergent cleaning. This approach was successful during the pre-mobilization sampling event.

Wipe samples will be taken from equipment after decontamination to verify properly decontaminated equipment. Wipe samples will be analyzed in the LANTDIV approved and certified laboratory.

6.3 UNDERGROUND STORAGE TANK

The two 50,000 gallon USTs, with a revised estimate of 4" of sludge (4,500 gallons), will require a three step cleaning approach. The initial phase will be water removal via pumping from the top (skimmer device) to approximately 2" above Bunker "C" layer or, until oil concentration exceeds equalization pool pre-filtration system. The removed water will be treated and, upon satisfactory analytical verification meeting the NPDES permit, discharged to the Forrestal Water Treatment Plant for disposal. The second phase consists of the removal of the pumpable viscous Bunker "C" liquid/sludge. Bunker "C" and the remaining water will be pumped into tankers with the excess water removed after a brief settling period (estimate 2 days). The removed water will be treated by the PU, and, as above, be disposed of via the Forrestal Water Treatment Plant. The pumpable sludge will be disposed of in full accordance with all current EPA regulations after receipt of NPDES acceptable and analytical data. The third and last step requires a manual removal of non-pumpable sludge, solids, and debris, followed by a high pressure rinse with a biodegradable cleaning solution. Removed sludge and debris will be containerized and stabilized for eventual transportation and disposal to the U.S. Mainland in full accordance with current EPA regulations. The biodegradable rinsate will be treated via the PU system and disposed at the Forrestal Water Treatment Plant after receipt of NPDES acceptable analytical data. All pre-filtration collected solids will be combined with the containerized sludge for transportation and disposal. Chip samples will be collected from the ceiling, walls, columns and floor surfaces of the USTs upon completion of cleaning cycle and analytically verified for PCBs and TPH. Sampling and analysis procedures are addressed in Appendix II, Sampling and Analysis Plan.

6.4 COOLING WATER LINE(S)

The cooling lines, due to their rectangular interior dimensions, are ideally suited for a mechanical, water powered cleaning device commonly used in sewer cleaning operations. This self propelled device, operated and controlled above ground, will be placed into the man ways and breached locations to clean the cooling lines. The high water pressured unit will blast all internal surfaces and, after traversing a predetermined distance, will reverse its direction and water force the released contaminants to the manway for

removal via a vacuum system. The same separation concept as used for pumped sludge, described in Section 6.3 above, will be employed for separating solids/sludge from pumpable liquids. Sludge and water generated from the cooling line pumping and cleaning operations will be treated as separate waste streams, pending analytical verification from the pre-mobilization sampling and analytical event.

7.0 SITE RESTORATION

Upon completion of decontamination processes, OHM will restore all disturbed areas to pre-construction conditions. This includes revegetation and planting as necessary.

Existing excavated soils will be used to backfill all excavated breach locations. The area will be compacted with a vibratory roller in lifts as directed by the NTR. The area will be fertilized and reseeded.

Silt fencing will remain in place until site excavations are backfilled, compacted, and reseeded and vegetation is established per specification.

8.0 DEMOBILIZATION

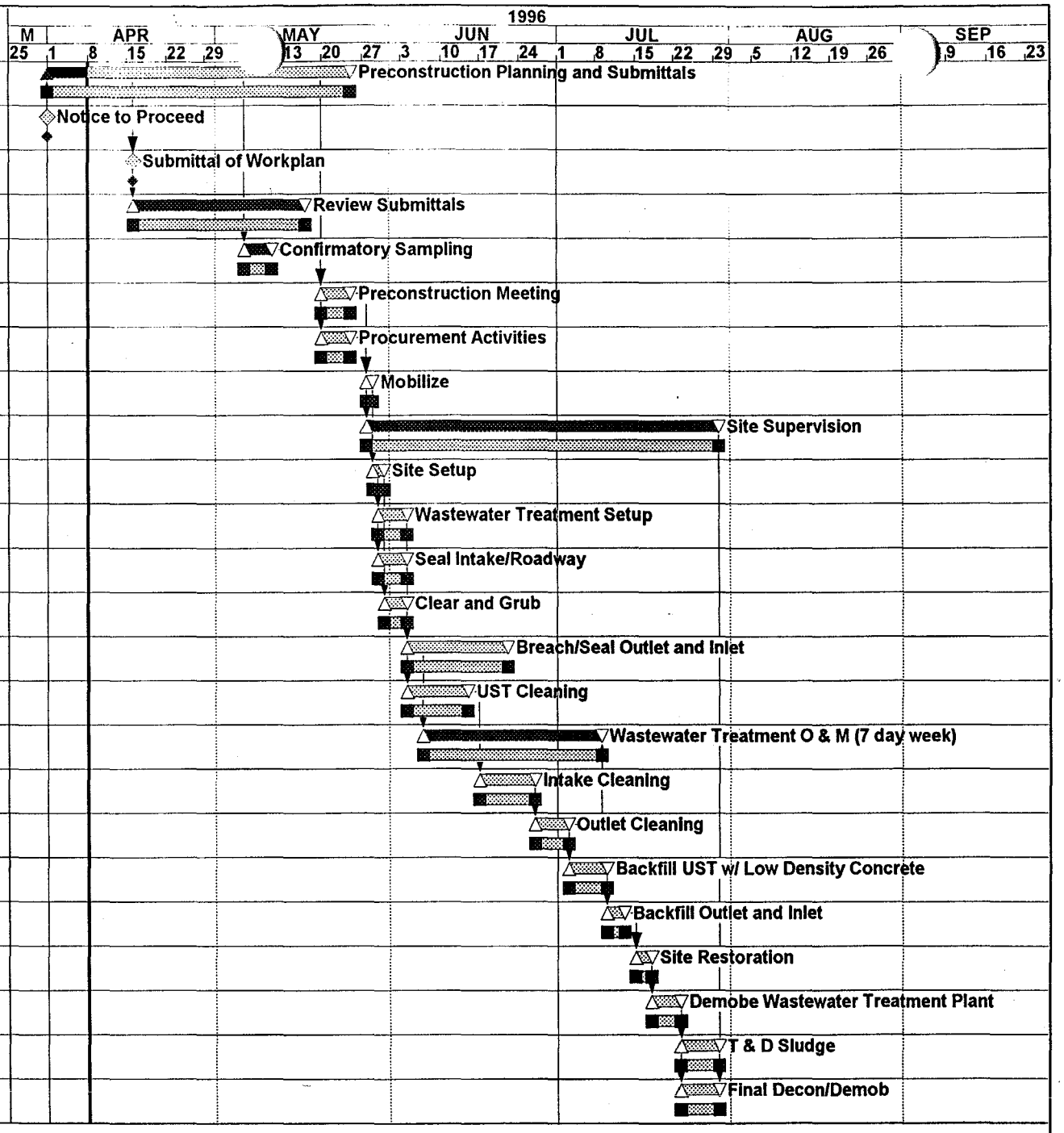
Demobilization activities include:

- Removal of construction trailers from the site
- Removal of temporary utilities (electrical and telephones)
- Removal of the temporary pretreatment unit. The PU will be used to the maximum extent possible to treat decontamination water generated during decontamination activities.
- Demobilization of construction equipment

OHM personnel will demobilize from the site upon completion of site restoration tasks and after the demobilization activities listed above are performed.

TABLES

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
100	Preconstruction Planning and Submittals	40	01APR96A	24MAY96
50	Notice to Proceed	0	01APR96A	
150	Submittal of Workplan	0	16APR96	
200	Review Submittals	23	16APR96	16MAY96
160	Confirmatory Sampling	5	06MAY96	10MAY96
300	Preconstruction Meeting	5	20MAY96	24MAY96
350	Procurement Activities	5	20MAY96	24MAY96
400	Mobilize	1	28MAY96	28MAY96
1900	Site Supervision	44*	28MAY96	29JUL96
500	Site Setup	2	29MAY96	30MAY96
600	Wastewater Treatment Setup	3	30MAY96	03JUN96
800	Seal Intake/Roadway	3	30MAY96	03JUN96
700	Clear and Grub	2	31MAY96	03JUN96
850	Breach/Seal Outlet and Inlet	14	04JUN96	21JUN96
1000	UST Cleaning	9	04JUN96	14JUN96
900	Wastewater Treatment O & M (7 day week)	32	07JUN96	08JUL96
1100	Intake Cleaning	8	17JUN96	26JUN96
1200	Outlet Cleaning	4	27JUN96	02JUL96
1300	Backfill UST w/ Low Density Concrete	4	03JUL96	09JUL96
1500	Backfill Outlet and Inlet	3	10JUL96	12JUL96
1600	Site Restoration	3	15JUL96	17JUL96
1700	Demobe Wastewater Treatment Plant	3	18JUL96	22JUL96
1400	T & D Sludge	5	23JUL96	29JUL96
1800	Final Decon/Demob	5	23JUL96	29JUL96



Project Start	11JAN96
Project Finish	29JUL96
Data Date	08APR96
Plot Date	12APR96

Early Bar
Target Bar
Progress Bar
Critical Activity

© Primavera Systems, Inc.

PRIC

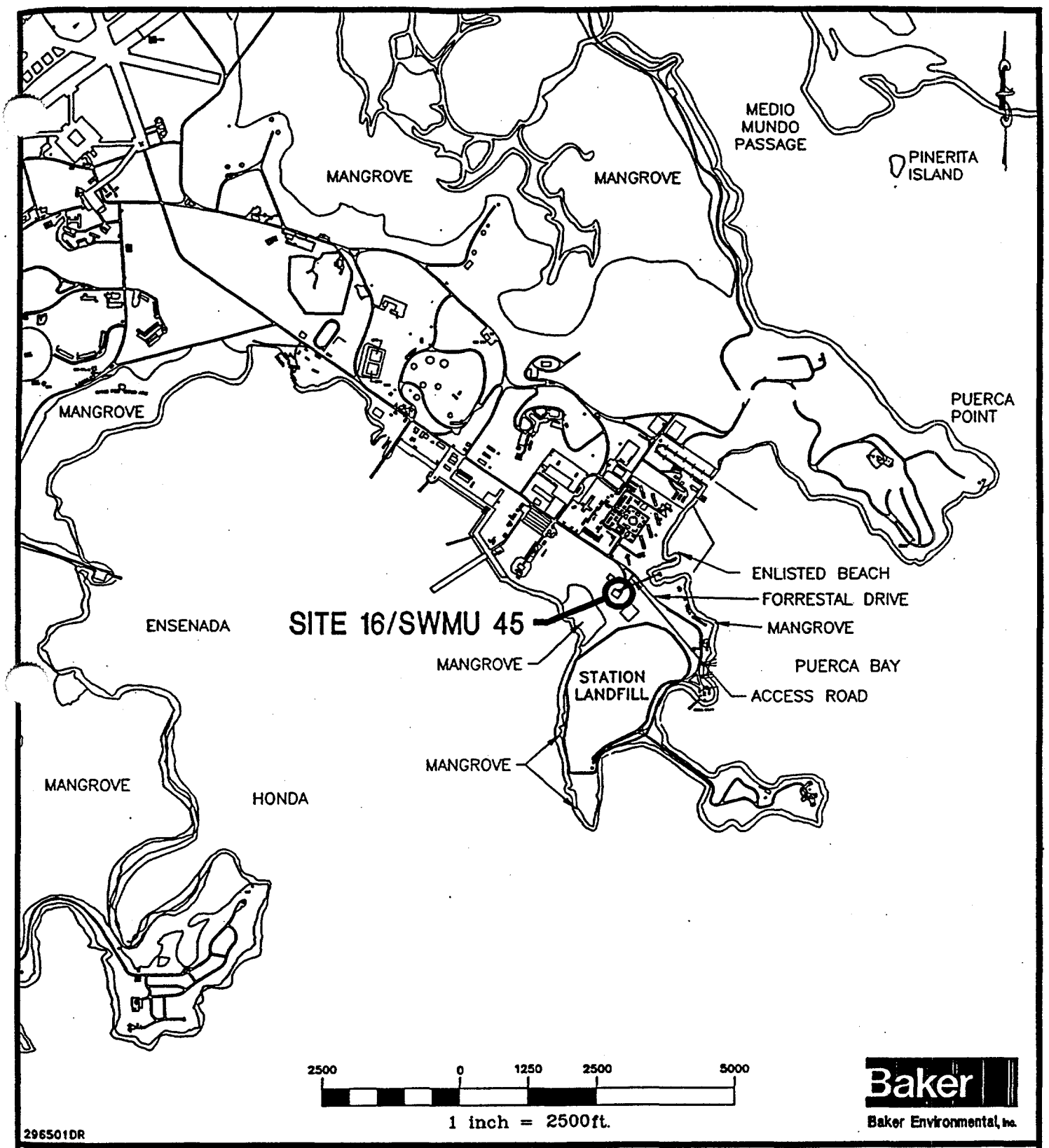
Sheet 1 of 1

Naval Station Roosevelt Rds.
OHM# 17780
Puerto Rico Table 1.1

TABLE 4.1 EFFLUENT DISCHARGE STANDARDS		
Contaminant	**Influent**	**Effluent**
Aroclor-1260	0.41	non-detect
Methylene Chloride	3	non-detect
Chlorobenzene	16	5.0
1,3-Dichlorobenzene	3	600
1,4-Dichlorobenzene	4	75
Barium	19.3	1,000
Lead	11.8	15
Mercury	0.38	1
Silver	6.4	2
Vanadium	22	22
TPH	2,000	2,000
Oil and Grease	NE	8
Total Suspended Solids	NE	30 mg/l
Biochemical Oxygen Demand	NE	30 mg/l
Chemical Oxygen Demand	NE	50 mg/l
Dissolved Oxygen	>4.0 mg/l	>4.0 mg/l
pH	6.0 to 9.0	7.5 to 8.0

NE = Not Evaluated

FIGURES



LEGEND

◇ BUILDING

SOURCE: LANTDIV, FEB. 1992

FIGURE 2-1
SITE LOCATION MAP

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

785800
786000
786200
786400
143400
143200
143000
142800
142600
142400

TO GATE NO. 1
MAIN ROAD
ACCESS ROAD
TO BEACH AREA
BEACH
BRIDGE
COOLING WATER INTAKE TUNNEL
COOLING TOWER INTAKE TUNNEL
COOLING TOWER DISCHARGE TUNNEL
DIRT ROAD
UNDERGROUND TANKS
CONCRETE GUTTER
CONC. SLAB
POWER PLANT (BLDG. 38)
CONCRETE STRUCTURE
FORMER INCINERATOR
TO LANDFILL
SANITARY SEWAGE TREATMENT PLANT
ROOSEVELT ROAD LANDFILL

T.E.=103.82
T.E.=103.41
T.E.=103.44
T.E.=103.42
T.E.=103.48
T.E.=108.37
T.E.=108.57
T.E.=108.53
T.E.=108.53
T.E.=108.57
T.E.=108.54
T.E.=108.74
T.E.=109.03
T.E.=109.41
T.E.=109.60
T.E.=109.62
T.E.=111.40

100 0 50 100
1 inch = 100 ft.

Baker
Baker Environmental, Inc.

296502DR

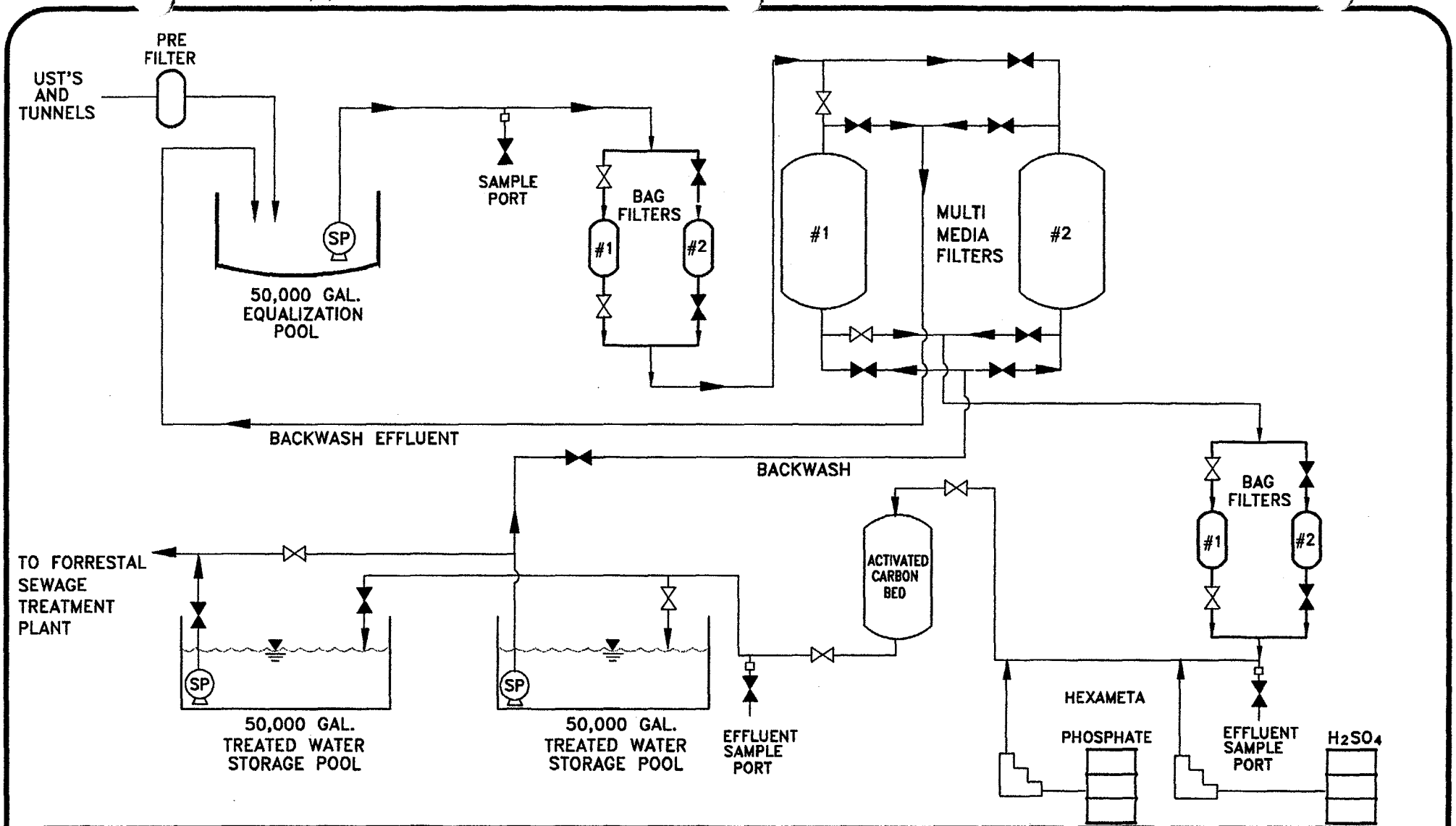
LEGEND

T.E.=108.54 MANHOLE LOCATION (WITH ELEVATION)
CHAIN LINK FENCE
ELECTRIC POLE
ELECT. POLE WITH TRANSFORMER
ELECTRIC POLE (CONC.)
TELEPHONE POLE
SANITARY SEWER MANHOLE
FIRE HYDRANT
CONTROL STATION
SIGN
GRAVEL

FIGURE 2-2
UST AND TUNNEL LOCATION PLAN

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

00544I01Z



Legend

SP ELECTRIC SUBMERSIBLE PUMP

METERING PUMP

OHM Remediation Services Corp.

OHM Project No. 17780

Drawn By:	Checked By:	Approved By:
D. Leech	M. Jurusz	
Date:	Scale:	Drawing No.
4/4/96	NONE	17780-A1

FIGURE 4.1

PROCESS FLOW DIAGRAM

WASTEWATER TREATMENT SYSTEM

PREPARED FOR

NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

APPENDIX I
HEALTH AND SAFETY PLAN

FINAL
HEALTH AND SAFETY PLAN
FOR
TANK CLOSURE, SWMU #45 AT
U.S. NAVAL STATION,
ROOSEVELT ROADS, PUERTO RICO

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0090

Prepared by:

Robert Frizzle
Health & Safety Supervisor
OHM Remediation Services Corp.
Hopkinton, MA

Reviewed by:

Michael Zustra, MSPH, CIH
Northern Division
Health & Safety Manager

John P. Franz, P.E.
Program Manager

May 15, 1996
OHM Project 17780HS

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

1.1 SITE HISTORY 1-1
1.2 SCOPE OF WORK 1-1

FIGURE 1.1 SITE MAP 1-3

2.0 KEY PERSONNEL AND MANAGEMENT 2-1

2.1 PROJECT MANAGER 2-1
2.2 SITE SUPERVISOR 2-1
2.3 SITE SAFETY OFFICER 2-1
2.4 DISTRICT HEALTH AND SAFETY MANAGER 2-2
2.5 CERTIFIED INDUSTRIAL HYGIENIST 2-2
2.6 EMPLOYEE SAFETY RESPONSIBILITY 2-2
2.7 KEY SAFETY PERSONNEL 2-3

FIGURE 2.1 HEALTH & SAFETY ORGANIZATION 2-4

3.0 JOB HAZARD ANALYSIS 3-1

3.1 CHEMICAL HAZARDS 3-1
3.2 PHYSICAL HAZARDS 3-1
3.3 ENVIRONMENTAL HAZARDS 3-2
3.4 TASK-SPECIFIC AND HEALTH RISK ANALYSIS 3-4
3.5 ACCIDENT PREVENTION 3-12

4.0 WORK AND SUPPORT AREAS 4-1

4.1 EXCLUSION ZONE 4-1
4.2 CONTAMINATION-REDUCTION ZONE 4-1
4.3 SUPPORT ZONE 4-1
4.4 SITE CONTROL LOG 4-1
4.5 GENERAL 4-1

5.0 PROTECTIVE EQUIPMENT 5-1

5.1 ANTICIPATED PROTECTION LEVELS 5-1
5.2 PROTECTION LEVEL DESCRIPTIONS 5-2
5.3 SUPPLIED-AIR RESPIRATORS 5-3
5.4 BREATHING-AIR QUALITY 5-3
5.5 AIR-PURIFYING RESPIRATORS 5-3
5.6 RESPIRATOR CARTRIDGES 5-3
5.7 CARTRIDGE CHANGES 5-4
5.8 INSPECTION AND CLEANING 5-4
5.9 FIT TESTING 5-4
5.10 FACIAL HAIR 5-4
5.11 CORRECTIVE LENSES 5-4
5.12 CONTACT LENSES 5-4
5.13 MEDICAL CERTIFICATION 5-4
5.14 SITE-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT (PPE) PROGRAM 5-4

6.0 DECONTAMINATION PROCEDURES 6-1

6.1 PERSONNEL DECONTAMINATION 6-1
6.2 EQUIPMENT DECONTAMINATION 6-2
6.3 DISPOSAL 6-2

7.0 AIR MONITORING 7-1

7.1 LOWER EXPLOSIVE LIMIT/OXYGEN METER (LEL/O_2) 7-1
7.2 PHOTOIONIZATION DETECTOR (PID) 7-2
7.3 PORTABLE TOTAL DUST MONITOR 7-3
7.4 COLORIMETRIC DETECTOR TUBES 7-4
7.5 INTEGRATED AIR MONITORING PROGRAM 7-5
7.6 AIR MONITORING LOG 7-6
7.7 CALIBRATION REQUIREMENTS 7-6
7.8 AIR MONITORING RESULTS 7-7

8.0 EMERGENCY RESPONSE 8-1

8.1 PRE-EMERGENCY PLANNING 8-1
8.2 EMERGENCY RECOGNITION AND PREVENTION 8-2

TABLE 8.1 EMERGENCY TELEPHONE NUMBERS 8-3

8.3 PERSONNEL, ROLES, LINES OF AUTHORITY, AND COMMUNICATIONS 8-3
8.4 SAFE DISTANCES AND PLACES OF REFUGE 8-5
8.5 EVACUATION ROUTES AND PROCEDURES 8-6
8.6 EMERGENCY SPILL AND RESPONSE PROCEDURES AND EQUIPMENT 8-8
8.7 EMERGENCY CONTINGENCY PLANS 8-11
8.8 MEDICAL EMERGENCY PROCEDURES 8-11
8.9 FIRE CONTINGENCY MEASURES 8-12
8.10 HAZARDOUS WEATHER CONTINGENCY MEASURES 8-13
8.11 SPILL/RELEASE CONTINGENCY MEASURES 8-14

9.0 TRAINING REQUIREMENTS 9-1

10.0 MEDICAL SURVEILLANCE PROGRAM 10-1

TABLE 10.1 WORKER MEDICAL PROFILES 10-1

10.1 EXAMINATION SCHEDULE 10-1

APPENDICES
APPENDIX A HEALTH AND SAFETY PLAN CERTIFICATION
APPENDIX B OHM HAZARD COMMUNICATION PROGRAM
APPENDIX C MATERIALS SAFETY DATA SHEET
APPENDIX D SITE-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT (PPE) PROGRAM

1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed for United States Navy, LANTDIV, Delivery Order 0090 entitled, Tank Closure, SWMU #45, U.S. Naval Station Roosevelt Roads, Puerto Rico. The Delivery Order will be executed per the requirements stated in the Final Statement of Work (SOW) for Service Delivery Order per Contract No. N62470-93-D-3032, Delivery Order 0090, in cooperation with the Navy. This Delivery Order will also be executed in accordance with Naval Facilities Engineering Command (NAVFAC).

This HASP documents the policies and procedures which protect workers and the public from potential hazards posed by work at this site and is a key component in the OHM Safety Improvement Process. OHM considers safety the highest priority during work at a site containing potentially hazardous materials and has established a goal of **zero accidents** for all projects. All projects will be conducted in a manner which minimizes the probability of injury, accident, or incident occurrence. This HASP is a key element in the proper planning of project work which is necessary to assure the goal of **zero accidents**. The HASP Acknowledgment (Appendix A) will be signed by all who actively participate at this project.

Although the plan focuses on the specific work activities planned for this site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations may arise that require deviations from the original plan. This flexibility allows modification by the OHM supervisors and health and safety officials with approval from the project CIH.

1.1 SITE HISTORY

SWMU #45 is located in the Forestall Area of the Naval Base, North of the base landfill and adjacent to the Forestall Sewage Treatment Plant. Building #38, a former power plant and subsequent transformer storage location, located next to SWMU #45, are considered a potential source for the existing PCB contamination.

The site consists of two "bomb proof" underground storage tanks which formerly held and supplied fuel for the power plant (Bunker "C" fuel). Also included are three cooling lines (two intake and one outlet). The total volume of the three lines equal approximately 374,000 gallons of saline water and 28,000 of sludge, with a total run of approximately 1,675 linear feet.

Past evidence of visible oil emanating from the cooling lines and contaminating beaches prompted several investigations and subsequent UST draining.

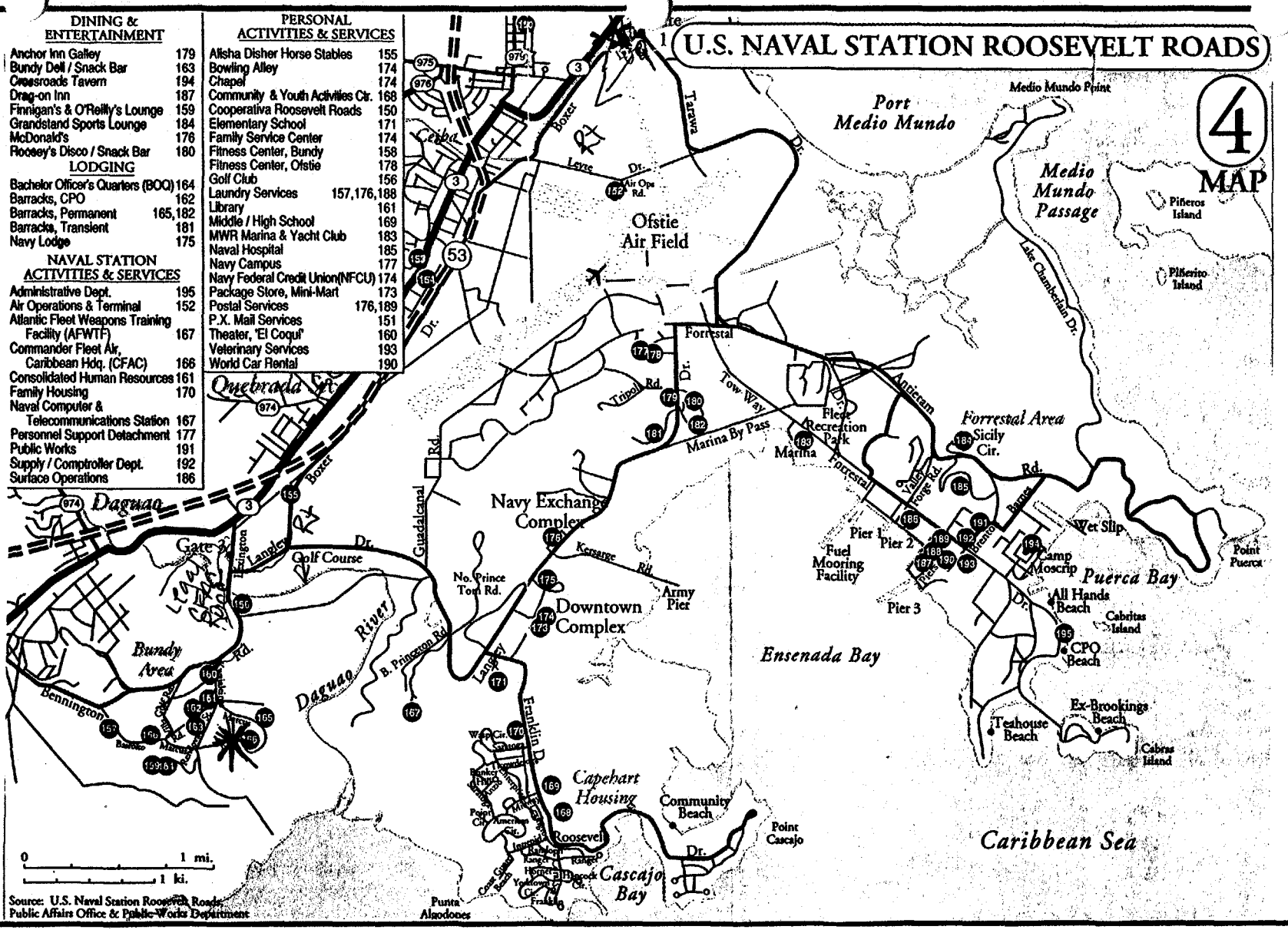
Recent studies provided results supporting the Interim Corrective Measure Action for the site. Analytical data demonstrates that all contaminants, with the exception of the outlet cooling line, are below RCRA and TSCA limits and meet the National Pollution Discharge Elimination System acceptance criteria for the Forestall Sewage Treatment Plant, except for Aroclor 1260 and Bunker "C" fuel.

1.2 SCOPE OF WORK

- Seal two intake cooling water intake tunnels near Puerca Bay and at Building 38.
- Seal a cooling water outflow tunnel at Building 38 and near the boiler building.
- Remove liquid and sludge from the two 50,000 gallon USTs.
- Remove liquid and sludge from the cooling water intake tunnels.
- Remove liquid and sludge from the cooling water outflow tunnel.
- Treat the removed liquids on-site.

- Dispose of the treated liquid at the Forestall Sewage Treatment Plant.
- Dispose of contaminated sludge at a permitted facility.
- Backfill the USTs.
- Seal the man way entrances.
- Install a water-tight lid on the pump pit.
- Restore the site.
- Repair the wooden walkway over the cooling water intake tunnel.
- Other related work.

These activities have been analyzed for potential hazards for which control measures are provided in Section 3.4 Job Safety Analysis.



Legend

OHM Remediation Services Corp.
OHM Project No. 17780

Drawn By: D. Leech	Checked By: M. Jurusz	Approved By:
Date: 4/12/96	Scale: NTS	Drawing No. 17780-A2

FIGURE 1.1
SITE MAP
ROOSEVELT ROADS
PREPARED FOR
U.S. NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

2.0 KEY PERSONNEL AND MANAGEMENT

The Project Manager (PM), Site Supervisor (SS), Certified Industrial Hygienist (CIH) and Site Safety Officer (SSO) are responsible for formulating and enforcing health and safety requirements, and implementing the HASP. Reporting relationships are shown in Figure 2.1

2.1 PROJECT MANAGER (PM)

The PM has the overall responsibility for the project and to assure that the goals of the construction remedial action are attained in a manner consistent with the HASP requirements. The PM will coordinate with the SS and the SSO to assure that the remedial action goals are completed in a manner consistent with the HASP. The PM will conduct a monthly health and safety audit of the project using the Management Safety Improvement Report Form. Specific Key Requirement Areas (KRAs) for safety performance include:

- Implement Safety Awareness/ Recognition programs on project if over $200,000
- Conduct monthly (a minimum of one) site audit of project (Management Safety Improvement Report)
- Implement Safety Improvement Team on all project if >20 employees and 1 month or longer duration
- Investigate and report findings for OSHA recordable cases; assure corrective actions are taken

2.2 SITE SUPERVISOR (SS)

The SS is responsible for field implementation of the HASP. The SS will be the main contact in any on-site emergency situation and is responsible for establishing communications with potential emergency responders prior to start of work. The SS will act as the SSO when the assigned SSO is not on the project site. The SS will conduct periodic inspections (at least weekly) of the work site to confirm compliance with all health and safety requirements. The Project Safety Improvement Checklist shall be used to document inspections. The SS is also responsible for coordinating remedial actions for all deficiencies and for enforcing the OHM "Cardinal Safety Rules." Specific KRAs for safety performance include:

- Complete site-specific Job Safety Analyses for all principle tasks
- Implement Safety Awareness/ Recognition program for the project if over $200,000
- Conduct weekly safety inspections of the job site
- Implement Safety Improvement Team on project if >20 employees and 1 month or longer duration
- Correct all deficiencies as noted on Management Safety Improvement Reports and safety department audits, within recommended time frames
- Investigate and report findings for OSHA recordable cases; assure corrective actions are taken

2.3 SITE SAFETY OFFICER (SSO)

The SSO has responsibility for administering the HASP relative to site activities, and will be in the field full-time while site activities are in progress. The SSO's primary operational responsibilities include personal and environmental monitoring, coordination of job safety analyses, selection and care of personal protective equipment, assignment of protection levels and review of work permits. The SSO will monitor all field activities involved with safety and is authorized to stop work when an imminent health or safety risk exists. The SSO is responsible for informing all on-site personnel of essential safety requirements and facilitating the daily safety meetings. Specific KRAs for safety performance include:

- Monitor workers for signs of stress, such as heat stress, and fatigue
- Reevaluate site conditions on an on-going basis. Coordinate protective measures including engineering controls, work practices and personal protective equipment
- Assist the SS in the preparation, presentation and documentation of daily safety meetings
- Conduct and prepare reports of daily safety inspections of work processes, site conditions, equipment conditions and submit to SS. Discuss any necessary corrective actions with the SS and review new procedures
- Initiate revisions of the HASP as necessary for new tasks or modifications of existing operations and submit to the Program CIH for approval
- Perform air monitoring as required
- Assist the PM and SS in accident investigations
- Prepare permits for special operations, e.g., hot work, confined spaces, line breaking, etc.
- Maintain site safety records
- Conduct weekly inspections of all fire extinguishers, supplied air respirators, first-aid kits, and eye washes/emergency showers
- Inform subcontractors of the elements of the HASP/contractor pre-job checklist
- Coordinate the preparation of Job Safety Analyses with the SS, team leader, and work crew
- Coordinate the daily Safety Observer Program
- Coordinate the Safety and Health Awareness and Recognition Program (SHARP) with Project Manager and Supervisor

2.4 DISTRICT HEALTH AND SAFETY MANAGER (DHSM)

The DHSM is responsible for staffing health and safety personnel and monitoring projects for compliance with regulatory and OHM health and safety policies and procedures. This position reports to the District Manager (DM) and will audit the site periodically to ensure compliance with this HASP.

2.5 PROGRAM CERTIFIED INDUSTRIAL HYGIENIST (CIH)

The Program CIH is responsible for overseeing development of the HASP and ensures that the HASP complies with all federal, state and local health and safety requirements. The Program CIH provides technical and administrative support for the LANTDIV Health and Safety Program. If necessary, the CIH can modify specific aspects of the HASP to adjust for on-site changes that affect safety. The CIH will coordinate with the DHSM and SSO on all modifications to the HASP and will be available for consultation when required. The CIH will not necessarily be on site during OHM activities but may make periodic site visits to determine compliance. The CIH reports to the Regional Vice President/General Manager.

2.6 EMPLOYEE SAFETY RESPONSIBILITY

Each employee is responsible for personal safety as well as the safety of others in the area. The employee will use all equipment provided in a safe and responsible manner as directed by the SS. All OHM personnel will follow the policies set forth in OHM's Employee Safety Guide and the OHM Health and Safety Procedures Manual, with particular emphasis on the OHM "Cardinal Safety Rules." Employees that knowingly disregard safety policies/procedures may be subject to disciplinary actions.

2.7 KEY SAFETY PERSONNEL

The following individuals share responsibility for health and safety at the site:

Project Manager	Gary Shirley 804-262-0079 (office) 804-273-8702 (pager)
ROICC	Ivan Rosado 787-865-2050 (office) 787-865-4066 (office)
RPM	Art Wells 804-322-4587 (office)
Site Supervisor	Stan Gable _____ (site phone)
Site Safety Officer	Mike Adams _____ (site phone)
Program Manager for LANTDIV	John P. Franz, P.E. 609-588-6477 (office)
Northern Division Health and Safety Manager/Project CIH	Mike Zustra, MSPH, CIH 508-497-6125 (office) 800-731-9629 (pager)
Northeast Region Health and Safety Director/Program CIH	Kevin McMahon, M.S., CIH 609-588-6375 (office) 609-421-7523 (pager)
Vice President, Health and Safety	Fred Halvorsen, Ph.D., PE, CIH 800-231-7031

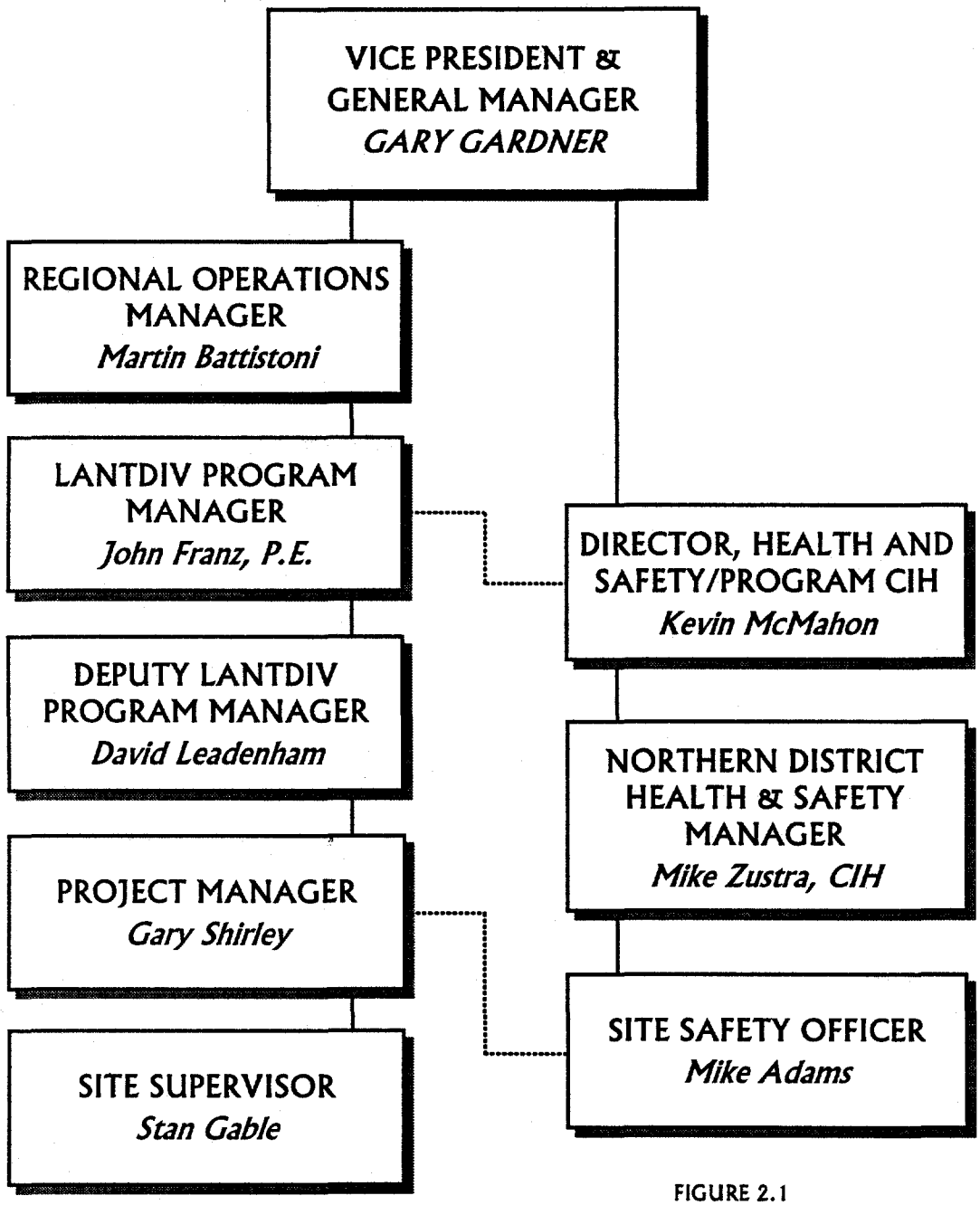


FIGURE 2.1

HEALTH & SAFETY ORGANIZATION
Remedial Action
Tank Closure SMWU #45, U.S. Naval Station
Roosevelt Roads, Puerto Rico
Delivery Order 0090
OHM Project 17780

Prepared for

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA

3.0 JOB SAFETY ANALYSIS

This section outlines the potential chemical and physical hazards which workers may be exposed to during work on this project. Table 3.1 lists significant contaminants identified at the site. An MSDS list is included in Appendix C.

3.1 CHEMICAL HAZARDS

CHEMICAL	EXPOSURE ROUTES	PEL/TLV	HEALTH HAZARDS/ PHYSICAL HAZARDS
PCB transformer oil in the Bunker C oil	Ingestion, inhalation, skin contact	1mg/m^3-PEL 0.5mg/m^3 TLV	Acute - eye, nose and throat irritation from mists.
			Chronic - Liver damage, chloracne, possible carcinogenic and reproductive effects and the material may appear in the breast milk of exposed mothers.
Bunker C oil	Ingestion, inhalation, skin contact	5mg/m^3 mineral oil mist	Acute - Inhalation of fumes or mists can cause irritation to respiratory passages and headache, dizziness, nausea, vomiting, and loss of coordination.
			Chronic - irritation of the hair follicles, and block the sebaceous glands which could produce a rash of acne pimples, and spots.

The following general symptoms may indicate exposure to a hazardous material. Personnel will be removed from the work site and provided proper medical attention immediately if the following symptoms occur:

- Dizziness or stupor
- Nausea, headaches, or cramps
- Irritation of the eyes, nose, or throat
- Euphoria
- Chest pains and coughing
- Rashes or burns

3.2 PHYSICAL HAZARDS

To minimize physical hazards, OHM has developed standard safety protocols which will be followed at all times. Failure to follow safety protocols will result in expulsion of an employee from the site and appropriate disciplinary actions.

The SS and SSO will observe the general work practices of each crew member and equipment operator, and enforce safe procedures to minimize physical hazards. Hard hats, safety glasses, and steel-toe safety boots are required in all areas of the site. Site-specific hazards and all necessary precautions will be discussed at the daily safety meetings. The Health and Safety Procedures Manual for LANTDIV will be maintained at the project site as a reference document.

3.3 ENVIRONMENTAL HAZARDS

Environmental factors such as weather, wild animals, insects, and irritant plants pose a hazard when performing outdoor work. The SSO and SS will take all necessary measures to alleviate these hazards should they arise.

3.3.1 Heat Stress

The combination of warm ambient temperature and protective clothing result in the potential for heat stress. Heat stress disorders include:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke

Heat stress prevention is outlined in procedure No. 22 of the OHM Corp. LANTDIV Health and Safety Procedures manual. This information will be reviewed during safety meetings. Workers will be encouraged to increase consumption of water and electrolyte-containing beverages (e.g., Gatorade).

It is recommended that workers break approximately every 2 hours for 10 to 15 minute rest periods when temperatures rise above 72.5 degrees F. and protective clothing is worn. In addition, workers are encouraged to take rests whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased upon worker recommendation to the SSO and SS. Heat stress can be prevented by assuring an adequate work/rest schedule; guidelines are printed below.

AMBIENT TEMPERATURE	NO CHEMICAL PROTECTIVE CLOTHING (LEVEL D PPE)	CHEMICAL PROTECTIVE CLOTHING (D+/C/B/A)
90° F or above	After 45 minutes of work	After 15 minutes of work
87.5 F-90 F	After 60 minutes of work	After 30 minutes of work
82.5-87.5 F	After 90 minutes of work	After 60 minutes of work
77.5-82.5 F	After 120 minutes of work	After 90 minutes of work
72.5-77.5 F	After 150 minutes of work	After 120 minutes of work

The work/rest schedule can be calculated based on heat stress monitoring results. Monitoring consists of taking the radial pulse of a worker for 30 seconds immediately after exiting the work area. The frequency of monitoring is provided herein.

If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by ⅓ and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next rest period, increase the following rest period by ⅓. The initial rest period should be at least 10 minutes.

Body temperature measured orally or through the ear canal may also be monitored to assess heat stress. Workers should not be permitted to continue work when their body temperature exceeds 100.4 F (38C). Monitoring should be conducted at the intervals given above.

Monitoring for heat stress will begin when the ambient temperature reaches or exceeds 70 degrees Fahrenheit when wearing chemical protective clothing, or 80 degrees Fahrenheit for site activities performed with no chemical protective clothing (Level D). Monitoring will include pulse rate, weight loss, oral temperature and signs and symptoms of heat stress. See Procedure 22 LANTDIV Health and Safety Procedures Manual.

3.3.2 Biological Hazards

Centipede

Description /Symptoms - Centipedes are many legged worm like creatures. Some of the larger centipedes of the genus Scolopendra can inflict a painful bite, with some localized swelling and erythema (inflammation). Lymphangitis and lymphadenitis are not uncommon. Necrosis is rare and infection almost unknown. Symptoms and signs seldom persist for more than 48 hours.

First Aid/Prevention - An ice cube will control the pain of most centipede bites. Hydrocortisone lotions may be used to treat local inflammation. Cleaning with alcohol should be avoided. Eye injuries require immediate irrigation. Wear tight fitting gloves and tuck pant cuffs into boots. Use caution working with earth and in wooded areas.

SCORPIONS

Symptoms/Description - Scorpions of the genus Centruroides Species are common in North, Central and South America, they are yellowish in color and are 4 to 6 inches long. Adults complain of immediate pain after being stung. Adults become tense and anxious and develop tacardia and hypertension and difficulty focusing and swallowing. General weakness and ataxia and muscle incoordination may occur. Most adults are asymptomatic within 12 hours.

First Aid/Prevention - There are no first aid measures of value. The only treatment is with scorpion antivenin. Prevention is to examine shoes, pockets and other areas that may retain warmth as scorpions will congregate in these areas and will sting when aroused. Wear long pants and boots when walking in grassy areas.

MOSQUITOS

Symptoms/Description - Mosquitos are small flying insects barely visible, usually found in wet marshy areas. Bites often cause local pain and minor swelling. The symptoms vary upon the sensitivity of the individual. Persons sensitive to these insect bites may be fatal while others will suffer only pain or discomfort.

First Aid/Prevention - Pain and itching which can be complicated by scratching the bite and causing subsequent infection can be treated locally with isopropyl alcohol or other topical astringents. Prevention includes utilizing insect repellants, netting, avoidance of marshy areas.

PLANTS

Only minimal contact with plant life is expected, because the work area has been previously cleared. The growth that will be cleared amounts to overgrowth of grasses and weeds and are not anticipated to be of concern.

3.3.3 Noise

Hearing protection is required for workers operating or working near heavy equipment, where the noise level is greater than 85 dbA (TWA) as well as personnel working around heavy equipment. The SSO will determine the need for and appropriate testing procedures, i.e., sound level meter and/or dosimeter for noise measurement.

3.4 TASK-SPECIFIC JOB SAFETY ANALYSES

This section of the Site-Specific HASP provides a breakdown of the hazards and control measures for each principal task. These Job Safety Analyses are general in nature and must be made project specific by the Site Supervisor prior to each task. The Job Safety Analyses will be field checked by the supervisor on an ongoing basis and revised as necessary. All revisions will be communicated to the work crew.

Job Hazard Analysis

Task	Hazard	Controls
Tank/Tunnel Prep.	Flow of material	• Drain, break and blank all lines and valves
	Electrocution	• Lockout/tagout associated equipment and controls
	Falls into tank/Tunnel	• Install standard hand and midrails. • Re-secure covers when left unattended.
	Unauthorized entry	• Post "Enter by Permit" signs
	Tidal Water Flow Into Tunnel.	• Investigate and determine if tidal flow is of concern. If it is plan impacted tasks during low tide.
Seal cracks in tunnels	Skin Contact with the sealant	• Consult the MSDS and use proper PPE. Ie. Gloves, and coveralls
Seal cracks in tunnels • Confined Space Entry	Fire/ Explosion	• Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers in all work, flammable storage areas and with fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Post "NO SMOKING" signs • Store combustible materials away from flammable • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammable and Oxidizers by 20 feet minimum
	Flammable, Toxic, Oxygen deficient Atmospheres	• Test vessel atmosphere for flammable/toxic vapors, and oxygen deficiency • Obtain Confined Space Entry Permit signed by Supervisor/Safety Officer • De-energize, lock-out and tag all energized equipment • Provide written rescue plan • Review hazardous properties of site contaminants with entrants and safety observer • Review emergency procedures before work commences • Provide safety observer outside vessel • Wear proper level of PPE for the type of atmospheric contaminants • Use body harness, safety belt with tripod winch for possible rescue
	Burns	• Use proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning

Task	Hazard	Controls
Seal cracks in tunnels • Confined Space Entry (Continued)	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present (See Section 5 HASP) • Review hazardous properties of site contaminants with workers before operations begin
	High Noise Levels	• Perform noise monitoring and engineer and/or provide PPE as necessary. • Utilize OHM Hearing Conservation Program.
	Illumination	• Provide ample intrinsically safe lighting for tasks to be performed.
	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions
Tank Cleaning • Confined Space Entry	Fire/ Explosion	• Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers in all work, flammable storage areas and with fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Post "NO SMOKING" signs • Store combustible materials away from flammable • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammable and Oxidizers by 20 feet minimum
	Flammable, Toxic, Oxygen deficient Atmospheres	• Test vessel atmosphere for flammable/toxic vapors, and oxygen deficiency • Obtain Confined Space Entry Permit signed by Supervisor/Safety Officer • De-energize, lock-out and tag all energized equipment • Provide written rescue plan • Review hazardous properties of site contaminants with entrants and safety observer • Review emergency procedures before work commences • Provide safety observer outside vessel • Wear proper level of PPE for the type of atmospheric contaminants • Use body harness, safety belt with tripod winch for possible rescue
	High Ambient Temperature	• Monitor for Heat stress in accordance with OHM Health and Safety Procedures Manual
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present (See Section 5 HASP) • Review hazardous properties of site contaminants with workers before operations begin

Task	Hazard	Controls
Tank Cleaning • Confined Space Entry (Continued)	High Noise Levels	• Perform noise monitoring and engineer and/or provide PPE as necessary. • Utilize OHM Hearing Conservation Program.
	Illumination	• Provide ample intrinsically safe lighting for tasks to be performed.
	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions
Tank and Tunnel Cleaning • Removing oil	Vacuum truck/pumps Weight of hoses	• Use proper lifting techniques. • Use mechanical means if possible. • Ground and bond the truck to the tank.
	Confined Space Hazards	• Follow CSE above
	Struck By/ Against Heavy Equipment	• Use reflective warning vests worn when exposed to vehicular traffic • Avoid equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review posted hand signals
Tank and Tunnel Cleaning • Removing Sludge	Material Handling	• Use proper lifting techniques. • Use proper rigging techniques to remove bucketed sludge from the tank. • Employees not permitted under loads
	Confined Space Hazards	• Follow CSE above
Tank and Tunnel Cleaning • Water Washing	Splash, burns	• Wear Proper PPE. Face Shield, and level "C" PPE • Use only trained operators. • Operate at the minimum pressure. • Do not modify.
	Confined Space Hazards	• Follow CSE above
Tank and Tunnel Cleaning • Detergent Washing	Splash, burns	• Wear Proper PPE. Face Shield, and level "C" PPE • Use only trained operators. • Operate at the minimum pressure. • Do not modify.

Task	Hazard	Controls
Tank and Tunnel Cleaning • Abrasive blasting	Confined Space Hazards	• Follow CSE above
	High Noise Levels	• Perform noise monitoring and engineer and/or provide PPE as necessary. • Utilize OHM Hearing Conservation Program.
	Illumination	• Provide ample intrinsically safe lighting for tasks to be performed.
	Contact with blast media	• Use only equipment with an operational deadman switch
	Limited Visibility	• Increase illumination and ventilation to allow adequate visibility.
	High Noise Levels	• Perform noise monitoring and engineer and/or provide PPE as necessary. • Utilize OHM Hearing Conservation Program.
	Illumination	• Provide ample intrinsically safe lighting for tasks to be performed.
	Inhalation of Dusts	• Use a supplied air hood
	Material Handling of the Blast Media	• Use proper lifting techniques.
Sampling Wastes	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present (See Section 5 HASP) • Review hazardous properties of site contaminants with workers before operations begin
	Struck By/ Against Heavy Equipment	• Use reflective warning vests worn when exposed to vehicular traffic • Avoid equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review posted hand signals
	Cross Contamination	• Decon personnel and equipment prior to leaving the EZ
Disposal of Wastes On-site	Struck By/ Against Heavy Equipment	• Use reflective warning vests worn when exposed to vehicular traffic • Avoid equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review posted hand signals
	Vacuum truck/pumps Weight of hoses	• Use proper lifting techniques. • Use mechanical means if possible. • Ground and bond the truck to the tank.

Task	Hazard	Controls
Backfilling	Struck By/ Against Heavy Equipment	• Use reflective warning vests worn when exposed to vehicular traffic • Avoid equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review posted hand signals
	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use
	High Ambient Temperature	• Monitor for Heat stress in accordance with OHM Health and Safety Procedures Manual
	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use
	High Ambient Temperature	• Monitor for Heat stress in accordance with OHM Health and Safety Procedures Manual
Seal the Manway Entrances	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use
	High Ambient Temperature	• Monitor for Heat stress in accordance with OHM Health and Safety Procedures Manual

Task	Hazard	Controls
Seal the Manway Enterances (Continued)	Inhalation and Contact with Hazardous Substances - Sealant	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present (See Section 5 HASP) • Review hazardous properties of site contaminants with workers before operations begin
Install Water Tight Lid on Pump Pit	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use
	High Ambient Temperature	• Monitor for Heat stress in accordance with OHM Health and Safety Procedures Manual
	Inhalation and Contact with Hazardous Substances - Sealant	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present (See Section 5 HASP) • Review hazardous properties of site contaminants with workers before operations begin
Restore the Site	Struck by, Against Heavy Equipment, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Avoid equipment swing areas • Make eye contact with operators before approaching equipment • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times • Understand and review hand signals
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb per person for manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Contact Dermatitis	• Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants (See Section 5 HASP) • Identify and review poisonous plants with workers
	Slips, Trips, Falls	• Clear, walkways of equipment, tools, debris, other materials • Mark, identify, or barricade other obstructions

Task	Hazard	Controls
Repair the Wooden Walkway over the cooling water Intake Tunnel	Struck by, Against Heavy Equipment, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Avoid equipment swing areas • Make eye contact with operators before approaching equipment • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times • Understand and review hand signals
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb per person for manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Contact Dermatitis	• Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants (See Section 5 HASP) • Identify and review poisonous plants with workers
	Hand Tool Injuries	• Inspect tools prior to use. • Only use tools for intended task.
	Slips, Trips, Falls	• Clear, walkways of equipment, tools, debris, other materials • Mark, identify, or barricade other obstructions • Use a harness and lanyard as necessary. • Access the integrity of the walkway prior to attempting to walk on it.

3.5 ACCIDENT PREVENTION

This Site Specific Health and Safety Plan has been developed with accident prevention as the primary goal. Details are discussed throughout this SSHSP. This section will outline the Accident Prevention Plan established for this project.

3.5.1 Administrative Responsibilities

The Project Manager is ultimately responsible for the safety and health of site personnel. The PM is to provide the materials and maintenance of equipment necessary to enhance and maintain safe site and work conditions.

The SS has the responsibility and the authority to control the day to day remediation activities in the field with respect to safety. The SS reports directly to the Project Manager. The SS monitors employees for signs of heat stress, excessive fatigue, and obvious outward signs of chemical exposure. In addition, the SS ensures that equipment brought to the site is in proper working condition and inspected regularly. These responsibilities will be shared by the Site Foremen.

The Site Safety Officer reports to the Project Manager and the District Health and Safety Manager and is responsible to point out unsafe conditions that may pose a hazard to personnel or the public. The SSO is required to conduct regular safety inspections. Accident investigation will be performed by the SSO, and the SS, or both.

3.5.2 Phase Hazard Analysis (Job Safety Analyses)

A Site-Specific Phase Hazard Analyses (Job Safety Analyses) will be developed for each contract activity and operation occurring in each major phase of work. The Phase Safety Plan for a specific task will be developed utilizing the job safety analyses presented in Section 3.4. The following areas will be addressed:

- Identify activity being performed; Sequence of work
- Hazards to be controlled in each activity
- Hazard control measures
- The analysis will be discussed with site personnel; training will be documented

All field employees must have received at least 40 hours of OSHA Hazardous Waste Operations training. Prior to work on site, all site personnel will undergo a safety and health orientation including discussion of the SSHSP and site conditions. Prior to each shift, a daily safety meeting will be held (in English) discussing the previous day's and the current days's health and safety issues.

3.5.3 Subcontractors

All subcontractors are subject to the same training and medical surveillance requirements as other field personnel. Subcontractors will be required to sign in daily and be required to attend a daily meeting (in English) discussing operations and safety issues. All subcontractors involved in construction/remedial activities will be required to submit a Subcontractor Safety Prequalification Questionnaire prior to the award of a contract. The subcontractor will submit task-specific job safety analyses for the work they will perform, along with copies of medical and training certifications for its personnel to the OHM Project Manager. The subcontractor reports directly to the OHM Project Manager.

3.5.4 Local Requirements

OHM will comply with any applicable local requirements such as noise control and traffic rules at the site. Traffic control will be developed as is needed for specific tasks.

3.5.5 Housekeeping

The project site will be kept in a neat and orderly fashion to prevent common injuries due to slips, trips, and falls, accumulation of trash to keep insects away, and to maintain a professional work site. Personnel shall not leave a work area in a disorderly condition. The SS responsible for housekeeping.

3.5.6 Emergency and Contingency Plan

OHM has developed an emergency contingency plan provided in section 8.0 of this HASP.

3.5.7 Safety Inspections

The Site Supervisor will perform regular safety inspections. A report, including results of the inspection and any corrective actions taken, will be kept in the project files. A copy will be provided to the client representative. Identified safety deficiencies and corrective measures will also be recorded in the "Contractors QC Report."

4.0 WORK AND SUPPORT AREAS

To prevent migration of contamination from personnel and equipment work areas will be clearly specified prior to beginning operations. OHM has designated work areas or zones as suggested by the NIOSH/OSHA/USCG/EPA'S document, titled "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities." Each work area will be divided into three zones as follows:

- An Exclusion or "hot" Zone (EZ)
- A Contamination Reduction Zone (CRZ)
- A Support Zone (SZ)

4.1 EXCLUSION ZONE

The EZ is the area suspected of contamination and presents the greatest potential for worker exposure. Personnel entering the area must wear the mandated level of protection for that area. In certain instances, different levels of protection will be required depending on the tasks and monitoring performed within that zone. The EZ for this project will be determined at the site with concurance of the NTR.

4.2 CONTAMINATION REDUCTION ZONE

The CRZ or transition zone will be established between the EZ and SZ. In this area, personnel will begin the sequential decontamination process required to exit the EZ. To prevent off-site migration of contamination and for personnel accountability, all personnel will enter and exit the EZ through the CRZ. The CRZ for this project will be determined at the site with concurance of the NTR.

4.3 SUPPORT ZONE

The SZ serves as a clean, control area. Operational support facilities are located within the SZ. Normal work clothing and support equipment are appropriate in this zone. Contaminated equipment, or clothing will not be allowed in the SZ. The support facilities should be located upwind of site activities. There will be a clearly marked controlled access point from the SZ into the CRZ and EZ that is monitored closely by the SSO and the SS to ensure proper safety protocols are followed. The SZ will be determined at the site with concurance of the NTR.

4.4 SITE CONTROL LOG

A log of all personnel visiting, entering or working on the site shall be maintained in the main office trailer location. The log will record the date, name, company or agency, and time entering or exiting the site.

No visitor will be allowed in the EZ without showing proof of training and medical certification, per 29 CFR 1910.120(e), (f). Visitors will supply their own boots and respiratory equipment, if required. Visitors will attend a site orientation given by the SSO and sign the HASP.

4.5 GENERAL

The following items are requirements to protect the health and safety of workers and will be discussed in the safety briefing prior to initiating work on the site:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination is prohibited in the EZ and CRZs.
- Hands and face must be washed upon leaving the EZ and before eating, drinking, chewing gum or tobacco and smoking or other activities which may result in ingestion of contamination.
- A buddy system will be used. Hand signals will be established to maintain communication.
- During site operations, each worker will consider himself as a safety backup to his partner. Off-site personnel provide emergency assistance. All personnel will be aware of dangerous situations that may develop.
- Visual contact will be maintained between buddies on site when performing hazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training, and medical surveillance certification.
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the SSO or the SS, will be immediately dismissed from the site.
- Proper decontamination procedures must be followed before leaving the site.
- All employees and visitors must sign in and out of the site.

5.0 PROTECTIVE EQUIPMENT

This section addresses the various levels of personal protective equipment (PPE) which are or may be required at this job site. OHM personnel are trained in the use of all PPE utilized.

5.1 ANTICIPATED PROTECTION LEVELS

TASK	PROTECTION LEVEL	COMMENTS/MODIFICATIONS
Site Setup	Level D	Hard hat, steel-toe work boots, safety eye wear (safety glasses with side shields or goggles and face shield if splash or flying particles are likely) and hearing protection > 85 dBA
Sealing the Tunnel	Level C	Full face APR respirator w/combo cartridges, Saranex suit, Nitrile gloves, Nuke Boots and all seams taped. Full body harness and hearing protection >85 dBA.
Tank Cleaning • General	Level B	Full face Pressure Demand SAR respirator w/escape, Saranex suit, Nitrile gloves, Nuke Boots and all seams taped. Full body harness and hearing protection >85 dBA.
Tank Cleaning • Abrasive Blasting	Level B	SAR Blasting Hood w/escape, Saranex suit, Nitrile gloves, Nuke Boots and all seams taped. Full body harness and hearing protection > 85 dBA.
Sampling of Wastes	Level C	Full face APR respirator w/combo cartridges, Saranex suit, Nitrile gloves, Nuke Boots and all seams taped. Full body harness and hearing protection > 85 dBA.
Disposal of Wastes	Level D	Hardhead, steel-toe work boots, safety eye wear (safety glasses with side shields or goggles and face shield if splash or flying particles are likely) and hearing protection > 85 dBA.
Backfilling Tanks	Level D	Hardhead, steel-toe work boots, safety eye wear (safety glasses with side shields or goggles and face shield if splash or flying particles are likely) and hearing protection > 85 dBA.
Seal the Manways Entrances	Level D	Hardhead, steel-toe work boots, safety eye wear (safety glasses with side shields or goggles and face shield if splash or flying particles are likely) and hearing protection > 85 dBA.

TASK	PROTECTION LEVEL	COMMENTS/MODIFICATIONS
Install the Water-tight lid on the Pump Pit.	Level D	Hardhead, steel-toe work boots, safety eye wear (safety glasses with side shields or goggles and face shield if splash or flying particles are likely) and hearing protection > 85 dBA.
Site Restoration	Level D	Hardhead, steel-toe work boots, safety eye wear (safety glasses with side shields or goggles and face shield if splash or flying particles are likely) and hearing protection > 85 dBA.
Repair the Wooden Walkway over the Cooling Water Intake Tunnel.	Level D	Hardhead, steel-toe work boots, safety eye wear (safety glasses with side shields or goggles and face shield if splash or flying particles are likely) and hearing protection > 85 dBA.
CRZ Workers	Level C	Full face APR respirator w/combo cartridges, Saranex suit, Nitrile gloves, Nuke Boots and all seams taped. Full body harness and hearing protection >85 dBA.
SZ Workers	Level D	Hardhead, steel-toe work boots, safety eye wear (safety glasses with side shields or goggles and face shield if splash or flying particles are likely) and hearing protection > 85 dBA.

5.2 PROTECTION LEVEL DESCRIPTIONS

This section lists the minimum requirements for each protection level. Modification to these requirements will be noted above.

5.2.1 Level D

Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work clothing as prescribed by weather

5.2.2 Modified Level D

Modified Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, latex or PVC over boots
- Outer nitrile, neoprene, or PVC gloves over latex sample gloves

- Face shield (when projectiles or splashes pose a hazard)
- Tyvek coverall [Polyethylene-coated Tyveks required when workers have a potential to be exposed to contaminated liquids or sludges.]

5.2.3 Level C

Level C consists of the following:

- Full-face, air-purifying respirator with appropriate cartridges
- Hooded Tyvek Coveralls [Polyethylene-coated Tyveks required when workers have a potential to be exposed to contaminated liquids or sludges].
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, latex or PVC over boots
- Nitrile, neoprene, or PVC gloves over latex sample gloves
- Face shield (when projectiles or splashes pose a hazard)

5.2.4 Level B

Level B protection consists of the items required for Level C protection with the exception that an air-supplied respirator is used in place of the air-purifying respirator.

5.2.5 Level A

Level A protection consists of the items required for Level B protection with the addition of a fully-encapsulating, vapor-proof suit capable of maintaining positive pressure.

5.3 SUPPLIED-AIR RESPIRATORS

If air monitoring shows that Level B protection is needed, OHM personnel will wear Survivair 9881-02 Hippack Airline respirators with 5-minute egress bottles. Personnel requiring Level "B" protection and high mobility will wear Survivair Mark 2 SCBA units.

5.4 BREATHING-AIR QUALITY

Code of Federal Regulations 29 CFR 1910.134 states breathing air will meet the requirement of the specification for Grade D breathing air as described in the ANSI/CGA Specification G-7.1-1989. OHM requires a certificate of analysis from vendors of breathing air in order to show that the air meets this standard. Breathing air will be obtained in cylinders exclusively and will be stationed in the exclusion zone (EZ).

5.5 AIR-PURIFYING RESPIRATORS

A NIOSH-approved full-face respirator with appropriate air-purifying cartridges will be used for Level C work.

5.6 RESPIRATOR CARTRIDGES

The crew members working in Level C will wear respirators equipped with air-purifying cartridges approved for the following contaminants.

- Organic vapors <1,000 ppm
- Chlorine gas <10 ppm
- Hydrogen chloride <50 ppm
- Sulfur dioxide <50 ppm
- Dusts, fumes and mists with a TWA <0.05 mg/m^3
- Asbestos-containing dusts and mists
- Radio nuclides

5.7 CARTRIDGE CHANGES

All cartridges will be changed a minimum of once weekly, or more frequently if personnel begin to experience increased inhalation resistance or breakthrough of a chemical warning property. Cartridges will be labeled with the date service began.

5.8 INSPECTION AND CLEANING

Respirators are checked periodically by a qualified individual and inspected before each use by the wearer. All respirators and associated equipment will be decontaminated and hygienically cleaned after each use.

5.9 FIT TESTING

Annual respirator fit tests are required of all personnel wearing negative-pressure respirators. The test will use isoamyl acetate or irritant smoke. The fit test must be for the style and size of the respirator to be used.

5.10 FACIAL HAIR

Personnel who have facial hair which interferes with the respirator's sealing surface will not be permitted to wear a respirator and will not be permitted to work in areas requiring respirator use.

5.11 CORRECTIVE LENSES

Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the respirator's sealing surfaces. For workers requiring corrective lenses, special spectacles designed for use with respirators will be provided.

5.12 CONTACT LENSES

Contact lenses will not be worn with any type of respirator.

5.13 MEDICAL CERTIFICATION

Only workers who have been certified by a physician as being physically capable of respirator usage will be issued a respirator. Personnel unable to pass a respiratory fit test or without medical clearance for respirator use will not be permitted to enter or work in areas on site that require respiratory protection. Employees receive a written physicians opinion that they are fit for general hazardous waste operations as per 29 CFR 1910.120(f)(7).

5.14 SITE SPECIFIC PERSONAL PROTECTIVE EQUIPMENT (PPE) PROGRAM

The primary objective of the PPE program is to ensure employee protection and to prevent employee exposure to site contaminants during site operations. Engineering controls are not feasible for many tasks and, therefore, require the use of PPE.

The SS will be responsible for implementing all aspects of the PPE program. This includes donning and doffing, temperature related stress monitoring, inspection, and decontamination (see Section 6.0). PPE selection is identified in Table 5.1 for each specified task. The SS in consultation with the SSO, if assigned, District Health and Safety Manager and project CIH will direct changes in PPE based on changing conditions. The site specific HASP will served as written certification that the workplace was evaluated concerning PPE requirements. OHM Corporation's comprehensive PPE Program is described in Appendix D.

5.14.1 Site-Specific Respiratory Protection Program

The primary objective of respiratory protection is to prevent employee exposure to atmospheric contamination. When engineering measures to control contamination are not feasible, or while they are being implemented, personal respiratory protective devices will be used.

The criteria for determining respirator need have been evaluated based on the site contaminants; expected levels of protection are outlined in Section 5.1. Air monitoring will be conducted to confirm that respiratory protection levels are adequate (Section 7.0). All respirator users are OSHA trained in proper respirator use and maintenance. The SS and SSO will observe workers during respirator use for signs of stress. The SS, CIH, and SSO will also evaluate this HASP periodically to determine its continued effectiveness with regard to respiratory protection. All persons assigned to use respirators will have medical clearance to do so.

6.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site.

6.1 PERSONNEL DECONTAMINATION

Decontamination procedures will ensure that material which workers may have contacted in the EZ does not result in personal exposure and is not spread to clean areas of the site. This sequence describes the general decontamination procedure. The specific stages will vary depending on the site, the task, the protection level, etc.

Level C Decontamination

1. Go to end of EZ
2. Wash outer boots (Tingley or Robars) and stage to let dry; or Remove and discard latex booties
3. Remove outer gloves and discard
4. Remove outer suit (Saranex/polycoated/regular tyvek)
5. Remove outer sample gloves and discard
6. Cross into CRZ (dirty side of respirator wash area)
7. Remove inner suit and discard, (if applicable)
8. Remove and wash respirator (4 stages)
   a. Soap and water solution
   b. First rinse
   c. Disinfect respirator (1 cap full of bleach to 1 gallon of water)
   d. Final rinse
9. Hang respirator to dry
10. Remove inner sample gloves and discard
11. Wash face and hands

Level B Decontamination (Airline/Egress)

1. Go to end of EZ
2. Wash outer boots (Tingley or Robars) and stage to let dry; or Remove and discard latex booties
3. Remove outer gloves and discard
4. Cross into CRZ
5. Disconnect airline, remove egress system, and disconnect egress from mask
6. Stage egress bottle for cleaning
7. Remove outer suit
8. Remove outer sample gloves and discard
9. Move to respirator wash area, and wash egress mask and related hose line
   a. Soap and water solution
   b. First rinse
   c. Disinfect respirator (1 cap full of bleach to 1 gallon of water)
   d. Final rinse
10. Hang egress mask (upside down) and line to dry
11. Remove inner sample gloves and discard.
12. Wash face and hands

Level B Decontamination (SCBA)

1. Move to edge of EZ
2. Bottle change only
   a. Wash boots and gloves
   b. Move to edge of EZ and CRZ
   c. Remove face mask airline from regulator assembly
   d. Allow assistant to change bottle and reconnect face mask airline
   e. Return to EZ
3. Wash outer boots and stage to let dry (Tingley or Robars only); or
   Remove and discard latex booties
4. Remove and discard outer gloves
5. Disconnect from SCBA bottle and stage SCBA (NOTE: SCBA mask remains on)
6. Remove outer suit (Saranex/polycoated/regular tyvek)
7. Remove outer sample gloves and discard
8. Cross into CRZ
9. Remove inner suit (if applicable)
10. Move to respirator wash area and wash SCBA facepiece and hose line
    a. Soap and water solution
    b. First rinse
    c. Disinfect respirator (1 cap full of bleach to 1 gallon of water)
    d. Final rinse
11. Hang mask to dry
12. Remove inner sample gloves and discard
13. Wash face and hands

6.1.1 Suspected Contamination

Any employee suspected of sustaining skin contact with chemical materials will first use the emergency shower. Following a thorough drenching, the worker will proceed to the decontamination facility. Here the worker will remove clothing, shower, don clean clothing, and immediately be taken to the first-aid station. Medical attention will be provided at determined by the degree of injury.

6.1.2 Personal Hygiene

Before any eating, smoking, or drinking, personnel will wash hands, arms, neck and face.

6.2 EQUIPMENT DECONTAMINATION

All contaminated equipment will be decontaminated before leaving the site. Decontamination procedures will vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steaming the exterior of the equipment. Personnel performing this task will wear the proper PPE as prescribed by the SSO.

6.3 DISPOSAL

All decontamination liquids and disposable clothing will be treated as contaminated waste unless determined otherwise by accepted testing methods. Wastes will be disposed of according to state and federal regulations.

7.0 AIR MONITORING

Air monitoring will be conducted in order to determine airborne contamination levels. This ensures that respiratory protection is adequate to protect personnel against the chemicals that are encountered. The following air monitoring efforts will be used at this site. Additional air monitoring may be conducted at the discretion of the SSO.

The following chart describes the air monitoring required and appropriate action levels.

Monitoring Device	Action Level	Action
LEL/O_2	>10% LEL <20.8% O_2	Evacuate area, ventilate, upgrade to Level B if necessary, continue to monitor
PID	1-5 ppm unknowns 5-500 ppm unknowns >500 ppm unknowns	Level C Level B Level A
Mini-Ram (total dust)	<1.0 mg/m^3 ≥1.0 mg/m^3 - ≤10.0 mg/m^3 >10.0 mg/m^3	Level D Level C Level B

7.1 LOWER EXPLOSIVE LIMIT/OXYGEN (LEL/O_2) METER

Prior to entering a confined-space area or hot work involving welding, cutting, or other high heat-producing operations where flammable or combustible vapors may be present, LEL/O_2 measurements will be taken.

7.1.1 Type and Operational Aspects

- MSA Combustible Gas/Oxygen Meter Model 260
  - Principle of Operation
    - Oxygen detector uses an electrochemical sensor; produces a minute electric current proportional to the oxygen content.
    - Combustible gas indicators use a combustion chamber containing a filament that ignites flammable vapors; filament is heated or coated with a catalyst (platinum) to facilitate combustion.
    - Filament is part of a balanced resistor circuit; combustion in the chamber causes the filament temperature to increase; results in increased filament resistance.
    - Change in the filament's resistance causes an imbalance in the circuit proportional to the percent of the lower explosive limit (% LEL).
    - Concentrations greater than the LEL and lower than the upper explosive limit (UEL) will read 100% LEL; combustible atmosphere present.

- Concentrations greater than the UEL will read above 100% LEL then return to zero. (NOTE: Some devices have catchment mechanisms which will cause the needle to remain at 100% until the meter is reset.) This type of response indicates the gas mixture is too rich to burn and is not combustible. The danger is that the addition of air to the gas mixture could bring it into the flammable range (less than the UEL).

- Oxygen meter set at the factory to alarm at 19.5% (oxygen deficient atmosphere) combustible gas meter set by the user to alarm at 10% LEL.

7.1.2 Calibration Methods/Frequencies

Before the calibration of the combustible gas indicator can be checked, the Model 260 must be in operating condition. The Model 260 combustible gas indicator is normally calibrated on pentane as being representative of the flammability characteristics of most commonly encountered combustible gases. The meter scale is calibrated from zero to 100% LEL, which corresponds in actual volume concentrations of 0 to approximately 14% pentane in air. A booklet of response curves is supplied with the Model 260. These curves may be used to interpret meter readings when sampling combustible gases other than pentane.

It is recommended that calibration be checked before and after using each time. The SSO will record and log such calibration information into an air monitoring notebook. The O_2 meter is calibrated by adjusting the O_2 control knob to 20.8% while the meter is operated in a fresh air atmosphere.

7.1.3 Preventative Maintenance

The primary maintenance of the Model 260 is the rechargeable 2.4 volt nickel cadmium battery. Recommended charging time is 16 hours. It may be left on charge for longer periods without damaging the battery. The battery sometimes will not supply full power capacity after repeated partial use between charging. Therefore, it is recommended that the battery be exercised at least once a month by running for eight to 10 hours and recharged. If the instrument has not been used for 30 days, the battery should be charged prior to use.

7.2 PHOTOIONIZATION DETECTOR (PID)

A PID will be used to monitor total ionizable organic content of the ambient air. A PID will prove useful as a direct reading instrument to aid in determining if respiratory protection needs to be upgraded and to define the EZ. (Note: PID readings do not always indicate the actual air concentration of a compound. Consult the manual, HNU, or the CIH for clarification.)

The SSO will take measurements before operations begin in an area to determine the amount of organic compounds naturally occurring in the air. This is referred to as a background level.

Levels of volatile organic compounds will be measured in the air at active work sites once every hour and at the support zone once every hour when levels are detected above background in the exclusion zone. If levels exceed background at any time in the support zone, work in the exclusion zone will cease and corrective actions will be taken, e.g., cover soil with polyethylene sheeting. Work will not resume until levels reach background in the support zone.

7.2.1 Type and Operational Aspects

- PID Model PI 101
  - Principle of Operation
    - Ionization potential (IP) - The energy required to remove the outermost electron from a molecule; measured in electron volts (eV); characteristic property of a specific chemical.
    - Photoionization - Using ultraviolet (UV) light to remove the outermost electron from a molecule.
    - Energy of UV light (10.2, 10.5, 11.7 eV) must be equal to or greater than the IP to photoionize the molecule.
    - Fan or pump is used to draw air into the detector where the contaminants are exposed to a UV light source (lamp).
    - Ions are collected on a charged plate and produce a current directly proportional to the number of ionized molecules; current is amplified and displayed on the meter.

7.2.2 Calibration Method/Frequencies

The PID Model PI 101 is designed for trace gas analysis in ambient air and is calibrated at HNU with certified standards of benzene, vinyl chloride, and isobutylene. Other optional calibrations are available (e.g., ammonia, ethylene oxide, H_2S, etc.).

OHM will use a PID with a 10.3 eV lamp. This lamp has been determined to be most responsive to the contaminants on site. Optional probes containing lamps of 93.5 and 11.7 eV are interchangeable in use within individual read-out assemblies for different applications.

The approximate span settings for the probe that would give different readings of the amounts of trace gas of a particular species in a sample are based upon the relative photoionization sensitivities of various gases twice daily (beginning and end of shift).

It is recommended that calibration be checked twice each day (beginning and end of shift). The SSO will record and log such calibration information into an air monitoring notebook.

7.2.3 Preventative Maintenance

Maintenance of the PID Model PI 101 consists of cleaning the lamp and ion chamber, and replacement of the lamp or other component parts or sub-assemblies.

7.3 PORTABLE TOTAL DUST MONITOR

A mini-ram will be used to monitor the general respirable dust levels on this site. The air sampling will be performed at designated locations at the site perimeter, upwind and downwind of the active work areas in the (EZ). Site conditions will determine the frequency and duration of dust monitoring. Mini-ram readings will trigger dust abatement actions and PPE upgrades.

7.3.1 Type and Operational Aspects

- Real-Time Aerosol Monitor (Mini Ram Model PDM-3)
  - Principle of Operation
    - Detection of light in the near infrared region back-scattered to a sensor (photovoltaic detector) by airborne particulate in a sensing volume
    - The higher the dust concentration the more back-scattering of light to the sensor, resulting in increased readings
    - Device calibrated at the factory against an air sampling filter/gravimetric analysis reference method

7.3.2 Calibration Methods/Frequencies

There is no calibration method or procedure for calibrating the mini-ram monitor. However, it is recommended that the mini-ram monitor be re-zeroed once a week. During a zero check, the sampled air passes through the purge air filter and dryer to effect a self-cleaning of the optical chamber.

7.3.3 Preventative Maintenance

Maintenance of the mini-ran consists of replacement of filters and desiccant; battery replacement; and cleaning of the optical detection assembly.

7.4 COLORIMETRIC DETECTOR TUBES

Detector tubes are useful for identifying specific air contaminants at approximate concentrations or a chemical group during field screening surveys. The SSO will use detector tubes in conjunction with other types of direct read instruments as a backup instrument and as another means for verifying the meters response. The SSO will also perform on-site exclusion zone monitoring in the areas of remedial activities with detector tubes for benzene and any other organic contaminant of concern when a PID or FID action level is exceeded.

7.4.1 Type and Operational Aspects

The CIH will select a specific colorimetric detector tube for a specific chemical.

- Drager Multi Glass Detector Model 21/31
  - Principle of Operation
    - Colorimetric indicator tubes (detector tubes) consist of a glass tube impregnated with an indicating chemical.
    - Tube is connected to a piston or bellow pump to draw a know volume of air through the tube.

- Contaminant reacts with the indicator chemical in the tube, producing a change in color whose length is proportional to the contaminant concentration; glass tube has degradations in ppm to match the length of stain.

- Preconditioning filter may precede the detector tube to remove interfering contaminants (benzene, vinyl chloride).

7.4.2 Calibration Methods/Frequencies

There is no method or procedure for calibrating any colorimetric detector tube. However, it is important to read the instructions provided with a specific detector tube to determine number of pump strokes, interfering chemicals, proper color change, and shelf life. It is important that the number of strokes is not exceeded on the first measurement, as this may overload the tube and overshoot the standard range of measurement.

Sampling pump can be checked but not calibrated using the bubble tube. All bellows pumps draw in a specific amount of air during each stroke. This amount should correspond to a specific amount on the bubble tube (i.e., if one stroke equals 100 cc, then the bubble should move 100 cc in the bubble tube). Also, a leak check can be conducted by activating a pump stroke, then inserting an unopened colorimetric tube in the pump inlet. The pump should not move, if it does, this indicates a leak. If the pump fails either the leak test or the volume test, return it back to the manufacturer for repair.

7.4.3 Preventative Maintenance

Generally speaking, the reagent of the colorimetric tubes cannot be stored for unlimited periods. The shelf life of the Drager tubes are, therefore, limited to two years (for storage at room temperature).

7.5 INTEGRATED AIR MONITORING PROGRAM

Air samples may be collected at all active work zones in the exclusion zone. Monitoring will be performed to determine if the level of protection is adequate for employees and to document that off-site migration of contaminants will not occur. The concentration will be evaluated based on ACGIH threshold limit values.

TWA sampling will be performed at each active work location. At least one (1) TWA sample will be taken at each location. One (1) sample will be obtained from a personal sampling pump carried by the most "at-risk" individual.

7.5.1 Type and Operational Aspects

Contaminant	Method	Media	Action Level
Lead	NIOSH 7300	MCE	0.05mg/m^3 OSHA PEL
PCB	NIOSH 5503	Glass Fiber Pre-Filter + Florisil Tube	1.0ug/m^3 OSHA PEL

- Gilian Air Sampling Pump (or equivalent)

  - Principle of Operation

- Air sampling pump is calibrated to draw a specified air flow rate (liters per minute) for a designated period of time (usually 8 hours).
- Volume of air sampled is then calculated as follows:

  Flow rate (liter/min.) x sample time (min.) = sample volume (liters)

- Use a bubble meter to calibrate air sampling pump; pump equipped with a rotameter that shows the flow rate during the sampling period.
- Equipped with a rechargeable battery for 8-hour sampling times; must be recharged for at least 16 hours.

  - Collection Media
    - See table above for specifics.
    - Connect collection media/holder to air sampling pump using Tygon tubing; comprises the sampling train that must be assembled to calibrate the pump.

7.5.2 Calibration Methods/Frequencies

Flow rate calibration can be accomplished by using primary standard soap and the Gilibrator Calibrator (or equivalent). The Gilibrator calibrator allows rapid flow rate determination with direct read-out on the built-in display.

Simply connect the sampler to the calibrator, press the ON push button, and then push the plunger to start a bubble up the flow cell. The flow rate is automatically calculated and shown on the display. Subsequent readings are averaged with the previous readings. It is recommended that calibration of the sampler be checked prior to the start of and after each sampling period.

7.5.3 Preventative Maintenance

The Gilian air sampling pump was designed for both mechanical and electronic reliability. The sampling pump should not require special maintenance or adjustments under normal conditions. However, as with all instruments, the sampling pump does require some basic care. Basic maintenance of the consists of filter replacement, installing and removing battery packs, storage conditions, and electronic control assembly.

7.6 AIR MONITORING LOG

The SSO will ensure that all air-monitoring data is logged into a monitoring notebook. Data will include instrument used, wind direction, work process, etc. The Regional and Corporate OHM CIH will periodically review this data.

7.7 CALIBRATION REQUIREMENTS

The PID, LEL/O_2 meter and sampling pumps required with fixed-media air sampling will be calibrated daily before and after use. A separate log will be kept detailing date, time, span gas, or other standard, and name of person performing the calibration.

7.8 AIR MONITORING RESULTS

Air monitoring results will be posted for personnel inspection, and will be discussed during morning safety meetings.

8.0 EMERGENCY RESPONSE

8.1 PRE-EMERGENCY PLANNING

Prior to engaging in construction/remediation activities at the site, OHM will plan for possible emergency situations and have available adequate supplies and manpower to respond. In addition site personnel will receive training during the site orientation concerning proper emergency response procedures.

The following situations would warrant implementation of the Emergency Response and Contingency Plan (ERCP):

Fire/Explosion	• The potential for human injury exists. • Toxic fumes or vapors are released. • The fire could spread on site or off site and possibly ignite other flammable materials or cause heat-induced explosions. • The use of water and/or chemical fire suppressants could result in contaminated run-off. • An imminent danger of explosion exists.
Spill or Release of Hazardous Materials	• The spill could result in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard. • The spill could cause the release of toxic liquids or fumes in sufficient quantities or in a manner that is hazardous to or could endanger human health.
Spill or Release of High Temperature Liquid or Vapor	• The spill can be contained on site, but the potential exists for groundwater contamination. • The spill cannot be contained on site, resulting in off-site soil contamination and/or ground-water or surface water pollution. • The spill quantity is greater than the reportable quantity limit for the material.
Natural Disaster	• A rain storm exceeds the flash flood level. • The facility is in a projected tornado path or a tornado has damaged facility property. • Severe wind gusts are forecasted or have occurred and have caused damage to the facility.
Medical Emergency	• Overexposure to hazardous materials. • Trauma injuries (broken bones, severe lacerations/bleeding, burns). • Eye/skin contact with hazardous materials. • Loss of consciousness. • Heat stress (Heat stroke). • Heart attack. • Respiratory failure. • Allergic reaction.

The following measures will be taken to assure the availability of adequate equipment and manpower resources:

- Sufficient equipment and materials will be kept on site and dedicated for emergencies only. The inventory will be replenished after each use.

- On-site emergency responders will be current in regards to training and medical surveillance programs. Copies of all applicable certificates will be kept on file for on-site personnel required to respond.

- It will be the responsibility of the emergency coordinator to brief the on-site response team on anticipated hazards at the site. The emergency coordinator shall also be responsible for anticipating and requesting equipment that will be needed for response activities.

- Emergency response activities will be coordinated with the Local Emergency Planning Committee (LEPC) in compliance with SARA Title III requirements.

Communications will be established prior to commencement of any activities at the remediation site. Communication will be established so that all responders on site have availability to all pertinent information to allow them to conduct their activities in a safe and healthful manner. The primary communication device will be two-way radios. Air horns may be used to alert personnel of emergency conditions. A telephone will be located at the command post to summon assistance in an emergency.

Primary communication with local responders in the event of an emergency will be accomplished using commercial telephone lines.

8.2 EMERGENCY RECOGNITION AND PREVENTION

Because unrecognized hazards may result in emergency incidents, it will be the responsibility of the Site Supervisor and Site Safety Officer (SSO), through daily site inspections and employee feedback (Safety Observation Program, daily safety meetings, and job safety analyses) to recognize and identify all hazards that are found at the site. These may include:

Chemical Hazards	• Materials at the site • Materials brought to the site
Physical Hazards	• Fire/explosion • Slip/trip/fall • Electrocution • Confined space • IDLH atmospheres • Excessive noise
Mechanical Hazards	• Heavy equipment • Stored energy system • Pinch points • Electrical equipment • Vehicle traffic
Environmental Hazards	• Electrical Storms • High winds • Heavy Rain/Snow • Temperature Extremes (Heat Stress) • Poisonous Plants/Animals

Once a hazard has been recognized, the Site Supervisor and/or the SSO will take immediate action to prevent the hazard from becoming an emergency. This may be accomplished by the following:

- Daily safety meeting
- Task-specific training prior to commencement of activity
- Lock-out/tag-out
- Personal Protective Equipment (PPE) selection/use
- Written and approved permits for hot work, confined space
- Trenching/shoring procedure
- Air monitoring
- Following all OHM standard operating procedures
- Practice drills for fire, medical emergency, and hazardous substances spills

TABLE 8.1
EMERGENCY TELEPHONE NUMBERS

Local Agencies All services	
Base Fire Station No.1 (Building 798)	787-865-4333
Base Security	787-865-4123
Hospital - Naval Hospital, Building 1790 *Directions:* From site(Building 38) turn left on Forrestal Road, then left on Breton Road, and left on Hospital Road (sign). Follow the signs to the Emergency Room.	787-865-5997 (emergency room) 787-865-4144 (ambulance)
Regional Poison Control Center	800-552-6337
Commonwealth Agencies	
Environmental Quality Board (notify Environmental Engineering Division, Public Works Department at (809) 865-4429 prior to calling EQB)	787-767-8181
Federal Agencies	
EPA Region Branch Response Center	215-597-9800
Agency for Toxic Substances and Disease Registry	404-639-0615 (24 HR)
Navy ROICC / NTR	
Ivan Rosado	787-865-2050 787-865-4066
U.S. Coast Guard MSO San Juan	787-729-6800 x308
National Response Center	800-424-8802
OHM Personnel	
Project Manager - Gary Shirley	804-262-0079
Project CIH - Mike Zustra	508-497-6125
Director, Health and Safety - Kevin McMahon	609-588-6375
OHM Corporation (24 hour)	800-537-9540

Additional Phone #'s in Section 2 of this HASP

8.3 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATIONS

This section of the ERCP describes the various roles, responsibilities, and communication procedures that will be followed by personnel involved in emergency responses.

The primary emergency coordinator for this site is the Site Supervisor. In the event an emergency occurs and the emergency coordinator is not on site, the Site Safety Officer or the highest ranking employee on site will serve as the emergency coordinator until he arrives. The emergency coordinator will determine the nature of the emergency and take appropriate action as defined by this ERCP.

The emergency coordinator will implement the ERCP immediately as required. The decision to implement the plan will depend upon whether the actual incident threatens human health or the environment. Immediately after being notified of an emergency incident, the emergency coordinator or his designee will evaluate the situation to determine the appropriate action.

8.3.1 Responsibilities and Duties

This section describes the responsibilities and duties assigned to the emergency coordinator.

It is recognized that the structure of the "Incident Command System" will change as additional response organizations are added. OHM will follow procedures as directed by the fire department, LEPC, State and Federal Agencies as required. OHM will defer to the local Fire Department chief to assume the role of Incident Commander upon arriving on site. Additional on-site personnel may be added to the Site Emergency Response Team as required to respond effectively.

8.3.2 On-Site Emergency Coordinator Duties

The on-site emergency coordinator is responsible for implementing and directing the emergency procedures. All emergency personnel and their communications will be coordinated through the emergency coordinator. Specific duties are as follows:

- Identify the source and character of the incident, type and quantity of any release. Assess possible hazards to human health or the environment that may result directly from the problem or its control.

- Discontinue operations in the vicinity of the incident if necessary to ensure that fires, explosions, or spills do not recur or spread to other parts of the site. While operations are dormant, monitor for leaks, pressure build-up, gas generation, or ruptures in valves, pipes, or other equipment, where appropriate.

- Notify local Emergency Response Teams if their help is necessary to control the incident. Table 8.1 provides telephone numbers for emergency assistance.

- Direct on-site personnel to control the incident until, if necessary, outside help arrives.

- Ensure that the building or area where the incident occurred and the surrounding area are evacuated and shut off possible ignition sources, if appropriate. The Emergency Response Team is responsible for directing site personnel such that they avoid the area of the incident and leave emergency control procedures unobstructed.

- If fire or explosion is involved, notify facility Fire Department.

- Notify LANTDIV ROICC
- Notify OHM Project Manager
- Have protected personnel, in appropriate PPE, on standby for rescue.

If the incident may threaten human health or the environment outside of the site, the emergency coordinator should immediately determine whether evacuation of area outside of the site may be necessary and, if so, notify the Police Department and the Office of Emergency Management.

When required, notify the National Response Center. The following information should be provided to the National Response Center:

- Name and telephone number
- Name and address of facility
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside of the facility.

The emergency telephone number for the National Response Center is 800-424-8802.

If hazardous waste has been released or produced through control of the incident, ensure that:

- Waste is collected and contained.
- Containers of waste are removed or isolated from the immediate site of the emergency.
- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided.
- Ensure that no waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed.
- Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.
- Notify the USEPA Regional Administrator that cleanup procedures have been completed and that all emergency equipment is fit for its intended use before resuming operations in the affected area of the facility. The USEPA Regional Administrator's telephone number is included in the Emergency Contacts.
- Record time, date, and details of the incident, and submit a written report to the USEPA Regional Administrator. Report is due to USEPA within 15 days of the incident.

8.4 SAFE DISTANCES AND PLACES OF REFUGE

The emergency coordinator for all activities will be the SS. No single recommendation can be made for evacuation or safe distances because of the wide variety of emergencies which could occur. Safe distances

can only be determined at the time of an emergency based on a combination of site and incident-specific criteria. However, the following measures are established to serve as general guidelines.

In the event of minor hazardous materials releases (small spills of low toxicity), workers in the affected area will report initially to the contamination reduction zone. Small spills or leaks (generally less than 55 gallons) will require initial evacuation of at least 50 feet in all directions to allow for cleanup and to prevent exposure. After initial assessment of the extent of the release and potential hazards, the emergency coordinator or his designee will determine the specific boundaries for evacuation. Appropriate steps such as caution tape, rope, traffic cones, barricades, or personal monitors will be used to secure the boundaries.

In the event of a major hazardous material release (large spills of high toxicity/greater than 55 gallons), workers will be evacuated from the building/site. Workers will assemble at the entrance to the site for a head count by their foremen and to await further instruction.

If an incident may threaten the health or safety of the surrounding community, the public will be informed and, if necessary, evacuated from the area. The emergency coordinator, or his designee will inform the proper agencies in the event that this is necessary. Telephone numbers are listed in Table 8.1.

Places of refuge will be established prior to the commencement of activities. These areas must be identified for the following incidents:

- Chemical release
- Fire/explosion
- Power loss
- Medical emergency
- Hazardous weather

In general, evacuation will be made to the crew trailers, unless the emergency coordinator determines otherwise. It is the responsibility of the emergency coordinator to determine when it is necessary to evacuate personnel to off-site locations.

In the event of an emergency evacuation, all the employees will gather at the entrance to the site until a head count establishes that all are present and accounted for. No one is to leave the site without notifying the emergency coordinator.

8.5 EVACUATION ROUTES AND PROCEDURES

All emergencies require prompt and deliberate action. In the event of an emergency, it will be necessary to follow an established set of procedures. Such established procedures will be followed as closely as possible. However, in specific emergency situations, the emergency coordinator may deviate from the procedures to provide a more effective plan for bringing the situation under control. The emergency coordinator is responsible for determining which situations require site evacuation.

8.5.1 Evacuation Signals and Routes

Two-way radio communication and an air horn will be used to notify employees of the necessity to evacuate an area or building involved in a release/spill of a hazardous material. Each crew supervisor will have a two way radio. A base station will be installed in the OHM office trailer to monitor for emergencies. Total site evacuation will be initiated only by the emergency coordinator, however, in his absence, decision to preserve the health and safety of employees will take precedence. Evacuation routes will be posted in each

outside work area. Signs inside buildings will be posted on walls or other structural element of a building. Periodic drills will be conducted to familiarize each employee with the proper routes and procedures.

8.5.2 Evacuation Procedures

In the event evacuation is necessary, the following actions will be taken:

- The emergency signal will be activated.
- No further entry of visitors, contractors, or trucks will be permitted. Vehicle traffic within the site will cease in order to allow safe exit of personnel and movement of emergency equipment.
- Shut off all machinery if safe to do so.
- ALL on-site personnel, visitors, and contractors in the support zone will assemble at the entrance to the site for a head count and await further instruction from the emergency coordinator.
- ALL persons in the exclusion zone and contamination reduction zone will be accounted for by their immediate crew leaders (e.g., foreman). Leaders will determine the safest exits for employees and will also choose an alternate exit if the first choice is inaccessible.
- During exit, the crew leader should try to keep the group together. Immediately upon exit, the crew leader will account for all employees in his crew.
- Upon completion of the head count, the crew leader will provide the information to the emergency coordinator.
- Contract personnel and visitors will also be accounted for.
- The names of emergency response team members involved will be reported to the emergency spill control coordinator.
- A final tally of persons will be made by the emergency coordinator or designee. No attempt to find persons not accounted for will involve endangering lives of OHM or other employees by re-entry into emergency areas.
- In all questions of accountability, immediate crew leaders will be held responsible for those persons reporting to them. Visitors will be the responsibility of those employees they are seeing. Contractors and truck drivers are the responsibility of the Site Supervisor. The security guard will aid in accounting for visitors, contractors, and truckers by reference to sign-in sheets available from the guard shack.
- Personnel will be assigned by the emergency coordinator to be available at the main gate to direct and brief emergency responders.
- Re-entry into the site will be made only after clearance is given by the emergency coordinator. At his direction, a signal or other notification will be given for re-entry into the facility.
- Drills will be held periodically to practice all of these procedures and will be treated with the same seriousness as an actual emergency.

8.6 EMERGENCY SPILL RESPONSE PROCEDURES AND EQUIPMENT

In the event of an emergency involving a hazardous material spill or release, the following general procedures will be used for rapid and safe response and control of the situation. Emergency contacts found in Table 8.1 provide a quick reference guide to follow in the event of a major spill.

8.6.1 Notification Procedures

If an employee discovers a chemical spill or process upset resulting in a vapor or material release, he or she will immediately notify the on-site emergency coordinator.

On-site Emergency Coordinator will obtain information pertaining to the following:

- The material spilled or released.
- Location of the release or spillage of hazardous material.
- An estimate of quantity released and the rate at which it is being released.
- The direction in which the spill, vapor or smoke release is heading.
- Any injuries involved.
- Fire and/or explosion or possibility of these events.
- The area and materials involved and the intensity of the fire or explosion.

This information will help the on-site emergency coordinator to assess the magnitude and potential seriousness of the spill or release.

8.6.2 Procedure for Containing/Collecting Spills

The initial response to any spill or discharge will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

If for some reason a chemical spill is not contained within a dike or sump area, an area of isolation will be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large (greater than 55 gallons) and involves a tank or a pipeline rupture, an initial isolation of at least 100 ft. in all directions will be used. Small spills (less than or equal to 55 gallons) or leaks from a tank or pipe will require evacuation of at least 50 ft. in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area. If possible the area will be roped or otherwise blocked off.

If the spill results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire) and its release (due to high vapor pressures under ambient conditions), further evacuation will be enforced. In general an area at least 500 feet wide and 1,000 feet long will be evacuated downwind if volatile materials are spilled. (Consult the DOT Emergency Response Guide for isolation distances for listed hazardous materials.)

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The on-site emergency coordinator will inform the proper agencies in the event this is necessary. (Refer to Table 8.1)

As called for in regulations developed under the Comprehensive Environmental Response Compensation Liability Act of 1980 (Superfund), OHM's practice is to report a spill of a pound or more of any hazardous material for which a reportable quantity has not been established and which is listed under the Solid

Waste Disposal Act, Clean Air Act, Clean Water Act, or TSCA. OHM also follows the same practice for any substances not listed in the Acts noted above but which can be classified as a hazardous waste under RCRA.

Clean up personnel will take the following measures:

- Make sure all unnecessary persons are removed from the hazard area.
- Put on protective clothing and equipment.
- If a flammable material is involved, remove all ignition sources, and use spark and explosion proof equipment for recovery of material.
- Remove all surrounding materials that could be especially reactive with materials in the waste. Determine the major components in the waste at the time of the spill.
- If wastes reach a storm sewer, try to dam the outfall by using sand, earth, sandbags, etc. If this is done, pump this material out into a temporary holding tank or drums as soon as possible.
- Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal site.
- Spray the spill area with foam, if available, if volatile emissions may occur.
- Apply appropriate spill control media (e.g. clay, sand, lime, etc.) to absorb discharged liquids.
- For large spills, establish diking around leading edge of spill using booms, sand, clay or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank.

8.6.3 Emergency Response Equipment

The following equipment will be staged in the support zone and throughout the site, as needed, to provide for safety and first aid during emergency responses.

- ABC-type fire extinguisher
- First-aid kit, industrial size
- Eyewash/safety shower
- Emergency oxygen unit
- Emergency signal horn
- Self contained breathing apparatus (two)
- Stretcher/backboard

In addition to the equipment listed above, OHM maintains direct reading instrumentation that may be used in emergency situations to assess the degree of environmental hazard. This equipment will only be used by the Site Safety Officer or other specially trained personnel. This equipment will be stored, charged and ready for immediate use in evaluating hazardous chemical concentrations. The equipment will be located at the OHM office trailer.

EQUIPMENT NAME	APPLICATION
Portable H-NU Photoionization Meter	Measures selected inorganic and organic chemical concentrations
MSA Oxygen and Combustible Gas Meter	Measures oxygen and combustible gas levels
Draeger Detector Tubes	Assorted detector tubes to measure specific chemical concentrations

8.6.4 Personal Protective Equipment

A supply of two (minimum) SCBAs will be located in the support zone for use in emergency response to hazardous materials releases. They will be inspected at least monthly, according to OSHA requirements. In addition, all emergency response personnel will have respirators available for use with cartridge selection determined by the Site Safety Officer based on the results of direct reading instruments. Emergency response personnel will also be provided with protective clothing as warranted by the nature of the hazardous material and as directed by the Site Safety Officer.

8.6.5 Emergency Spill Response Clean-Up Materials and Equipment

A sufficient supply of appropriate emergency response clean-up and personal protective equipment will be inventoried and inspected, visually, on a weekly basis.

The materials listed below may be kept on site for spill control, depending on the types of hazardous materials present on site. The majority of this material will be located in the support zone, in a supply trailer or storage area. Small amounts will be placed on pallets and located in the active work areas.

- Sand or clay to solidify/absorb liquid spills.
- Lime (calcium oxide), soda ash (sodium carbonate), or baking soda (sodium bicarbonate) for neutralizing acid (pH <7) spills.
- Activated charcoal (carbon) to adsorb organic solvents (hydrocarbons) and to reduce flammable vapors.
- Citric acid for neutralizing caustic (pH >7) spills.
- Vapor-suppressing foam, if required by the Client, for controlling the release of volatile organic compounds.
- Appropriate solvents, e.g., CITRIKLEEN, for decontamination of structures or equipment.

The following equipment will be kept on site and dedicated for spill cleanup:

- Plastic shovels for recovering corrosive and flammable materials.
- Sausage-shaped absorbent booms for diking liquid spills, drains, or sewers.
- Sorbent sheets (diapers) for absorbing liquid spills.
- Overpack drums for containerizing leaking drums.
- 55-gallon open-top drums for containerization of waste materials.

*NOTE: All contaminated soils, absorbent materials, solvents and other materials resulting from the clean-up of spilled or discharged substances shall be properly stored, labeled, and disposed of off-site.

8.7 EMERGENCY CONTINGENCY PLAN

This section of the ERCP details the contingency measures OHM will take to prepare for and respond to fires, explosions, spills and releases of hazardous materials, hazardous weather, and medical emergencies.

8.8 MEDICAL EMERGENCY CONTINGENCY MEASURES

The procedures listed below will be used to respond to medical emergencies. The SSO will contact the local hospital and inform them of the site hazards and potential emergency situations. A minimum of two First-Aid/CPR trained personnel will be maintained on site.

8.8.1 Response

The nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident. The work crew supervisor will be summoned.

The work crew supervisor will immediately make radio contact with the on-site emergency coordinator to alert him of a medical emergency situation. The supervisor will advise the following information:

- Location of the victim at the work site
- Nature of the emergency
- Whether the victim is conscious
- Specific conditions contributing to the emergency, if known

The Emergency Coordinator will notify the Site Safety Officer. The following actions will then be taken depending on the severity of the incident:

- Life-Threatening Incident — If an apparent life-threatening condition exists, the crew supervisor will inform the emergency coordinator by radio, and the local Emergency Response Services (EMS) will be immediately called. An on-site person will be appointed who will meet the EMS and have him/her quickly taken to the victim. Any injury within the EZ will be evacuated by OHM personnel to a clean area for treatment by (EMS) personnel. No one will be able to enter the EZ without showing proof of training, medical surveillance and site orientation.

- Non Life-Threatening Incident — If it is determined that no threat to life is present, the Site Safety Officer will direct the injured person through decontamination procedures (see below) appropriate to the nature of the illness or accident. Appropriate first aid or medical attention will then be administered.

*NOTE: The area surrounding an accident site must not be disturbed until the scene has been cleared by the Site Safety Officer.

Any personnel requiring emergency medical attention will be evacuated from exclusion and contamination reduction zones if doing so would not endanger the life of the injured person or otherwise aggravate the injury. Personnel will not enter the area to attempt a rescue if their own lives would be threatened. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate

decontamination may be an essential part of life-saving first aid. For others, decontamination may aggravate the injury or delay life-saving first aid. Decontamination will be performed if it does not interfere with essential treatment.

If decontamination can be performed, observe the following procedures:

- Wash external clothing and cut it away.

If decontamination cannot be performed, observe the following procedures:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel.
- Alert emergency and off-site medical personnel to potential contamination, instruct them about specific decontamination procedures.
- Send site personnel familiar with the incident and chemical safety information, e.g. MSDS, with the affected person.

All injuries, no matter how small, will be reported to the SSO or the Site Supervisor. An accident/injury/illness report will be completely and properly filled out and submitted to the Regional Health and Safety Director/Project CIH, in accordance with OHM's reporting procedures.

A list of emergency telephone numbers is given in Table 8.1.

8.8.2 Notification

The following personnel/agencies will be notified in the event of a medical emergency:

- Local Fire Department or EMS
- On-site Emergency Coordinator
- Workers in the affected areas
- Client Representative

8.9 FIRE CONTINGENCY MEASURES

OHM personnel and subcontractors are not trained professional firefighters. Therefore, if there is any doubt that a fire can be quickly contained and extinguished, personnel will notify the emergency coordinator by radio and vacate the structure or area. The emergency coordinator will immediately notify the local Fire Department.

The following procedures will be used to prevent the possibility of fires and resulting injuries:

- Sources of ignition will be kept away from where flammable materials are handled or stored.
- The air will be monitored for explosivity before and during hot work and periodically where flammable materials are present. Hot work permits will be required for all such work.
- "No smoking" signs will be conspicuously posted in areas where flammable materials are present.
- Fire extinguishers will be placed in all areas where a fire hazard may exist.

- Before workers begin operations in an area the foreman will give instruction on egress procedures and assembly points. Egress routes will be posted in work areas and exit points clearly marked.

8.9.1 Response

The following procedures will be used in the event of a fire:

- Anyone who sees a fire will notify their supervisor who will then contact the Emergency Coordinator by radio. The emergency coordinator will activate the emergency air horns and contact the local Fire Department.

- When the emergency siren sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest fire exit.

- Work crews will be comprised of pairs of workers (buddy system) who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble at a predetermined rally point for a head count.

- When a small fire has been extinguished by a worker, the emergency coordinator will be notified.

8.10 HAZARDOUS WEATHER CONTINGENCY MEASURES

Operations will not be started or continued when the following hazardous weather conditions are present:

- Lightning
- Heavy Rains
- High Winds

8.10.1 Response

- Excavation/soil stock piles will be covered with plastic liner.

- All equipment will be shut down and secured to prevent damage.

- Personnel will be moved to safe refuge, initially crew trailers. The emergency coordinator will determine when it is necessary to evacuate personnel to off-site locations and will coordinate efforts with fire, police and other agencies.

8.10.2 Notification

The emergency coordinator will be responsible for assessing hazardous weather conditions and notifying personnel of specific contingency measures. Notifications will include:

- OHM employees and subcontractors
- Client Representative
- Local Civil Defense Organization

8.11 SPILL/RELEASE CONTINGENCY MEASURES

In the event of release or spill of a hazardous material the following measures will be taken:

8.11.1 Response

Any person observing a spill or release will act to remove and/or protect injured/contaminated persons from any life-threatening situation. First aid and/or decontamination procedures will be implemented as appropriate.

First aid will be administered to injured/contaminated personnel. Unsuspecting persons/vehicles will be warned of the hazard. All personnel will act to prevent any unsuspecting persons from coming in contact with spilled materials by alerting other nearby persons. Attempt to stop the spill at the source, if possible. Without taking unnecessary risks, personnel will attempt to stop the spill at the source. This may involve activities such as uprighting a drum, closing a valve or temporarily sealing a hole with a plug.

Utilizing radio communications, the emergency coordinator will be notified of the spill/release, including information on material spilled, quantity, personnel injuries and immediate life threatening hazards. Air monitoring will be implemented by the emergency coordinator and SSO to determine the potential impact on the surrounding community. Notification procedures will be followed to inform on-site personnel and off-site agencies. The emergency coordinator will make a rapid assessment of the spill/release and direct confinement, containment and control measures. Depending upon the nature of the spill, measures may include:

- Construction of a temporary containment berm utilizing on-site clay absorbent earth
- Digging a sump, installing a polyethylene liner and
- Diverting the spill material into the sump placing drums under the leak to collect the spilling material before it flows over the ground
- Transferring the material from its original container to another container

The emergency coordinator will notify the LANTDIV ROICC of the spill and steps taken to institute clean-up. Emergency response personnel will clean-up all spills following the spill clean-up plan developed by the emergency coordinator. Supplies necessary to clean up a spill will be immediately available on-site. Such items may include, but are not limited to:

- Shovel, rake
- Clay absorbent
- Polyethylene liner
- Personal safety equipment
- Steel drums
- Pumps and miscellaneous hand tools

The major supply of material and equipment will be located in the Support Zone. Smaller supplies will kept at active work locations. The emergency coordinator will inspect the spill site to determine that the spill has been cleaned up to the satisfaction of the ROICC. If necessary, soil, water or air samples may be taken and analyzed to demonstrate the effectiveness of the spill clean-up effort. The emergency coordinator will determine the cause of the spill and determine remedial steps to ensure that recurrence is prevented. The emergency coordinator will review the cause with the ROICC and obtain his concurrence with the remedial action plan.

9.0 TRAINING REQUIREMENTS

As a prerequisite to employment at OHM, all field employees are required to take a 40-hour training class and pass a written examination. This training covers all forms of personal protective equipment, toxicological effects of various chemicals, hazard communication, bloodborne pathogens, handling of unknown tanks and drums confined-space entry procedures, and electrical safety. This course is in full compliance with OSHA requirements in 29 CFR 1910.120. In addition, all employees receive annual 8-hour refresher training and three day on-site training under a trained experienced supervisor. Supervisory personnel receive an additional 8-hour training in handling hazardous waste operations.

All personnel entering the exclusion zone will be trained in the provisions of this site safety plan and be required to sign the Site Safety Plan Acknowledgment in Appendix A.

Site-specific training for the Tank Closure, SWMU #45 at U.S. Naval Station Roosevelt Roads, Puerto Rico will include potential site contaminants, Hazard Communication as per 29 CFR 1910.1200, site physical and environmental hazards, emergency response and evacuation procedures, and emergency telephone numbers will be held at the site location by the SS and SSO before any site work activities begin.

10.0 MEDICAL SURVEILLANCE PROGRAM

All OHM personnel participate in a medical and health monitoring program. This program is initiated when the employee starts work with a complete physical and medical history and is continued on a regular basis. A listing of OHM's worker medical profile is shown below. This program was developed in conjunction with a consultant toxicologist and OHM's occupational health physician. Other medical consultants are retained when additional expertise is required.

The medical surveillance program meets the requirements of the OSHA Standard 29 CFR 1910.120 (f).

TABLE 10.1
WORKER MEDICAL PROFILE

Item	Initial	Annual
Medical History	X	X
Work History	X	X
Visual Acuity and Tonometry	X	X
Pulmonary Function Tests	X	X
Physical Examination	X	X
Audiometry Tests	X	X
Chest X-Ray	X	X
Complete Blood Counts	X	X
Blood Chem. (SSAC-23 or equivalent)	X	X
Urinalysis	X	X
Dermatology Examination	X	X
Electrocardiogram/Stress Test	X	X (based on age)

Specific Tests (PCB blood or fat, blood lead, urine lead.)

10.1 EXAMINATION SCHEDULE

Employees are examined initially upon start of employment, annually thereafter, and may be examined upon termination of employment. Unscheduled medical examinations are conducted:

- At employee request after known or suspected exposure to toxic or hazardous materials
- At the discretion of the client, the CIH, SSO, or OHM occupational physician after known or suspected exposure to toxic or hazardous materials

- At the discretion of the OHM occupational physician

All nonscheduled medical examinations will include, as a minimum, all items specified above for periodic surveillance examination, with the exception of the chest X-ray, which will be conducted at the discretion of the occupational physician performing the examination.

APPENDIX A
HEALTH AND SAFETY PLAN CERTIFICATION

HEALTH-AND-SAFETY PLAN CERTIFICATION

By signing this document, I am stating that I have read and understand the site health-and-safety plan for OHM Remediation Services Corp. personnel and visitors entering Tank Closure, SWMU #45, U.S. Naval Station Roosevelt Roads, Puerto Rico site.

REPRESENTING	*NAME (PRINT)*	*SIGNATURE*	*DATE*

APPENDIX B
OHM HAZARD COMMUNICATION PROGRAM

APPENDIX B
OHM HAZARD COMMUNICATION PROGRAM

1. OBJECTIVE

A Site Specific Hazard Communication (Employee Right-To-Know) Program will be instituted at Tank Closure, SWMU #45, U.S. Naval Station Roosevelt Roads, Puerto Rico.

2. PURPOSE

The purpose of Hazard Communication (Employee Right-To-Know) is to ensure that the hazards of all chemicals located at field project sites, shops, and facilities are transmitted (communicated), according to 29 CFR 1910.1200 and 29 CFR 1926.59 to all OHM personnel and OHM subcontractors.

3. GENERAL REQUIREMENTS

3.1 It is the responsibility of site supervisors, shop supervisors, and facilities managers to ensure that the Hazard Communication Program for the area under their supervision is updated as necessary.

3.2 Container Labeling--OHM personnel will ensure that all drums and containers are labeled according to contents. These drums and containers will include those from manufacturers and those produced by on site operations. All incoming and outgoing labels shall be checked for identity, hazard warning, and name and address of responsible party.

3.3 Material Safety Data Sheets (MSDSs)--There will be an MSDS located on site for each hazardous chemical known to exist or which is being used on site. All MSDSs will be located in the site health and safety plan which can be found in the office trailer. MSDS's for products in use may be stored in a separate binder.

3.4 Employee Information and Training--Training employees on chemical hazards is accomplished through an ongoing corporate and regional training program. Additionally, chemical hazards will be communicated to employees through daily safety meetings held at OHM field projects and by an initial site orientation program.

3.5 OHM employees will be instructed on the following:

- Chemicals and their hazards in the work area
- How to prevent exposure to these hazardous chemicals
- What the company has done to prevent workers' exposure to these chemicals
- Procedures to follow if they are exposed to these chemicals
- How to read and interpret labels and MSDSs for hazardous substances
- Emergency spill procedures
- Proper storage and labeling

3.6 Before any new hazardous chemical is introduced on site, each employee will be given information in the same manner as during the initial safety class. The site supervisor will be responsible for seeing that the MSDS on the new chemical is available. During the mandatory morning safety briefing, information on each new chemical will be presented.

Should any new chemical be brought on site, the appropriate MSDSs will be added and reviewed with the employees.

1. GENERAL

The following written Hazard Communication Program has been established for OHM Remediation Services Corp. (OHM). The purpose of this program is to transmit information to the workers about the chemical hazards in the work place using various media. The transmittal of information will be accomplished by means of a comprehensive Hazard Communication Program, which will include container labeling and other forms of warning, material safety data sheets (MSDSs), and employee training in accordance with 29 CFR 1910.1200 and 29 CFR 1926.59.

Upon mobilization at the job site the Hazard Communication Program will be reviewed with all employees. Upon reading the Hazard Communication Program employees will be asked to sign the "Worker Hazard Communication Acknowledgment Form". The Hazard Communication Program will also be reviewed with new employees and visitors as they arrive on site. These persons will also be asked to sign the acknowledgment form. The Hazard Communication Program shall be available for review by anyone on site any time during normal work hours. OHM will accomplish the hazard communication requirements through formal safety training, departmental safety meetings, and job-site safety meetings.

The Health and Safety Department shall update the Hazard Communication Program when personnel responsibilities change, a new non-routine task is introduced, or an extremely hazardous material needs particular attention. This new program will then be distributed throughout the company.

2. RESPONSIBILITIES

Overall responsibility for compliance with the Hazard Communication Program rests with officers, managers, and supervisors of OHM. A brief outline of responsibilities for those persons directly involved with the program will follow. These responsibilities are not all inclusive, but are designed to give guidance in initial and long-term program development. Since each area is different, these responsibilities may vary.

This program is intended to cover those employees who are directly involved with the handling of hazardous chemicals or supervision of activities that involve the use of hazardous chemicals.

2.1 Health and Safety Department Responsibilities

- Review operations with site supervisors to determine what tasks require hazard communication training.
- Advise supervisory people as to which materials may need to be considered hazardous initially and eventually to ensure that hazard task determination is being done according to the written policy.
- Follow up through safety meetings and safety audits to ensure that supervisors are carrying out prescribed company policy.
- Notify supervisors immediately of any operating changes affecting the hazardous chemicals being used.
- Periodically audit the Hazard Communication Program's progress using the Hazard Communication Program audit sheet found at the end of this procedure.

2.2 Training Department Responsibilities

- Ensure that up-to-date records are maintained on training of all employees required to handle hazardous chemicals. The supervisor should keep copies of these records and should also send copies of the initial training to the corporate training secretary for the training file.
- Educate personnel upon initial 40-hour OSHA training to the requirements of the Hazard Communication Standard.

2.3 Site Supervisors' Responsibilities

- Identify jobs requiring the use of hazardous chemicals and provide a list of those jobs and chemicals to the health and safety department.
- Provide the training required by the Hazard Communication Standard and document training of employees in the safe handling of hazardous chemicals.
- Ensure inspection of engineering controls and personal protective equipment before each use. The health and safety department shall help determine a suitable inspection plan for each application as needed.
- Make daily surveys of the work area to ensure that safe practices are being followed. Advise employees of and document unsafe work practices on the first occasion and consider further unsafe work practices as disciplinary violations. Use documentation as topics of safety meetings.
- Ensure required labeling practices are being followed. Labels should be affixed to the container when it arrives. If the contents are transferred to another container, then all label information (manufacturer, manufacturer's telephone number, product name, target organ(s) and product number) must also be affixed to the new container, so that all containers of the material, regardless of size, are labeled. Contact the health and safety department for proper labels.
- Enforce all applicable safety and health standards through periodic documented audits.
- Before ordering a material, determine if a MSDS exists on file. Request a MSDS from the manufacturer for all new products.
- Contact the health and safety department upon receiving new MSDSs to ensure that they have a copy. If they do not, then the site supervisor shall forward a copy to them.

2.4 Employee Responsibilities

- Read and understand entire Hazard Communication Program.
- Obey established safety rules and regulations.
- Use all safety procedures and personal protective equipment as required by company procedures.
- Notify supervisor of the following:
  - Any symptoms or unusual effects that may be related to the use of hazardous chemicals.
  - Any missing, incomplete, or unreadable labels on containers.
  - Missing, damaged, or malfunctioning safety equipment.
- Use approved labels on containers; do not remove labels (labels are available from the health and safety department).
- Use only approved containers for hazardous chemicals. (Is chemical and container compatible and appropriate?)
- Know where emergency equipment and first-aid supplies are located.
- Know location of MSDSs. These will be located in the break/decon area and the job-site office trailer.
- Know what you are expected to do in case of an emergency. Before the commencement of any task, emergency considerations shall be made.

2.5 Shipping/Receiving Personnel Responsibilities

- The Project Control Technician (PCT) or other persons assigned by the site supervisor shall ensure MSDSs are received with initial shipment of a hazardous chemical; if not, contact purchasing to request the appropriate MSDS and also call the health and safety department to determine if there is a MSDS available until the requested MSDS arrives.
- Ensure labels with required information are affixed to all containers.
- Store hazardous materials in designated locations.
- Use proper personal protective equipment when handling hazardous chemicals.
- Report damaged containers or spills to the site supervisor and the site safety officer immediately.

3. HAZARD DETERMINATION

OHM will rely on MSDSs from chemical suppliers and manufacturers to meet hazard determination requirements. Other relevant data from laboratory analyses, chemical reference materials, and chemical manufacturers' written evaluation procedures will be utilized when warranted. No other method shall be used to determine a chemicals' hazards unless approved by the health and safety department.

4. LABELING

The site supervisor will be responsible for seeing that all containers arriving at OHM job sites are properly and clearly labeled. Site supervisors shall also check all labels for chemical identity and appropriate hazard warnings. If the hazardous chemical is regulated by OSHA in a substance specific health standard (29 CFR 1910), the site supervisor shall ensure that the labels or other forms of warning used are in accordance with the requirements of that standard. Any container that is not labeled shall be immediately labeled after initial discovery with the required information.

The site supervisor, general foreman, or foreman shall be responsible for seeing that all portable containers used in their work area are properly labeled with chemical identity and hazard warning. (Refer to MSDS for required labeling information.)

The site supervisor, general foreman, or foreman shall also ensure that labels on hazardous chemical containers are not removed or defaced unless the container is immediately marked with the required information and that all labels are legible in English and prominently displayed on the container or readily available in the work area throughout each shift.

If any container is found and the contents cannot be identified, the site supervisor shall be contacted immediately. When proper identification is made, a label shall be affixed to the container immediately. If it is discovered that no MSDS is available, the manufacturer and the health and safety department shall be contacted to assist in locating the proper MSDS. If there is no means of identifying the material in the container, the container shall be taken out of service, away from all personnel until it can be tested by the health and safety department or laboratory personnel. The site supervisor shall communicate their findings or awareness of such containers to all personnel working in the area and to the regional health and safety manager.

5. MATERIAL SAFETY DATA SHEETS (MSDS)

The site supervisor at OHM job sites will be responsible for maintaining a current MSDS relevant to the hazardous chemicals used on their job sites. The health and safety department will be responsible for compiling the initial MSDS file for the job site and aiding all job sites with the completion and maintenance of their respective MSDS files.

All MSDSs shall be readily available for review by all employees during each work shift. Each job site will designate a clearly marked "Employee Right-to-Know" station where employees can immediately obtain a MSDS and the required information in an emergency. MSDSs shall also be made available, upon request, to designated OHM representatives, other employer's employees, and to any OSHA inspector in accordance with the requirements of 29 CFR 1910.1200(e).

Although manufacturers are required to provide employers with MSDSs on an initial chemical shipment, OHM purchasing agents (and site supervisors purchasing their own material) shall request MSDSs and updates to MSDSs on all purchase orders. Site supervisors that are without proper MSDSs shall be responsible for requesting this information from chemical manufacturers. The site supervisor shall maintain a file of follow-up letters for all hazardous chemical shipments they receive without MSDSs.

6. EMPLOYEE INFORMATION AND TRAINING

It is the responsibility of the supervisor in charge of each employee to ensure that the employee is properly trained. Training employees on chemical hazards and chemical handling is accomplished at the time of initial employment at OHM, whenever a new chemical (or physical) hazard is introduced into the work area, and through ongoing formal and informal training programs. Additionally, chemical hazards are communicated to employees through weekly and morning, job- site safety meetings, which shall be documented according to topic, major points discussed, and names of those attending (attendance is mandatory). Records of all formal training conducted at OHM are coordinated and maintained by the Training Department secretary.

At a minimum, OHM will inform employees on the following:

- The requirements of 29 CFR 1910.1200--Hazard Communication--Evaluating the potential hazards of chemicals and communicating information concerning hazards and appropriate protective measures to employees. OHM shall accomplish employee training in several different ways including, but not limited, to 40-hour OSHA Hazardous Waste Worker Training (29 CFR 1910.120), shop safety meetings, job-site safety meetings, Health and Safety Department safety meetings, and formal and informal training about specific chemical hazards.

- The location and availability of the written Hazard Communication Program, list of hazardous chemicals, and MSDSs will be periodically posted on the employee bulletin boards providing the location of the above material.

- Any operations in their work area where hazardous chemicals are present.

- How to work safety with chemicals present in the workplace and minimize potential exposure.

Employee training shall include the following:

- Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (monitoring instruments, visual appearance or odor, and acute and chronic health effects).

- The physical, chemical, and health hazards of the chemicals in the work area.

- The methods of preventing exposure to hazardous chemicals including the measures OHM has taken to protect the employees.

- Procedures to follow if OHM employees are exposed to hazardous chemicals (location of the nearest phone, emergency eyewash, and shower will be included). These discussions shall include proper operating procedures for all emergency equipment.

- The details of the OHM written Hazard Communication Program, including an explanation of the labeling system and the MSDSs, and how employees can obtain and use the appropriate hazard information.

- Standard operating procedures within each respective shop. OHM company policy determines what is considered standard operating procedures.

- Procedures for workers involved in non-routine tasks.

Each site supervisor shall ensure that the above training is emphasized to OHM employees. The health and safety department will ensure that each job site is properly informing and training all employees through group meetings and individual discussions. Whenever a new hazardous chemical is placed into use, the site supervisor shall inform the employees of the hazards said chemical may pose. The site supervisor shall also be responsible for obtaining and making available a MSDS for the new chemical.

7. HAZARDOUS NON-ROUTINE TASKS

Occasionally, employees at OHM are required to perform tasks which are considered to be non-routine. All tasks OHM considers non-routine shall be carefully discussed among the supervisor and those performing the task. This safety briefing shall include all possible hazards an employee may encounter while completing the task, including:

- Hazard recognition
- Chemicals involved and their hazardous properties
- Physical hazards
- Methods of avoiding hazards (monitoring instruments, proper personal protective equipment, etc.)

The following is a list of some of the non-routine tasks which may occur at OHM job sites. These tasks are all covered in detail in various OHM standard operating Procedures.

7.1 Confined Space Entry
7.2 Excavation, Trenching, and Shoring
7.3 Decontamination of Equipment
7.4 Laboratory Spills
7.5 High-Pressure Washer (Laser) Operation
7.6 Line Entry Procedure
7.7 Hot Work

8. INFORMING CONTRACTORS

It shall be the responsibility of the OHM site supervisor to provide subcontractors with the following information:

- Hazardous chemicals to which they may be exposed while performing a task including the following:

  - Chemical properties
  - Physical properties
  - Acute/Chronic health effects

- Location of "Employee Right-to Know" station which includes the following:

  - MSDS for work area
  - Hazard Communication Program
  - Other relevant safety material such as Project Health and Safety Plan (HASP)

- Precautionary measures to be taken to protect employees from chemical and physical hazards.

- Location of nearest emergency equipment (fire extinguisher, eyewash, shower, phone, first-aid kit, etc.)

- Procedures to follow in the event of employee exposure.

- Steps OHM has taken to reduce the risk of exposure to physical and chemical hazards including the following:

  - Safety meetings
  - Hazard Communication Program
  - Proper storage and labeling of hazardous chemicals
  - Health and safety department shop audits

- The methods used to label all hazardous chemicals.

- Emergency evacuation signals and evacuation rally locations.

The health and safety department shall offer assistance in providing the above information to subcontractors working at OHM job sites. On initial visit by a subcontractor to OHM job sites, a "Contractor Right-to-Know" release form shall be completed. This form will state that the above information has been communicated to the perspective contractor.

Conversely, the site supervisor shall obtain the above information from subcontractors for hazardous materials they have brought to our projects.

8.1 Contractor Right-to-Know Acknowledgment

By signing this sheet, the signee is stating that an OHM employee or representative has briefed said signee on the essentials of OHM's Hazard Communication Program, including hazardous chemical(s) to which one may be exposed, location of program and MSDS, precautionary measures taken to protect contractors from chemical and physical hazards, location of nearest emergency equipment, procedures to follow in the event of employer's employee chemical exposure, and method used to label all hazardous chemicals.

Name	Date	Company

9. LIST OF HAZARDOUS CHEMICALS

The following is a list of hazardous chemicals used on this OHM job site. Further information on each hazardous chemical listed below can be found in the MSDS which are included in the site specific health and safety plan.

- Typical OHM Job-Site Hazardous Chemical Inventory List

Available On Site	Chemicals
_____	Acetone
_____	Acetylene
_____	Activated Charcoal, Powder
_____	Alum (Aluminum Sulfate)

_____ Anti-fog Bausch & Lomb
_____ Argon/Methane (95%/5%)
_____ Brake Fluid
_____ Calcium Hydroxide (Hydrated Lime)
_____ Calibration Check Gas
_____ Carbon
_____ Caustic Soda (Sodium Hydroxide)
_____ Citrikleen
_____ Coal Fly Ash
_____ Compressed Air
_____ Diatomaceous Earth
_____ Diesel Fuel
_____ Dry Ice (Solid Carbon Dioxide)
_____ Ethylene Glycol
_____ Ferric Chloride
_____ Freon
_____ Gear Grease - Delta
_____ Helium
_____ Hexane
_____ Hydraulic Fluid
_____ Hydrochloric Acid
_____ Hydrogen
_____ Isobutylene
_____ Kiln Dust
_____ Methanol
_____ Nitrogen
_____ Nitrous Oxide
_____ Oxygen
_____ Penetone
_____ Pentane
_____ Polymers (Flocculants)
_____ Premium Unleaded Gasoline
_____ PVC Solvent Cleaner
_____ PVC Cement
_____ Regular Leaded Gasoline
_____ Starting Fluid
_____ Stoddard Solvent
_____ Sulfuric Acid
_____ 10W-40 Motor Oil - Shell
_____ Tube Grease - Kendall
_____ TU Type 555 Thread Sealing Compound
_____ 2-Cycle Oil - Wolf's Head

- Site-Specific Hazardous Chemical Inventory

_____

_____

_____

_____

_____

APPENDIX C
MATERIAL SAFETY DATA SHEETS

No. 1200

AROCLOR 1254

Date May 1980

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION
P.O. BOX 1436, SCHENECTADY, NY 12301 USA
(518) 385-2577

GENIUM PUBLISHING CORP.

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: AROCLOR 1254
DESCRIPTION: Distillation cut of polychlorinated biphenyl (or diphenyl), containing 54% Cl.
OTHER DESIGNATIONS: PCB, an Askarel, PYRANOL, GE Material A13B1, CAS # 027 323 188
MANUFACTURER: Material was a product of Monsanto Co., but dropped in 1977. Except for uses specifically exempted and regulated by EPA (for example power transformers), legal manufacture, distribution in commerce, and use of PCB's in USA ended in 1979 under TSCA.

SECTION II. INGREDIENTS AND HAZARDS

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Mixture of Chlorinated Biphenyls, $C_{12}H_{10-x}Cl_x$:	ca 100	EPA exemption or authorization needed for any measurable exposure*
		Rat, Oral LD_{50} Adult 4-10 g/kg Weaning 1.2 g/kg
		Rat, Intravenous LD_{50} 358 mg/kg
		Rat, Oral, TDLo 1220 mg/kg/35 wk (neoplastic effect)

x	Approx. %
2	0.5
3	1
4	21
5	48
6	23
7	6

Includes 69 or more compounds with average of 4.98 Cl atom/molecule. Mixture may contain 0-2 ppm chlorinated dibenzofurans.

*Current ACGIH 8-hr TWA is 0.5 mg/m^3. NIOSH has proposed a 10-hr TWA of 1.0 µg/m^3. Materials with over 50 ppm PCB content are regulated for handling, storage, records, and waste disposal. EPA criterion in navigable waters is 0.001 µg/L. PCB's.

SECTION III. PHYSICAL DATA

Boiling range at 1 atm, deg C	ca 360-390	Specific gravity (65/15.5 C)	1.5
Vapor pressure at 150 C, mm Hg	<1	Pour point, deg C	10
Water solubility at 25 C, ppm	ca 0.01	Molecular weight (Av)	327
Viscosity at 100 F, cstk	ca 460	Partition Coef. (octanol/water)	$>10^4$

Appearance & Odor: A light yellow, viscous fluid.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
None to boiling point				

Extinguishing Media: Use media appropriate to the surrounding fire conditions. This material has very low combustibility, but it can undergo thermal-oxidative degradation in a fire situation.

Firefighters should use full protective clothing and self-contained breathing equipment when fighting fire where any PCB's are involved.

SECTION V. REACTIVITY DATA

AROCLOR 1254 and other PCB's are nearly inert materials with very high chemical stability; the higher chlorine levels usually give the greater stability. At about 300 to 600 C some PCB's can oxidize to produce chlorinated dibenzofurans which are much greater in toxicity than the PCB's. For complete incineration of PCB's a 2-second dwell time above 2000 F (1090 C) with 3% excess oxygen in the stack is suitable (see Sect. VII).

AROCLOR 1254 shows very little degradation after 3 weeks exposure to direct sunlight.

PCB's are strongly absorbed on particulates or sediments in aquatic systems (streams, lakes, ocean, etc.).

Mixed in activated sludge, biodegradation occurs slowly, but only very slowly or almost not at all with compounds above Cl_4.

Copyright © 1984 Genium Publishing Corporation
Any commercial use without publisher's specific permission is prohibited.

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION
P.O. BOX 1436, SCHENECTADY, NY 12301 USA
(518) 385-2577

GENIUM PUBLISHING CORP.

No. 474

FUEL OIL NO. 6

Date October 1981

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: FUEL OIL NO. 6
DESCRIPTION: A high-viscosity residual oil; Preheating required for use.
OTHER DESIGNATIONS: ASTM D396, Bunker C, GE Material D27B1D, CAS # 068 553 004
MANUFACTURER: Available from many suppliers, including:
Amerada Hess Corp.
1 Hess Plaza
Woodbridge, N.J. 07095 Tel: (201) 636-3000

SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Fuel Oil No. 6 Complex mixture of paraffinic, olefinic, naphthenic, and aromatic hydrocarbons, including polycylic aromatic hydrocarbons.		8-hr TWA 5 mg/m^3 (mineral oil mist)*
Sulfur content**	<2.8	

*Current OSHA standard and ACGIH (1981) TLV
**No. 6 fuel oil with low sulfur (0.2 and 1.2%) is commercially availble.

SECTION III. PHYSICAL DATA

Boiling point, 1 atm, deg C --- >260
Vapor pressure, 70F, mmHg ----- ca 0.2
Solubility in water ---------- negligible
Specific gravity (H_2O=1) (approx) -- 0.966
Viscosity at 122 F, cSt ---------- 92-638

Appearance and Odor: Black liquid to heavy paste, petroleum odor.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air % by volume	LOWER	UPPER
>140 F (PMCC)	765F		3.9	20.1

Extinguishing Media: Dry chemical, carbon dioxide, foam, water spray. Use a water spray to cool fire exposed containers. Use a smothering technique for extinguishing fire of this combustible liquid. Do not use a forced water stream directly on oil fire as this will only scatter the fire. Material is an OSHA Class IIIA combustible liquid. Exhibits "boil-over" characteristics.
Firefighters should wear self-contained breathing apparatus and full protective clothing.

SECTION V. REACTIVITY DATA

This is a stable material in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization.
Incompatible with strong oxidizing agents; heating greatly increases fire hazard.
Thermal-oxidative degradation may yield various hydrocarbons and hydrocarbon derivatives (partial oxidation products), CO_2 and CO and SO_2.

Copyright © 1984 Genium Publishing Corporation
Any commercial use without publisher's specific permission is prohibited.

APPENDIX D
SITE-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT (PPE) PROGRAM

1. OBJECTIVE

OHM Remediation Services Corp. (OHM) personnel will be protected for chemical, physical, and environmental hazards by the appropriate personal protective equipment (PPE) when engineering and administrative controls are not effective in controlling job hazards.

2. PURPOSE

The purpose of this procedure is to address the elements of the PPE program. This PPE program conforms to the requirements found in 29 CFR 1910.120 (g) Engineering controls, work practices, and personal protective equipment for employee protection; 29 CFR 1910 Subpart I - Personal Protective Equipment - .132 General Requirements, .133 Eye and Face Protection, .135 Head Protection, .136 Foot Protection, .138 Hand Protection; and 29 CFR 1910.1200 Hazard Communication.

3. RESPONSIBILITY AND AUTHORITY

The responsibility and authority for the selection, use, and maintenance of personal protective equipment is shared between management, supervisory, health and safety, and employee personnel.

3.1 Management - Management has the responsibility to provide PPE appropriate for the hazard/s associated with expected work tasks.

3.2 Supervisors - Supervisors have the responsibility to conduct hazard assessments and ensure personnel to utilize PPE in compliance with this SOP. Supervisors may request assistance from or designate authority to health and safety personnel for hazard assessment, selection, inspection, and decontamination of PPE. The use of PPE by employees is the supervisor's responsibility.

3.3 Health and Safety Personnel - Health and safety personnel have the responsibility to assist supervisors in hazard assessment, selection, inspection, and decontamination of PPE. In the event of conflict, health and safety personnel have the authority to implement the necessary measures.

3.4 Employees - Employees have the responsibility to use, inspect, and decontaminate PPE as directed by supervisors.

4. PROGRAM ELEMENTS

Program elements define the regulatory requirements of a PPE program.

4.1 Hazard assessment - All tasks undertaken by OHM personnel will be assessed for chemical, physical, and environmental hazards present or likely to be present which necessitate the use of PPE to ensure adequate protection. This assessment shall take place prior to commencement of work.

4.2 Hazard Reassessment - The level of protection or type of personal protective equipment shall be increased when additional information on site conditions indicates that increased protection is necessary to reduce employee exposures below permissible exposure limits, published exposure levels for hazardous substances and health hazards, or other physical and environmental hazards.

4.3 PPE Selection - The regional health and safety director/manager or designee will initially select the level and types of PPE that will protect the affected employee from the hazards identified in the initial hazard assessment.

4.4 Written Certification - The site specific Health and Safety Plan (HASP) will serve as the written certification that identifies the workplace was evaluated. The HASP shall be dated. The signature line shall designate the person certifying that the evaluation has been performed.

4.5 Communication of Selection - Employees will be informed of the PPE selection decisions through reading or verbally reviewing the HASP, attending pre-project safety briefings, job safety analysis (JSA) review, or attending safety meetings.

4.6 PPE Use and Fit - The supervisor will be responsible for the proper use and fit of PPE by workers under their direction and will monitor the effectiveness of these items. Heath and safety personnel will advise and assist the supervisor in these areas.

4.7 Work Mission Duration - The supervisor will be responsible for the establishment of the duration of specific work missions. The duration will be determined by the complexity of the assignment, PPE involved, physical factors, temperature, humidity, weather conditions, elevation of work, and acclimation of the worker to the demands of the task assigned. The supervisor will consider the recommendations of the health and safety personnel.

A sufficient amount of rest breaks will be allowed in order to avoid overexertion or thermal stress by the employees while maintaining productive work practices. Further guidance is offered in OHM Health and Safety Procedures entitled Heat Stress and Cold Stress.

4.8 PPE Maintenance and Storage - Each employee is responsible for the proper maintenance and storage of the standard issue equipment (e.g., hard hat, full-face piece negative pressure respirator, safety glasses). The supervisor will assure that proper maintenance is carried out.

4.9 PPE Decontamination - Each employee is responsible for daily cleaning and decontamination of reusable PPE such as outer gloves, outer boots, reusable chemically resistant clothing, and standard issue PPE such as hard hats and respirators.

OHM will provide an area/s for decontamination operations, necessary cleaning agents, cleaning tools, such as brushes and wash basins, and a method to dispose of materials generated during decontamination activities.

OHM will attempt to reduce decontamination requirements through the use of disposable protective clothing and gloves as feasible.

4.10 PPE Training - All employees will receive training in the proper use of PPE prior to wearing the equipment in a work situation. This training will be administered upon commencement of employment during HAZWOPER training. PPE refresher training will be reviewed annually during the HAZWOPER refresher training. Project specific training will be provided as required.

4.11 PPE Donning and Doffing Procedures - All employees will receive training upon commencement of employment and during annual refresher training concerning the donning and doffing of PPE. Periodic training will be provided as required.

4.12 PPE Inspection - Each employee shall inspect PPE for defects and proper function prior to each use. Defective or damaged PPE shall not be used. Any PPE found to be defective or have missing parts will be replaced prior to use.

4.13 PPE In Use Monitoring - The supervisor is responsible for monitoring the effectiveness of selected PPE. If at any time level of PPE is to be downgraded, it is mandatory that the change be approved by the regional health and safety director/manager or designee.

4.14 Evaluation of PPE Program - Health and safety personnel will compile data on PPE in the field to determine that the PPE performs to OHM needs. Periodically, this information should be reviewed cognizant health and safety professional to ensure that PPE is providing the necessary level of protection, quality, and is appropriate for the work performed.

If at any time the failure of PPE causes injury to an employee or fails to perform as expected, the supervisor will take the unit or item out of service and investigate the incident. The incident shall be immediately reported to the regional health and safety director/manager. If after scrutiny, the unit or item is determined to have a manufacturing defect, all identical units will be removed from use until corrective actions are taken.

4.15 Limitations During Temperature Extremes - Extreme temperatures exert stress on personnel and may alter the performance characteristics of PPE. During periods of extreme temperature, work assignments will be adjusted to protect the employee from overexertion or exposure. The supervisor will evaluate if temperature extremes are effecting performance characteristics of PPE and report these findings to the regional health and safety director/manager.

4.16 Unserviceable PPE - Any PPE which is no longer functioning properly or is no longer serviceable shall be removed from use and either repaired or destroyed.

5. SAFETY EQUIPMENT POLICY

OHM will provide, maintain, and replace personal protective equipment as detailed below.

5.1 Standard issue safety equipment - Standard issue safety equipment will be provided at no cost to field employees. These items consist of:

- Hard hat
- Safety glasses with clear and shaded lenses
- Full-face respirator with nose cup

5.2 Company provided equipment - OHM will provide at no cost to the employee the following items on a task specific or project specific basis:

- Chemical protective equipment such as gloves, boots, and clothing
- Specialty glasses or goggles

- Face shields
- Flame resistant clothing
- Hearing protection
- Fall protection

5.3 Employee provided equipment - The employee shall provide the following equipment:

- ANSI approved steel toed and shank boots/shoes (Note: Further guidance is provided in Section 7 Safety footwear)
- Outerwear for cold weather

5.4 Equipment replacement - OHM will replace worn-out or work-damaged equipment detailed in 5.1 and 5.2. OHM reserves the right to charge employees for the replacement cost of equipment which is lost or damaged though neglect or abuse.

5.5 Additional PPE - The regional health and safety director/manager or the supervisor may require additional company provided PPE on a task specific basis.

6. WORK CLOTHES

OHM employees, subcontractors, and visitors will observe the requirements for proper work clothing when on OHM project sites, facilities, and shops.

6.1 Pants - Long pants are required at all times. These pants must be in good repair.

6.2 Shirts - Shirts will be worn on the job. Shirts will be buttoned up the front and at the cuff unless rolled up. Shirt tails must be kept in the trousers. Sleeveless shirts are prohibited at all work locations. Supervisory personnel are expected to wear a shirt with a collar. T-shirts are permitted for personnel who wear protective clothing most of the day.

6.3 Clothing - Loose or ragged clothing will not be worn.

6.4 Modifications - Regional health and safety director/manager may modify work clothing requirements on a project specific basis.

6.5 Contaminated Clothing - Clothing (including shoes) saturated with petroleum products or chemicals will be removed immediately to prevent irritation and possible dermal exposure.

6.6 Jewelry - Rings and other jewelry (except watches) must be removed when working in areas where they could catch on moving objects, sharp protrusions, come in contact with electrical circuits or chemical agents, or compromise PPE ie. rings capable of cutting gloves. Additionally, the supervisor may deem other types of jewelry inappropriate for the work task.

6.7 Hair Length - Hair long enough to constitute a hazard while working around moving machinery or rotating tools and equipment must be secured by a net or tied back. Hair styles must not interfere with the ability to properly wear safety headgear, safety spectacles, and respiratory protection.

7. EYE/FACE PROTECTION

All OHM employees, subcontractors, and visitors shall wear eye and face protection meeting the requirements of ANSI document Z87.1 - 1989 titled "Practice of Occupational and Educational Eye and Face Protection" during the tasks posing exposure to eye or face injury.

7.1 Requirements - To protect the face and eyes against injuries from flying objects, splashing liquids, and harmful rays, safety spectacles with side shields, goggles, face shields, cutting goggles, and welding helmets will be used as appropriate. The supervisor will be responsible to identify the need for eye/face protection and specify the eye/face protection required for each operation. A selection guide is attached in Table 1.

7.2 Safety spectacles - Safety spectacles are protective devices intended to shield the wearer's eyes from a variety of hazards. While they are primary protectors and may be used alone, they may also be used in conjunction with other protective devices such as goggles and face shields.

7.3 Goggles - Goggles are protective devices intended to fit the face immediately surrounding the eyes in order to shield the eyes from a variety of hazards. While they are primary protectors and may be used alone, they also may be used in conjunction with other protectors.

7.4 Face shields - Face shields are protective devices intended to shield the wearer's face, or portions thereof, in addition to the eyes, from certain hazards. Face shields are secondary protectors and shall be used with primary protectors.

7.5 Cutting goggles - Cutting goggles are protective devices designed to protect the eyes from radiation and impact. Goggles are primary protectors and in some situations must be supplemented with face shields. See Table 2 for selection guidelines.

7.6 Welding helmets - Welding helmets are protective devices intended to shield the eyes and face from optical radiation and impact. Welding helmets are secondary protectors and shall be used only in conjunction with primary protectors such as safety spectacles or goggles. See Table 3 for selection guidelines.

7.7 Prescription Spectacles - For personnel that wear prescription spectacles, OHM provides prescription safety spectacles with side shields. It is mandatory that prescription safety spectacles not be altered by the employee and be worn at all times when safety spectacles are required.

7.8 Contact lenses - Contact lenses are not permitted to be worn where accidental eye contact with chemical agents or physical materials is possible. OHM provides prescription spectacles and other protective devices for use in these situations.

7.9 Shaded lenses - Shaded lenses are not to be worn indoors or under low light conditions.

8. SAFETY HEADGEAR

All OHM employees, subcontractors, and visitors shall wear safety headgear meeting the requirements of ANSI document Z89.1-1986 titled "Protective Headwear for Industrial Workers - Requirements" when exposed to overhead hazards.

8.1 Requirement - Safety headgear shall be worn by all personnel while engaged in work where there is a hazard of falling objects, low overhead restrictions, and other overhead hazards exist. Safety headgear may also be required to be worn by contractual requirements.

8.2 Use - Safety headgear must be worn as prescribed by the manufacturer in the bill front position unless the headgear was approved to be worn in another position.

8.3 Modifications - Safety headgear shall not be painted, drilled or modified in any manner. Use of safety related headgear stickers are permitted.

8.4 Life Expectancy - No maximum mandatory service life is specified by regulation for safety headgear. However, a hard hat should be removed from service if chemical corrosion, cracks, deformities, worn suspension, or discoloration is noted with the unit.

9. SAFETY FOOTWEAR

All OHM employees, subcontractors, and visitors that enter OHM project sites and are exposed to foot hazards shall wear footwear meeting the ANSI document Z41 - 1991 titled "Protective Footwear" during operations posing foot injury.

9.1 Project Sites - Steel toe and shank leather work boots shall be worn on all OHM project sites. High top or low top sneakers, western style boots, or other footwear even though ANSI approved are not appropriate for the activities encountered at hazardous waste and emergency response sites and shall not be worn.

9.2 OHM Facilities and Shops - Personnel working at OHM shops and facilities have the option of wearing other types of ANSI approved safety work shoes and boots provided they are appropriate for the tasks being performed. The supervisor of the work area is responsible to decide what type footwear is appropriate.

10. HAND PROTECTION/GLOVES

OHM employees, subcontractors, and visitors will don appropriate gloves when engaged in any operation that presents a hazard to the hands.

10.1 Use - Appropriate work gloves shall be available for hand protection against heat and flame, cold, chemicals, petroleum products, corrosive materials, moisture, mechanical abrasion, electricity, and sharp and rough surfaces.

10.2 Selection - Glove selection of the appropriate hand protection shall be based on an evaluation of the performance characteristic of the hand protection relative to the task(s) to be performed, chemical concentration and properties, physical conditions present, duration of use, and the hazards and potential hazards identified. The type of work gloves used must be approved by the regional health and safety director/manager and designee as specified in the HASP for the particular task.

10.3 Electrical - When working on high voltage (480 volts and above) electrical equipment, electrically tested high voltage gloves will be worn. Leather protection will be worn over these gloves. (NOTE: Only authorized personnel are permitted to work on High Voltage electrical equipment).

11. PROTECTIVE CLOTHING

OHM employees, subcontractors, and visitors will don appropriate protective clothing when engaged in any operation that presents a hazard to the body.

11.1 Use - Appropriate clothing shall be available for body protection against heat and flame, cold, chemicals, petroleum products, corrosive materials, moisture, mechanical abrasion, electricity, and sharp and rough surfaces.

11.2 Selection - Clothing selection of the appropriate body protection shall be based on an evaluation of the performance characteristic of the body protection relative to the task(s) to be performed, chemical concentration and properties, physical conditions present, duration of use, and the hazards and potential hazards identified. The type of protective clothing used must be approved by the regional health and safety director/manager and designee and specified in the HASP for the particular task.

12. TOTALLY-ENCAPSULATING CHEMICAL PROTECTIVE SUITS

Totally-encapsulating chemical protective suits (Level A) shall be used in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

12.1 Use - OHM will only use Level A protection when all other reasonable efforts of controlling employee exposure through engineering or administrative means are not possible.

12.2 Authorization - Level A protection may only be used after authorization of the regional health and safety director/manager has been granted.

12.3 Health and Safety Personnel - An appropriately experienced health and safety employee must be assigned to the project site where Level A is to be used. They must evaluate that the following items are ready:

- Communications
- Decontamination
- Emergency rescue procedures and personnel
- Emergency medical attention

12.4 OHM will discard and properly dispose of any Level A suit which has come in contact with chemical contaminants or sustained physical damage at least at the end of the project.

13. LOANING PERSONAL PROTECTIVE EQUIPMENT

OHM personnel should not loan OHM personal protective equipment to any client, subcontractor, or visitor personnel. If there are urgent circumstances, such as an emergency response where the equipment cannot be obtained elsewhere and chemical exposure is possible, OHM personnel can loan personal protective equipment such as respirators, protective clothing and other safety equipment to client personnel or personnel from other organizations. However because of the potential liability involved, approval of senior OHM management is required as well as the requirement that a representative of the company and the individual using the equipment execute an OHM Indemnification and Release Agreement. A copy of this agreement is attached in Appendix A.

13.1 Execution of Indemnification and Release Agreement - In general, the following will be required BEFORE the personal protective equipment may be loaned:

- The OHM Regional Vice President (or designee) must specifically authorize the loaning of personal protective equipment on the particular project.
- An authorized representative of the company whose personnel will use the equipment must sign the Indemnification and Release Agreement.
- The individual who will use the equipment must also sign the Indemnification and Release Agreement attesting to the fact that the individual is either experienced in the use of the equipment or has been given instruction on the safe use of the equipment and is medically qualified to wear the equipment.
- An OHM representative must also sign the form as a witness to the above.

13.2 Contractual Requirement - An indemnification and release agreement is not required if providing personal protective equipment to clients or regulatory personnel is a contractual requirement.

13.3 Exemptions - Hard hats, safety glasses, hearing protection, and protective clothing provided for cleanliness is exempted for the indemnification requirement. Instruction should be provided to the individual prior to wearing.

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

TABLE 1
FACE PROTECTION SELECTION GUIDELINES

Hazard	Protection
Flying fragments, objects, large chips, particles, sand, and dirt from chipping, grinding, machining, masonry work, riveting, and sanding	Safety spectacles or goggles Supplement with face shield for severe exposure
Chemical splash from corrosive and chemical handling, pressure washing operations shield for severe exposure	Goggles Supplement with face
Nuisance dust from woodworking, buffing, and general dusty conditions	Safety spectacles or goggles
Hot sparks from grinding operations	Safety spectacles or goggles Supplement with face shield for severe exposure
Molten metal from torch cutting operations	Shaded cutting goggles (see Table 3) and face shield
Welding operations	Safety spectacles and shaded welding hood (see Tables 2)

OHM Remediation Services Corp.

TABLE 2

GUIDE FOR CUTTING SHADE NUMBERS

Operation	Plate Thickness	Minimum Protective Shade
Gas Welding		
Light	Under 1/8	4 or 5
Medium	1/8 to 1/2	5 or 6
Heavy	over 1/2	6 or 8
Oxygen Cutting		
Light	Under 1	3 or 4
Medium	1 to 6	4 or 5
Heavy	Over 6	5 or 6

TABLE 3

GUIDE FOR WELDING SHADE NUMBERS

Operation	Electrode Size 1/32 inch	Arc Current (A)	Minimum Protective Shade	Suggested* Shade No. (Comfort)
Shielding metal arc welding	Less than 3	Less than 60	7	—
	3-5	60-160	8	10
	5-8	160-250	10	12
	More than 8	250-550	11	14
Gas metal arc welding and flux cored arc welding		Less than 60	7	—
		60-160	10	11
		160-250	10	12
		250-500	10	14
		150-500	10	14
Air carbon Air cutting	(Light)	Less than 500	10	12
	(Heavy)	500-1000	11	14
Plasma arc welding		Less than 20	6	6 to 8
		20-100	8	10
		100-400	10	12
		400-800	11	14
Plasma arc cutting	(Light)	Less than 300	8	9
	(Medium)	300-400	9	12
	(Heavy)	400-800	10	14
Torch brazing		—	—	3 or 4
Torch soldering		—	—	2
Carbon arc welding		—	—	14

*As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

OHM Remediation
Services Corp.
A Subsidiary of OHM Corporation

APPENDIX A
OHM REMEDIATION SERVICES CORP.
INDEMNIFICATION AND RELEASE AGREEMENT
FOR PERSONAL PROTECTION CLOTHING

FOR AND IN CONSIDERATION OF the use by the undersigned of property belonging to OHM Remediation Services Corp. (hereinafter referred to as "OHM") and which may include full-face mask respirators, self-contained breathing apparatus, and other equipment and supplies, and other good and valuable consideration, the undersigned , for himself and his successors, and assigns, does hereby release and discharge OHM, its officers, employees, agents, and subcontractors from any and all claims, actions, demands, damages, costs, loss of services, expenses, compensation, third-party actions, or suits, including attorneys fees, arising and resulting from the aforementioned use of property, equipment, or supplies belonging to OHM.

In addition, the undersigned, on behalf of his employer, principal, himself, and his successors, and assigns, agrees to release, save, and hold harmless, protect, indemnify, and defend OHM, and its officers, employees, agents, and subcontractors against any and all claims, actions, and expenses as above described, whether for bodily injury, property damage or destruction, or both, arising or resulting in any way from the use by the undersigned of property of OHM and agrees to save, hold harmless, protect, indemnify, and defend OHM against any such claims, actions, or expenses, referenced above, that might be brought against OHM by any third persons or the heirs, successors, executors or assigns of the undersigned.

The undersigned acknowledges by signing that he has carefully read this Agreement, understands the contents thereof, and has freely and voluntarily signed the same.

EXECUTED on _____, 19___.

1. OHM Regional Vice President (or designee) authorizing use of equipment:

   _____

2. <u>CLIENT OR SUBCONTRACTOR REPRESENTATIVE AUTHORIZING EQUIPMENT USE:</u>

   I authorize the individual(s) in 3. below to use OHM provided personal protective equipment

   Company Name_____

   Sign Name_____

   Print Name_____

   Title_____

3. <u>INDIVIDUAL USING EQUIPMENT</u>: I certify that I am familiar with the equipment and medically qualified to wear the equipment

   Company Name_____

   Sign Name_____

   Print Name_____

   NOTE: A continuation sheet can be used if more than one individual is to be certified to use equipment

4. OHM Representative Acknowledging Signatures:

   Sign Name_____

APPENDIX II
SAMPLING AND ANALYSIS PLAN

FINAL
SAMPLING, ANALYSIS, AND QUALITY ASSURANCE PLAN
FOR
TANK CLOSURE, SWMU #45 AT
U.S. NAVAL STATION,
ROOSEVELT ROADS, PUERTO RICO

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0090

Prepared by:

OHM Remediation Services Corp.
Trenton, New Jersey

Robert Lynch
Project Chemist

Reviewed by:

Gary Shirley
Project Manager

John P. Franz, P.E.
Program Manager

May 15, 1996
OHM Project 17780SAP

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

1.1 SITE BACKGROUND 1-1
1.2 SAMPLING PLAN ORGANIZATION 1-1

2.0 SAMPLING AND ANALYSIS OBJECTIVES 2-1

TABLE 2.1 PRE-MOBILIZATION SAMPLING AND ANALYSIS PLAN 2-1

2.1 PRE-MOBILIZATION SAMPLING 2-1
2.2 WASTEWATER TREATMENT SAMPLING 2-1
2.3 SLUDGE SAMPLING 2-2
2.4 CONFIRMATORY SAMPLING 2-2

3.0 DATA QUALITY OBJECTIVES 3-1

3.1 LABORATORY METHODS 3-1
3.2 QA/QC SAMPLES 3-1
3.3 DATA DELIVERABLES 3-2

4.0 PROJECT ORGANIZATION 4-1

4.1 OHM FIELD ANALYTICAL SERVICES 4-1
4.2 PROJECT MANAGEMENT 4-1

5.0 FIELD SAMPLING PROCEDURES 5-1

5.1 PRE-MOBILIZATION SAMPLING 5-1
5.2 PU SAMPLING 5-2
5.2 SLUDGE SAMPLING 5-3
5.3 CONCRETE SAMPLING 5-3

6.0 FIELD SAMPLING QUALITY CONTROL 6-1

6.1 FIELD DOCUMENTATION 6-1
6.2 CHAIN OF CUSTODY PROCEDURES 6-1

FIGURE 6.1 CHAIN OF CUSTODY RECORD 6-3

6.3 DECONTAMINATION PROCEDURES 6-4

TABLE 6.1 ANALYSIS OF ORGANIC AND INORGANIC COMPOUNDS USING USEPA SW-846 METHODOLOGIES FOR AQUEOUS, NON-AQUEOUS, AND WASTE SAMPLES 6-5

7.0 ANALYTICAL PARAMETERS 7-1

TABLE 7.1 ANALYTICAL PARAMETERS 7-1
TABLE 7.2 TOTAL SAMPLES AND ANALYSIS REQUIREMENTS 7-2

8.0 LABORATORY QUALITY CONTROL 8-1

8.1 SAMPLE HANDLING IN THE LABORATORY 8-1
8.2 LABORATORY SAMPLE STORAGE 8-2
8.3 METHOD SPECIFIC QUALITY CONTROL 8-2
8.4 DATA QUALITY EVALUATION 8-2
8.5 CORRECTIVE ACTION 8-2

9.0 DATA REDUCTION, VALIDATION, AND REPORTING 9-1

9.1 DATA REDUCTION AND TABULATION 9-1
9.2 GENERAL PROCEDURES FOR DATA REVIEW/VALIDATION 9-1
9.3 DATA REPORTING 9-2
9.4 PROJECT TECHNICAL AND PEER REVIEWS 9-2

TABLE 9.1 NEESA LEVEL C DATA DELIVERIES 9-4

1.0 INTRODUCTION

OHM is pleased to submit this revised Sampling and Analysis Plan (SAP) to the U.S. Navy, in support of Interim Corrective Measures at Solid Waste Management Unit #45, Roosevelt Roads Naval Station, Puerto Rico.

This SAP is written based upon the Bid Specifications for Delivery Order No. 0090, under Contract No. N64270-93-D-3032. The SAP describes the data quality objectives, sampling methods, field documentation, analytical requirements, and quality assurance for project completion.

The following documents were used as guidance for the development of this SAP:

- Naval Facilities Engineering Service Center. Navy Installation Restoration Laboratory Quality Assurance Guide. February 1996.
- Naval Energy and Environmental Support Activity (NEESA). Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Restoration Program. NEESA 20.2-047B. June 1988.
- US. EPA SW-846. Test Methods for Evaluating Solid Waste. Third edition, Volume 1. July, 1994.
- U.S. EPA SW-846. Test Methods for Evaluating Solid Waste. Third edition, Volume 2. November 1986.
- OHM Field Sampling Manual. March, 1989.

1.1 SITE BACKGROUND

The Interim Corrective Measures for SWMU #45 involve the removal and remediation of contaminated liquids and contaminated sludges from two 50,000-gallon concrete-reinforced underground storage tanks (USTs), a cooling water intake tunnel and a cooling water discharge tunnel. Bunker "C" fuel was stored in the USTs during the 1940s. Building 38 is enclosed by SWMU #45. Building 38 has been used for transformer maintenance and storage. Dumping of transformer oil has been reported. Bunker "C" fuel has been observed in the proximity of Building 38.

Prior sampling of the water, product, and sludge at the two USTs show low level contamination of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and especially PCBs (Aroclor-1260).

1.2 SAMPLING PLAN ORGANIZATION

This SAP is written to describe all sampling procedures (Sections 2.0 and 5.0), field sampling quality control (Section 6.0), analytical methods (Section 7.0) and associated laboratory QA/QC (Section 8.0).

The data quality objectives as discussed in Section 3.0 will be executed by the project organization described in Section 4.0. Section 9.0 discusses the data reporting format.

The OHM Field Analytical, Technical Services group is responsible for the writing and execution of this SAP.

2.0 SAMPLING AND ANALYSIS OBJECTIVES

SWMU #45 sampling and analytical requirements include:

- Pre-mobilization RCRA/TSCA waste characterization of the contents (liquid, sludge, and solids) from the following:

  - Dual intake lines
  - Outlet line
  - Two USTs

  Table 2.1 summarizes sampling points, materials to be sampled, and type of analysis to be performed during the pre-mobilization sampling event.

- Waste characterization of the sludge removed from the USTs and the intake/outlet tunnels

- Performance monitoring of the influent and effluent of the pretreatment unit (PU)

- Chip sampling of the concrete for PCBs and TPH.

TABLE 2.1
PRE-MOBILIZATION SAMPLING AND ANALYSIS PLAN

	UST 1	UST 2	Intake 1	Intake 2	Outlet 1
Free Product Phase	X	X	X	X	X
Water Phase	X	X	X	X	X
Sludge Phase	X	X	X	X	X

X = SW846 (RCRA/TSCA) = Full TCLP/Reactivity/Ignitablity/Corrosivity/PCB

2.1 PRE-MOBILIZATION SAMPLING

OHM will conduct a pre-mobilization sampling and analytical event designed to fully characterize all waste phases (liquid, sludge, and solids, including free product) within the the cooling lines (two intake, one outlet) and two USTs at SWMU #45. Each cooling line and each UST will be discreetly sampled and analyzed as described in Sections 5.0 and 7.0, respectively.

The ultimate goal of this event is to insure the successful operation of the PU, while at the same time, completely identifying the personnel hazards.

2.2 WASTEWATER TREATMENT SAMPLING

All water contained in the two USTs and the intake/outlet tunnels will be treated in the on-site pretreatment unit (PU).

The influent and effluent water will be sampled within the initial 1,000 gallons at start-up. Influent samples will be obtained at approximate 10-hour intervals, thereafter.

Effluent samples will be obtained by the use of an ISCO water composite sampler. Hourly grab samples will be composited. Composite effluent samples will be obtained on a daily basis. Sampling and analysis will assure that PU discharges are within the permit discharge criteria.

The results of PU sampling will be compared to applicable discharge criteria.

Sampling procedures for the PU are discussed in Section 5.2 of this SAP.

2.3 SLUDGE SAMPLING

All sludge which is removed from the USTs and the tunnels, and solids which are generated from the PU, will be stored in separate rolloff boxes. Each container will be sampled for waste characterization of the sludge/solids. In the event the sludge is removed in a liquid state, the sludge from each tanker will be sampled and fully characterized.

2.4 CONFIRMATORY SAMPLING

Upon completion of all PU operations, the UST and tunnel concrete will be sampled, in order to assure "cleanliness". The concrete will be chip sampled.

The following concrete samples will be obtained:

- One (1) sample from each manhole in the USTs and tunnels (total 4 samples)
- Four (4) samples from the floor of each UST (total 8 samples)
- Four (4) samples from the roof of each UST (total 8 samples)
- Four (4) samples from the perimeter wall of each UST (total 8 samples)
- One (1) sample from each UST column (total 16 samples)
- One (1) sample from each Intake Manway at base Intake Tunnel (total 28 samples)
- One (1) sample from each manway and breach location of Outlet Tunnel (total 5 samples)

Chip sampling procedures are discussed in Section 5.3 of this SAP.

Confirmatory samples of any non-porous (metal, etc.) surface will be obtained by wipe sampling.

3.0 DATA QUALITY OBJECTIVES

OHM will generate data which confirms to DQO 1 and NEESA Level C (DQO 3) for this project.

- DQO Level 1 data pertains to field data generated during screening with on-site instrumentation, including the photoionization detector (PID).
- NEESA Level C pertains to data obtained for the PU product, sludge characterization, and confirmatory sampling.

EPA DQO 1

The field data obtained within DQO 1 will pertain to all measurements by the PID, or other screening instrument. DQO 1 is generally applicable to all health and safety related data.

Field QC which relates to DQO 1 involves accurate and complete documentation of all PID (and other instrumental) readings. Prior to use, the PID will be calibrated using isobutylene. Each calibration will be documented in the field sampling log book.

Field sampling QC is discussed more completely in Section 6.0 of this SAP.

NEESA LEVEL C

NEESA Level C is the equivalent to EPA DQO 3. This involves a higher QC level than DQO 1. Level C protocols include the use of QA/QC samples. The use of laboratory QC will assure quality data.

3.1 LABORATORY METHODS

The subcontract laboratory will perform all analyses using accepted EPA methodology.

3.2 QA/QC SAMPLES

OHM will obtain the following QA/QC samples to assure accuracy, precision, and representativeness of the analytical data.

3.2.1 Duplicate Samples

Duplicate samples are obtained to determine the degree of precision for sampling and analysis. The analytical results for the duplicate pair will be compared and the difference expressed as a relative percentage difference (RPD). A high level of precision is shown by a small RPD. The actual RPD should be within +/- 20%.

Field duplicate samples will be obtained for the WTS. One (1) influent and two (2) effluent samples will be obtained as duplicates.

All other samples will be obtained as laboratory QC samples. OHM will provide additional samples for the laboratory in order to perform duplicate analysis for 5% of the samples within each batch.

3.2.2 Matrix Spike Samples

Matrix spike samples are used in order to access the accuracy of sampling and analysis. A sample is "spiked" with a known concentration of analyte; the spiked sample is analyzed for the parameter(s) of interest. A percentage recovery is calculated upon subtracting the spike concentration, then obtaining the calculated analyte recovery by the sample concentration, and expressing the result as a percentage. The matrix spike (MS) recovery is compared to an acceptable range for each analyte. The data is accepted if the MS recovery is within the acceptable range.

Accuracy and precision can be assessed by the use of a MS duplicate (MSD) sample.

Both MS and MSD analysis are performed within the laboratory standard QA/QC protocols. MS/MSD analysis are performed on 5% of the samples in a batch. The results of MS/MSD analysis are included in the laboratory report.

3.2.3 Equipment Rinsate Samples

Rinsates consist of samples generated upon pouring analyte-free water over decontaminated sampling apparatus; the rinsate water is collected in the appropiate containers. The rinsate samples are analyzed for the parameters of interest. The analyticals should indicate that contamination is not transferred from other locations by the sampling apparatus; that is, cross-contamination does not occur. OHM will collect rinsate samples at a frequency of 5%, with a minimum of one (1) obtained per day, for all confirmatory, WTS, and sludge sampling.

3.2.4 Field Blank Samples

Field blank samples consist of analyte-free water contained in bottles within the lot used for sampling. Analysis of the water by the subcontract laboratory should indicate no levels of contamination are present due to the source water or the bottle. One (1) field blank will be submitted daily for each analytical parameter of interest.

3.3 DATA DELIVERABLES

Laboratory data will be reported in NEESA Level C deliverable format.

4.0 PROJECT ORGANIZATION

4.1 OHM FIELD ANALYTICAL SERVICES

OHM provides sampling services through the Northeast Region Field Analytical Services (FAS) Group. This group is capable of providing a quality sampling effort, from the initial site characterization, through the sampling event. A sample technician or field chemist will be assigned to collect samples. A senior project chemist and QC representative will review the data.

Sample Technician

An OHM sample technician or field chemist will perform all site sampling activities. OHM sample technicians are trained in the accurate and complete documentation of the sampling event, and are familiar with all sampling procedures for various matrices. OHM has two sample technicians who are based out of the Glen Allen, Virginia Divisional office, who will be utilized for this work. Additional personnel are available at the OHM Trenton, New Jersey Regional office.

Project Chemist

Bob Lynch will be the project chemist for this project. As project chemist, he will provide support for the sample technician. This may be in the form of technical assistance, or for the procurement of sampling materials required.

The sample technician consults with the project chemist, as needed, for assistance with sampling protocols. The project chemist serves as the liaison between the project manager, the sample technician, and the laboratory.

Senior Project Chemist

Ron Kenyon is the senior project chemist and the QC manager of the FAS group. He is routinely in communication, often on a daily basis, with the on-site sample technician and project chemist.

4.2 PROJECT MANAGEMENT

Site Supervisor

All on-site activities are coordinated by the OHM site supervisor. The sample technician will coordinate and communicate all sampling efforts with the site supervisor.

Project Manager

Gary Shirley is the project manager and will serve to coordinate all project related decisions. The project chemist acts as a liaison between the laboratory and the project manager. The project manager will be consulted immediately if any sampling and analysis problems occur, and will be involved in the decision regarding corrective action to be taken.

QC Officer

The project chemist or senior project chemist will act as the QC officer. Responsibilities include:

- Review of all sampling documentation, to include chain-of-custody forms.
- Communication with laboratory to assure proper laboratory procedures and QC protocols are adhered to.

5.0 FIELD SAMPLING PROCEDURES

The OHM sample technician (or field chemist) will perform all site sampling. The sample technician will don a clean pair of sample gloves, which will be changed between sample points, in order to assure that no cross-contamination occurs.

Sampling of the SWMU #45 Site will be performed using the following procedures.

5.1 PRE-MOBILIZATION SAMPLING

The pre-mobilization sampling event will include the two USTs and three cooling lines (two intake and one outlet). Each of the above will be individually sampled from top to bottom, capturing all phases present (product, water layer, sludge, and solids). A full RCRA/TSCA waste characterization will be performed on all sampled layers with analytical results available prior to project commencement.

Access to the recessed sample points (below grade) will be accomplished via rope ladders with safety harness for sample technician.

5.1.1 UST Sampling

The USTs have been described as product-free (organics at surface). However, if free product is discovered at the surface, it will be sampled and analyzed for full RCRA/TSCA characteristics. The main phases, water and sludge, will be sampled, preserved, and analyzed as per the following sections.

5.1.1.1 Water Phase

Each UST will be discreetly sampled from the two available manways, forming one composite sample for each UST. An eight foot coliwasa will be lowered to a predetermined depth (to avoid sludge contamination), providing two water column samples for each UST to be consolidated into one sample for full RCRA/TSCA waste characterization.

5.1.1.2 Sludge Phase

The depth of sludge within the USTs, estimated at six inches, presents a minor sampling technique problem. OHM will utilize a dual sampling approach to insure a representative sample is obtained. The preferred approach will be vacuuming the sludge via a controlled pump with thick wall poly tubing. As with the water above, the sludge will be sampled from both manways and composited into one sample for each UST. An Eckmann dredge will be on-site for backup purposes. The composited sample will be analyzed for full RCRA/TSCA waste characteristics.

5.1.2 Cooling Line(s) Sampling

The cooling lines (two intake, one outlet) will be discreetly sampled and analyzed for each phase (product, water, and sludge/solid) as per the three sections below, and Section 7.0.

The intake cooling lines (two lines) span a distance of 600 feet with 14 manways to sample from. Free product visually exists in one manway, with others to be determined. OHM intends to discreetly sample each intake line, forming a composite sample of free product, water, and sludge (three discreet samples for each intake line) from the 14 manways for full RCRA/TSCA waste characterization.

The cooling line, currently with two sampling access points, spans a distance of approximately 450 feet for this project. The three phases (free product, water, and sludge) will be discreetly sampled at both locations, producing three samples for full RCRA/TSCA waste characterization.

5.1.2.1 Free Product Phase

When visually detected, free product will be discreetly skimmed from the surface of each of the cooling lines, producing one sample for each line for full RCRA/TSCA waste characterization.

5.1.2.2 Water Phase

The water phase of each of the three cooling lines will be discreetly sampled from the available access manways, producing three water samples for full RCRA/TSCA waste characterization. OHM will utilize a four foot coliwasa to insure a representative water column sample is retrieved.

5.1.2.3 Sludge/Solid Phase

The sludge phase of each of the three cooling lines will be discreetly sampled from the available access manways, producing three sludge samples for full RCRA/TSCA waste characterization. OHM will utilize one of three devices to insure a representative sample is retrieved. The controlled pump and Eckmann dredge, as formerly discussed, will be available. In addition, a modified scraping dredge, currently in production, will be used when required.

5.2 PU SAMPLING

Sampling of the PU involves influent sampling at 10 hour intervals, and daily effluent composite sampling.

5.2.1 Influent Sampling

Sampling for volatile organics compounds (VOCs) will occur by direct sampling of the influent pool. A sample bottle will be immersed into the pool. The water will be transferred to three 40-ml vials (which have four drops of concentrated HCl preservative previously added), with no allowance for headspace. The vials will be capped immediately.

All other sampling will occur at the influent port. VOC sampling will not occur at the influent port, in order to minimize turbulance, which would reduce the level of volatiles in the sample.

Influent samples will be obtained in the proper containers with the proper preservation, as indicated in Figure 6.1.

5.2.2 Effluent Sampling

Effluent samples will be obtained by the use of a programmable ISCO water sampler. The ISCO sampler will be programmed to obtain 100-ml grab samples at hourly intervals. The grab samples will be obtained at the effluent sample port. The grab samples will be composited in a 2.5 gallon polyethylene container.

The composite effluent water will be transferred to the appropriate sample bottles (with preservative, as necessary), as indicated in Figure 6.1.

Samples for VOCs will not be composited. Effluent volatile samples will be obtained by direct sampling of the effluent tank. The effluent samples will be transferred to preserved (HCl) 40-ml vials, with no allowance for headspace.

Volatile samples will be obtained at 3-hour intervals. All eight (8) samples will be submitted to the analytical laboratory. The lab will randomly choose one of the samples for VOC analysis.

5.3 SLUDGE SAMPLING

Grab samples of the sludge will be obtained from the USTs and associated tunnels. One (1) grab sample will be obtained for every 100 cubic yards (CY) of sludge. Every five (5) grab samples will be composited. A total of ten (10) composite samples are anticipated for this removal action.

The sludge will be sampled by transfer of the sludge to the appropriate containers with a wooden tongue depressor or a disposable polypropylene scoop.

5.4 CONCRETE SAMPLING

Chip sampling of the concrete will be performed. A hammer and chisel will be used in order to excavate the concrete to a depth of 1/4-inch. The hammer and chisel will be decontaminated prior to use.

The concrete chips will be transferred to the appropriate containers. The chip samples will be composited as indicated:

- One (1) sample from each manhole in the USTs and tunnels (total 4 samples)
- Four (4) samples from the floor of each UST (total 8 samples)
- Four (4) samples from the roof of each UST (total 8 samples)
- Four (4) samples from the perimeter wall of each UST (total 8 samples)
- One (1) sample from each UST column (total 16 samples)
- One (1) sample from each Intake Manway at base Intake Tunnel (total 28 samples)
- One (1) sample from each manway and breach location of Outlet Tunnel (total 5 samples)

A total of 77 concrete samples will be obtained for both PCB and TPH analysis as described in section 7.0.

6.0 FIELD SAMPLING QUALITY CONTROL

All sampling and analysis will be performed with all applicable QA/QC procedures, as stipulated in EPA SW-846, *Test Methods for Evaluating Solid Waste*, Third Edition (as amended).

6.1 FIELD DOCUMENTATION

All pertinent sampling and field survey information will be recorded in a logbook to facilitate reconstruction of events that occurred during closure activities. Logs will be kept in a waterproof bound notebook with numbered pages. All entries will be printed in waterproof ink. No pages will be removed and corrections will be made by drawing a single line through the incorrect data and initializing and dating the correction that was made to the side of the error. Entries in the logbook will contain, at a minimum, the following information:

- Location of sampling point
- Name and address of field contact
- Type of waste (i.e., soil, wastewater, etc.)
- Number and volume of samples taken
- Purpose of sampling (i.e., closure activities)
- Description of sampling point and sampling methodology
- Date and time of collection
- Collector's sample identification number
- Sample distribution and how transported (i.e., name of laboratory, UPS, FedEx)
- References, such as maps, photographs or sketches of the sampling site
- Field observations
- Any field measurements made (PID readings)
- Signatures of personnel responsible for observations.

6.2 CHAIN OF CUSTODY PROCEDURES

6.2.1 Sample Labels

Each sample will be assigned a unique identification number, which will be marked on the sample container in waterproof ink. All samples will be clearly labeled to prevent misidentification in the field and at the laboratory. Sample labels will include the site name, sample number, name of collector, date and time of collection, and location of collection point. Labels will be printed clearly and legibly and provide enough information to enable cross reference with the analytical laboratory logbook.

6.2.2 Chain of Custody Forms

Chain of Custody records will be maintained by the contractor and included in the closure report. The original form will accompany the samples at all times after collection when the samples are not under the direct custody of field personnel. The samples are under custody of field personnel if: a) they are in the physical possession of the sampler; b) they are in view after being in possession; c) they are locked up or sealed securely to prevent tampering; or d) they are in a designated secure area. When sample possession is transferred, the individuals relinquishing and receiving will sign, date, and note the time on the chain of custody form. When samples are shipped, field personnel will note the method of shipment, courier name, and waybill number, if possible, in the "remarks" box on the form. A copy of the waybill, if available, will be attached to the chain

of custody form. The laboratory must return the completed form documenting receipt of the undisturbed sample. The contractor will keep a copy of the form shipped to the laboratory until the original is returned.

The chain of custody form will contain information to distinguish each sample from any other sample. Entries will be made in waterproof ink during sample collection. The chain of custody form will include the following information:

- Signature of the person performing the sampling.
- The project for which sampling is being conducted
- The matrix being sampled
- The sampling date and time
- The specific sampling location
- The method of sample collection, including preservation techniques (if any)
- Significant observations made during the sampling process

Figure 6.1 represents a typical "Chain of Custody Record" form.

6.2.3 Custody Seals

Custody seals will be placed over the cap of each sample container and the lids of shipping containers prior to the samples and containers leaving the custody of the shipping personnel. The custody seals will be preprinted adhesive-backed labels with perforations designed to break if the containers are opened. The custody seals will contain the following information:

- Sample number (identical to the sample number on the sample label)
- Name of collector
- Date and time of sampling
- Place of collection.

6.2.4 Sample Analysis Request Sheet

Sample analysis request sheet(s) will accompany the samples to the laboratory. The sample collector will complete the field portion of the form. All pertinent information recorded in the field logbook also will be included on the chain of custody/sample analysis request sheet. The laboratory portion of the form will be completed by laboratory personnel. The following information will be recorded:

- Name of person receiving the sample
- Laboratory sample number
- Date and time of sample receipt
- Sample Allocation
- Analyses to be performed.

All samples will be delivered to the laboratory as soon as practicable but always within one day of sampling. Samples will be maintained at 4°C.

FIGURE 6.1
CHAIN OF CUSTODY RECORD

OHM Remediation Services Corp.

LAB COPY

Form 0019
Field Technical Services
Rev. 08/89

152852

CHAIN-OF-CUSTODY RECORD

O.H. MATERIALS CORP. • P.O. BOX 551 • FINDLAY, OH 45839-0551 • 419-423-3526

PROJECT NAME	PROJECT LOCATION
PROJ. NO. / PROJECT CONTACT	PROJECT TELEPHONE NO.
CLIENT'S REPRESENTATIVE	PROJECT MANAGER/SUPERVISOR

ITEM NO.	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE DESCRIPTION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS)								REMARKS
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME	REMARKS
1						
2						
3						
4						SAMPLER'S SIGNATURE

6.3 DECONTAMINATION PROCEDURES

All non-disposable sampling equipment (augers, stainless steel trowels) will be decontaminated prior to, and between, sampling events by the following procedure:

- Detergent/tap water wash
- Distilled/de-ionized (DI) water rinse
- 10% nitric acid rinse
- DI water rinse
- Acetone rinse
- Air dry

Use of these procedures will ensure that material transfer between sampling points is minimized; that is, cross-contamination will not occur. This will be verified by the use of equipment rinsate samples.

TABLE 6.1
ANALYSIS OF ORGANIC AND INORGANIC COMPOUNDS USING USEPA SW-846 METHODOLOGIES FOR AQUEOUS, NON-AQUEOUS, AND WASTE SAMPLES

Parameter	Matrix	Sample Container(1)	Container Volume	Preservation(2)	Maximum Holding Time*
Volatile Organics	Concentrated Waste Samples	G, wide mouth, teflon liner	8 oz.	None	14 days
Volatile Organics - no residual Cl_2	Liquids	G vial, teflon lined septum cap	40 ml	4 drops conc. HCl, cool 4°C	14 days
Volatile Organics - for Acrolein and Acrylonitrile	Liquids	G vial, teflon lined septum cap	40 ml	Adjust to pH 4-5, cool 4°C	14 days
Volatile Organics	Soil/sludge/ solids	G, wide mouth, teflon liner	4 oz.	Cool 4°C	14 days
Extractable Organics	Waste Samples	G, wide mouth, teflon liner	8 oz.	Cool 4°C	14 days
Extractable Organics - residual Cl_2	Liquids	G, amber, w/teflon liner	1 gallon or 2½ gallon	Cool 4°C	Extraction - 7 days ---------- Analysis - 40 days from extraction
Extractable Organics - soils/sediments	Solids	G, wide mouth, teflon liner	8 oz.	Cool 4°C	14 days
Metals except Cr VI, and Hg	Waters	P	1000 ml	HNO_3 to pH<2	28 days
Hg (total)	Waters	G	400 ml	HNO_3 to pH<2	28 days
Metals	Soils	G	8 oz.	Cool 4°C	6 months
Cyanide, total and amenable to chlorination	Waters	P	1 liter or larger	Cool 4°C, 0.6 g ascorbic acid NaOH to pH>12	14 days
Cyanide - soils/sediments	Solids	G	8 oz.	Cool 4°C	28 days
TOX	Liquids/sludge	G vials, teflon lined, septum cap	250 ml	H_2S0_4 to pH<2 Cool to 4°C	7 days
TPH	Liquids	G	1,000 ml	Cool to 4°C	7 days
TPH	Sludge/solid	G	250 ml	Cool to 4°C	28 days
Oil and Grease	Liquids/sludge	G	1,000 ml	pH<2/HCl Cool to 4°C	28 days
PCBs	Liquids	G amber, teflon lined cap	1,000 ml	Cool to 4°C	Extraction w/in 5 days Analysis w/in 40 days from VSTR
PCBs	Sludge/solid	G amber, teflon lined cap	1,000 ml	Cool to 4°C	Extraction w/in 10 days Analysis w/in 40 days from VSTR
TSS	Liquids	G	100 ml	Cool to 4°C	7 days
BOD	Liquids	P or G	1,000 ml	Cool to 4°C	48 hours
COD	Liquids	P or G	500 ml	pH<2 w/H_2S0_4 Cool to 4°C	28 days

7.0 ANALYTICAL PROCEDURES

The analytical methods which pertain to the SWMU #45 Site include wastewater analysis and waste characterization of sludge and concrete. The following is a listing of all types of analysis required, and the EPA method for each analytical parameter.

TABLE 7.1 ANALYTICAL PARAMETERS	
ANALYTICAL PARAMETER	EPA METHOD
TCLP-volatiles	SW-846 1311/8240
TCLP-semi-volatiles	SW-846 1311/8270
TCLP-pesticides	SW-846 1311/8080
TCLP-metals	SW-846 1311/6010
Polychlorinated biphenyls (PCBs)	SW-846 8080
Corrosivity (pH)	SW-846 Part 2/Chap. 8.1
Ignitability (flash point)	SW-846 Part 2/Chap. 8.2
Reactivity (CN/S)	SW-846 Part 2/Chap. 8.3
Total petroleum hydrocarbons (TPH)	418.1[1]
Oil & grease	SW-846 9070
Total organic halides (TOX)	SW-846 9020
Volatile organic compounds	8240
Semi-volatile organic compounds	8270
Metals	6010
TSS[2]	160.2
Biological oxygen demand (BOD)[2]	40 CFR 136.3
Chemical oxygen demand (COD)[2]	40CFR136.3
Dissolved oxygen	40 CFR 136.3

(1) Method 418.1 will be performed only if in current-use by subcontracted laboratory. Method 8015 (mod.)/DRO may be used in lieu of 418.1.

(2) Effluent only

Table 7.2 summarizes total number of waste and wastewater samples collected during pre-mobe and wastewater treatment phases of the project and identifies different analytical requirements for each sample.

TABLE 7.2
TOTAL SAMPLES AND ANALYSIS REQUIREMENTS

	Full TCLP	React. Ign. Corr.	PCB 8080	TPH	Oil & Grease	Total Organic Halides	TSS/ BOD/ COD	Dissolved Oxygen	VOC	Semi-VOC	Pest/ PCB	Metals
Pre-Mobe Free Product Phase	5	5	5									
Pre-Mobe Water Phase	5	5	5									
Pre-Mobe Sludge Phase	5	5	5									
Concrete Chip			77	77								
WTS Influent[1]				40	40	40		40	40	40	40	40
WTS Effluent[1]				20	20	20	20	20	20	20	20	20
Sludge Removal	10	10	10	10	10	10						

(1) Quantities include field duplicates and rinsates, at 5% each.

8.0 LABORATORY QUALITY CONTROL

Quality control related to the acquisition of the chemical data has two main elements once the samples arrive at the laboratories. The first involves the documented handling of the samples as they are processed through the laboratory. The second area involves the project requirements for the method specified quality control. These two elements are discussed separately in the following two sections.

8.1 SAMPLE HANDLING IN THE LABORATORY

The proper handling begins with the document receipt by the laboratory of the samples from the field team. After signing the chain-of-custody, the sample receipt personnel will inspect the shipping containers and samples and document the condition in which the samples were received, especially noting any deficiencies in the "Remarks" box of the Chain-of-Custody Form and the sample log book.

Following the initial receiving tasks, the samples will be logged into a hardbound handwritten notebook and the computer data system. The data system generated work requests will be reviewed for accuracy and will be placed in the proper file.

In general, the receiving laboratory's sample custodian will:

- Examine the integrity of the shipping cooler and inner shipping containers, determine if the proper temperature has been maintained during shipment and verify the completeness of the chain of custody. If samples have been damaged during shipment, the remaining samples will be carefully examined to determine whether they were affected. Any samples affected shall also be considered damaged. It will be noted on the Analysis Request and Chain-of-Custody Record that specific samples were damaged and that the samples were removed from the sampling program. Field personnel will be notified as soon as possible that samples were damaged and that they must be resampled, or the testing program changed, and an estimate of the cause of damage.

- Compare samples received against those listed on the Chain-of-Custody Record.

- Verify that sample holding times have not been exceeded.

- Sign and date the Analysis Request and Chain-of-Custody Record and attach the waybill to it.

- Denote the samples in the laboratory sample log-in book with contains the following information:

  - Project identification number
  - Sample numbers
  - Type of samples
  - Date received in laboratory
  - Record of the verified time of sample receipt (VTSR)
  - Date put into storage after analysis is completed
  - Date of and disposition of sample disposal.

  The last two item will be added to the log when the action is taken.

- Notify the laboratory project manager of sample arrival.

- Place the completed Analysis Request and Chain-of-Custody Records in the project file.

Holding times for the samples associated with this project will begin at the time of sample collection.

8.2 LABORATORY SAMPLE STORAGE

The primary considerations for sample storage are:

- Maintenance of prescribed temperature, if required, which is typically 4 degrees Celsius
- Extracting and/or analyzing samples within the prescribed holding time for the parameters of interest

The requirements for temperatures and holding times will be followed. Placing of samples in the proper storage environment is the responsibility of the Sample Custodian, or designee, who will notify the Laboratory Group/Team Leaders, or designated representative, if there are any samples which must be analyzed immediately because of holding-time requirements.

8.3 METHOD SPECIFIC QUALITY CONTROL

The methods of analysis are the standard methods that will be followed without deviation. The analytical methods have quality control requirements and/or recommendations and the laboratory will meet or exceed all method quality control as specified by the method. This includes calibration procedures and frequency (including the GC/MS tune date), laboratory quality control checks (internal standards and surrogate spike recoveries), detection limits, corrective actions and reporting.

8.4 DATA QUALITY EVALUATION

The data quality evaluation that will be completed at the laboratory will be a combination of contract compliance review and limited data evaluation. All data generated will be reviewed to ensure that they meet the written requirements. This review will be based on comparison of the information generated by the Laboratory with the written requirements of the Sampling and Analytical Plan for the project. The second portion of this process which deals more with data evaluation will involve review of the quality control results and preparation of a summary report qualifying the data. Review will include all quality control parameters such as holding times, detection limits, method blanks, surrogate recoveries, matrix spikes, matrix spike duplicates, interference check sample result, internal standard data, GC/MS tune data and the initial and continuing calibration data. The data evaluation summary is intended to provide a qualitative judgment of the overall integrity and usefulness of the data.

8.5 CORRECTIVE ACTION

Corrective Action is required if:

1. Any QC data is outside of the acceptable precision and/or accuracy
2. Blanks or laboratory control samples contain contaminants above acceptable limit
3. Undesirable trends are detected in spike or surrogate recoveries or RPD between duplicates
4. There are unusual changes in method detection limits

5. Deficiencies are detected by the QA department during internal or external audits or from the results of performance evaluation samples

6. Inquiries concerning data quality are received from the Contracting Officer

8.5.1 Corrective Action Procedures

Corrective actions/procedures for out of control events in the following areas shall be found in the contract laboratory's Quality Assurance Plan. The laboratory QA/QC plan will include standard operating procedures for:

1. Incoming samples
2. Sample holding times
3. Instrument calibrations
4. Practical quantitation limits
5. Method QC
6. Calculation errors
7. On-site audits

9.0 DATA REDUCTION, VALIDATION, AND REPORTING

9.1 DATA REDUCTION AND TABULATION

Data generated from the site activities can be grouped into two broad categories:

- Field data, such as data collected during VOC/PID screening; and
- Chemical data for environmental samples generated by the project laboratory and accompanying QA/QC data package deliverables as required for DQO Level II and Level III;

These data will be compiled and managed using a central project filing system. The field and laboratory data filing system will be a manual storage system established at the Contractor's field office at the Site. Field and laboratory data will be filed chronologically. Field log books, sample logs, sample data sheets, chain-of-custody records, laboratory log books, and laboratory calculation sheets will be labeled with a task number and date.

Chemical data will be stored in a spread-sheet based system (e.g., LOTUS 123, EXCEL), with separate files maintained according to sample medium and validation status. The project laboratory will provide the Project Coordinator with computer diskette files containing the analytical data.

9.2 GENERAL PROCEDURES FOR DATA REVIEW/VALIDATION

9.2.1 Level I Data

Level I data (e.g., screening for VOCs) will be validated by reviewing calibration and maintenance records for field instruments and field logbook information associated with individual data sets to ensure that appropriate SOPs were followed. Data validation, therefore, will be qualitative, and will focus on whether field screening data are of acceptable quality based upon supporting documentation. Acceptance or rejection of data will be determined by the judgement of experienced field personnel familiar with the SOPs.

9.2.2 Level II Data

Level II data will undergo qualitative and semi-quantitative review based on the standards or performance of the equipment in use. Acceptance or rejection of Level II data will be based on the judgement of qualified personnel. Level II review would include activities similar to Level I, i.e., review of instrument calibration concentrations.

9.2.3 Level III Data

Generation of the Level III data will include the analysis of QA/QC samples, including blanks, calibration and reference standards, and possibly spiked samples in some instances. Items that will be reviewed to validate the data include:

1. Integrity and completeness of the data package,
2. Holding times from sample receipt at the laboratory to sample extraction and analysis or holding times from sample receipt to analysis, as appropriate,
3. Trip blank and laboratory method blank sample results,
4. Matrix spike, matrix spike duplicate, and replicate analyses,

5. Surrogate recoveries,
6. Field blank sample results, and
7. Field duplicate results.

Data validation will be a qualitative process. Review of precision, accuracy, representativeness, completeness and comparability criteria will be included whenever measurement data are reviewed. The analytical laboratory will provide numerical precision and accuracy data that will be compared to the acceptance criteria. Precision and accuracy values for project data sets that are within the ranges for the type of sample and analytical method used will be considered acceptable. In some cases, data of apparently poor precision and/or accuracy may be somewhat useful. The judgement to accept such data, with appropriate qualifications, will be made by a data validator with appropriate technical expertise.

9.3 DATA REPORTING

The project laboratory will report the data in a certificate of analysis format, except for analyses requiring NEESA Level C deliverables. NEESA Level C deliverables are summarized in Table 9.1. Sample analytical results and accompanying QA/QC sample results will be reported to the Project Coordinator on computer diskette files suitable for transfer to the spreadsheet data base.

Analytical data will be identified according to the project laboratory's procedures for establishing sample lots, so that sample analysis data can be matched to corresponding QA/QC samples, control charts, and calibration data.

9.4 PROJECT TECHNICAL AND PEER REVIEWS

Project documents and deliverables will be reviewed by designated project personnel prior to submittal to the U.S. Department of the Navy QA/QC office. The review shall address whether:

- The report satisfies the scope of work.
- Assumptions are clearly stated, justified, and documented.
- References are cited for information utilized in report preparation that originated outside the document.
- The report correctly and accurately presents the results obtained by the project work.
- The tables and figures presented in the report are prepared, checked, and approved according to project QA/QC protocol.
- The figures presented in the report are dated and carry the initials of the appropriate project personnel and Contractor's Project Manager.
- The basis for recommendations and conclusions presented in the report are clearly documented.
- The report has been reviewed for correct punctuation, grammar, capitalization, and spelling.

Completion of technical and QA/QC reviews will be documented by the signature or initials of the reviewer.

In addition to technical and peer review of documents, project review meetings will be scheduled periodically by the Contractor's Project Manager. The intent of these project reviews is to assure scope compliance and overall technical quality of the contracted services. Project reviews may be scheduled for key junctures in the project schedule that precede deliverables, such as initial scoping meetings, prior to finalization of work plans, immediately following completion of field programs, or during development of conclusions and recommendations. Documentation of the project review, especially regarding identified action items and their follow-up, is essential to maximizing the utility of these reviews.

TABLE 9.1
NEESA LEVEL C DATA DELIVERIES

Parameter	Method Requirements	Deliverables
Organics	Method blank spikes with results and control charts. Run with each batch of samples processed.	Control chart
	Results to be reported on CLP Form 1 or spreadsheet per Sect. 9. Sample results using CLP data flags.	Form 1 or Sect. 9 1/Sample chromatograms/ and mass spectra
	Surrogate recovery from samples reported on CLP Form 2. Surrogates to be used in volatiles, semivolatiles, pesticides/ PCB. For volatiles by GC, the names of surrogates should be changed to reflect the surrogate used.	Form 2
	Matrix spike/spike duplicate -1 spike and spike duplicate per 20 samples of similar matrix reported on Form 2.	Form 3
	Method blank reported on CLP Form 4.	Form 4 or Sect. 9
	For volatiles by GC, a similar format will be used as CLP Form 4 for blanks.	
	GC/MS tuning for volatiles/semi-volatiles. Report results on Form 5.	Form 5
	Initial calibration data reported on Form 6.	Form 6
	For volatiles by GC, the initial calibration data with response factors must be reported.	No Form
	For pesticide/PCB data Form 9 must be used for calibration data.	Form 9
	Continuing calibration GC/MS data reported on Form 7.	Form 7
	For volatiles GC data, the response factors and their percent differences from the initial must be reported.	No Form
	Internal Standard Area for Volatiles and Semivolatiles.	Form 8
	For pesticides/PCB data, the CLP Form 9 must be presented.	Form 9
	No chromatograms or mass spectra are presented for calibration. These data should be filed in the laboratory and available if problems arise in reviewing/validating the data. The calibration information should be available for checking during on-site audits.	
	Internal standard are for GC/MS analyses CLP Form VIII shall be supplied.	Form VIII
	Second column confirmation shall be done for all GC work when compounds are detected above reporting limits. Chromatograms of confirmation must be provided.	Chromatograms

TABLE 9.1
NEESA LEVEL C DATA DELIVERIES

Parameter	Method Requirements	Deliverables
Metals	Sample results with CLP flagging system.	CLP Form 1 or Sect. 9
	Initial and continuing calibration.	CLP Form 2, Part 1 only
	Blanks 10% frequency.	Form 3
	Method blank taken through digestion (1/20 samples of same matrix).	Form 3 or Sect. 9
	ICP interference check sample.	Form 4
	Matrix spike recovery (1 per 20 samples of similar matrix).	Form 5, Part 1
	Postdigestion spike sample recovery for ICP metals. Only done if predigest spike recovery exceed CLP limits.	Form 5, Part 2 (never used for GFAA work)
	Postdigest spike for GFAA.	Recovery will be noted on raw data
	Duplicates (1 per 20 samples will be split and digested as separate.	Form 6 samples
	Method blank spike information will be plotted on control chart, one per batch of samples processed.	Control chart
	Standard addition. The decision process outlined in CLP page E-3 will be used to determine when standard additions are required.	Form 8
	Holding times.	Form 1
Wet Chemistry	Blank spike/1 batch.	Control chart
	Method Blank 1/batch.	Report result No format
	Sample results.	Report result No format
	Matrix spike/spike duplicate or calibration information.	Report result if applicable
	Calibration check- report percent RSD or percent difference from initial calibration.	No format

APPENDIX III
EROSION AND SEDIMENT CONTROL PLAN

FINAL
EROSION AND SEDIMENT CONTROL PLAN
FOR
TANK CLOSURE, SWMU #45 AT
U.S. NAVAL STATION,
ROOSEVELT ROADS, PUERTO RICO

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0090

Prepared by:

OHM Remediation Services Corp.
Trenton, New Jersey

Reviewed by:

Gary Shirley
Project Manager

John P. Franz, P.E.
Program Manager

May 15, 1996
OHM Project 17780ESCP

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION 1

2.0 GROUND DISTURBING ACTIVITIES 1

3.0 EROSION AND SEDIMENT CONTROL MEASURES 1

3.1 SILT FENCE 2
3.2 TEMPORARY SEEDING 2
3.3 DUST CONTROL 2
3.4 CONSTRUCTION ENTRANCES .....

4.0 SEEDING AND MULCHING 2

4.1 SEEDBED PREPARATION 2
4.2 SEED MIXTURE 2
4.3 FERTILIZER AND LIME 3
4.4 MULCH AND WATER 3

5.0 DEMOBILIZATION 3

EROSION AND SEDIMENT CONTROL PLAN

Erosion and sediment control will consist of temporary and permanent measures to prevent the pollution of air, water, and land both within and outside of project limits. Installation of temporary erosion controls will be coordinated with permanent site restoration to provide continuous control of erosion.

OHM will comply with the erosion and sediment control measures provided in the plans and specifications for the delivery order. In particular, reference will be made to the erosion and sediment control specification (Section 01561) when ordering materials and installing erosion and sediment controls.

1.0 PROJECT DESCRIPTION

The project generally consists of the following remedial activities:

- Sealing of cooling water intake tunnels near Puerca Bay and at Building No. 38 (power plant)
- Sealing of the cooling water discharge tunnel at three locations between the power plant and near Building No. 1936 (boiler house)
- Removing liquid and sludge from USTs and cooling water tunnels
- Liquid treatment on site with disposal at the Forrestal Sewage Treatment Plant
- Disposal of contaminated sludge at a permitted facility
- Backfilling the USTs and sealing manway entrances
- Erosion control and permanent site restoration

2.0 GROUND DISTURBING ACTIVITIES

The scope of work for this delivery order requires that OHM excavate cooling water intake and discharge tunnels at specific locations in the general vicinity of the power plant. Excavation of cooling water tunnels and stockpiling of excavation spoils will take place at the following locations:

- Intake tunnel immediately northeast of the power plant
- Discharge tunnel immediately southeast of the power plant
- Discharge tunnel immediately north of the boiler house
- Discharge tunnel prior to the former incinerator building

3.0 EROSION AND SEDIMENT CONTROL MEASURES

This section described the various temporary erosion and sediment controls that will be implemented in conjunction with ground disturbing activities at the site. All controls will comply with project specifications as well as Federal, Commonwealth, and local requirements. Prior to installation of erosion and sediment controls, OHM will field stake areas to be disturbed for inspection by the NTR. Upon approval by the NTR, OHM will first proceed with the installation of erosion and sediment controls at the anticipated downgradient limits of ground disturbance and at the perimeter of proposed soil stockpile areas. Ground disturbance, including grubbing of vegetation, will be initiated only upon completing installation of sediment and erosion control measures.

OHM will inspect the erosion and sediment controls on a daily basis and after each significant precipitation event. OHM will maintain the controls during the course of work. Accumulated sediment will be removed, and the devices repaired as necessary immediately following each storm event.

3.1 Silt Fence

Silt fence will be installed at the perimeter of soil stockpiles and downgradient of all disturbed areas where the potential for soil erosion and sedimentation exists. Materials and installation methods for the silt fence will comply with the erosion and sediment control specification for silt fence.

3.2 Temporary Seeding

Seed, mulch, and fertilizer will be applied within 48 hours to disturbed ground surfaces that may require additional construction activity. Circumstances under which temporary seed will be applied include:

- Grading operations that are discontinued for 30 days or more
- On cut and fill slopes where activity is discontinued for an extended period
- Where permanent restoration is not possible without further disturbance from site activities
- Where the potential for erosion exists, or where erosion has taken place
- On erosion control devices composed of soil

A Commonwealth-certified Bermuda grass seed of the latest growing season will be used at a rate of 100 pounds per acre as indicated in the specifications. In addition, fertilizer will be applied at a rate of 1,000 pounds per acre, and mulch will be applied at 1.5 tons per acre, followed by crimping with a disc.

3.3 Dust Control

A clean water supply will be established prior to earth disturbing activities to allow suppression of dust that may be generated during excavation, stockpiling of soil, or tracking of equipment. In addition, OHM will make available any pumps, suction and discharge hoses, and plastic storage tanks that may be required for dust suppression until the site is permanently restored. Approved dust suppression agents will be used when necessary at rates prescribed in the specifications.

3.4 Construction Entrances

Due to existing site conditions, additional gravel requirements are unecessary.

4.0 SEEDING AND MULCHING

This section describes permanent restoration measures to be performed at all disturbed areas. Permanent restoration will include fertilizer, seed, and mulch application in disturbed areas, as described in the specifications, immediately upon attaining final grade.

4.1 Seedbed Preparation

OHM will scarify the existing subgrade, and then place approximately 4 inches of topsoil over both newly graded areas as well as areas disturbed by construction activities. Stripped topsoil will be reused as necessary before procuring additional topsoil.

4.2 Seed Mixture

Seed matching existing vegetation will be applied at a rate of 5 pounds per 1,000 square feet.

4.3 Fertilizer and Lime

Fertilizer, designated as CID A-A-1909, Type I, Class 2, 10-10-10 analysis, will be applied at rate of 25 pounds per 1,000 square feet. Commercial, agricultural limestone, designated as 94-80-14 analysis, will be applied at a rate of 70 pounds per 1,000 square feet.

4.4 Mulch and Water

Mulch and water will be provided as necessary to establish an acceptable stand of grass cover.

5.0 DEMOBILIZATION

Upon completion of all site work, OHM will remove erosion control devices as directed by the NTR. Locations where devices are removed will be regraded and permanently restored as necessary to match surrounding areas.

APPENDIX IV
QUALITY CONTROL PLAN

FINAL
QUALITY CONTROL PLAN
FOR
TANK CLOSURE, SWMU #45 AT
U.S. NAVAL STATION,
ROOSEVELT ROADS, PUERTO RICO

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0090

Prepared by:

OHM Remediation Services Corp.
Trenton, New Jersey

Michael I. Gilman
Program QC Manager

Reviewed by:

Gary Shirley
Project Manager

John Franz
Program Manager

May 15, 1996
OHM Project 17780QC

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

TABLE OF CONTENTS

1.0 STATEMENT OF QC PROGRAM 1-1

2.0 PROGRAM ORGANIZATION AND PERSONNEL RESPONSIBILITIES 2-1

2.1 PROGRAM MANAGER, JOHN FRANZ, P.E. 2-1
2.2 PROJECT MANAGER, GARY SHIRLEY 2-2
2.3 SITE SUPERVISOR, STANFORD GABLE 2-2
2.4 PROGRAM QC MANAGER, MICHAEL I. GILMAN 2-2
2.5 SITE QUALITY CONTROL MANAGER, STANFORD GABLE 2-2

3.0 METHODS OF INSPECTION 3-1

4.0 SAMPLING PROCEDURES 4-1

5.0 FIELD VERIFICATION TESTING 5-1

5.1 GENERAL REQUIREMENTS 5-1
5.2 FIELD TESTING 5-1

6.0 INSPECTION AND TESTING DOCUMENTATION 6-1

6.1 DAILY RECORDS 6-1
6.2 PERFORMANCE DOCUMENTATION 6-1
6.3 AS-BUILT DOCUMENTATION 6-2
6.4 SUBMITTAL REGISTER 6-2

7.0 MEETINGS/COORDINATION 7-1

7.1 COORDINATION AND MUTUAL UNDERSTANDING MEETING 7-1
7.2 QC MEETINGS 7-1

ATTACHMENT A - PROFESSIONAL PROFILES
ATTACHMENT B - INSPECTION SCHEDULE
ATTACHMENT C - DOCUMENTATION FORMS
ATTACHMENT D - SUBMITTAL REGISTER

LIST OF FIGURES

FIGURE 1 QC ORGANIZATION CHART

1.0 STATEMENT OF QC PROGRAM

OHM Remediation Services Corp. (OHM), a subsidiary of OHM Corporation, will provide and maintain an effective Contractor Quality Control (CQC) Program as required by contract clauses. This program will be performed in conjunction with the Program Quality Control Plan (OHM, 1994) as applicable and in accordance with the requirements of Contract No. N62470-93-D-3032, Atlantic Division, Naval Facilities Engineering Command, dated August 1993. OHM will perform the inspections and tests required to ensure that materials, workmanship, and construction conform to the drawings, specifications, and contract requirements. OHM will perform the test or inspection specified, unless the required inspection and/or test is specifically designated to be performed by the Government.

2.0 PROGRAM ORGANIZATION AND PERSONNEL RESPONSIBILITIES

OHM will implement the CQC Program by establishing a QC organization which works directly with the Navy's on-site representative and reports to the OHM Program QC Manager. The QC organization will consist of not less than one full-time QC person who will be at the site while work is in progress to verify compliance with the contract requirements. The QC organization will be supplemented by additional QC personnel as may be necessary. OHM recognizes that the Navy Technical Representative (NTR) reserves the right to replace a member of the QC staff who, in the opinion of the NTR, is not accomplishing their assigned duties.

The CQC Program includes an inspection schedule, which will be available for review prior to the start of construction and throughout the life of the project. The inspection and testing processes will monitor the overall quality of work, and project controls will be instituted to assure correction of deficiencies identified during the inspections and testing. Project scheduling will be instituted to assure proper sequence and performance of work activities.

The NTR will be notified in writing prior to proposed changes to the CQC Program, and the proposed changes will be subject to the NTR's approval prior to implementation.

OHM's QC organization chart for Delivery Order 0090 is included as Figure 1. Professional profiles of OHM's delivery order specific project team and QC team are provided in the attachment to this plan. Professional profiles of OHM's Program Management team are provided in the Program QC Plan. The responsibilities of each person identified in the QC organization are presented below.

2.1 PROGRAM MANAGER, JOHN FRANZ, P.E.

The program manager has ultimate responsibility for QC of project deliverables. Specific responsibilities includes:

- Reviewing all deliverables prior to submittal to Atlantic Division, Naval Facilities Engineering Command
- Communicating with the OHM project manager to ensure project schedule and scope compliance
- Communicating with contracting officer (CO), contracting officer's technical representative (COTR), and/or NTR on a regular basis to review project progress and contract compliance
- Reviewing program QC procedures
- Providing cost accounting updates to verify project is within budget.

2.2 PROJECT MANAGER, GARY SHIRLEY

The project manager is responsible for:

- Providing deliverables which are both responsive and on schedule
- Reviewing all project activities including, but not limited to, sampling, remediation, decontamination, documentation, chain-of-custody procedures, site rules and compliance, and compliance with the OHM site-specific health and safety plan and the work plan
- Monitoring project progress to ensure schedule and budget maintenance
- Ensure CQC program is being performed.

2.3 SITE SUPERVISOR, STANFORD GABLE

The site supervisor is responsible for day-to-day on-site activities. He communicates with the project manager to update him on project progress and QC activities.

2.4 PROGRAM QC MANAGER, MICHAEL I. GILMAN

The program QC Manager is responsible for delivery order quality and, for this delivery order, will provide support to the project Manager on an as-needed basis. If an independent site audit were to take place during site activities, the program QC Manager would perform the audit. The program QC Manager will oversee work performed by the site QC Manager. The QC Manager will also monitor the correction of any nonconforming work. He will be responsible for reviewing the laboratory QC program to ensure its conformance with the contract program requirements.

2.5 SITE QUALITY CONTROL MANAGER, STANFORD GABLE

The responsibilities of the site QC Manager will include:

- Perform, or cause to be performed, daily inspections and tests of the scope and characters necessary to achieve the quality of construction outlined in the plans and specifications for work under the contract.
- Maintain the latest applicable drawings and specifications with amendments and/or approved modifications at the job site and assure that they are used for shop drawings, fabrication, construction, inspections, and testing.
- Maintain marked-up drawings at the site depicting as-built conditions. The drawings will be available for review by the NTR at all times.
- Maintain the delivery order submittal register (see Section 6.4 of this plan) for the duration of the contract. A review of the register will be performed at least every 14 days in conjunction with the scheduled dates on the register and in relation to the actual work status. Appropriate actions will be undertaken should slippages or other changes so necessitate.

- Review shop drawings and/or other submittals for compliance with the contract requirements prior to their transmission to the Navy.
- Authorization to temporarily shut down a portion of work if work practices or procedures are determined to be incorrect or out of compliance with the specifications.
- Authorization to stop a work task or series of tasks after consultation with the site supervisor and NTR in the event that severe weather conditions interfere with quality of work.
- Responsible for testing construction and backfill materials for compliance with specifications and authorized to reject materials to be used if they are not in compliance.
- Establish and maintain a Rework Items List program and a tracking and/or suspense system to monitor and assure inspection and testing activities and frequencies are in accordance with the contract requirements. This list will be submitted on a monthly basis.
- Attend and assist the Government at the prefinal inspection and final acceptance inspection.
- Assist in preparing Contractor Production Report.
- Prepare and submit daily Contractor QC Report.
- Prepare, maintain, and continually update the Construction Testing Plan and Log for the field activities.
- Conduct and document QC meetings on site.

3.0 METHODS OF INSPECTION

A three-phase control system will be implemented for each major work task and will include preparatory, progress, and follow up inspections. The QC Manager will assure that no work proceeds until the appropriate inspections have been performed. In addition to the three phase system, the Site QC Manager will also conduct receiving inspections for all materials arriving on site being incorporated into the project. An inspection schedule listing the expected major phases of work for which the inspections will be conducted is presented in Attachment B. In addition to, and independent of, the site QC Manager, the site safety officer (SSO) and site supervisor will implement this same control system as part of their normal duties/responsibilities. The inspection phases are discussed in the following paragraphs.

A preparatory inspection will be performed by the site QC Manager prior to beginning physical work. This will consist of a meeting attended by site QC Manager, site supervisor, and site foreman in charge of the relevant task. This meeting shall include a review of contract requirements, including relevant plans and specifications; a check to assure that all required submittals have been submitted and approved; a discussion of required testing and what constitutes acceptable work; a physical examination of material and equipment necessary to perform task; and a discussion of construction methods. The purpose of this phase of inspection is to establish exactly what is required in order to comply with the contract documents, making sure that the people in charge of performing the task understand these requirements, and to try and foresee and resolve any potential problems. The NTR will be notified a minimum of 24-hours prior to the beginning of the preparatory inspection.

A progress inspection will be performed by the site QC Manager as soon as a representative segment of the particular item of work has been accomplished. The progress inspection will include an examination of the quality of workmanship and a review of control testing results for compliance with contract requirements, use of defective or damaged materials, omissions, and dimensional requirements. The purpose of this phase of inspection is to ensure that the requirements outlined in the preparatory phase are being met. Should any additional requirements be necessary to ensure contract compliance, they will be identified in the progress inspection report. Progress inspections will be performed periodically throughout a task to ensure that work continues to meet the requirements of the contract documents.

Follow-up inspections will be performed by the site QC Manager after a task has been completed. The purpose of this phase of inspection is to ensure that the completed task has met all of the contract requirements, including any required testing. Should any rework items be identified at this stage, an additional follow-up inspection will be required. A satisfactory follow-up inspection indicates successful (contract compliance) completion of the task. The NTR will be notified a minimum of 24-hours prior to the beginning of the follow-up inspection.

Inspections will be documented and tracked by the site QC Manager, with copies of the inspection reports attached to the CQC Daily Report.

Receiving inspections will be conducted whenever material to be incorporated into the project arrives on site. These inspections shall consist of verifying that materials received match the purchase order and that the materials meet specifications. The materials received each day will be noted on the site supervisor's daily report which is attached to the QC daily report.

In addition to the inspections outlined above, special inspections or testing may be conducted in the event of an approved change or modification to work plans or field operations. The site QC Manager will

coordinate scheduling of special inspections with the Contracting Officer at the time when a change or modification in work operations has been approved.

It is OHM's responsibility to identify and correct deficiencies in the work. To ensure that defective work is corrected and not built upon, a Rework Items System will be implemented. Rework items identified in the work during any of the inspections or testing programs by a party to this contract will be corrected as soon as practicable and recorded by completing a Rework Items List. The list will be issued to the site supervisor and a copy attached to the inspection report. The site QC Manager will be responsible for documenting and tracking rework items, with a description of the deficiency, the action taken and date completed. The list will be updated accordingly. The form to be used for tracking is included in Attachment C.

In addition to site QC Manager directed inspections, standard inspections will be performed during the course of remediation to verify the quality of the final construction work. There will be visual inspections performed by the site supervisor, a qualified general foreman, or other appropriate personnel. These inspections are supplemental to the site QC inspections and are intended to enhance the QC inspections by identifying problem areas that may require more stringent QC inspection. In the event of a discrepancy between one of these visual inspections and the field verification test performed as per this document, the field verification test result will take precedence.

4.0 SAMPLING PROCEDURES

OHM sampling procedures will meet the requirements of the project scope of work. The sampling procedures as described in the Sampling and Analysis Plan shall be used for the control of field testing of various materials and processes.

5.0 FIELD VERIFICATION TESTING

The following requirements will be used by the OHM site QC Manager during the performance of his/her duties to verify compliance with the contract requirements. Additions or modifications to these requirements may be necessary to address changing circumstances. The responsibilities of the site QC Manager are fully described in Section 2.0 of this QC Plan.

5.1 GENERAL REQUIREMENTS

Verification of field testing requirements will be performed in accordance with this plan. OHM will witness/verify, on a sampling basis, the tests performed by the contractors/suppliers as required by the project installation specifications. Additional testing that may be required by the QC Manager of the project, such as specific field verification testing, will be performed in accordance with this plan. OHM will utilize testing agency (agencies), to be named later, for various types of field testing requirements. The testing laboratories used in the testing shall have a QA program acceptable for this project. The equipment/measurements used in testing shall be calibrated on regular intervals and all measurements shall be traceable to national bureau of standards. In the event that any single test fails to meet the specification requirements, a second test will be performed. Should the second test fail, the appropriate corrective action will be taken in the field. If the second test meets the specification requirements, then the corresponding verification test will be conducted. The results of that test will then be used to determine the acceptance or rejection of the construction task, or equipment/material being monitored.

5.2 FIELD TESTING

The site QC Manager will review the QC data to verify that testing requirements are being met, or to determine when defective material or work may require removal and/or reconstruction, and when additional testing may be required to confirm the quality of the material or work. The results of field tests, field inspections, receiving inspections, and surveys will be reviewed by the site QC Manager. The review will be made on a daily basis to prevent the construction of new work over defective material or work which is later found to be defective.

6.0 INSPECTION AND TESTING DOCUMENTATION

6.1 DAILY RECORDS

Daily records of inspections and tests performed for each shift or subcontractor operation will be signed by the site QC Manager and the original and one copy provided to the NTR no later than the next working day. Samples of reports and forms to be utilized are included in the Program QC Plan.

The site QC Manager will prepare a daily CQC report/production report which will include, as a minimum, the following:

- Project identification
- Data on weather and any delays attributable to such weather
- Number of personnel on site (OHM and subcontractors)
- A listing of construction equipment and indication of equipment usage on the report day
- Factual evidence that continuous QC inspections and tests have been performed. This includes, but is not limited to, the following data:
  - Type and number of inspections or tests performed
  - Results of inspections or tests including computations
  - Evaluation of test results--accept or reject work
  - Nature of defects, if present
  - Causes for rejection
  - Safety inspections/violations
  - Proposed remedial action
  - Corrective actions taken
- The records will cover both conforming and non-conforming work
- A statement that supplies and materials incorporated into the work are in full compliance with the requirements of the contract

6.2 PERFORMANCE DOCUMENTATION

Construction inspection personnel (site supervisor, foreman, and site QC Manager) will keep a daily log of project activities. Whenever possible, information will be recorded on a standardized form or in a bound field logbook. Documentation will include a daily log of construction activities; the appropriate field test, laboratory test, and survey data forms; photographs; and field collection and sampling custody forms. Copies of the daily logs will be sent to the site supervisor on a daily basis. After review of the logs, they will be routed to other members of the project team as needed.

As part of the remediation control activities, a photographic record is to be prepared. Photographs will be in color. As examples, photographs could be taken of field testing, sampling locations, remediation processes, and final constructed features.

Photographs are to be identified with the project number, date taken, and a brief description. This may be done individually on the back of the photographs or in an album in which the photographs are mounted. Album photographs must be provided with individual descriptions and dates taken.

Appropriate remediation control test, survey, and material installation data forms will also be prepared. All requested information will be addressed, including the location of the activity. If not applicable, requested information will be designated as such. Results of field and laboratory testing will be sent to the NTR, the project manager and site supervisor as soon as they become available.

Field construction verification records will be collected and maintained by the site supervisor until they are submitted to the project central file.

6.3 AS-BUILT DOCUMENTATION

All appropriate documentation will be retained in the project records system to provide documentation of how the remedial action was actually built. Final as-built drawings and specifications will be prepared utilizing this information and retained as a permanent record of the final location, dimensions, and orientation of the construction.

At contract closeout, record documents will be delivered to the NTR. A transmittal letter in duplicate accompanying the submittal will contain:

- Date
- Contract name and number
- Contractor's name, address, and telephone number
- Number and title of each record document
- Signature of contractor or his authorized representative.

6.4 SUBMITTAL REGISTER

The submittal register at the end of this section (Attachment D) has been generated based on the requirements set forth in each individual specification. This register will be maintained in the field office by the site QC Manager and will be available for review by the NTR.

7.0 MEETINGS/COORDINATION

7.1 COORDINATION AND MUTUAL UNDERSTANDING MEETING

After submission of the QC plan addendum and prior to the start of construction, OHM's project manager, program QC Manager, and site QC Manager will meet with the COTR and the NTR to discuss the QC program required by this delivery order. The purpose of this meeting is to develop a mutual understanding of the QC details, including forms to be used; administration of on-site and off-site work; and coordination of the OHM management, production, and the QC Manager's duties with the NTR. Minutes of the meeting will be prepared by the QC Manager and signed by both OHM and the COTR. This meeting may be combined with the pre-construction meeting.

7.2. QC MEETINGS

After the start of construction, the OHM site QC Manager will conduct QC meetings once every week or as required by the COTR/delivery order at the work site, or where specified, with the site supervisor, the foreman responsible for the upcoming work, and the NTR. The OHM site QC Manager will prepare the minutes of the meeting and provide a copy to the COTR within two working days after the meeting. The site QC Manager will notify the NTR at least 48 hours in advance of each meeting. As a minimum, the following will be accomplished at each meeting:

- Review the minutes of the previous meeting.
- Review the schedule and the status of work:
  - Work or testing accomplished since last meeting
  - Rework items identified since last meeting
  - Rework items completed since last meeting
- Review status of submittals:
  - Submittals reviewed and approved since last meeting
  - Submittals required in the near future
- Review work to be accomplished in the next week and documentation required. Schedule the three phases of control and testing:
  - Establish completion dates for rework items
  - Preparatory phases required
  - Initial phases required
  - Follow-up phases required
  - Testing required
  - Status of off-site work or testing
  - Documentation required.
- Resolve any QC concerns
- Address items that may require revising the QC plan (e.g., changes in procedures)
  - Changes in procedures.

ATTACHMENT A

PROFESSIONAL PROFILES

Project Manager's Resume

JOHN GARY SHIRLEY

Mr. Shirley joined OHM in 1995 with 11 years experience in remediation services. He has experience in international chemical waste management, including projects in Saudi Arabia, where he supervised the thermal destruction of the U.S. Military's Gulf War chemical waste. Mr. Shirley's experience also includes the successful start-up of three hazardous waste remedial groups, along with hands-on experience with government and commercial contracts. He was also responsible for the management of a chemical laboratory.

Experience

Solutions Laboratories, Inc. (1994-1995)

Environmental Manager - Bid and managed the following hazardous waste projects:

- Managed the sampling and analysis of unknown drums at the Defense General Supply Center in Richmond, VA.
- Managed the labpacking of hazardous waste chemicals at the Naval Surface Warfare Center in Dahlgren, VA.

J.G. Environmental Inc. (1992-1994)

General Manager -

- Managed the slurry bioremediation of an estimated 16,000 cubic yards of TPH contaminated soil at Ft. Story, VA. This project was completed in three months.
- Bid, won, and managed a $6.8 million, three year government contract at the Norfolk Naval Base in Portsmouth, VA. The contract involved remediation of hazardous and non-hazardous wastes.

Chemical Waste Management (1985-1992)

General Manager - Responsible for the successful start-up of three hazardous waste remedial groups (Buffalo, NY; Sealston, VA; and Columbus, OH) with gross revenues in excess of $25 million a year. Mr. Shirley bid, won, and managed numerous government and commercial contracts with an estimated value in excess of $100 million. The contracts consisted of both on-site treatment and off-site disposal. The federal contracts included:

- Norfolk Naval Base
- Norfolk/Portsmouth Naval Shipyard
- Picatinny Army Arsenal
- Dahlgren Naval Surface Warfare Center
- Puerto Rico Naval Base
- Ft. Meade
- Ft. Belvoir
- Aberdeen Proving Grounds (five year, $35 million)
- Philadelphia Naval Shipyard
- Bermuda Naval Base
- Mechanicsburg Army Depot
- Richmond Army Depot

Information herein is proprietary and confidential and to be used or released to others only with explicit written permission of OHM Remediation Services Corp.

Mr. Shirley supervised a total field staff of 35 professionals covering a five-state area. His other responsibilities included profit and loss of a $20 million budget; environmental and health and safety compliance; preparation, including costing, of all government and commercial solicitations; negotiator for all government/commercial projects; and final approval for health and safety plans for all remedial projects.

Mr. Shirley managed the following international projects:

- Supervised the thermal destruction of the U.S. Military's Gulf War chemical waste (estimated at eight million pounds of various chemicals) in Saudi Arabia.
- Supervised the transportation and disposal of the U.S. Navy's hazardous waste from Bermuda to the United States.
- Supervised the transportation and disposal of the U.S. Navy's hazardous waste from Puerto Rico to the United States.

Other projects for which Mr. Shirley was responsible include:

- Managed UST removal/replacement at various locations.
- Managed groundwater remediation using bioremediation at Ft. Story, VA.
- Managed Methyl Phosphonic Dichlorid nerve agent neutralization (Level A) at Aberdeen Proving Grounds.
- Managed PCB transformer remediation/disposal at various locations. Remediated/disposed in excess of 500 transformers.
- Managed lead abatement from firing ranges at various locations.
- Managed the sampling of unknown chemicals at various locations.
- Managed peroxide reactive chemical neutralization at Aberdeen Proving Grounds.
- Managed mercury spill cleanup (Level B) at Aberdeen Proving Grounds. Cleanup included the use of mercury coating and HEPA vacuum.
- Managed air/water monitoring at various locations.
- Managed labpacking of D, F, U, P, and K wastes at various locations.

Laidlaw Environmental (1981-1985)

Field Service Manager - Supervised 20 field professionals in the transportation and disposal of hazardous waste chemicals. Mr. Shirley also managed the field laboratory.

- Supervised asbestos abatement projects at various locations, including the Naval Surface Warfare Center in Dahlgren, VA.

Academic Background

B.S., Chemistry, George Mason University, 1973

Information herein is proprietary and confidential and to be used or released to others only with explicit written permission of OHM Remediation Services Corp.

Site Supervisor's Resume

STANFORD N. GABLE

Mr. Gable joined OHM in 1994, having 6 years previous experience in the hazardous waste remediation field. He is a qualified EPA response manager, and has supervised the completion of over 40 environmental remediation projects. His areas of expertise include soil remediation, building decontamination, and drum removal. He has considerable experience in project estimating and bid preparation, project cost control and administration, and the supervision of multi-disciplinary work crews in accordance with project scopes of work. He is proficient in the use of various types of sampling equipment including photo and flame ionization detectors, mercury vapor analyzers, explosimeters, aerosol and dust monitors. He is also trained in the completion of state hazardous waste manifests.

Experience

- Project supervisor on an $18 million remediation project in Hillside, New Jersey. The facility and approximately 4 acres of surrounding land were contaminated with high levels of PCBs and heavy metals. Mr. Gable's responsibilities included supervision of two crews, each crew consisting 15 persons in various labor categories. He was also responsible for project cost control and administration in accordance with bid specifications, and overall project oversight.

- Project supervisor for an illegal dump clean-up in Detroit, Michigan. The dump held several thousand drums containing various waste streams, including solvents, paints, and sludges which contained heavy metals and solid wastes. Mr. Gable's project responsibilities included supervision of remedial crew and sampling team, oversight of health and safety program, and coordination of the transportation and disposal of waste.

- Project supervisor on facility decontamination project for a major battery manufacturer in Tarrytown, New York. Mr. Gable supervised the decontamination of the facility, which was highly contaminated with lead and mercury, and the subsequent demolition of the facility upon completion of decontamination. He also supervised the work of the demolition subcontractor, and acted as health and safety officer during demolition phase.

- Project supervisor for a building decontamination project of a high-tech microchip manufacturing facility in Somerville, New Jersey. Mr. Gable supervised a multi-disciplinary field crew that cleaned the facility, which was contaminated with various acids, heavy metals, and solvents.

- Supervisor on a demolition project at an elevator manufacturing facility in Randolph, New Jersey. The facility was contaminated with various solvents and paints.

- Supervisor on a project involving the installation of groundwater and methane gas treatment system at a closed landfill in Cleveland, Ohio. Mr. Gable supervised the final phases of installing the system and bringing the system on line.

- Supervisor for a buried tank removal project in Trenton, New Jersey. Mr. Gable supervised the field crew in the removal, cutting, cleaning and disposal of three 10,000 gallon tanks that contained fuel oil

- Sampling program manager for a project involving the clean up of a PCB spill at the U.S. Capitol in Washington D.C. Mr. Gable supervised all aspects of the sampling plan, implemented the sampling QA/QC program, and controlled data evaluation.

- Served as a project estimator from January 1991 to August 1991. Mr. Gable's responsibilities as a project estimator included: preparing project cost estimates for labor, material, travel, equipment, etc., for site remediation proposals; keeping track of project costs as work was accomplished; advising and assisting project

Information herein is proprietary and confidential and to be used or released to others only with explicit written permission of OHM Remediation Services Corp.

managers in the preparation of proposals; seeking out other cost effective construction and remediation methods that could be used by the branch; and obtaining bids from various subcontractors and major material suppliers and evaluating bids, contractor reputations, quality, etc., before purchasing services or materials.

Specialized Training

40-Hour OSHA Training, 1988
8-Hour Refresher Training, 1995
8-Hour Supervisory Training, 1991

Information herein is proprietary and confidential and to be used or released to others only with explicit written permission of OHM Remediation Services Corp.

Site QC Manager's Resume

STANFORD N. GABLE

Mr. Gable joined OHM in 1994, having 6 years previous experience in the hazardous waste remediation field. He is a qualified EPA response manager, and has supervised the completion of over 40 environmental remediation projects. His areas of expertise include soil remediation, building decontamination, and drum removal. He has considerable experience in project estimating and bid preparation, project cost control and administration, and the supervision of multi-disciplinary work crews in accordance with project scopes of work. He is proficient in the use of various types of sampling equipment including photo and flame ionization detectors, mercury vapor analyzers, explosimeters, aerosol and dust monitors. He is also trained in the completion of state hazardous waste manifests.

Experience

- Project supervisor on an $18 million remediation project in Hillside, New Jersey. The facility and approximately 4 acres of surrounding land were contaminated with high levels of PCBs and heavy metals. Mr. Gable's responsibilities included supervision of two crews, each crew consisting 15 persons in various labor categories. He was also responsible for project cost control and administration in accordance with bid specifications, and overall project oversight.

- Project supervisor for an illegal dump clean-up in Detroit, Michigan. The dump held several thousand drums containing various waste streams, including solvents, paints, and sludges which contained heavy metals and solid wastes. Mr. Gable's project responsibilities included supervision of remedial crew and sampling team, oversight of health and safety program, and coordination of the transportation and disposal of waste.

- Project supervisor on facility decontamination project for a major battery manufacturer in Tarrytown, New York. Mr. Gable supervised the decontamination of the facility, which was highly contaminated with lead and mercury, and the subsequent demolition of the facility upon completion of decontamination. He also supervised the work of the demolition subcontractor, and acted as health and safety officer during demolition phase.

- Project supervisor for a building decontamination project of a high-tech microchip manufacturing facility in Somerville, New Jersey. Mr. Gable supervised a multi-disciplinary field crew that cleaned the facility, which was contaminated with various acids, heavy metals, and solvents.

- Supervisor on a demolition project at an elevator manufacturing facility in Randolph, New Jersey. The facility was contaminated with various solvents and paints.

- Supervisor on a project involving the installation of groundwater and methane gas treatment system at a closed landfill in Cleveland, Ohio. Mr. Gable supervised the final phases of installing the system and bringing the system on line.

- Supervisor for a buried tank removal project in Trenton, New Jersey. Mr. Gable supervised the field crew in the removal, cutting, cleaning and disposal of three 10,000 gallon tanks that contained fuel oil

- Sampling program manager for a project involving the clean up of a PCB spill at the U.S. Capitol in Washington D.C. Mr. Gable supervised all aspects of the sampling plan, implemented the sampling QA/QC program, and controlled data evaluation.

- Served as a project estimator from January 1991 to August 1991. Mr. Gable's responsibilities as a project estimator included: preparing project cost estimates for labor, material, travel, equipment, etc., for site remediation proposals; keeping track of project costs as work was accomplished; advising and assisting project

Information herein is proprietary and confidential and to be used or released to others only with explicit written permission of OHM Remediation Services Corp.

managers in the preparation of proposals; seeking out other cost effective construction and remediation methods that could be used by the branch; and obtaining bids from various subcontractors and major material suppliers and evaluating bids, contractor reputations, quality, etc., before purchasing services or materials.

Specialized Training

40-Hour OSHA Training, 1988
8-Hour Refresher Training, 1995
8-Hour Supervisory Training, 1991

Information herein is proprietary and confidential and to be used or released to others only with explicit written permission of OHM Remediation Services Corp.

Program QC Manager's Resume

MICHAEL I. GILMAN

In addition to 18 years of Engineering experience, Mr. Gilman presently holds a lead QA position at Stone & Webster Engineering Corporation. In this position, he has implemented a wide variety of QA programs involving services such as QA program review, vendor monitoring, and field inspection. His quality engineering work has included performing assessments of numerous plant QA programs, review of technical documents, preparation of inspection plans, QA procedure system development, procedure review, and continuing education. Mr. Gilman is experienced in trend analysis with the development of systems and forms to ensure the recording, transmission, and adequacy of quality data, and the use of computer and statistical techniques to collect, process, and analyze data.

Experience

As Program Quality Control Manager for OHM's LantDiv RAC, Mr. Gilman is responsible for the enforcement of Corporate QA/QC policies and contract provisions. He works closely with the Program Manager, Mr. George Krauter, to coordinate QA/QC activities at each site to ensure they are carried out properly in support of on-going site operations. Mr. Gilman's role and responsibilities at the Program level include:

- Establishing and administering all quality matters for OHM for the LantDiv RAC
- Designating a project QC Manager for each Delivery Order
- Reviewing and approving Delivery Order QC plans
- Authorizing stop work if work activities or planning activities violate OHM quality guidelines or LantDiv RAC contract requirements
- Developing and implementing a Delivery Order specific quality control plan
- Interfacing directly with Government Quality Assurance personnel
- Conducting daily QC meetings
- Supervising performances of site QC activities
- Ensuring that QC testing is performed in accordance with specifications, and in a timely manner
- Requiring corrective actions for any item or activity which does not meet specifications or quality standards
- Modifying/halt work if activities violate LantDiv or OHM quality standards or contract requirements
- Preparing required QC certifications and documentation

Stone and Webster Environmental Technology & Services

As Section Manager of the QA Department of Stone & Webster Engineering Corporation's Cherry Hill office, he is responsible for providing guidance in the implementation of all phases of the QA programs for nuclear and fossil power plants, environmental assessment, management, and remediation, and government projects. These projects include:

- Department of the Navy - Newport News Shipbuilding
- Department of the Navy - North Div Naval Facilities Engineering Command BRAC
- Delmarva Power & Light
- New Jersey Turnpike
- Salem Generating Station - Units 1 and 2
- Hope Creek Generating Station
- River Bend Station
- Nine Mile Point Nuclear Station - Unit 2
- Calvert Cliffs Nuclear Power Plant

Information herein is proprietary and confidential and to be used or released to others only with explicit written permission of OHM Remediation Services Corp.

- Limerick Generating Station
- Fort Calhoun

Mr. Gilman has served as the Project Manager responsible for QA and other supporting department activities for services provided to a major shipyard involved in the construction and overhaul of naval vessels.

Since joining Stone & Webster, he has been assigned to the Cherry Hill office as Supervisor, QA Department Representative, QA Engineer, and Lead Engineer, and to the Boston office as an Engineer in the Reports Group of the Quality Systems Division.

Prior to joining Stone and Webster, Mr. Gilman worked in manufacturing engineering on several government projects for GTE Sylvania, the Foxboro Company, and a plastic molding manufacturer for which his responsibilities were to provide industrial engineering support for the assembly of electronic equipment, and quality control inspection and testing.

Education

M.S., Business Administration, Drexel University
B.S., Industrial Engineering, Northeastern University

Specialized Training

Hazardous Waste Operations Courses, both worker and supervisory training (per OSHA 1910.120)

Licenses and Registrations

American Society for Quality Control - Certified Quality Engineer
American Society for Quality Control - Member
American Nuclear Society - Delaware Valley Section - Member
American Institute of Industrial Engineers - Member

Information herein is proprietary and confidential and to be used or released to others only with explicit written permission of OHM Remediation Services Corp.

ATTACHMENT B

INSPECTION SCHEDULE

ATTA ENT B
INSPECTI SCHEDULE
SOLID WASTE MANAGEMENT UNIT 45
NAVAL STATION ROOSEVELT ROADS
PUERTO RICO
Delivery Order #0090
OHM Project #17780

ACTIVITY	PREPARATORY	DONE	INITIAL	DONE	FOLLOW-UP	DONE
Waste Sampling and Analysis	Sampling Procedures per specification Sample Log Test methods defined Test Laboratory approved		Waste samples taken and checked • Two samples/day or as required by applicable standards		Evaluation of sample analysis results Documentation of sampling analysis results, per specification requirements	
Erosion and sediment control	Materials meet specification: • Haybales • Silt fence • Riprap Alignment		Proper installation Alignment and location		Proper maintenance and on going inspection	
Temporary Decontamination Pad	Materials meet specification requirements Location defined		Proper installation Proper grades		Decontamination liquids recovered Area restored	
Demolition and removal	Limits of work established and demolition plan approved.		Designated buildings/structures demolished and removed. Site grade/contours maintained		Removal material from site, as required (for characterization and disposal)	
Clearing and Grubbing	Limits of work established		Survey control		Remove material from site as required	

ACTIVITY	PREPARATORY	DONE	INITIAL	DONE	FOLLOW-UP	DONE
Excavation, Filing, and Backfilling	Initial limits of area and depth defined Alignment, limits and grade Sampling and laboratory procedures established Filling/Backfilling materials meet specification		Survey control Visual inspection of excavation Field screening of excavation Dust control Chain of custody Field QC testing of fill material Compacting between layers		Verification of sampling Data inspection/evaluation Grades Density Testing Material thickness daily logs maintained	
Borrow Material	Sampling and analysis Geotechnical properties		Conformance with test data Dust control		On going	
Removal of wastewater/ sludge from underground storage tanks and tunnels	Plans per specification requirements submitted. Documentation of qualifications submitted		Compliance to technical standards reviewed		On going	
Confirmation Sampling and Analysis	Sampling and laboratory procedures established		Quality control of sampling and analysis procedures Chain of custody		Data inspection/evaluation	

ACTIVITY	PREPARATORY	DONE	INITIAL	DONE	FOLLOW-UP	DONE
Wastewater treatment system equipment • Tanks • Pumps • Piping • Filters • Misc.	Material meets specification requirements Verify test data required by the specification for shop testing Installation, operation, maintenance and lubrication instructions, supplied and approved prior to installation		Name-plates per specification Lubrication schedule developed and utilized prior to equipment use Equipment foundation per specification and drawings Equipment alignment and anchoring per specification requirements Piping arrangement per drawings Piping/filter installed per specification instructions or manufacturer's instructions		Testing per specification requirements prior to start up. Equipment maintained prior to start up Piping tests performed as required by the specification	
Transportation of Contaminated Material	Specified trucks being utilized		Monitoring for spillage during loading and transportation		Roadway spillage and condition completion	

ATTACHMENT C

DOCUMENTATION FORMS

CONTRACTOR PRODUCTION REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE		
CONTRACT NO.	TITLE AND LOCATION	REPORT NO.
CONTRACTOR	SUPERINTENDENT	
WEATHER	MAX TEMP: °F	MIN TEMP: °F

WORK PERFORMED TODAY

WORK LOCATION AND DESCRIPTION	EMPLOYER	#	TRADE	HRS

JOB SAFETY

WAS A JOB SAFETY MEETING HELD THIS DATE? ☐ YES ☐ NO
(If YES attach copy of the meeting minutes)

WERE THERE ANY LOST TIME ACCIDENTS THIS DATE? ☐ YES ☐ NO
(If YES attach copy of completed OSHA report)

WAS TRENCHING/SCAFFOLD/HV ELECTRICAL/HIGH WORK DONE? ☐ YES ☐ NO
(If YES attach statement or checklist showing inspection performed)

WERE THERE ANY NEAR MISS ACCIDENTS THIS DATE? ☐ YES ☐ NO
(If YES attach description of incident and proposed action)

TOTAL WORK HOURS ON JOB SITE THIS DATE	
CUMULATIVE TOTAL OF WORK HOURS FROM PREVIOUS REPORT	
TOTAL WORK HOURS FORM START OF CONSTRUCTION	

LIST SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB

CONSTRUCTION AND PLANT EQUIPMENT ON JOB SITE TODAY. INCLUDE NUMBER OF HOURS USED TODAY

REMARKS

CONTRACTOR/SUPERINTENDENT _____ DATE _____

FORM 01400-1 9/90

CONTRACTOR QUALITY CONTROL REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE

PHASE — IDENTIFY DEFINABLE FEATURE OF WORK, LOCATION AND *LIST PERSONNEL PRESENT*

Y - YES; N - NO, SEE REMARKS; BLANK - NOT APPLICABLE

PREPARATION

	THE PLANS & SPECS HAVE BEEN REVIEWED.
	THE SUBMITTALS HAVE BEEN APPROVED.
	MATERIALS COMPLY WITH APPROVED SUBMITTALS.
	MATERIALS ARE STORED PROPERLY.
	PRELIMINARY WORK IS DONE CORRECTLY.
	SAFETY REQUIREMENTS HAVE BEEN MET.
	TESTING PLAN HAS BEEN REVIEWED.
	WORK METHOD/SCHEDULE DISCUSSED.

INITIAL

TESTING PERFORMED & WHO PERFORMED TEST

	PRELIMINARY WORK IS DONE CORRECTLY.
	SAMPLE HAS BEEN APPROVED/PREPARED.
	SAFETY REQUIREMENTS HAVE BEEN MET.
	TEST RESULTS ARE ACCEPTABLE.
	WORK IS IN COMPLIANCE WITH THE CONTRACT.

FOLLOW-UP

TESTING PERFORMED & WHO PERFORMED TEST

	WORK COMPLIES WITH CONTRACT AS APPROVED IN INITIAL PHASE.

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)

REWORK ITEMS CORRECTED TODAY (FROM REWORK LOG)

REMARKS

On behalf of the contractor, I certify that this report is complete and correct and all equipment and material used and work performed during this reporting period is in compliance with the contract plans and specifications to the best of my knowledge except as noted above.

AUTHORIZED CQC MANAGER AT SITE

DATE

GOVERNMENT QUALITY ASSURANCE REPORT

DATE

QUALITY ASSURANCE REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONS TO THE REPORT

GOVERNMENT QUALITY ASSURANCE REPRESENTATIVE

DATE

FORM 01400-1 9/90

(Back)

Sheet of

ATTACHMENT D

SUBMITTAL REGISTER

SUBMITTAL REGISTER
Interim Corrective Measure at SWMU 45
Roosevelt Road, Puerto Rico

Delivery Order 090 | Project Number: 17780

Contract No. N62470-93-D-3032 | Project Title: Remedial Construction Activities | Location: Roosevelt Road | Contractor: OHM Remediation Services Corp.

Submittal No.	Spec Section No.	SD No. and Type of Submittal / Material or Product	Spec Para No.	Classification/ Approval by Contracting Officer *	Government or A/E Reviewer	Transmittal Control No.	Planned Submittal Date	Contractor Action: Action Code	Contractor Action: Date of Action	Contractor Action: Date Forwarded to Approving Authority/ Date Received From Contractor	Approving Authority Action: Date Forwarded to other Reviewer	Approving Authority Action: Date Received from other Reviewer	Approving Authority Action: Action Code	Approving Authority Action: Date of Action	Contractor Mailed to Contractor/ Received from Approved Authority	Remarks
(a)	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
	01010	SD-09, Reports	1.2.1													
		Work Plan	1.2.1.1	G												
	01010	SD-18,Records	1.3.1													
		As Built Records	1.3.1.1													
		Environmental Conditions Report	1.3.1.2													
		QC Meeting Minutes	1.3.1.3													
		Test Results Summary Report	1.3.1.4													
		Contractor Production Report	1.3.1.5													
		QC Report	1.3.1.6													
		Rework Items List	1.3.1.7													
		Permits	1.3.1.8													
		Contractor's Closeout Report	1.3.1.9													
	01430	SD-08, Statements	1.2.1													
		Sample Log	1.2.1.1													
	01430	SD-12, Field Test Reports	1.2.2													
		Waste Characterization Sample Analyses Results	1.2.2.1													
		Wastewater Treatment System Sample Analyses Results	1.2.2.2													
		Confirmation Sample Analyses Results	1.2.2.3													
		SD-02, Manufacturer's Catalog Data	1.3.1													
		Silt Fence	2.1													
		Dust Suppressors	2.2.3													
	01561	SD-04, Drawings	1.3.2													
		Erosion Control Plan	1.3.2.1	G												
	02050	SD-08, Statements	1.3.1													
		Demolition plan														

SUBMITTA. GISTER
Interim Corrective Measure at SWMU 45
Roosevelt Road, Puerto Rico

Delivery Order 090 | Project Number: 17780
Contract No. N62470-93-D-3032 | Project Title: Remedial Construction Activities | Location: Roosevelt Road | Contractor: OHM Remediation Services Corp.

Submittal No.	Spec Section No.	SD No. and Type of Submittal / Material or Product	Spec Para No.	Classification/ Approval by Contracting Officer *	Government or A/E Reviewer	Transmittal Control No.	Planned Submittal Date	Contractor Action: Action Code	Contractor Action: Date of Action	Contractor Action: Date Forwarded to Approving Authority/ Date Received From Contractor	Approving Authority Action: Date Forwarded to other Reviewer	Approving Authority Action: Date Received from other Reviewer	Approving Authority Action: Action Code	Approving Authority Action: Date of Action	Contractor: Mailed to Contractor/ Received from Approved Authority	Remarks
(a)	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
	02220	SD-05, Design Data	1.3.1													
		Low Density Flowable Fill Material	2.2													
	02223	SD-08, Statements	1.2.1													
		Waste Shipping Documentation	1.2.1.1													
		Waste Delivery Documentation	1.2.1.2													
		Waste Site Vehicle Decontamination Verification	1.2.1.3													
		Treatment Site Vehicle Decontamination Verification	1.2.1.4													
	02901	SD-08, Statements	1.2.1													
		Air Emissions Permit	1.4													
	13219	SD-02, Manufacturer's Catalog Data	1.2.1													
		Cleaning agents	2.1.2	G												
		Gasoline-oil-resisting rubber gloves and boots	2.2	G												
		Dermal protective equipment	2.2	G												
		Respiratory protective equipment	2.2	G												
		Disinfectant	2.2	G												
		Abrasive for blasting	2.1.2	G												
	13219	SD-06, Instructions	1.2.2													
		Cleaning agents	2.1.2													
	13219	SD-08, Statements	1.2.3													

SUBMITTAL REGISTER
Interim Corrective Measure at SWMU 45
Roosevelt Road, Puerto Rico

Delivery Order 090 | Project Number: 17780
Contract No. N62470-93-D-3032 | Project Title: Remedial Construction Activities | Location: Roosevelt Road | Contractor: OHM Remediation Services Corp.

Submittal No.	Spec Section No.	SD No. and Type of Submittal / Material or Product	Spec Para No.	Classification/ Approval by Contracting Officer *	Government or A/E Reviewer	Transmittal Control No.	Planned Submittal Date	Contractor Action: Action Code	Contractor Action: Date of Action	Contractor Action: Date Forwarded to Approving Authority/ Date Received From Contractor	Approving Authority Action: Date Forwarded to other Reviewer	Approving Authority Action: Date Received from other Reviewer	Approving Authority Action: Action Code	Approving Authority Action: Date of Action	Contractor: Mailed to Contractor/ Received from Approved Authority	Remarks
(a)	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
		Qualifications of Certified Industrial Hygienist (CIH)	1.2.3.1	G												
		Testing Laboratory	1.2.3.2	G												
		Safety Plan	1.2.3.3	G												
		Work Plan	1.2.3.4	G												
		Hazardous Waste Disposal Plan	1.2.3.5	G												
		Tank Certification of Safety	1.2.3.6	G												
		Training Certification	1.2.3.3	G												
	13219	SD-10, Test Reports	1.2.4													
		Tank and Tunnel contents	1.2.4.1	G												
	13219	SD-12, Field Test Reports	1.2.5													
		Monitoring Results	1.2.5.1	G												
	13219	SD-18, Records	1.2.6													
		Safety permits	1.4.3													

*Navy Notes:
Approved By:
G: Contracting Officer
Blank: CQC Manager

*NASA Notes:
Approved By:
Blank: Contracting Officer

*Army Notes:
Classification:
GA: Government Approval
FIO: For Information Only

Action Codes: (Others may be prescribed by Transmittal Form)
NR: Not Reviewed
A: Approved
AN: Approved as Noted
RR: Disapproved; Revise and Resubmit

Date: 04/10/96

FIGURES

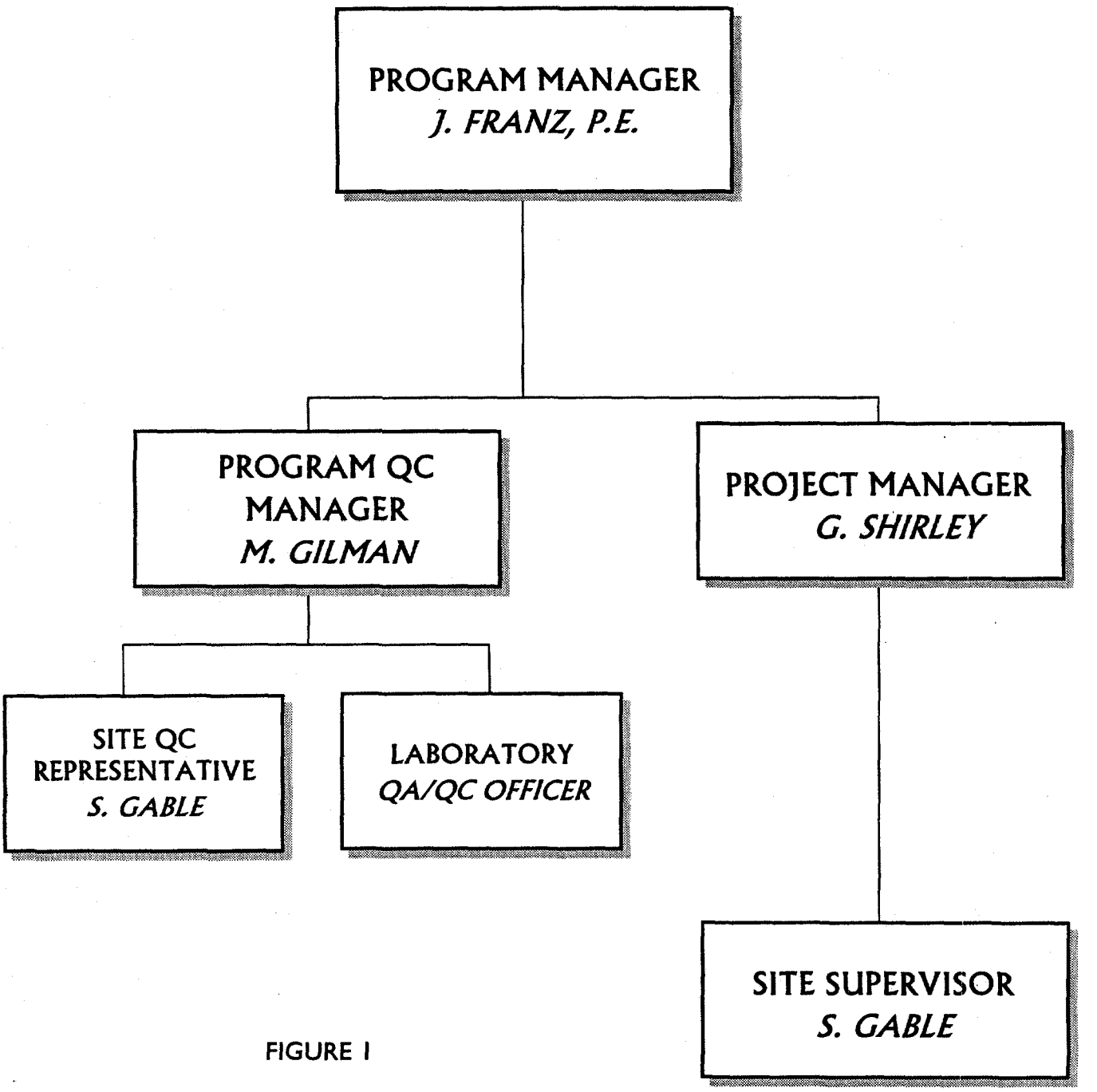


FIGURE I

QC ORGANIZATION CHART
Remediation of Solid Waste Management Unit 45
Naval Station Roosevelt Roads
Puerto Rico
Delivery Order 0090
OHM Project 17780

Prepared for

DEPARTMENT OF THE NAVY
CHESAPEAKE DIVISION
ENGINEERING FIELD ACTIVITY
WASHINGTON, D.C.

OHM Remediation
Services Corp.

APPENDIX V
TRANSPORTATION AND DISPOSAL PLAN

FINAL
TRANSPORTATION AND DISPOSAL PLAN
FOR
TANK CLOSURE, SWMU #45 AT
U.S. NAVAL STATION,
ROOSEVELT ROADS, PUERTO RICO

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0090

Prepared by:

OHM Remediation Services Corp.
Trenton, New Jersey

Tom Joyner
Transportation and Disposal Manager

Reviewed by:

Gary Shirley
Project Manager

John P. Franz, P.E.
Program Manager

May 15, 1996
OHM Project 17780TD

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 SITE HISTORY 1
1.2 DESCRIPTION OF WASTES 1

2.0 WASTE CHARACTERIZATION 1

2.1 WASTE CLASSIFICATION 1

3.0 DISPOSAL 1

3.1 DETERMINATION OF REQUIRED TREATMENT TECHNOLOGY 1
3.2 SELECTION OF DISPOSAL FACILITY 2
3.3 DISPOSAL ARRANGEMENTS 2

4.0 TRANSPORTATION 3

4.1 PACKAGING REQUIREMENTS 3
4.2 SELECTION OF TRANSPORTER 3
4.3 REQUIRED SHIPPING PAPERS 3

5.0 DOCUMENTATION AND SUBMITTALS 3

5.1 SUBMITTALS 3
5.2 RETENTION OF REQUIRED DOCUMENTS 3

TRANSPORTATION AND DISPOSAL

1.0 INTRODUCTION

1.1 Site History

The Interim Corrective Measures for SWMU #45 involve the removal and remediation of contaminated liquids and contaminated sludges from two 50,000-gallon concrete-reinforced underground storage tanks (USTs), a cooling water intake tunnel and a cooling water discharge tunnel. Bunker "C" fuel was stored in the USTs during the 1940s. Building 38 is enclosed by SWMU #45. Building 38 has been used for transformer maintenance and storage. Dumping of transformer oil has been reported. Bunker "C" fuel has been observed in the proximity of Building 38.

Prior sampling of the water, product, and sludge at the two USTs show some contamination with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and especially PCBs (Aroclor-1260).

1.2 Description of Wastes

Three waste streams will be generated from the remedial activities at this site: UST tank bottoms (Bunker "C" oil), free product, and oily waters. Previous data have detected PCBs at 1.7 and 1.8 ppm in samples taken from USTs, and 86 ppm in one sample taken from the sludge layer in the cooling water outlet tunnel near Building 1936.

2.0 WASTE CHARACTERIZATION

2.1 Waste Classification

Previous sampling and analysis has not indicated the presence of any RCRA characteristic waste within the USTs and cooling lines. A confirmation of this analytical data will be conducted during a pre-mobilization sampling and analysis event scheduled for the week of May 6, 1996. As no listed waste codes apply to these waste streams at this time, the waste streams to be generated will be treated as non-RCRA hazardous, until demonstrated otherwise. In the event RCRA waste is revealed, appropriate EPA RCRA disposal will be utilized.

Low level PCB's, below TSCA regulations, have been detected in the USTs and intake cooling lines (PCB<50ppm). The outlet cooling line demonstrated PCB levels in excess of TSCA limits (PCB=86ppm), and will be disposed of as TSCA regulated waste upon analytical confirmation.

All analytical parameters will be verified during the pre-mobilization sampling and analysis event and during the project operation (see Section 7.0 of Appendix II, Sampling and Analysis Plan).

3.0 DISPOSAL

3.1 Determination of Required Treatment Technology

Waste generated from the USTs and intake cooling line are below RCRA/TSCA limits, and, upon analytical confirmation, will be disposed of as follows:

1. Sludge	
a. Solid	Landfill (U.S. Mainland)
b. Liquid	Fuels (To be determined)
2. Free Product	Fuels (To be determined)
3. Water	Water Treatment (Forrestal Plant)

Waste generated from the outlet cooling line, consisting of non-TSCA water and potential TSCA sludge, will, upon analytical confirmation, be disposed of as follows:

1. Sludge	
a. Solid	Landfill (U.S. Mainland)
b. Liquid	Incineration (U.S. Mainland)
2. Water	Water Treatment (Forrestal Plant)

Miscellaneous waste such as PPE, will be containerized with non-TSCA solids for disposal.

3.2 Selection of Disposal Facility

OHM will select the ultimate disposal facility based on several factors:

- TSCA compliance
- CERCLA compliance (applicable to RCRA wastes only)
- TSDF capacity to handle incoming waste
  - volume
  - turnaround time for approval to ship
  - regulatory status
- Solicitation of bids using applicable FARs
- Verification of permits and insurance (at time of award to the facility)

Potential disposal facilities to be used for this project are:

UST Tank Bottoms\PPE	Chemical Waste Management, Emelle, AL Laidlaw, Pinewood, SC Wayne Disposal, Belleville, MI
Aqueous liquids	Forrestal Sewage Treatment Plant, Roosevelt Roads, PR
PCB containing free product	Chemical Waste Management, Port Arthur, TX Rollins, Deer Park, TX Aptus, Aragonite, UT
PCB contaminated sludge	Chemical Waste Management, Emelle, AL USPCI Grayback Mountain Landfill
Uncontaminated fuel	Chemical Waste Management, Emelle, AL Safety Clean, Amnhei, Puerto Rico

3.3 Disposal Arrangements

OHM's Transportation and Disposal Coordinator will complete all necessary paperwork required for approval at the selected disposal facility. This paperwork includes, but is not limited to, waste profiles, analytical data, and generator certifications. These documents will be forwarded to the proper Navy personnel for review and signature as generator.

4.0 TRANSPORTATION

4.1 Packaging Requirements

UST sludges will be shipped via lined and covered intermodal marine rolloff container. OHM will solidify the UST sludge before placement onto each rolloff. Sludge, if in a pumpable state, will be placed into marine tankers for oceanic shipment.

Free product will be containerized in fifty-five gallon drums prior to off-site shipment. The drums will be placed into an intermodal marine container for shipment off-island.

4.2 Selection of Transporter

OHM will verify that any haulers used on this project will have the proper waste permits for each waste they are transporting. Since each disposal facility has provided transportation with their bids, no separate solicitation of transporters will be required for this project.

Each vehicle entering the site will be required to produce the applicable permits for the waste stream it is transporting.

4.3 Required Shipping Papers

OHM's T & D Coordinator will complete all necessary shipping papers for the project. These shall include: hazardous waste manifests, LDR certification, and bills of lading. Sample copies of each will be provided to the Navy at least forty-eight hours prior to the first shipment of any waste stream.

5.0 DOCUMENTATION AND SUBMITTALS

5.1 Submittals

Formal submittals to Navy regarding transportation and disposal will consist of the following:

- waste profiles for review and signature
- sample hazardous waste manifest, LDR certification, and/or bill of lading
- weight tickets, TSD manifest copy, and certificate of disposal (as part of final report)

5.2 Retention of Required Documents

The OHM project file will contain copies of:

- hazardous waste manifests and/or bills of lading
- LDR certifications
- certificates of disposal (as required)

OHM will ensure that manifest copies from the disposal facility are received within seven days of off-site shipment and will collect all associated weight tickets and certificates of disposal for inclusion in the final report.