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WORK PLAN
FOR
REMOVAL OF LEAD-CONTAMINATED SOIL AT SITE 56
NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Atlantic Division
Naval Facilities Engineering Command
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May 8, 1996
Delivery Order 0058
OHM Project 16773WP

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

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1.0 INTRODUCTION

OHM Remediation Services Corp. (OHM) has been retained by the Department of the Navy, Atlantic Division, to perform a removal action under Delivery Order 0058 of the ongoing contract between the two parties. The removal action will be at Site 56, located at the Naval Surface Warfare Center in Indian Head, Maryland. The removal action consists of the excavation and off-site disposal of lead-contaminated sediment/soil and pipe from around an industrial outfall. The planned action is consistent with the chosen remedy for Site 56, Alternate #4, from the Engineering Evaluation and Cost Analysis, produced by Jorgensen and Phillips in April 1994. This Work Plan describes the procedures which will be followed by OHM in performing the remedial action.

1.1 WORK PLAN CONTENTS

Section 1.0 of this Work Plan provides a background to the project and a basic overview of OHM's approach to implementing the project. Section 2.0 lists the resources which OHM intends to employ for completion of the project. Section 3.0 describes the scope of work involved in completing the project. Section 4.0 details the preparatory activities which will be completed prior to initiating full-scale activities. Section 5.0 describes how excavation of lead-contaminated soil/sediment will be performed. Section 6.0 describes the system for separating contaminated solids from liquids and treatment and discharge of these liquids. Section 7.0 describes the measures which OHM anticipates undertaking to restore the site to its pre-construction condition.

1.2 SITE DESCRIPTION

The Indian Head Division of the Naval Surface Warfare Center is located in Indian Head, Charles County, Maryland, 25 miles southwest of Washington, D.C. Site 56, located at the Indian Head facility, is sometimes referred to as Industrial Outfall 87 (IW87). IW87 operates under a National Pollutant Discharge Elimination System (NPDES) permit for the activity. Figure 1 provides a site location map. Appendix E drawing sheet 2 of 4 provides a layout of the area surrounding Site 56.

Site 56 consists of approximately 700 feet of 24-inch terra cotta pipe, 30 feet of overland flow along a sandy swale, and an antiquated brick and mortar pit (manhole) adjacent to Building 790. The pipe run begins at the Building 790 pit and discharges to the swale just upstream to the IW87 permit outfall. The lower end of the pipe is 75 percent filled with sand and other soil materials. The sediment in the pit, pipe, and the open swale were contaminated from the past practice of rinsing the lead floors in Building 790. The two floor drains in Building 790 emptied into the pit until October 1992, when the two drains were sealed. The outfall pipe currently provides services to several systems which include stormwater collected from a nearby catch basin, heater condensate from several sources, and intermittent drainage from the building 790 outdoor spill dike.

1.3 PROJECT SUMMARY

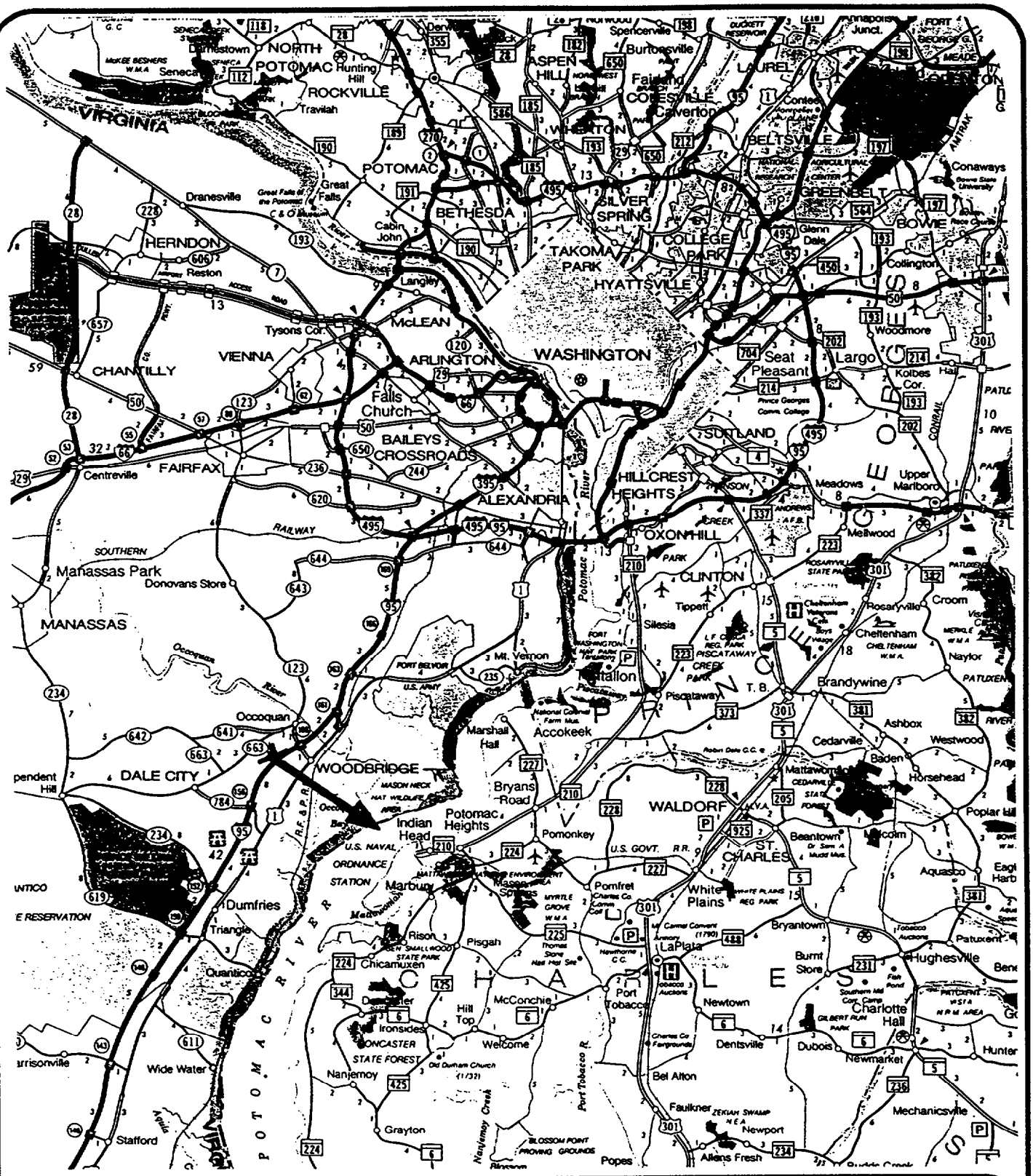
In general, the Site 56 removal action consists of setting up a sediment filtration and water treatment system, and constructing special access measures, including erosion and sediment controls, swamp mats, and temporary roads, to minimize site disturbance. Once these measures are in place, OHM will clean and resurface the Building 790 sump, remove lower 70 foot section of outfall pipe, then pressure wash and reline the outfall pipe. After the pipe lining process is completed, OHM will excavate approximately 66 cubic yards of lead contaminated sediment/soil from the outfall swale, and construct a new riprap outfall.

The collected sediment will be dried using gravity filtration. The dried sediment will be transported off site and disposed, along with the excavated pipe and other incidental wastes. Water removed from the sediment will be treated via parallel bag filters and then carbon, sampled, and then discharged to the IW87 ourfall.

1.4 PROJECT SCHEDULE

OHM's project schedule is provided as Figure 2. The schedule hinges upon the requirement of the Maryland Department of the Environment (MDE) that no in-stream work be performed between March 1 and June 15 in order to protect important aquatic species. Since site setup will require approximately four weeks, OHM will prepare to mobilize May 20 so that work which will impact the stream area will commence as close as possible to the June 16 date. The mobilization date of May 20 is based on OHM receiving approval on all required submittals prior to this date.

The sequence of work has been constructed to provide an efficient and timely progression of activities. The driving sequence of activities involves the pipe cleaning/lining tasks and the sediment removal. Since the same subcontractor will be performing both the cleaning and lining, those activities are scheduled sequentially. The removal of the lower 70 foot of pipe section is scheduled to be performed before the pipe cleaning to allow this progression. After the pipe has been removed, the precast concrete sump will be set to collect and recycle water generated during the cleaning process.



General Notes / Legend

FOR REFERENCE, SEE DRAWINGS LISTED BELOW FOR DETAILS & SPECIFICS.

16773-D1	TOPOGRAPHY/SITE LAYOUT
16773-D2	LOCATION OF DISCHARGE AREA
16773-D3	WATER TREATMENT SYST. LAYOUT
16773-D4	ENGR. DETAILS & SECTIONS

Figure 1
SITE LOCATION MAP

SITE 56
INDIAN HEAD, MARYLAND

PREPARED FOR

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VA

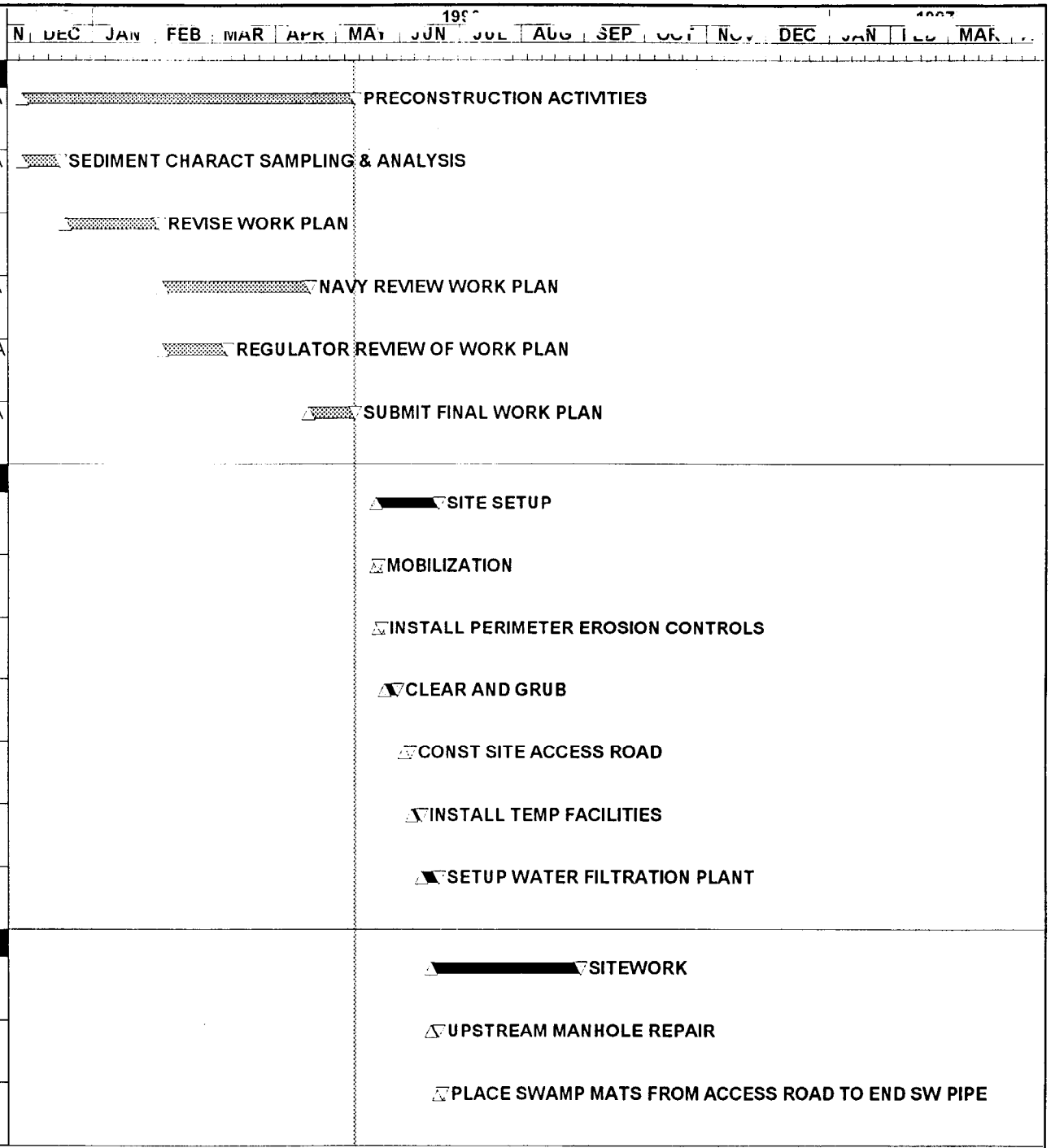
OHM Remediation Services Corp.

OHM Project No. 16773

Drawn By: DAVE LEECH	Checked By:
Date 1/13/95	Approved By:
Scale: NONE	Drawing No. 16773-A1

16773-A1 dl 1/13/95 REV 1

ivity ID	ivity Description	Dur	E Start	Finish
PRECONSTRUCTION				
100000	PRECONSTRUCTION ACTIVITIES	117*	27NOV95A	09MAY96A
100100	SEDIMENT CHARACT SAMPLING & ANALYSIS	15	27NOV95A	15DEC95A
100200	REVISE WORK PLAN	33	18DEC95A	02FEB96A
100210	NAVY REVIEW WORK PLAN	35	05FEB96A	17APR96A
100211	REGULATOR REVIEW OF WORK PLAN	32	05FEB96A	07MAR96A
100220	SUBMIT FINAL WORK PLAN	10	17APR96A	09MAY96A
SITE SETUP				
200000	SITE SETUP	23*	20MAY96	20JUN96
201000	MOBILIZATION	1	20MAY96*	20MAY96
202000	INSTALL PERIMETER EROSION CONTROLS	2	21MAY96	22MAY96
203000	CLEAR AND GRUB	4	24MAY96	30MAY96
204000	CONST SITE ACCESS ROAD	3	03JUN96	05JUN96
205000	INSTALL TEMP FACILITIES	3	07JUN96	11JUN96
206000	SETUP WATER FILTRATION PLANT	7	12JUN96	20JUN96
SITEWORK				
300000	SITEWORK	54*	17JUN96	30AUG96
300100	UPSTREAM MANHOLE REPAIR	4	17JUN96*	20JUN96
301000	PLACE SWAMP MATS FROM ACCESS ROAD TO END SW PIPE	1	21JUN96	21JUN96



Project Start	01MAR94	Early Bar
Project Finish	30SEP96	Progress Bar
Data Date	10MAY96	Critical Activity
Plot Date	09MAY96	

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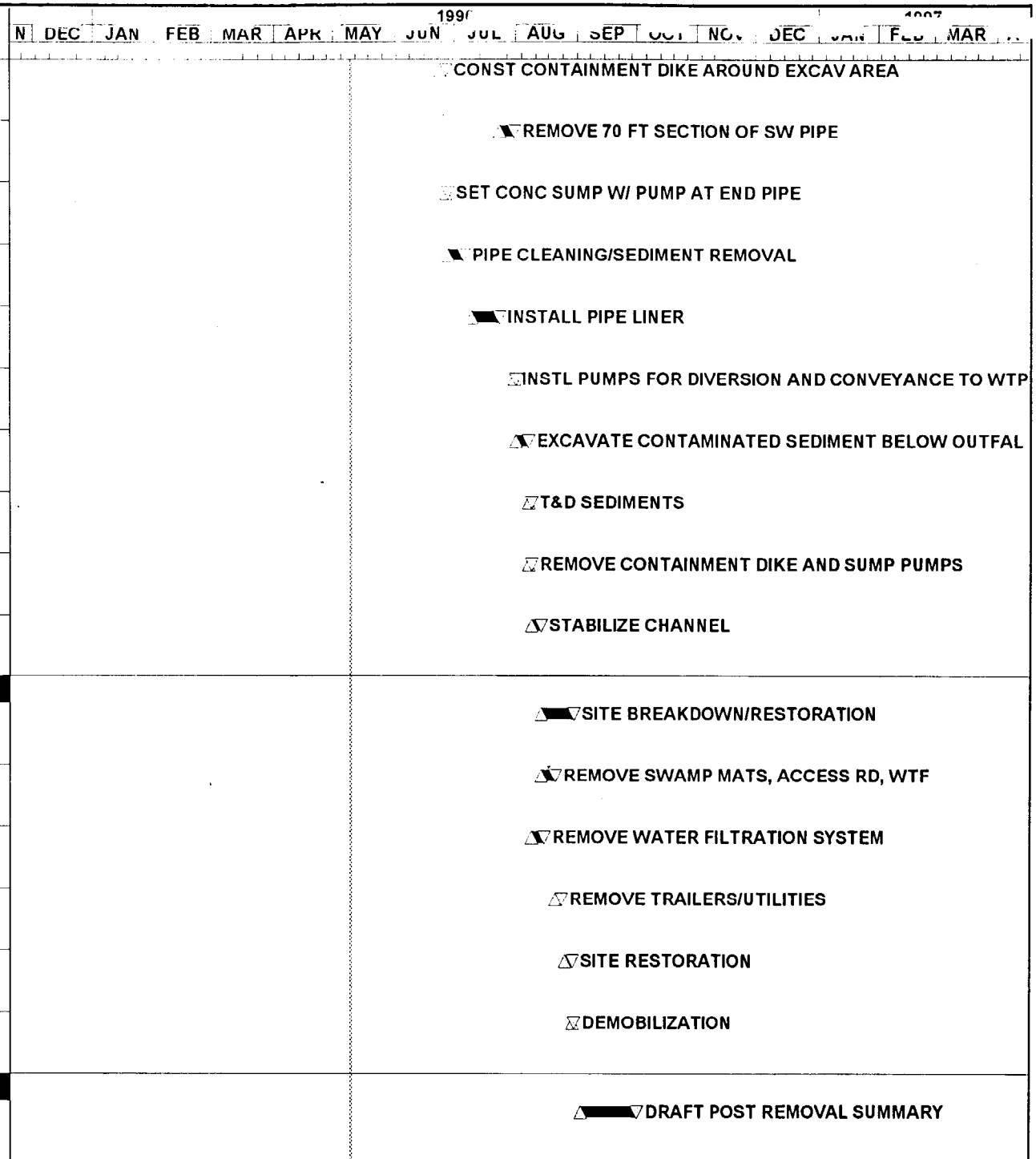
58DO

Sheet 1 of 2

Removal of Lead Contaminated Soil
Naval Surface Warfare Center
Indian Head, Maryland - Site 56

Figure No. 2

...ity ID	...vity Description	Dur	Ea... Start	E... Finish
302000	CONST CONTAINMENT DIKE AROUND EXCAV AREA	3	24JUN96	26JUN96
302100	REMOVE 70 FT SECTION OF SW PIPE	5	24JUL96	30JUL96
303000	SET CONC SUMP W/ PUMP AT END PIPE	1	27JUN96	27JUN96
305000	PIPE CLEANING/SEDIMENT REMOVAL	5	28JUN96	05JUL96
306000	INSTALL PIPE LINER	10	10JUL96	23JUL96
307000	INSTL PUMPS FOR DIVERSION AND CONVEYANCE TO WTP	1	31JUL96	31JUL96
308000	EXCAVATE CONTAMINATED SEDIMENT BELOW OUTFALL	4	01AUG96	06AUG96
309000	T&D SEDIMENTS	2	07AUG96	08AUG96
310000	REMOVE CONTAINMENT DIKE AND SUMP PUMPS	2	07AUG96	08AUG96
311000	STABILIZE CHANNEL	3	09AUG96	13AUG96
SITE BREAKDOWN				
311010	SITE BREAKDOWN/RESTORATIO	13*	14AUG96	30AUG96
312000	REMOVE SWAMP MATS, ACCESS RD, WTF	5	14AUG96	20AUG96
312010	REMOVE WATER FILTRATION SYSTEM	4	09AUG96	14AUG96
313000	REMOVE TRAILERS/UTILITIES	3	21AUG96	23AUG96
314000	SITE RESTORATION	4	26AUG96	29AUG96
315000	DEMOBILIZATION	1	30AUG96	30AUG96
POST CONSTRUCTION				
460000	DRAFT POST REMOVAL SUMMARY	20	03SEP96	30SEP96



2.0 PROJECT ORGANIZATION AND RESOURCES

This section details the organizational structure of project personnel and the equipment and materials which OHM anticipates utilizing for the Site 56 lead-contaminated soil removal. The discussion of resources presented herein is based on OHM following the scope of work summarized in Section 3.0, and meeting the schedule given in Section 1.4.

2.1 EQUIPMENT LIST

The equipment listed below is anticipated to be used on the project:

- Chain saws
- Swamp mats
- Vibratory roller
- Wide track excavator
- John Deere 690 front-end loader
- Submersible pumps and hoses - 2 inch and 3 inch
- D-6 LGP bulldozer
- Decontamination trailer
- Office trailer
- Bag filters
- Carbon vessel
- Holding pools - 50,000 gallon and 12,000 gallon
- Pool liners
- High pressure pipe cleaning equipment
- Small hand tools and sampling equipment
- Roll-off containers
- Vac truck

The equipment listed above will either be OHM-owned equipment from the Windsor, New Jersey shop or will be rented from local vendors. Not all equipment listed above will be present on site for the entire duration of the project.

2.2 MATERIALS LIST

OHM anticipates utilizing the following materials on site:

- Silt fence
- Hay bales
- Non-woven geotextile - 8 ounce
- HDPE liner - 60 mil
- Rip rap - 4 inch to 6 inch
- Quarry process stone
- Pea gravel
- Number 57 stone
- Clean gravel - 2 inch
- Building sand
- Fiberglass weir and attachment hardware
- Pre-cast concrete sump and riser

- Corrugated HDPE - 4 inch
- PVC - 12 inch and 2 inch
- High visibility safety fence

2.3 MANAGERIAL APPROACH TO CONSTRUCTION

OHM's approach to project management is to place the management at a level close to the Navy Technical Representative (NTR). The NTR is the primary contact for the Navy in regard to technical issues associated with this project. All required project correspondence between OHM and the Navy will be directed to the NTR. OHM's project manager works directly with the NTR to achieve the NTR's satisfaction with the project. Therefore, the project manager will have overall project responsibility to the NTR from a schedule, cost, and resources aspect. OHM assigns a site supervisor to be responsible for accomplishing the work in the field. The site supervisor reports directly to the project manager. The site supervisor is responsible for the day-to-day activities in the field.

The project manager and site supervisor will jointly develop the project schedules and budgets and work to achieve these goals over the duration of the project. The schedule and budgets also include the resources required. The required resources will be reviewed with OHM's regional resource manager to schedule the necessary resources for the project. These activities are part of the initial planning activities and act as a baseline for measuring the progress of the project.

The proposed project organization is presented in Figure 3. The duties and responsibilities of the project team members are defined in Section 2.4.

2.4 PERSONNEL - DUTIES AND RESPONSIBILITIES

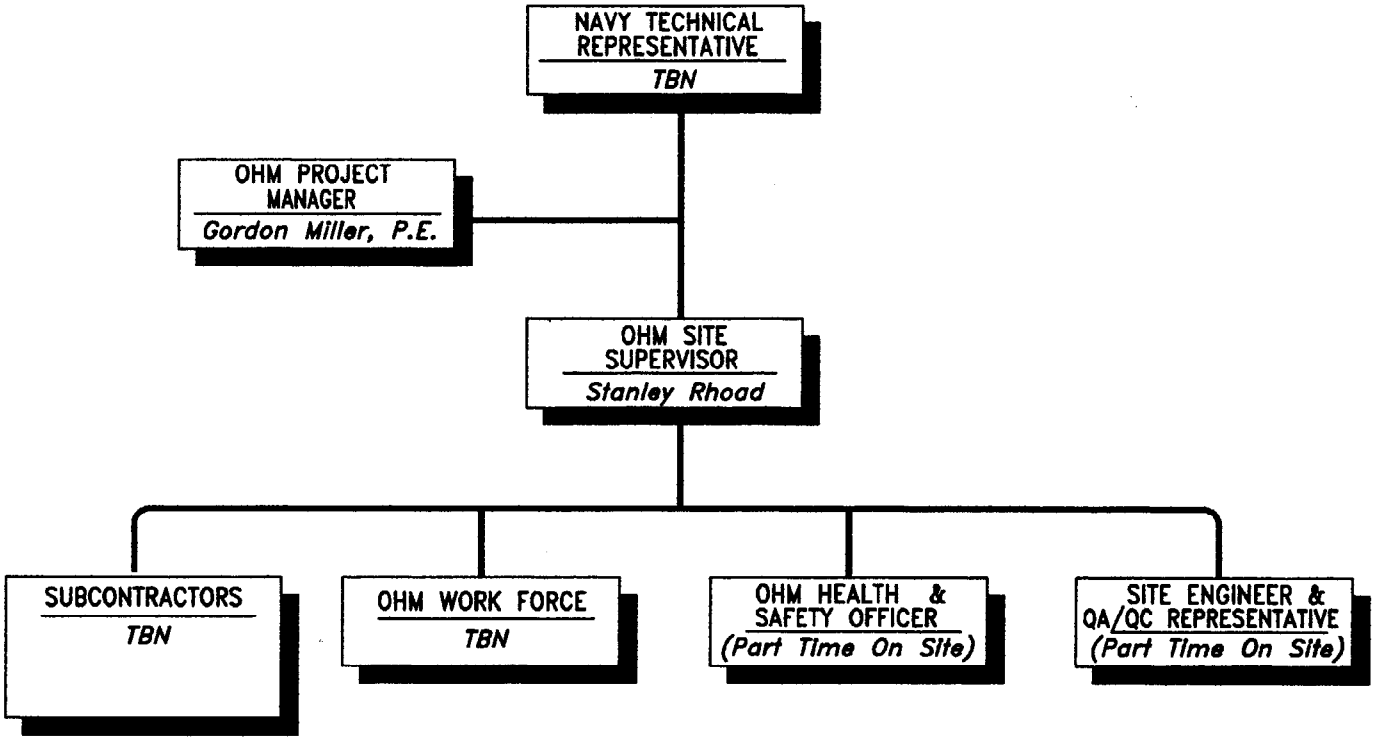
2.4.1 OHM Responsibilities

The responsibilities of OHM are:

- Perform the remedial activities defined in the Work Plan and required under this delivery order.
- Prepare and submit to the NTR monthly status reports containing such information regarding percentage of completion, unresolved delays (encountered or anticipated) that may affect the schedule and a description of efforts made to mitigate those delays or anticipated delays, revise construction schedule, listing of activities scheduled for the next month, and other information relating to the progress of construction as is customary in the industry.
- Initiate, maintain, and supervise all safety precautions and programs in connection with the work.
- If conflict, error, or discrepancy is found in contract documents, report to the NTR in writing before proceeding to obtain a written interpretation or clarification from the NTR.
- Notify the NTR representative in writing of any subsurface or latent physical conditions encountered which differ materially from those specified or indicated.
- Implement CQCP and establish chain of command.

Plot Scale: 1 = 1 revision 2

CAD File: 16773-A2



Legend

OHM Remediation Services Corp.

OHM Project No. 16773

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FIGURE 3

ON-SITE PROJECT ORGANIZATIONAL CHART

REMOVAL OF LEAD CONTAMINATED SOIL

SITE 56

INDIAN HEAD, MARYLAND

PREPARED FOR

ATLANTIC DIVISION

NAVAL FACILITIES ENGINEERING COMMAND

NORFOLK, VA.

- Provide a site supervisor, who will not be replaced without written notice to the NTR. The site supervisor will be OHM's representative at the site. The NTR will have final approval on replacement of the site supervisor.

- If materials or equipment, or specific means, methods, techniques, sequence, or procedure of construction is indicated in or required by the contract documents, furnish or utilize a substitute acceptable to the NTR if needed.

- Procure subcontractor services; submit these services to the NTR for acceptance.

- Maintain at the site two record copies of all as-built drawings, one copy of specifications, addenda, written amendments, change orders, work directive changes, field test records, field orders, and written interpretations and clarifications. Upon completion of the work, deliver these records to the NTR.

2.4.2 Project Manager

The project manager is the person in charge of the overall project and has full authority for coordination and direction of the project. The project manager will communicate directly with the NTR. For the Site 56 removal action, the project manager will be on site part-time, on an as-needed basis. Specific responsibilities of the project manager include:

- Interpret and plan overall work effort
- Approve work products, plans, and deliverables
- Overall responsibility for preparation and planning of documents for the work
- Respond to resource requirements by defining resource needs and securing the commitments for staff and equipment
- Monitor subcontractor performance, schedules, budgets, and invoices
- Develop, review, and meet work schedule and budget objectives
- Ensure technical adequacy of field, laboratory, data management, and construction activities
- Prepare for and attend meetings with the NTR, as required
- Manage and coordinate group interfaces
- Document the need for contract modifications, if needed.

To carry out these functions, the project manager will have the authority to:

- Make work assignments for staff and subcontractors
- Allocate additional personnel as needed
- Establish work budgets and schedules with milestones
- Approve subcontractor work and invoices
- Communicate with the site supervisor about day-to-day activities and alert the program manager and/or the project engineer to potential problems
- Maintain OHM quality standards.

2.4.3 Site Supervisor

The site supervisor is the OHM contact at the site and is responsible for performing the remediation activities in accordance with the work plan and other project plans and specifications. The site supervisor's responsibilities include, but are not limited to:

- Implementing the day-to-day aspects of the Health and Safety Plan (HASP) jointly with the SSO
- Coordinating engineering activities at the site as directed by the project manager
- Managing the day-to-day execution of the project at the site including administrative and procurement activities
- Monitoring work progress and schedule, and advise project manager of variances
- Implementing state and federal regulations pertinent to the work
- Assisting in preparation of work progress schedules, project reports, "as-built" drawings, and required compliance submittals
- Compiling the daily logs into a weekly report which will be forwarded to the project manager
- Attending work progress meetings
- Reporting to the project manager changes desired in the contract documents so that required review and approval can be accomplished prior to when the change is made, and reporting for review and approval changes necessitated by unanticipated site conditions
- Procuring, with approval of the project manager, subcontractor services
- Ensuring that remedial rework is subjected to the same quality requirements as the original work.
- Perform QC responsibilities in absence of QC Representative.

2.4.4 Site Safety Officer

The site safety officer (SSO) is responsible for implementing the HASP which satisfies federal, state, and local regulations and is consistent with site conditions. The site safety officer may take actions independent of the project group to stop the project, if required, for compliance with the HASP.

At the Site 56 removal action, the SSO will be on site on a part-time, as needed, basis. The SSO will work with the site supervisor to ensure that proper safety programs are set up, and then check periodically to ensure that they are being implemented and that the requirements of the HASP are being met.

- Directing the entrance and exit medical physical requirements, if required
- Approval of personnel protective equipment and safety procedures specified in the HASP
- Overseeing the maintenance and use of field monitoring equipment necessary to define on-site hazards associated with remediation
- Designating appropriate personnel protection level; determining protection level upgrades and downgrades as site conditions permit
- Providing necessary guidance to the project staff so they can safely perform their functions in accordance with federal and state regulations

2.4.5 Quality Control Representative

The QC representative is independent of the site project chain of command and reports to the Program QC manager and works with the NTR. The QC representative will be on site on a part-time, as needed, basis throughout the project. Daily QC requirements will be performed by the site superintendent in the absence of the QC representative and shall be audited by the QC representative during scheduled inspections.

The QC representative along with the Site Superintendent shall be jointly responsible for coordinating inspection and surveillance activities. The QC representative will be supported in this role by the superintendent. The QC representative will monitor the full site activities on a periodic basis. The results of inspections and surveillance will be documented in a report describing the events reviewed that day. The QC representative will also be responsible for

- Reviewing results of on-site verification testing and inspection reports.
- Implementing appropriate provisions of this plan.
- Serving as the collection point for remediation-related non-conformance.
- Performing, or causing to be performed, daily inspections and tests of the scope and character necessary to achieve the quality of construction outlined in the plans and specifications for work under the contract performed on or off site.
- Maintaining 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.
- Insuring that marked-up drawings are maintained at the site depicting as-built conditions. The drawings will be available for review by the NTR at all times.
- Maintaining a contractor-generated submittal register, ENG Form 4288, 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. A copy of the submittal register is included as an attachment to this document.
- Reviewing shop drawings and/or other submittals for compliance with the contract requirements prior to their transmission to the NTR.
- Establishing and maintain a Rework Item List of work that does not conform to specifications. Track and monitor the items on the list to assure the rework inspection and testing activities and frequencies are in accordance with the contract requirements.
- Attending and assisting the NTR at the pre-final inspection and the final acceptance inspection.

2.4.6 Transportation and Disposal Coordinator

OHM will assign a transportation and disposal (T&D) coordinator to the project team to manage the transportation and disposal of the various wastes, if necessary. The T&D coordinator will not be on site during the project. The T&D coordinator will be responsible for preparing waste profiles and manifests, and for

obtaining cost-effective transportation disposal options and disposal facility approval. The T&D coordinator will work closely with the NTR.

3.0 SCOPE OF WORK

OHM has prepared this Work Plan based on the requirements of Alternative #4 of Engineering and Cost Analysis prepared by Jorgensen and Phillips. This alternative required the removal of lead-contaminated soil/sediment from the IW87 outfall and from the stormwater collection pipe. This section details the specifics upon which this Work Plan is based.

3.1 KEY ASSUMPTIONS

In developing this Work Plan, OHM has made the following assumptions that directly affect project cost and schedule:

- OHM and its subcontractors will have open site access during normal working hours, Monday through Friday.
- Construction water generated during pipe cleaning activities can meet permitted discharge requirements of 0.082 mg/l of lead by the filtration treatment process described herein.
- During pipe cleaning, OHM intends to store generated water within the treatment system holding tanks. Water will be filtered and recycled during the cleaning process until all sediment/soil is removed from the pipeline. Collected water shall then be treated and discharged through the pipe pending acceptable analytical results and approval from the Navy.
- Based on the rainfall which occurs around the time of site work, OHM may elect to install additional dewatering sumps at locations upstream/upgradient of the area to be disturbed. The water pumped from these sumps may be directly discharged downstream of the work area.
- Tank storage volumes will be monitored to assure at least one foot of freeboard at all times.

3.2 SUMMARY OF WORK TASKS

The following details the individual tasks which OHM is prepared to perform to effect the removal of lead-contaminated soil. These tasks are listed in rough chronological order, although some overlap of tasks will occur, as listed on the schedule.

- Set up site support facilities, including decontamination, analytical, and office trailers, contamination reduction zone (CRZ) control measures, and work zone protective barriers, fence.
- Perform non-intrusive tree clearing.
- Non-intrusive construction of a stabilized construction entrance and site access road.
- Install perimeter haybales and silt fence in accordance with approved Erosion and Sedimentation Control Plan.
- Set up water filtration plant.
- Install water diversion measure at upstream manhole of stormwater pipe.

- Repair upstream Building 790 sump pit
- Install upgradient/upstream dewatering sumps, as needed.
- Place swamp mats at end of SW pipe.
- Construct containment dike around excavation area.
- Remove last 70 feet of stormwater pipe at outlet end, stage in roll-off.
- Set concrete sump with pump at downstream end of pipe.
- Pressure wash pipe and remove sediment.
- Operate water filtration system.
- Reline remaining stormwater pipe.
- Excavate contaminated soil/sediment below outfall.
- Transport excavated soil/sediment to filtration pool, dewater, and place in roll-off boxes.
- Perform post-excavation sampling on excavated area.
- Perform transportation and disposal of dewatered sediment and miscellaneous site debris.
- Conduct analysis on treated water and discharge.
- Reconstruct grades at stormwater discharge area and disturbed areas.
- Construct stormwater ourfall with 4 inch rip rap to confluence with northern swale.
- Reconstruct channel
- Install weir in new channel.
- Remove access road, water filtration plant, site trailers and utilities, and erosion and sedimentation control measures.
- Reseed disturbed areas and re-establish vegetation.
- Demobilize site.

3.3 SOIL CLEANUP LEVELS

A cleanup level of 35 mg/kg lead in soil will be enforced to determine when the objectives of the removal action have been met. The cleanup level for this removal action has been prescribed by the Navy and applies upstream of the IW87 discharge point. Post-excavation samples will be collected at the completion of excavation to the initial limits in the outfall area. In areas where post-excavation samples exceed the cleanup level, additional rounds of excavation and sampling will be performed until the cleanup level is met.

3.4 ARARs

The work associated with this delivery order include activities which are regulated by various Applicable, Relevant and/or Appropriate Requirements (ARARs). These activities, which are described elsewhere within this work plan generally include; soil disturbance, activities within a nontidal wetland or buffer, transportation and disposal of hazardous materials, and permitted industrial discharge. These requirements and how they will be coordinate with field activities are listed in the following sections.

3.4.1 Soil Erosion and Sediment Control Requirements

OHM is required to provide soil erosion and sediment control measures as required by the Maryland Department of the Environment. Soil erosion and sediment control measures and procedures shall also be constructed and maintained in accordance with the approved Erosion and Sediment Control Plan for Industrial Wastewater Outfall 87 prepared by Black and Veatch dated September 13, 1995. One copy of the approved plan shall be maintained on site at all times.

3.4.2 Activities Within a Nontidal Wetland

A portion of the project involves work within a wetland, and is regulated under both federal requirements by the U.S. Army Corps of Engineers and State of Maryland requirements by the MDE. The Navy has obtained a permit from the Corps of Engineers and a Letter of Authorization from the MDE to proceed with this project. The MDE authorization stipulated several requirements which include Best Management Practices For Working in Nontidal Wetlands (BMP) and the restriction of work within the wetland or buffer during the period of March 1 to June 15. The BMP requirements are included in section 5.1 of this Work Plan. A copy of the Letter of Authorization will be maintained by OHM on the jobsite.

3.4.3 NPDES Permitted Discharge Limits

The goal of this delivery order is to remove the source lead contamination which has caused IW87 NPDES permitted discharge limits to be exceeded. The source of discharge water contamination has been identified to be lead contaminated sediment contained within the discharge piping and swale upstream of the IW87 discharge point. As part of the removal action, OHM will generate water from dewatered sediment and from the pipe pressure washing. This water will be filtered and tested prior to being released to the IW87 outfall.

The MDE discharge permit provides the monitoring requirements and discharge limitations to which IHDNSWC must comply. The permit requires a measurement frequency of one month for all stated effluent characteristics which include flow, total suspended solids, temperature, nitrated esters, lead, mercury, chemical oxygen demand, total nitrogen, total phosphorus and pH. While IHDNSWC will continue to perform the monitoring requirements during this removal action, water generated from construction activities will be tested for lead and nitrated esters only. This requirement has been coordinated by the Navy with MDE. The testing will be performed by IHDNSWC's on-site laboratory. Lead shall be measured as stipulated in the discharge permit as total recoverable lead (EPA Method 239.2). Only after analytical results confirm that construction generated water is within the effluent limits for lead and nitrated esters shall that water be discharged to IW87. A copy of IHDNSWC's discharge permit shall be maintained on the jobsite by OHM.

3.4.4 RCRA Disposal Requirements for Lead Contaminated Soil

Lead contaminated sediment shall be transported in accordance with the requirements of DOT 49 CFR Parts 172,173 and 177. Disposal shall be in accordance with EPA 40 CFR Parts 261, 262 and 268.

4.0 PREPARATORY ACTIVITIES

This section describes the activities which OHM will complete in preparation for the removal of the lead-contaminated soil at Site 56. The preparatory activities consist of submittals, a pre-construction meeting, and mobilization.

4.1 SUBMITTALS

OHM's required submittals consist of a Work Plan, Health and Safety Plan, Sampling and Analysis Plan, and Quality Control Plan along with all permanent materials to be incorporated in the work. It is the intent of the submittal register to list in advance all submittal items required to establish the consistency and quality of the work. It is also the intent of the submittal register to document additional submittals not specifically listed on the register but deemed necessary for quality control and documentation. These items will be identified, documented and approved prior to their incorporation into the work.

4.2 PRE-CONSTRUCTION MEETING

A pre-construction meeting will be held on site once final Work Plan approval has been received, or earlier if requested by the Navy. Attendees at the meeting will include the OHM on-site project team, the Contracting Officer and other Navy personnel, and other involved parties. The meeting will cover site logistics, including working hours, materials storage, tree removal, erosion control, and an assessment of current conditions and the need for swamp mats while working near the outfall. Any last minute changes to the proposed work methods will be agreed to at this meeting, and a firm date for mobilization will be established. Minutes of this meeting will be recorded and distributed to all attendees.

4.3 MOBILIZATION

OHM will mobilize equipment, personnel, and materials to the project site from the Glen Allen, Virginia, Windsor, New Jersey, Buffalo, New York, and Hopkinton, Massachusetts offices. All OHM employees and its hazardous material subcontractors are 40-hour OSHA trained in accordance with 29 CFR 1910.120. OHM will use a combination of owned or rented equipment on the project, and will attempt to purchase materials locally. OHM will obtain commitments on all key equipment and materials in order to ensure a smooth mobilization. The following subsections detail the anticipated mobilization tasks.

4.3.1 Site Setup

The anticipated layout of site support facilities is shown in Appendix E drawing sheet 2 of 4. OHM will mobilize and set up an office trailer and a decontamination trailer. The decontamination trailer will have shower and wash facilities and a change room. Dirty wash water from the decontamination trailer will be pumped to the water filtration system and treated. OHM will spot portable toilets adjacent to the office trailer only. Waste will be removed from the portable toilets via sanitary tanker. OHM will install temporary electrical power and to each of the trailers and telephone service to the office trailer. Drinking water will be supplied in water coolers.

4.3.2 Tree Clearing

Tree clearing will be performed in a selective, non-intrusive manner in the future location of the water treatment system, the temporary access road, the pipe discharge area, and the pipe removal area. Tree clearing will consist of the selective trimming and cutting of trees into sections and their satisfactory disposal. Other

vegetation to be removed during this phase will include downed timber, branches, snags, brush, and rubbish within the area to be cleared.

Felled trees and branches with diameters greater than six inches and lengths greater than eight feet will be considered merchantable timer. This material will be cut into eight to 10 foot lengths and stockpiled on site, as directed by the Contracting Officer. This timber will remain the property of the Government.

4.3.3 Access Road Construction

OHM will construct a temporary access road from the existing road east of Building 1769 to the outfall area, in the alignment shown on Appendix E drawing sheet 2 of 4. As shown on Detail E of drawing sheet 3 of 4, a stabilized construction entrance, consisting of Number 57 stone, will be constructed at the beginning of the access road. The access road will be approximately 800 feet long, and will be constructed by placing quarry process stone over an eight ounce non-woven geotextile fabric. The roadway stone will be compacted with one pass of a vibratory roller. The access road will be constructed in a non-intrusive fashion, will be competent for heavy machinery and truck traffic, and will comply with the Erosion and Sediment Control Plan. Where required to maintain drainage, culverts will be placed under the temporary access road.

4.3.4 Erosion and Sediment Control Plan

OHM will install and maintain erosion and sediment control measures in accordance with the Erosion and Sediment Control Plan for Industrial Outfall 87 prepared by Black and Veatch dated September 13, 1995. The required measures include placement of silt fence and haybales where required to control erosion. In addition, a containment dike will be constructed around both sides of the discharge area to be excavated and around the 70 foot section of stormwater pipe to be removed. Finally, a sump pit and water diversion outlet structure will be constructed in the stream which enters the outfall area in order to divert this stream flow. The approved E&S plan is contained in Appendix A of this Work Plan.

4.3.5 Swamp Mats

Depending on the dryness and stability of the sediments in the discharge area at the time of mobilization, OHM may be required to place swamp mats to gain access to this area. Swamp mats are large wooden timbers lashed together so that excavating equipment can maneuver on tope of them without sinking in the mud. An alternative to swamp mats might be to use lighter excavating equipment than planned. The decision on whether or not to use swamp mats will be made by OHM and Navy personnel on or about June 15.

4.3.6 Water Filtration Plant Set Up

OHM will set up the water filtration system once the required adjacent perimeter erosion controls are in place. The construction details on the water filtration plant are shown on Appendix E drawing sheet 4 of 4. First, the entire plant area will be rough graded and sharp rocks or debris removed to form a smooth subgrade area for the plant. Then the dual containment system will be constructed. A two foot high row of haybales will be placed around the perimeter of the plant area. A layer of eight ounce non-woven geotextile will then be placed on the subgrade and laid over the haybales. Next, a one to six inch leveling course of fine building sand will be placed on the geotextile and compacted. A 60-mil textured high density polyethylene (HDPE) liner will then be placed on the leveling course and its ends lapped over the haybales. The seams of the HDPE liner will be welded and then rebar will be used to attach the liner and geotextile to the haybales.

The next step in the construction of the water filtration plant will be to construct the various holding pools on top of the 60-mil liner. The 50,000 settling/dewatering pool will be constructed as shown in the plan

view and Section B-B on drawing sheet 4 of 4. Free standing structural forms will be set to form the perimeter of the pool, then two pool liners will be placed over the forms. The pool bottom will slope slightly to one end. An eight ounce non-woven geotextile will be placed over the liners on the bottom of the pool, followed by a six inch layer of pea gravel. The geotextile will then cover the pea gravel. Two 4-inch corrugated HDPE perforated pipes, wrapped in filter cloth, acting as drains, will be laid in the pea gravel so that they drain into a 12-inch diameter sump at the low end of the pool. The sump will consist of a 12-inch diameter, 4-foot high perforated PVC pipe, which stands on end. An entrance ramp, 10 feet wide by 35 feet long by 30 inches high, will be constructed which allows a front end loader to deposit sediment from the excavation area into the 50,000 gallon pool. The two 12,000 gallon pools will be constructed in a similar manner, according to the details shown on drawing sheet 4.

Once the 50,000 gallon pool and the two 12,000 gallon pools have been set up, a bag filter system and carbon polishing system will be installed. The carbon unit and bag filters will be installed in-line between the first and second 12,000 gallon pool. The bag filters will consist of two parallel series of filters, each series consisting of 20 micron, five micron, and one micron particulate filters. The carbon unit will be a 1,000 pound fully loaded activated carbon vessel.

Once the treatment units have been placed, submersible pumps will be field placed and then either flexible hose or hard piping will be run between the various pools and treatment units. Non-contaminated water will then be run through the system and discharged to ensure that no vessels or piping joints are leaking.

4.3.7 Dewatering System Setup

OHM may elect to construct additional measures for dewatering the work area, in addition to the berms, dikes, and pits described in Section 4.3.4. These additional dewatering measures would potentially be rock-lined sumps upstream of the work area, with submersible pumps used to convey the collected water to a release point downstream of the work area. The decision on whether or not to implement these additional dewatering measures will be made on-site with the consultation of the Navy.

5.0 SEDIMENT REMOVAL PLAN

Removal of lead-contaminated soil/sediment will not begin until the site control measures discussed in the previous section are in place. Additionally, in-stream work will not begin until after June 15, as required by MDE regulations for conservation of aquatic habitat. In general, the sediment removal sequence will be as follows:

- Removal of the last 70 feet of pipe
- Pipe cleaning and lining
- Excavation of the discharge area

Further details on the sediment removal process are presented in this section.

5.1 BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) for Working in Non-Tidal Wetlands are a requirement of the MDE. BMPs will be strictly adhered to when wetland areas are directly or indirectly impacted by construction activities.

The BMPs to be followed by OHM are listed below:

1. No excess fill, construction material, or debris is to be stockpiled or stored in the wetlands or buffer.

2. Place materials in a location and manner which does not adversely impact surface or subsurface water flow into or out of the non-tidal wetlands.

3. Do not use the excavated material as backfill if it contains waste metal products, unsightly debris, toxic material, or any other deleterious substance. If additional backfill is required, use clean material free of waste metal products, unsightly debris, toxic material, or any other deleterious substance.

4. Place heavy equipment on mats or suitably operate the equipment to prevent damage to the non-tidal wetlands or buffer.

5. Repair and maintain any serviceable structure or fill so there is no permanent loss of non-tidal wetlands in excess of non-tidal wetlands lost under the original structure or fill.

6. Rectify any non-tidal wetlands temporarily impacted by construction activities.

7. All stabilization in the wetland and buffer shall be of the following recommended species: Annual Ryegrass (Lolium multiflorum), Millet (Setaria italica), Barley (Hordeum sp.), Oats (Uniola sp.), and/or Rye (Secale cereale). These species will allow for the stabilization of the site while also allowing for the voluntary revegetation of natural wetland species. Other non-persistent vegetation may be acceptable, but must be approved by the Division. Kentucky 31 rescue shall not be utilized in the wetland or buffer areas. The area should be seeded and mulched to reduce erosion after construction activities have been completed.

8. After installation has been completed, make post-construction grades and elevations of non-tidal wetlands the same as the original grades and elevations in temporarily impacted areas.

9. To protect important aquatic species, in-stream work is prohibited as determined by the classification of the stream as follows: Class I waters - in-stream work may not be conducted during the period of March 1 through June 15, inclusive, during any year.

5.2 SUMP PIT REPAIR

Prior to the pipe lining task, OHM will need to modify and repair the Building 790 sump pit. The modifications are required to allow the lining subcontractor full access to the pit interior. This will include cutting all protruding piping back toward the walls of the pit including the temporary removal of the valve from the outdoor spill dike. Additionally, OHM will remove excess concrete which exists within the 24 inch terra cotta pipe at the pit entrance.

Once the necessary modifications have been made to the pit, the pit interior surfaces will be decontaminated and cleaned by pressure washing in order to prepare for the interior surface repairs. The sump pit will be patched and resurfaced by the application of non sag repair mortar with a minimum 28 day compressive strength of 5,000 psi and a minimum 28 day bond strength of 2,200 psi.

5.3 STORMWATER PIPE REMOVAL

Prior to the pipe cleaning task, OHM will remove the lower 70 foot section of stormwater pipe which lies within the discharge area. An excavator resting on swamp mats will be used to remove the pipe sections. The removed lengths of pipe will be lifted with a chain or sling with the excavator bucket and loaded into the front-end loader bucket and transported to the 50K pool for decontamination. Contaminated sediment within the pipe will also be removed as the pipe is being removed. The sediment will be staged in an adjacent HDPE lined staging area and will be loaded out to the water treatment system. OHM will make reasonable attempts to pressure wash the pipe sufficiently to allow for its disposal as ordinary waste.

Once the 70 feet of pipe have been removed, a new pre-cast concrete sump will be installed at the new end of the pipe. With the sump installed, pressure washing of the 24 inch pipe can begin.

5.4 PIPE CLEANING

In preparation for pipe cleaning, the pre-cast concrete sump (as shown in Appendix E, drawing 3 of 4, Detail C) will be placed at the discharge end of the stormwater pipe. From the concrete sump, rinsate and run-off will be pumped to the on-site water filtration plant.

Decontamination of the stormwater pipe will be accomplished using high pressure water jets (a jet rodder). OHM will start at the upstream end of the stormwater pipe and work down gradient. First, the upper manhole next to Building 790 will be pressure washed. Pipe from the upper manhole to the middle manhole will be decontaminated next, followed by the middle manhole, the lower section of pipe, and finally, the pre-cast concrete sump.

Personnel entering the Building 790 sump pit and the intermediate manhole will be subject to confined space entry procedures and requirements. Hazard control measures associated with confined space entry are identified.

The sediment and rinsate released during this process will flow to the concrete sump, where it will be pumped to the water filtration plant. It is estimated that the pressure washing of the pipe will generate 25 gpm which will collect in the sump. In addition, groundwater infiltration may generate another 0-25 gpm which will

collect in the sump. To minimize treated water volumes requiring storage prior to final discharge, the water source for the jet rodder will be the untreated water in the first 12,000 gallon storage pond.

5.5 EXCAVATION VOLUMES IN DISCHARGE AREA

The initial estimated volume of the contaminated sediment to be excavated from the sandy swale immediately downstream of the pipe discharge (the excavation limits) was 51 cubic yards. However, pre-construction sampling was performed in December 1995 to further define the excavation limits prior to construction. The results of this December 1995 sampling have been transmitted to the Navy under separate cover. Based on these results, the excavation limits have been revised as shown on the Stormwater Discharge Area Plan contained in Appendix E, drawing sheet 3 of 4. The new excavation limits encompass a volume of 66 cubic yards, consisting of the same area in the outfall channel and an additional area one foot deep by two feet wide by 30 feet long on the right (facing upstream) embankment. After excavating to these initial limits, post-excavation sampling will be performed as discussed in the Sampling and Analysis Plan, Appendix D. The initial limits of excavation will be staked out by the Site Superintendent with the NTR's concurrence.

5.6 DISCHARGE AREA SEDIMENT EXCAVATION

OHM will use an excavator resting on swamp mats to excavate the area within the discharge area to the initial excavation limits. The excavated sediment will be transferred from the excavator bucket to the bucket of the front end loader. The loader will then transport the sediment to the water filtration plant where it will deposit the sediment in the 50,000 gallon settling pool. After excavation to the initial limits, OHM will collect post-excavation samples according to the SAP. In areas where analytical results exceed the cleanup levels, additional rounds of excavation and sampling will be performed until the cleanup level is met.

As an alternative to an excavator, OHM may elect to remove some portions or all of the sediment from within the excavation limits using a "vactor" truck. The choice to use this alternative will be based on the success of dewatering measures in drying the sediments prior to excavation. If the sediments are too wet, then excessive sedimentation release may occur. The decision to use a vactor truck will be made with the Navy's consent.

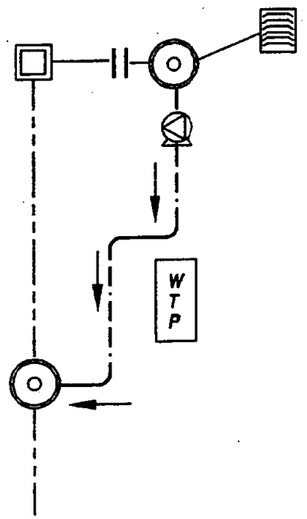
5.7 WATER DIVERSION PLAN

OHM will be required to install various water diversion measures so that the required scope of work can be performed while maintaining proper stormwater drainage along with control of non-contact process water discharge. The diversion schematics along with their required service are presented in Figure 4.

Detail DP-1 will be used while sump pit repairs are implemented. The bypass pump will be sized to accommodate the stormwater inflows along with process water inflow.

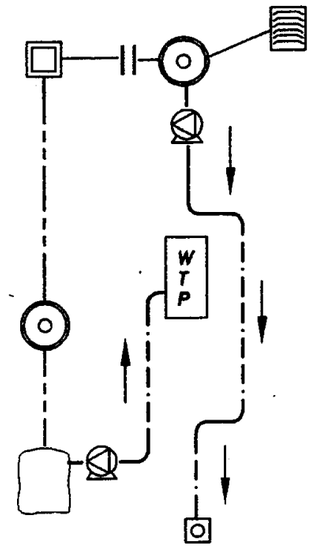
Detail DP-2 schematic will be used while the lower 70 foot section of pipe is removed. The same bypass pump will be utilized as in DP-1 except the discharge will be directed to the diversion outlet structure. Water which collects in the work area will be pumped for storage at the 50K pool.

Detail DP-3 schematic will be used while the pipe cleaning task is performed. Water generated during the water jet rodding will be recycled through the Water Treatment Plant (WTP). Discharge to the outlet structure from the WTP will be batch releases pending sample analytical results. If necessary, inflow to the Building 790 sump pit will be bypassed as in DP-1 or DP-2 if required by the cleaning process.



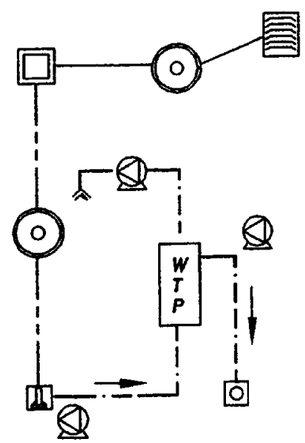
DP-1

SUMP PIT REPAIR



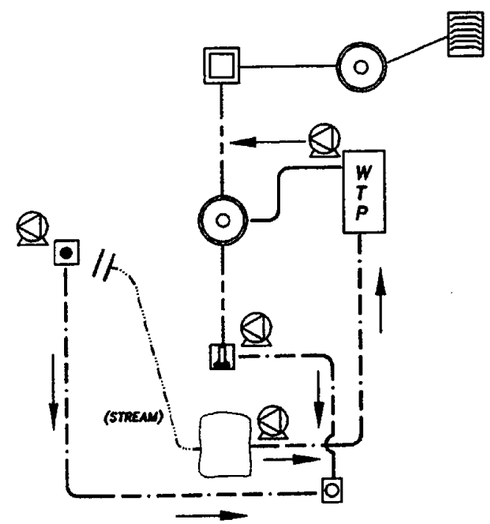
DP-2

PIPE REMOVAL



DP-3

PIPE CLEANING AND RELINING



DP-4

TRENCH EXCAVATION RESTORATION

LEGEND

- STORM INLET
- BLDG 790 SUMP PIT
- ISOLATION POINT
- MANHOLE
- TERRA COTTA STORM PIPE
- DIVERSION INLET
- DIVERSION OUTLET
- CONTAINED WORK AREA
- PUMP
- CONC SUMP
- WATER TREATMENT SYSTEM
- STREAM
- JET RODDER FOR PIPE CLEANING

REVISIONS

OHM Remediation Services Corp.

OHM PROJECT NO. 16773

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION NORFOLK, VIRGINIA
NAVAL SURFACE WARFARE CENTER INDIAN HEAD, MARYLAND
ATLANTIC DIVISION

FIGURE 4
WATER DIVERSION SCHEMATICS
SITE 56

SCALE: AS SHOWN
CONTRACT NO. N62470-93-D-3032
SHEET I.D. 1 of 1

X-REF: TOPO-1
OHM CORPORATION TRENTON, NJ
DRAWING NUMBER 16773-B2

PLOT SCALE: 1 = 1

Detail DP-4 will be implemented during the stream sediment removal action and restoration tasks. Stormwater from the stream confluent with the work area will be diverted to the outlet structure. The bypass pump for this action will be sized to handle a one-year storm event for that drainage area. Other pumps will be used if greater water handling capacity is required. Water which collects in the work area will be pumped to the WTP for storage and filtration. Inflows to the 24 inch T.C. storm pipe will be diverted from the outlet sump to the diversion outlet structure.

5.8 EXCAVATED SEDIMENT DEWATERING

Excavated sediment will be transported to the water filtration plant via either front-end loader or vactor truck and deposited in the 50,000 gallon settling pool. In the settling pool, the water will be allowed to drain by gravity out of the sediment and into the underlying drainage layer. The surface of the settling pool and the collection sump will be kept free of standing water using submersible pumps. Once discharge area sediment excavation is complete, the sediment dewatering may take an additional week until the sediment is sufficiently dry for off-site disposal. OHM may resort to adding a small portion, approximately 10 percent by weight, of portland cement to the sediment to expedite the drying process.

5.9 TRANSPORTATION AND DISPOSAL PLAN

Once the dewatered sediments have been sufficiently dried, they will be loaded into lined roll-off boxes or end dump trailers. OHM will then characterize the waste by collecting a representative sample from the dewatered lead-contaminated sediment, and analyze it for Resource Conservation and Recovery Act (RCRA) characteristics and a full Toxicity Characteristic Leaching Procedure (TCLP). Based on these results, the sediments will be classified.

The most cost effective off-site treatment for lead contaminated soil is stabilization and disposal in a landfill. Most commercial hazardous waste landfills have this treatment capability, some of which are:

- Chemical Waste Management, Model City, NY.
- Envirosafe Services of Ohio, Inc., Oregon OH.
- EQ Co., Belleville, MI.

Final selection of the disposal facility will be based on competitive bid results in order to comply with all FAR requirements. OHM will forward the name of the disposal facility to the Navy immediately following procurement so that the Navy may provide this information to MDE and EPA.

Each vehicle/container will be visually inspected to verify that they are clean and free of contaminants prior to entering the site. Copies of applicable waste permits and insurance certificates for both the disposer and transporter will be submitted to the Navy prior to loading out of contaminants. The activity hazardous waste coordinator, Bob Steves (telephone 301-743-4343) will be given 24 hour advance notification of outgoing hazardous waste shipments so that he may sign manifests. Characterization sample results along with disposal manifests shall be included in the appendix of the final removal action report.

6.0 WATER TREATMENT PLAN

The layout for treating the impacted water generated during the removal action is shown on drawing sheet 4 of 4 (Appendix E). In general, the water will be treated by gravity settling of large sediment particles, bag filtration of smaller particulates, and then carbon polishing. Water collected in sumps outside the treatment plant which has not contacted contaminated sediment or pipe will be directly discharged.

6.1 WATER COLLECTION MEASURES

Water from the following sources will be pumped to the water treatment system:

- Stormwater pipe outfall during pipe cleaning and pipe removal operations
- Inside the discharge area containment dike until excavation of contaminated sediment is complete, as verified by analytical results
- Pressure washing and personal decontamination operations

Water from the following sources will be considered clean and directly discharged to a point downstream of the limit of disturbance:

- The sump pit in the stream upgradient of the discharge area
- Outside of the containment dike, which is constructed around the discharge area
- From the upper and middle manholes once these manholes and the pipe between them have been pressure washed with jet rodders
- From the precast concrete sump after pipe cleaning
- Diverted source waters prior to the Building 790 collection pit
- From other dewatering pits or drains which are constructed upstream or upgradient of the active work area

6.2 SEDIMENT CHARACTERISTICS

Sieve and hydrometer analysis was performed on a sediment sample taken at the pipe's downstream invert to determine its gradation and settlement characteristics. The gradation curve is included in Figure 5. Testing indicated about 11% fines passing the No. 200 sieve. The hydrometer analysis performed on the sample finer than the No. 10 sieve indicated at least 90% of the particles settled out within five minutes and about 96% of the particles settled out within four hours. No significant settlement of the remaining particles was noted at the 24 hour reading. Based on these results, it is anticipated that most of the solids will be removed through settlement. The remaining suspended particles are most likely clay and silt with a grain size of approximately 74 microns. These particles can be easily removed by filtration.

6.3 WATER TREATMENT PLAN

OHM intends to use settlement tanks and a simple solids filtration and carbon adsorption scheme to treat the impacted water generated during the removal action. This concept is based upon familiarity of the location and material to be treated. It is anticipated that the high degree of solids removal achieved by settlement and filtering will enable the treated water to be discharged with lead levels below the permit discharge limit of 0.082 mg/l.

Contaminated water will enter the filtration system by being pumped to the 50,000 gallon settling pool. Water in the 50,000 gallon pool will be pumped out of the sump or from pumps above the pea gravel drainage layer. From the 50,000 gallon settling pool water will be pumped to the initial 12,000 gallon settling pool where further settling out of particles will occur.

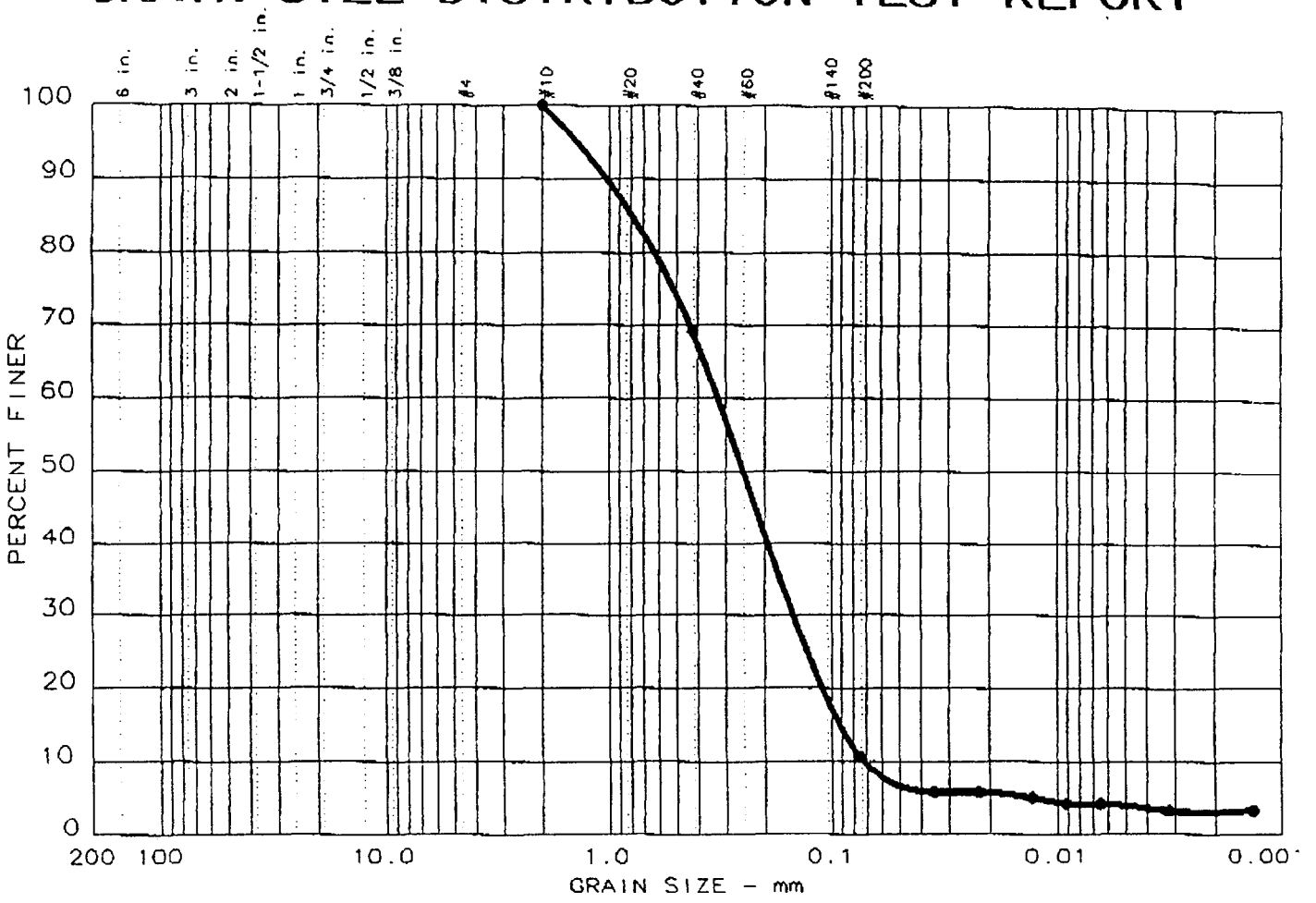
After the first 12,000 gallon pool, water will be pumped through one or two parallel sets of 20, five, and one micron bag filters in series. The dual filter arrangement will allow for the simultaneous changeout of one filter with running of another filter. The filtered water will then pass through a single liquid-phase activated carbon vessel where nitrate esters are removed. Once the water has been treated in the carbon vessel, it will be discharged into the 12,000 gallon holding pool.

During the pipe cleaning activity, approximately 25 gpm is anticipated to be processed through the water treatment system. Assuming that 50% capacity is available in the 50,000 gallon pool and 75% capacity is available in the first 12,000 gallon pool, a retention period of 23 hours is provided. This retention time is more than sufficient to allow for particle settlement.

6.4 TREATED WATER SAMPLING AND DISCHARGE

Treated water will be sampled in the 12,000 gallon holding pool for analysis prior to discharge. Treated water will be analyzed for lead and nitrated esters in accordance with the IHDNSWC's discharge permit. Once analytical results have been received that indicate that the permit discharge limits for these two parameters have been reached, the water held in the pool will be discharged downstream of the outfall.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	0.0	0.0	89.3	6.8	3.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.776	0.324	0.250	0.149	0.0917	0.0712	0.96	4.5

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded SAND with Silt	SP-SM	A-2-4(0)

Project No.: CT00596000
Project: OHM Corporation
● Location:

Date: 02/05/96

Remarks:

FIGURE 5

GRAIN SIZE DISTRIBUTION TEST REPORT

BENGTSON, DEBELL & ELKIN

7.0 DEMOBILIZATION AND SITE RESTORATION

Site restoration will begin once all dewatered sediment and other contaminated debris have been removed from the site.

7.1 DECONTAMINATION

All small equipment and pumps which contacted the lead-contaminated sediments or rinsate will be decontaminated within the dual containment system. This equipment will then be transported off site. This decontamination rinsate will be run through the treatment system as the final batch, sampled, and then discharged. Larger equipment such as backhoes and loaders will be decontaminated on the decon pad. Water collected at the decon pad will be transferred to the water treatment system.

7.2 FINAL DEBRIS DISPOSAL

OHM will sample and characterize all remediation generated debris in order to facilitate final debris disposal. Examples of this debris requiring sampling and disposal include silt fence, haybales, geotextile, liner, pea gravel, building sand, pipe, and PPE.

7.3 STORMWATER PIPE RELINING

The stormwater pipe will be relined from the upper manhole to the pipe outfall. In addition, any required repairs to the manholes will be made at this time. Many different techniques exist for pipe relining; the exact method to be utilized at Site 56 will be known once the relining subcontractor has been chosen. However, at this time, OHM anticipates using a process where a tube saturated with epoxy resin is inserted through the entire length of pipe to be relined. The tube is heated and cooled and the resin hardens onto the inside of the pipe to form a new pipe lining. The tube is then removed and the relined pipe put back into service.

7.4 RIP RAP INSTALLATION

OHM will install rip rap to re-establish the former channel in the locations where the stormwater pipe was removed or where contaminated sediment was excavated. First, a layer of eight ounce geotextile will be placed on the subgrade, then four to six inch rip rap will be placed to blend the final channel grade to the immediately adjacent surroundings. The channel reconstruction detail is shown in Appendix E, drawing 3 of 4, Detail C.

7.5 WEIR

The existing wooden weir will be replaced with a new fiberglass weir to be located at the end of the rip rap channel. The weir will be construction of ½ inch to ¾ inch thick waterproof fiberglass or stainless steel. A detail of the weir installation is shown on Detail D of drawing sheet 3 of 4 (Appendix E).

7.6 TEMPORARY ACCESS ROAD REMOVAL

Temporary access roads leading into the work area will be removed following remediation activities. The access roam material will be excavated down to the underlying non-woven geotextile. The road material and geotextile will then be disposed off site unless otherwise directed by the Navy. If the Navy wishes to re-use this material on site, OHM will transport it to a Navy designated stockpile area.

7.7 REGRADING AND RESEEDING

The pipe discharge and pipe removal areas will receive erosion control measures. Once post soil/sediment removal is completed, and analytical testing has indicated that removal goals have been achieved, a layer of eight ounce non-woven geotextile will be placed, followed by a layer of four inch to six inch diameter rip rap which will be brought up to final grade. Areas disturbed during soil/sediment removal will be graded to drain into the rip rap drainage channel. Temporary erosion control matting will be installed on all disturbed areas.

OHM will protect newly graded areas from traffic, erosion, and settlements that may occur. Damaged grades, elevations, or slopes will be repaired or re-established.

Temporary access roads and the water filtration system area will be reseeded. The planting of grass seed will take place during an appropriate planting season. Fertilizer, lime, and water will be applied to promote rapid and successful growth. A local landscaping company may be subcontracted to perform part or all these tasks. OHM will obtain and spread a seed mix as recommended by the Navy, Indian Head Environmental Department.

7.8 DEMOBILIZATION

As reseeding and restoration activities are completed, OHM will remove the water diversion systems and drainage will be redirected towards its natural flow path. All support equipment, including trailers, water, telephone, and electrical service will be removed, and OHM will then vacate the site.

APPENDIX A
EROSION AND SEDIMENTATION CONTROL PLAN

EROSION AND SEDIMENTATION CONTROL PLAN

OHM will control soil erosion and sediment in and around all work areas, including roadways and access routes, the pipe discharge area, soil/sediment removal areas, the pipe removal area, and the water filtration system. The soil erosion and sediment control measures to be implemented are shown on the Erosion and Sediment Control Plan for Industrial Wastewater Outfall 87 prepared by Black and Veatch dated September 13, 1995.

Roadways and access routes will be constructed such that soil erosion and sediments are controlled. Geotextile fabric will underlie stone, and silt fences will be erected around the perimeter of disturbed areas. These control measures will be implemented according to the details described in the contract specifications, drawings, and notes.

The stream channel area to be excavated will be protected from soil erosion and sediment through the installation of temporary perimeter silt fences, as detailed in the contract specifications, drawings, and notes. Following soil/sediment removal, eight to 12 ounce non-woven geotextile, followed by four to six inch diameter rip rap, will be placed to inhibit erosion.

OHM will construct and maintain all temporary diversion devices necessary for diversions during cleaning activities. Flows will be discharged adjacent to the stream downgradient of the construction site in a manner to ensure sediments and erosion are controlled. Bypass pumping operations will not be manned 24 hours per day, seven day per week. The installations will be checked at night and on weekends during precipitation events. In case of a problem, other OHM personnel will be contacted to effect repairs.

The OHM site supervisor will ensure the adherence to the procedures referenced in the contract specifications, drawings, and notes. In addition to the procedures referenced, the following Maryland Department of the Environment (MDE) Best Management Practices for Work in Non-Tidal Wetlands will be followed where applicable throughout the project:

1. No excess fill, construction material, or debris is to be stockpiled or stored in the wetlands or buffer.

2. Place materials in a location and manner which does not adversely impact surface or subsurface water flow into or out of the non-tidal wetlands.

3. Do not use the excavated material as backfill if it contains waste metal products, unsightly debris, toxic material, or any other deleterious substance. If additional backfill is required, use clean material free of waste metal products, unsightly debris, toxic material, or any other deleterious substance.

4. Place heavy equipment on mats or suitably operate the equipment to prevent damage to the non-tidal wetlands or buffer.

5. Repair and maintain any serviceable structure or fill so there is no permanent loss of non-tidal wetlands in excess of non-tidal wetlands lost under the original structure or fill.

6. Rectify any non-tidal wetlands temporarily impacted by any construction.

7. All stabilization in the wetland and buffer shall be of the following recommended species: Annual Ryegrass (Lolium multiflorum), Millet (Setaria italica), Barley (Hordeum sp.), Oats (Uniola sp.),

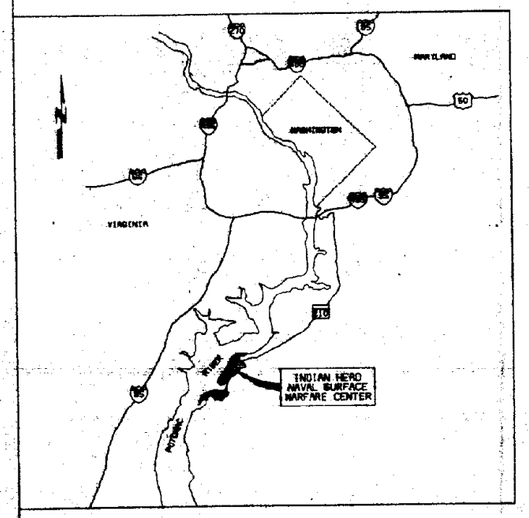
and/or Rye (Secale cereale). These species will allow for the stabilization of the site while also allowing for the voluntary revegetation of natural wetland species. Other non-persistent vegetation may be acceptable, but must be approved by the Division. Kentucky 31 rescue shall not be utilized in the wetland or buffer areas. The area should be seeded and mulched to reduce erosion after construction activities have been completed.

8. After installation has been completed, make post-construction grades and elevations of non-tidal wetlands the same as the original grades and elevations in temporarily impacted areas.

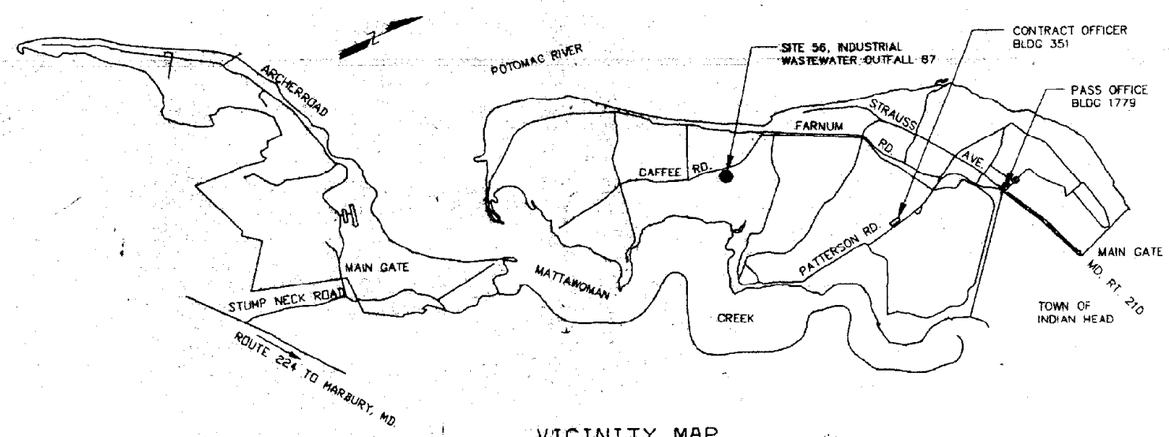
9. To protect important aquatic species, in-stream work is prohibited as determined by the classification of the stream as follows: Class I waters - in-stream work may not be conducted during the period of March 1 through June 15, inclusive, during any year.

EROSION AND SEDIMENT CONTROL PLAN FOR INDUSTRIAL WASTEWATER OUTFALL 87

CONTRACT NO. N62470-93-D-3032



LOCATION MAP
SCALE 1" = 8 MILES



VICINITY MAP
SCALE 1" = 2000'

LIST OF DRAWINGS

SHEET NO.	DRAWING TITLE
1	COVER SHEET
2	EROSION AND SEDIMENT CONTROL PLAN
3	EROSION AND SEDIMENT CONTROL NOTES AND CERTIFICATIONS
4	EROSION AND SEDIMENT CONTROL DETAILS

SYMBOL	DESCRIPTION	DATE	APPROVAL

REVISIONS

GRAPHIC SCALES

Black & Veatch
Gaithersburg, Maryland

DESIGN PDM
DRAFT RLC
CHECK TRD
DATE 00/13/96
OBL:
001:
0011:
0012:
041:

APPROVED (00):

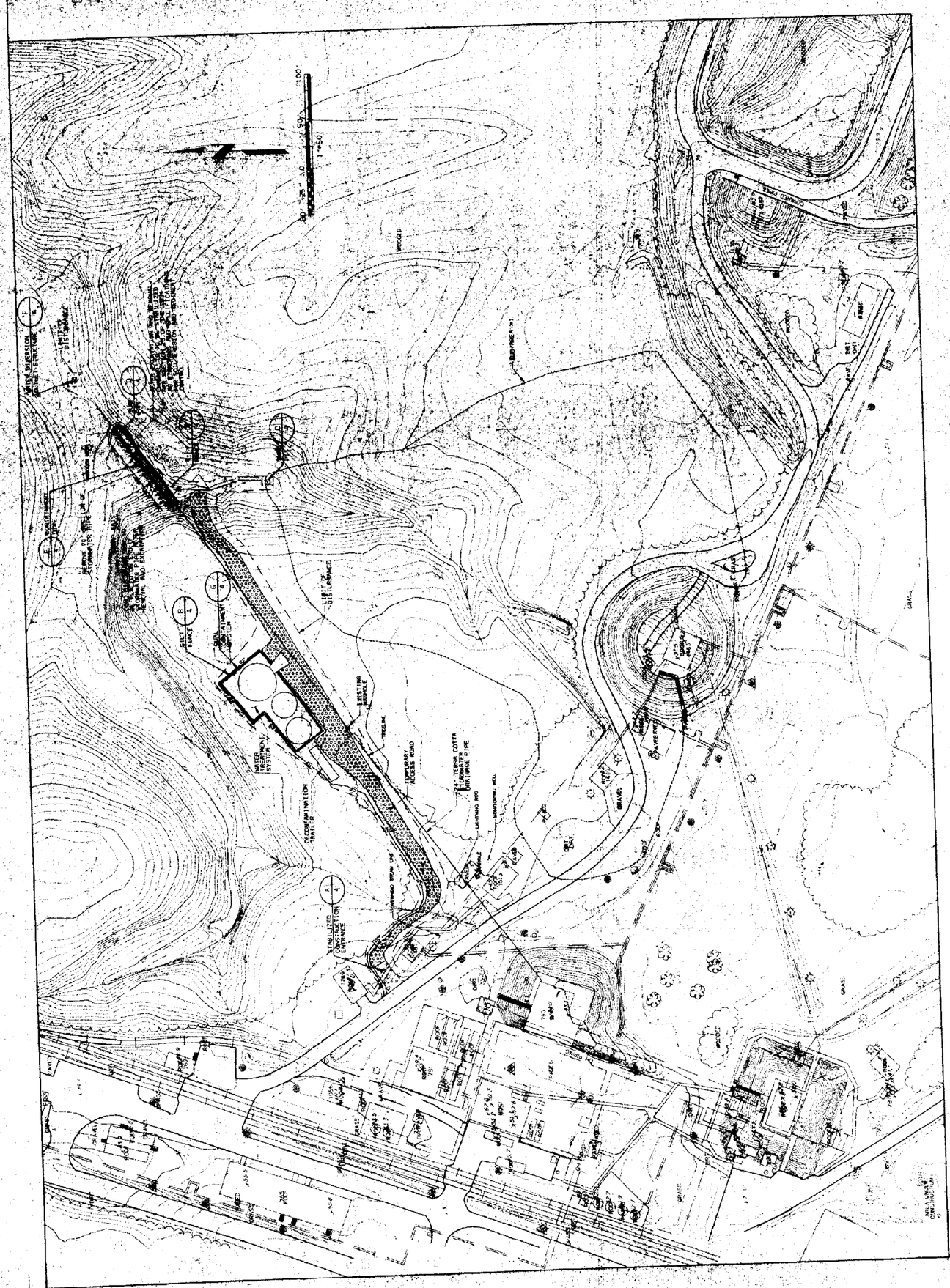
SATISFACTORY TO: ( )

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
INDIAN HEAD DIVISION
NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND

COVER SHEET

CODE ID. NO. 80091
DRAWING SIZE: F
CONSTR. CONTR. NO.
SPEC.
SCALE: NO SCALE
NAVFAC DRAWING NO.
3164191
SHEET 1 OF 4
SEP-1

0071I02X
Box 3
App. A SEP-1



007I03X
Box 3
APP.A SEP-2

SEQUENCE OF CONSTRUCTION

IN GENERAL, CONSTRUCTION ACTIVITIES SHALL BE PERFORMED IN THE FOLLOWING ORDER:

1. NOTIFY SEDIMENT CONTROL INSPECTOR 24 HOURS PRIOR TO START OF CONSTRUCTION.
2. PERFORM CLEARING REQUIRED FOR INSTALLATION OF PERIMETER CONTROLS.
3. INSTALL PERIMETER CONTROLS. NOTIFY SEDIMENT CONTROL INSPECTOR AND OBTAIN APPROVAL BEFORE PROCEEDING FURTHER.
4. COMPLETE ALL REQUIRED CLEARING.
5. CONSTRUCT WATER TREATMENT PAD AND CONSTRUCT TEMPORARY ACCESS ROAD TO WATER TREATMENT SYSTEM.
6. INSTALL TEMPORARY UTILITIES.
7. COMPLETE TEMPORARY ACCESS ROAD TO BOTTOM OF SLOPE.
8. PLACE SWAMP MATS FROM ACCESS ROAD TO STORMWATER PIPE.
9. CONSTRUCT CONTAINMENT DIKE AROUND AREA TO BE EXCAVATED.
10. INSTALL CONCRETE DISCHARGE BOX WITH WEIR AT END OF STORMWATER PIPE.
11. REMOVE CONTAMINATED SEDIMENT FROM STORMWATER PIPE.
12. PLACE LINER INSIDE STORMWATER PIPE.
13. INSTALL SUMP PUMPS FOR DISCHARGING CONTAMINATED FLOW TO WTP AND FOR STREAM DIVERSION.
14. EXCAVATE CONTAMINATED SOIL DOWNSTREAM OF OUTFALL.
15. REMOVE 70' SECTION OF STORMWATER PIPE UPSTREAM OF OUTFALL.
16. REMOVE CONTAINMENT DIKE AND SUMP PUMPS.
17. STABILIZE CHANNEL.
18. REMOVE SWAMP MATS, ACCESS ROAD, TREATMENT FACILITIES AND TRAILER AND PROVIDE VEGETATIVE STABILIZATION.
19. NOTIFY SEDIMENT CONTROL INSPECTOR AND OBTAIN APPROVAL TO REMOVE EROSION AND SEDIMENT CONTROLS.

THE CONTRACTOR MAY SUBMIT TO SSA FOR APPROVAL A REVISED SEQUENCE OF CONSTRUCTION.

DESIGN CERTIFICATION

"I/WE HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH THE 1994 STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL OR CURRENT REVISIONS THEREOF, AND DEPARTMENT OF THE ENVIRONMENT STORMWATER MANAGEMENT REGULATIONS."

SEPTEMBER 13, 1995 — DATE

DESIGNER SIGNATURE

THOMAS E. DUMM — PRINTED NAME

OWNER/DEVELOPER CERTIFICATION

"I/WE HEREBY CERTIFY THAT ALL CLEARING, GRADING, CONSTRUCTION AND OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS PLAN AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I HEREBY AUTHORIZE THE RIGHT OF ENTRY FOR PERIODIC ON-SITE EVALUATION BY STATE OF MARYLAND, DEPARTMENT OF THE ENVIRONMENT, COMPLIANCE INSPECTORS."

9/14/95 — DATE

OWNER/DEVELOPER SIGNATURE

03599 — CARD NO.

William M. Weidenmyer, P.E. — PRINTED NAME AND TITLE

RESPONSIBLE PERSONNEL CERTIFICATION

"I/WE HEREBY CERTIFY THAT ALL CLEARING, GRADING, CONSTRUCTION WILL BE DONE IN ACCORDANCE WITH THE SEDIMENT CONTROL PLANS AND THAT THE RESPONSIBLE PERSONNEL WILL OBTAIN CERTIFICATION BY REGISTERING FOR AND/OR COMPLETING THE MARYLAND DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR SEDIMENT AND EROSION CONTROL BEFORE ANY CLEARING OR EARTHWORK FOR THE PROJECT MAY BEGIN."

DATE — OWNER/DEVELOPER SIGNATURE

CARD NO. — PRINTED NAME AND TITLE

PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF REMOVING AND TREATING CONTAMINATED SILT FROM APPROXIMATELY 700' OF 24" DIA TERRA COTTA PIPE AND ALSO REMOVING AND TREATING SEDIMENT APPROXIMATELY 30' DOWNSTREAM OF THE OUTFALL. A TEMPORARY ACCESS ROAD CONSISTING OF CRUSHED STONE PLACED ON AN 8 TO 12 OUNCE GEOTEXTILE FABRIC WILL BE LAID TO REACH THE BOTTOM OF THE SLOPE ADJACENT TO THE CONTAMINATED AREA. SWAMP MATS WILL BE USED TO ACCESS THE OUTFALL FROM THE TEMPORARY ACCESS ROAD. A TEMPORARY WATER TREATMENT SYSTEM AND ASSOCIATED TRAILER WILL BE PLACED ON SITE FOR DECONTAMINATION OF THE SOIL.

THE APPLICANT FOR EROSION AND SEDIMENT CONTROL PLAN APPROVAL IS:

INDIAN HEAD DIVISION
NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MD 20640-5035
CONTACT: MR. JEFF BOSSART
(301) 743-4705

THE ARCHITECT/ENGINEER FOR THE EROSION AND SEDIMENT CONTROL PLAN IS:

BLACK & VEATCH
18310 MONTGOMERY VILLAGE AVENUE, SUITE 500
GAITHERSBURG, MARYLAND 20879
(301) 840-1123

SITE DESCRIPTION

THE SITE IS LOCATED WITHIN THE INDIAN HEAD DIVISION, NAVAL SURFACE WARFARE CENTER IN INDIAN HEAD, MARYLAND. THE PREDOMINANT SOIL TYPE FOUND ON THE SITE IS BELTSVILLE. THIS SOIL TYPE FALLS INTO SCS HYDROLOGIC SOIL GROUP C. THIS IS A SANDY CLAY LOAM THAT HAS A MODERATELY FINE TO EXTRA FINE TEXTURE. THESE SOILS HAVE A LOW RATE OF WATER TRANSMISSION.

STANDARD EROSION AND SEDIMENT CONTROL NOTES

1. THE CONTRACTOR SHALL NOTIFY THE ADMINISTRATION (SSA) AT (410) 631-3510 SEVEN (7) DAYS BEFORE COMMENCING ANY LAND DISTURBING ACTIVITY AND, UNLESS WAIVED BY THE ADMINISTRATION, SHALL BE REQUIRED TO HOLD A PRE-CONSTRUCTION MEETING BETWEEN PROJECT REPRESENTATIVES AND A REPRESENTATIVE OF SSA.

2. THE CONTRACTOR MUST NOTIFY SSA IN WRITING AND BY TELEPHONE AT THE FOLLOWING POINTS:

   A. THE REQUIRED PRE-CONSTRUCTION MEETING.

   B. FOLLOWING INSTALLATION OF SEDIMENT CONTROL MEASURES.

   C. DURING THE INSTALLATION OF SEDIMENT BASINS (TO BE CONVERTED INTO PERMANENT STORMWATER MANAGEMENT STRUCTURES) AT THE REQUIRED INSPECTION POINTS (SEE INSPECTION CHECKLIST ON PLAN). NOTIFICATION PRIOR TO COMMENCING CONSTRUCTION OF EACH STEP IS MANDATORY.

   D. PRIOR TO REMOVAL OR MODIFICATION OF ANY SEDIMENT CONTROL STRUCTURE(S).

   E. PRIOR TO REMOVAL OF ALL SEDIMENT CONTROL DEVICES.

   F. PRIOR TO FINAL ACCEPTANCE.

3. THE CONTRACTOR SHALL CONSTRUCT ALL EROSION AND SEDIMENT CONTROL MEASURES PER THE APPROVED PLAN AND CONSTRUCTION SEQUENCE AND, SHALL HAVE THEM INSPECTED AND APPROVED BY THE AGENCY INSPECTOR OF SSA INSPECTOR PRIOR TO BEGINNING ANY OTHER LAND DISTURBANCES. MINOR SEDIMENT CONTROL DEVICE LOCATION ADJUSTMENTS MAY BE MADE IN THE FIELD WITH THE APPROVAL OF THE SSA INSPECTOR. THE CONTRACTOR SHALL ENSURE THAT ALL RUNOFF FROM DISTURBED AREAS IS DIRECTED TO THE SEDIMENT CONTROL DEVICES, AND SHALL NOT REMOVE ANY EROSION OR SEDIMENT CONTROL MEASURE WITHOUT PRIOR PERMISSION FROM SSA INSPECTOR AND AGENCY INSPECTOR. THE CONTRACTOR MUST OBTAIN PRIOR AGENCY AND SSA APPROVAL FOR CHANGES TO THE SEDIMENT CONTROL PLAN AND/OR SEQUENCE OF CONSTRUCTION.

4. THE CONTRACTOR SHALL PROTECT ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS TO PREVENT THE DEPOSITION OF MATERIALS ONTO PUBLIC ROADS. ALL MATERIALS DEPOSITED ONTO PUBLIC ROADS SHALL BE REMOVED IMMEDIATELY.

5. THE CONTRACTOR SHALL INSPECT DAILY AND MAINTAIN CONTINUOUSLY IN AN EFFECTIVE OPERATING CONDITION ALL EROSION AND SEDIMENT CONTROL MEASURES UNTIL SUCH TIMES AS THEY ARE REMOVED WITH PRIOR PERMISSION FROM SSA INSPECTOR AND AGENCY INSPECTOR.

6. ALL SEDIMENT BASINS, TRAP EMBANKMENTS AND SLOPES, PERIMETER DIKES, SWALES AND ALL DISTURBED SLOPES STEEPER OR EQUAL TO 3:1 SHALL BE STABILIZED WITH SOD OR SEED AND ANCHORED STRAW MULCH, OR OTHER APPROVED STABILIZATION MEASURES, AS SOON AS POSSIBLE BUT NO LATER THAN SEVEN (7) CALENDAR DAYS AFTER ESTABLISHMENT. ALL AREAS DISTURBED OUTSIDE OF THE PERIMETER SEDIMENT CONTROL SYSTEM MUST BE MINIMIZED. MAINTENANCE MUST BE PERFORMED AS NECESSARY TO ENSURE CONTINUED STABILIZATION. (REQUIREMENT FOR STABILIZATION MAY BE REDUCED TO THREE (3) DAYS FOR SENSITIVE AREAS.)

7. THE CONTRACTOR SHALL APPLY SOD OR SEED AND ANCHORED STRAW MULCH, OR OTHER APPROVED STABILIZATION MEASURES TO ALL DISTURBED AREAS AND STOCKPILES WITHIN FOURTEEN (14) CALENDAR DAYS AFTER STRIPPING AND GRADING ACTIVITIES HAVE CEASED IN THE AREA. MAINTENANCE SHALL BE PERFORMED AS NECESSARY TO ENSURE CONTINUED STABILIZATION. (REQUIREMENT MAY BE REDUCED TO SEVEN (7) DAYS FOR SENSITIVE AREAS.)

8. PRIOR TO REMOVAL OF SEDIMENT CONTROL MEASURES, THE CONTRACTOR SHALL STABILIZE AND HAVE ESTABLISHED PERMANENT STABILIZATION FOR ALL CONTRIBUTORY DISTURBED AREAS USING SOD OR AN APPROVED PERMANENT SEED MIXTURE WITH REQUIRED SOIL AMENDMENTS AND AN APPROVED ANCHORED MULCH. WOOD FIBER MULCH MAY ONLY BE USED IN SEEDING SEASON WHERE THE SLOPE DOES NOT EXCEED 10% AND GRADING HAS BEEN DONE TO PROMOTE SHEET FLOW DRAINAGE. AREAS BROUGHT TO FINISHED GRADE DURING THE SEEDING SEASON SHALL BE PERMANENTLY STABILIZED AS SOON AS POSSIBLE, BUT NOT LATER THAN FOURTEEN (14) CALENDAR DAYS AFTER ESTABLISHMENT. WHEN PROPERTY IS BROUGHT TO FINISHED GRADE DURING THE MONTHS OF NOVEMBER THROUGH FEBRUARY, AND PERMANENT STABILIZATION IS FOUND TO BE IMPRACTICAL, TEMPORARY SEED AND ANCHORED STRAW MULCH SHALL BE APPLIED TO DISTURBED AREAS. THE FINAL PERMANENT STABILIZATION OF SUCH PROPERTY SHALL BE APPLIED BY MARCH 15 OR EARLIER IF GROUND AND WEATHER CONDITIONS ALLOW.

9. THE SITE'S APPROVAL LETTER, APPROVED EROSION AND SEDIMENT CONTROL PLANS, DAILY LOG BOOKS AND TEST REPORTS SHALL BE AVAILABLE AT THE SITE FOR INSPECTION BY DULY AUTHORIZED OFFICIALS OF SSA AND AGENCY RESPONSIBLE FOR PROJECT.

10. SURFACE DRAINAGE FLOWS OVER UNSTABILIZED CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER PREVENTING DRAINAGE FLOWS FROM TRAVERSING THE SLOPES OR BY INSTALLING PROTECTIVE DEVICES TO LOWER THE WATER DOWNSLOPE WITHOUT CAUSING EROSION. DIKES SHALL BE INSTALLED AND MAINTAINED AT THE TOP OF CUT OR FILL SLOPES UNTIL THE SLOPE AND DRAINAGE AREA TO IT ARE FULLY STABILIZED, AT WHICH TIME THEY MUST BE REMOVED AND FINAL GRADING DONE TO PROMOTE SHEET FLOW DRAINAGE. PROTECTIVE METHODS MUST BE PROVIDED AT POINTS OF CONCENTRATED FLOW WHERE EROSION IS LIKELY TO OCCUR.

11. PERMANENT SWALES OR OTHER POINTS OF CONCENTRATED WATER FLOW SHALL BE STABILIZED WITH SOD OR SEED WITH AN APPROVED EROSION CONTROL MATTING, RIPRAP OR BY OTHER APPROVED STABILIZATION MEASURES.

12. TEMPORARY SEDIMENT CONTROL DEVICES MAY BE REMOVED, WITH PERMISSION OF SSA INSPECTOR AND AGENCY INSPECTORS, WITHIN THIRTY (30) CALENDAR DAYS FOLLOWING ESTABLISHMENT OF PERMANENT STABILIZATION IN ALL CONTRIBUTORY DRAINAGE AREAS. STORMWATER MANAGEMENT STRUCTURES USED TEMPORARILY FOR SEDIMENT CONTROL SHALL BE CONVERTED INTO THE PERMANENT CONFIGURATION WITHIN THIS TIME PERIOD AS WELL.

13. NO PERMANENT CUT OR FILL SLOPE WITH A GRADIENT STEEPER THAN 3:1 WILL BE PERMITTED IN LAWN MAINTENANCE AREAS. A SLOPE GRADIENT OF UP TO 2:1 WILL BE PERMITTED IN NON-MAINTENANCE AREAS PROVIDED THAT THOSE AREAS ARE INDICATED ON THE EROSION AND SEDIMENT CONTROL PLAN WITH A LOW-MAINTENANCE GROUND COVER SPECIFIED FOR PERMANENT STABILIZATION. SLOPE GRADIENT STEEPER THAN 2:1 WILL NOT BE PERMITTED WITH VEGETATIVE STABILIZATION.

14. FOR FINISHED GRADING, THE CONTRACTOR SHALL PROVIDE ADEQUATE GRADIENTS SO AS TO: PREVENT WATER FROM STANDING ON THE SURFACE MORE THAN TWENTY FOUR (24) HOURS AFTER THE END OF A RAINFALL EXCEPT IN DESIGNATED DRAINAGE COURSES AND SWALE FLOW AREAS WHICH MAY DRAIN AS LONG AS FORTY-EIGHT (48) HOURS AFTER THE END OF A RAINFALL, AREAS DESIGNED TO HAVE STANDING WATER SHALL NOT BE REQUIRED TO MEET THIS REQUIREMENT.

15. SEDIMENT TRAPS OR BASINS ARE NOT PERMITTED WITHIN 20 FEET OF A FOUNDATION WHICH IS EXISTING OR UNDER CONSTRUCTION. NO STRUCTURE MAY BE CONSTRUCTED WITHIN 20 FEET OF AN ACTIVE SEDIMENT TRAP OR BASIN.

16. THE SSA INSPECTOR HAS THE OPTION OF REQUIRING ADDITIONAL SAFETY OR SEDIMENT CONTROL MEASURES, IF DEEMED NECESSARY.

17. ALL TRAP DEPTH DIMENSIONS ARE RELATIVE TO THE OUTLET ELEVATION. ALL TRAPS MUST HAVE A STABLE OUTFALL. ALL TRAPS AND BASINS SHALL BE STABLE INFLOW POINTS.

18. VEGETATIVE STABILIZATION SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. REFER TO APPROPRIATE SPECIFICATIONS FOR TEMPORARY SEEDING, PERMANENT SEEDING, MULCHING, SODDING AND GROUND COVERS.

19. TEMPORARY SEDIMENT TRAP(S) SHALL BE CLEANED OUT AND RESTORED TO THE ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO A POINT ONE HALF (1/2) THE DEPTH BETWEEN THE OUTLET CREST AND THE BOTTOM OF THE TRAP. SEDIMENT BASINS SHALL BE CLEANED OUT AND RESTORED TO THE ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO ONE HALF (1/2) THE DEPTH BETWEEN THE DEWATERING ELEVATION AND THE BOTTOM OF THE BASIN.

20. SEDIMENT REMOVED FROM TRAPS (AND BASINS) SHALL BE PLACED AND STABILIZED IN APPROVED AREAS, BUT NOT WITHIN A FLOODPLAIN, WETLAND OR TREE-SAVE AREA. WHEN PUMPING SEDIMENT LADEN WATER, THE DISCHARGE MUST BE DIRECTED TO A SEDIMENT TRAPPING DEVICE PRIOR TO RELEASE FROM THE SITE. A SUMP PIT MAY BE USED IF SEDIMENT TRAPS THEMSELVES ARE BEING PUMPED OUT.

21. WHERE DEEMED APPROPRIATE BY THE ENGINEER OR INSPECTOR, SEDIMENT BASINS AND TRAPS MAY NEED TO BE SURROUNDED WITH AN APPROVED SAFETY FENCE. THE FENCE MUST CONFORM TO LOCAL ORDINANCES AND REGULATIONS. THE DEVELOPER OR OWNER SHALL CHECK WITH LOCAL BUILDING OFFICIALS ON APPLICABLE SAFETY REQUIREMENTS. WHERE SAFETY FENCE IS DEEMED APPROPRIATE AND LOCAL ORDINANCES DO NOT SPECIFY FENCING SIZES AND TYPES, THE FOLLOWING SHALL BE USED AS A MINIMUM STANDARD: THE SAFETY FENCE MUST BE MADE OF WELDED WIRE AND AT LEAST 42 INCHES HIGH, HAVE POSTS SPACED NO FARTHER APART THAN 8 FEET, HAVE MESH OPENINGS NO GREATER THAN 2 INCHES IN WIDTH AND 4 INCHES IN HEIGHT WITH A MINIMUM OF 14 GAUGE WIRE. SAFETY FENCE MUST BE MAINTAINED AND IN GOOD CONDITION AT ALL TIMES.

22. SEDIMENT CONTROL FOR UTILITY CONSTRUCTION FOR AREAS OUTSIDE OF DESIGNED CONTROLS OR AS DIRECTED BY ENGINEER OR SSA INSPECTOR:

   (A) CALL "MISS UTILITY" AT 1-800-257-7777 48 HOURS PRIOR TO THE START OF WORK.

   (B) EXCAVATED TRENCH MATERIAL SHALL BE PLACED ON THE HIGH SIDE OF THE TRENCH.

   (C) TRENCHES FOR UTILITY INSTALLATION SHALL BE BACKFILLED, COMPACTED AND STABILIZED AT THE END OF EACH WORKING DAY. NO MORE TRENCH SHALL BE OPENED THAN CAN BE COMPLETED THE SAME DAY, UNLESS:

   (D) TEMPORARY SILT FENCE SHALL BE PLACED IMMEDIATELY DOWNSTREAM OF ANY DISTURBED AREA INTENDED TO REMAIN DISTURBED FOR MORE THAN ONE DAY.

23. OFF-SITE SPOIL OR BORROW AREAS ON STATE OR FEDERAL PROPERTY MUST HAVE PRIOR APPROVAL BY SSA AND OTHER APPLICABLE STATE, FEDERAL, AND LOCAL AGENCIES. OTHERWISE, APPROVAL MUST BE GRANTED BY THE LOCAL AUTHORITIES. ALL WASTE AND BORROW AREAS OFF-SITE MUST BE PROTECTED BY SEDIMENT CONTROL MEASURES AND STABILIZED.

24. SITES WHERE INFILTRATION DEVICES ARE USED FOR THE CONTROL OF STORMWATER, EXTREME CARE MUST BE TAKEN TO PREVENT RUNOFF FROM UNSTABILIZED AREAS FROM ENTERING THE STRUCTURE DURING CONSTRUCTION. SEDIMENT CONTROL DEVICES PLACED IN INFILTRATION AREAS MUST HAVE BOTTOM ELEVATIONS AT LEAST TWO (2) FEET HIGHER THAN THE FINISH GRADE BOTTOM ELEVATION OF THE INFILTRATION PRACTICE. WHEN CONVERTING A SEDIMENT TRAP TO AN INFILTRATION DEVICE, ALL ACCUMULATED SEDIMENT MUST BE REMOVED AND DISPOSED OF PRIOR TO FINAL GRADING OF INFILTRATION DEVICE.

25. WHEN A STORM DRAIN SYSTEM OUTFALL IS DIRECTED TO A SEDIMENT TRAP OR SEDIMENT BASIN AND THE SYSTEM IS TO BE USED FOR TEMPORARILY CONVEYING SEDIMENT LADEN WATER, ALL STORM DRAIN INLETS IN NON-SUMP AREAS SHALL HAVE TEMPORARY ASPHALT BERMS CONSTRUCTED AT THE TIME OF BASE PAVING TO DIRECT GUTTER FLOW INTO INLETS TO AVOID SURCHARGING AND OVERFLOW OF INLETS IN SUMP AREAS.

26. SITE INFORMATION (APPROXIMATELY):

   TOTAL PROJECT

   DISTURBED AREA: 0.46 ACRES

   SUB-AREA #1

   DRAINAGE AREA: 3.74 ACRES

STANDARD STABILIZATION NOTE

"FOLLOWING INITIAL SOIL DISTURBANCE OF REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN SEVEN (7) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES GREATER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1); AND FOURTEEN (14) DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE."

NOTE TO CONTRACTOR

SEDIMENT AND EROSION CONTROL WILL BE STRICTLY ENFORCED.

SYMBOL	DESCRIPTION	DATE	APPROVAL
	REVISIONS		

GRAPHIC SCALES

Black & Veatch
Gaithersburg, Maryland

DESIGN	TED
DRAFT	RLK
CHECK	TED
DATE	00/13/95
90A:	
091:	
0911:	
0912:	
041:	
APPROVED (09):	
SATISFACTORY TO: (---)	

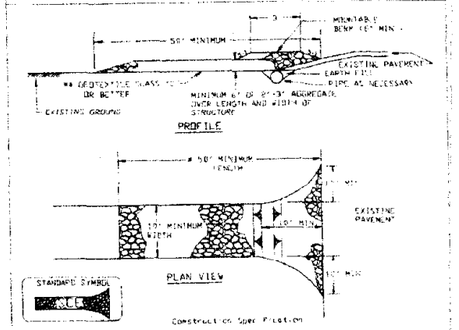
DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
INDIAN HEAD DIVISION
NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND

EROSION AND SEDIMENT CONTROL NOTES AND CERTIFICATIONS

CODE ID. NO. 80091
DRAWING SIZE: F
CONSTR. CONTR. NO.
SPEC.
SCALE: NONE
NAVFAC DRAWING NO.
3164193
SHEET 3 OF 4
SEP-3

0071I04X
Box 3
APPA SEP-3

DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE



Construction Specifications

1. Length - Minimum of 50' (*30' for single residence lot).

2. Width - 10' minimum, should be flared at the existing road to provide a turning radius.

3. Geotextile (fabric) cloth shall be placed over the existing ground prior to placing stone. Entrance sign approval authority may not require single family residences to use geotextile.

4. Stone - crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.

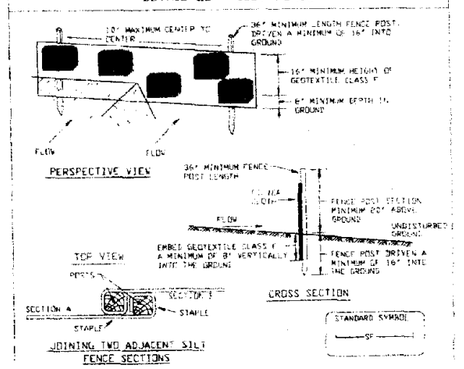
5. Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining undivided drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 5:1 slopes and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.

6. Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE F - 17 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

STABILIZED CONSTRUCTION ENTRANCE (A/2)
NO SCALE

DETAIL 22 - SILT FENCE



Construction Specifications

1. Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 11/2" x 11/2" square (minimum cut), or 1 3/4" diameter (minimum round) and shall be of sound quality hardwood. Steel posts will be standard T or U section weighing not less than 1.00 pond per linear foot.

2. Geotextile shall be fastened securely to each fence post with wire ties or staples at top and midsection and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal ft²/minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

3. Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.

4. Silt fence shall be inspected after each rainfall event and maintained when bulging occurs or when sediment accumulation reaches 50% of the fence height.

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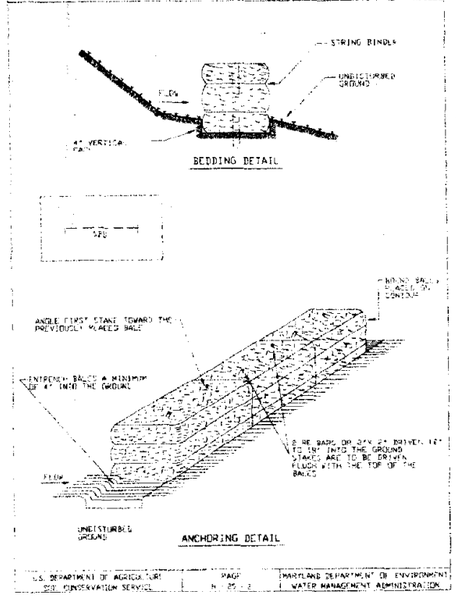
SILT FENCE (B/2)
NO SCALE

DETAIL 32 - STRAW BALE DIKE



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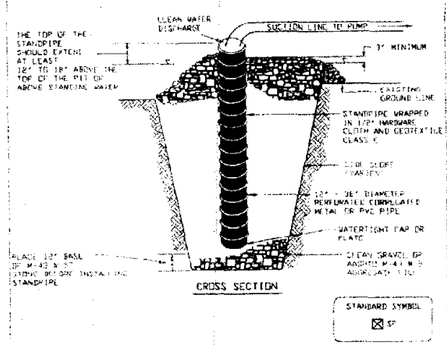
STRAW BALE DIKE (C/4)
NO SCALE

DETAIL 20B - SUMP PIT



Construction Specifications

1. Pit dimensions are variable, with the minimum diameter being 2 times the standpipe diameter.

2. The standpipe should be constructed by perforating a 12" to 24" diameter corrugated or PVC pipe. Then wrapping with 1/2" hardware cloth and Geotextile Class C. The perforations shall be 1/2" x 6" slots or 1" diameter holes.

3. A base of filter material consisting of clean gravel or #57 stone should be placed in the pit to a depth of 12". After installing the standpipe, the pit surrounding the standpipe should then be backfilled with the same filter material.

4. The standpipe should extend 12" to 18" above the lip of the pit or the lowest elevation (basin geometry only) and the filter material should exceed 2" minimum above the anticipated standing water elevation.

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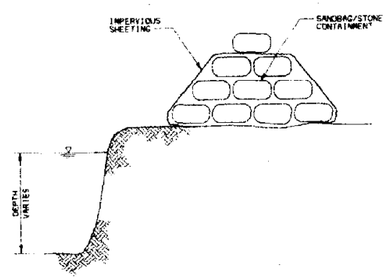
SUMP PIT (D/2)
NO SCALE



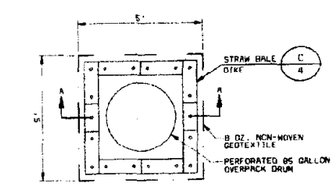
MATERIAL SPECIFICATIONS

1. SANDBAGS: SANDBAGS SHALL CONSIST OF MATERIALS WHICH ARE RESISTANT TO ULTRA-VIOLET RADIATION, TEARING AND PUNCTURE AND WOVEN TIGHTLY ENOUGH TO PREVENT LEAKAGE OF FILL MATERIAL (I.E., SAND, FINE GRAVEL, ETC.).

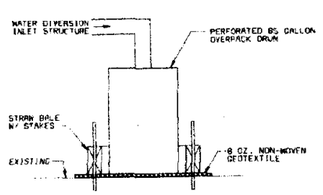
2. STONE: STONE SHALL BE WASHED AND HAVE A MINIMUM DIAMETER OF 6 INCHES.

3. SHEETING: SHEETING SHALL CONSIST OF POLYETHYLENE OR OTHER MATERIAL WHICH IS IMPERVIOUS AND RESISTANT TO PUNCTURE AND TEARING.

CONTAINMENT DIKE (E/2)
NO SCALE

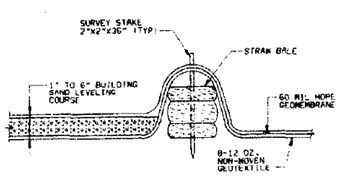


PLAN VIEW



SECTION A-A

WATER OUTLET DIVERSION STRUCTURE (F/2)
NO SCALE



DUAL CONTAINMENT SYSTEM (G/2)
NO SCALE

SYMBOL	DESCRIPTION	DATE	APPROVAL

REVISIONS

GRAPHIC SCALES

Black & Veatch
Gaithersburg, Maryland

DESIGN PDM
DRAFT RLC
CHECK TLD
DATE 09/13/95
06A:
09I:
09II:
09I2:
04I:

APPROVED (09):

SATISFACTORY TO: ( )

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
INDIAN HEAD DIVISION
NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND

EROSION AND SEDIMENT CONTROL DETAILS

CODE ID. NO. 80091
DRAWING SIZE: F
CONSTR. CONTR. NO.
SPEC.
SCALE: NO SCALE
NAVFAC DRAWING NO.
3164194
SHEET 4 OF 4
SEP-4

0071I05
Box 3
APP A SEP-4

1.10-5/8/1996-00072

APPENDIX B
SITE-SPECIFIC HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN
FOR
REMOVAL OF LEAD CONTAMINATED SOILS
AT SITE 56, NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0058

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Program Manager

May 8, 1996
OHM Project 16773HS

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed for United States Navy, LANTDIV, Delivery Order entitled, Removal of Lead Contaminated Soil at Installation Site 56, Naval Surface Warefare Center, Indian Head, Maryland. 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 0058, 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 of 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

The Indian Head Division of the Naval Surface Warefare Center is located in the northwestern section of Charles County, Maryland, 25 miles southwest of Washington, D.C. The principal mission of the activity is research development of propellant and explosive ingredients and formulations used in ordinance devices.

Site 56, sometimes referred to as, Industrial Outfall 87 (IW87), consists of an antiquated brick and mortar pit (manhole), approximately 700 feet of 24 inch terra cotta pipe and 30 feet ov overland flow along a sandy swale. The sediments in the pit, pipe and open swale are contaminated with lead from past practice of rinsing lead floors in building 790. The two floor drains in Building 790 emptied into the pit until October of 1992 when they were sealed. The outfall at the end of the pipe is 75% filled with sand and other materials and collection of water samples is very difficult. Also contributing to the pit and the outfall system are several non-contact process water sources and some storm drain discharge.

Discharge from this outfall exceeds the limit for Lead set in the outfalls NPDES (National Pollution Discharge Elimination System) permit.

1.2 SCOPE OF WORK

- Site preparation
- Site road construction
- Install sediment and erosion controls
- Water treatment system installation/operations
- Excavation of vitrified clay pipe and contaminated soils
- Construct temporary decontamination pad
- Install rip-rap and geotextile
- Decontaminate vitrified clay pipe

- Install vitrified clay pipe liner
- Install concrete weir
- Stage/loadout contaminated sediments for transportation and disposal
- Equipment decontamination

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

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 program
- Conduct monthly (a minimum of one) site audit of project (Management Safety Improvement Report)
- Implement Safety Improvement Team on all projects
- 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. 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
- Conduct weekly safety inspections of the job site
- Implement Safety Improvement Team on project
- 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 cold exposure, 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 HEALTH AND SAFETY MANAGER (HSM)

The HSM 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 Regional Health and Safety Director 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 HSM 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 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	Gordon Miller 609-588-6932 (office) 609-738-8914 (pager)
ROICC/NTR	Lt. Jim Croom 301-743-4112 (office)
Site Supervisor	Stanley Rhoad 804-273-8709 (site phone)
Site Safety Officer	TBD _____ (site phone)
Program Manager for LANTDIV	John P. Franz, P.E. 609-588-6477 (office)
Southern District Health and Safety Manager	Robert A. Brooks, CSP 609-588-6423 (office) 800-818-2185 (pager)
Northeast Region Health and Safety Director/Project 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

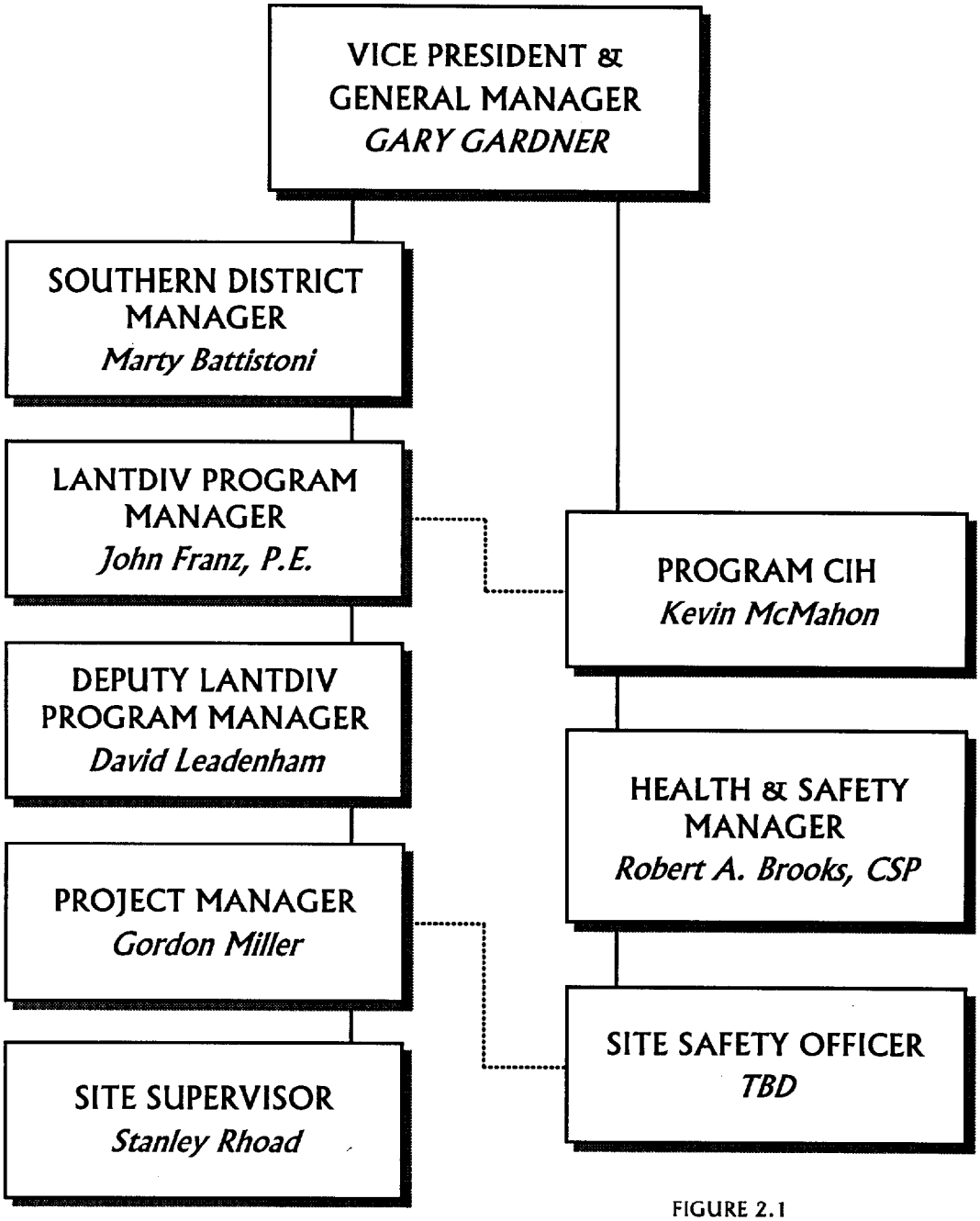


FIGURE 2.1

HEALTH & SAFETY ORGANIZATION
Remedial Action
Site 56, Naval Surface Warfare Center
Indian Head, Maryland
Delivery Order 0058
OHM Project 16773

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
Lead	Inhalation, ingestion	0.050 mg/m^3	Weakness, insomnia; loss of appetite, loss of weight, abdominal pain; anemia; tremors; weakness of wrists/ ankles; kidney damage; low blood pressure
			Incompatible with strong oxidizers, hydrogen peroxide and acids

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

- POISON IVY (*Rhus Radicans*)

Poison Ivy may be found at the site. It is highly recommended that all personnel entering into an area with poison ivy wear a minimum of a tyvek coverall, to avoid skin contact.

The majority of skin reactions following contact with offending plants are allergic in nature and characterized by:

- General symptoms of headache and fever
- Itching
- Redness
- A rash

Some of the most common and most severe allergic reactions result from contact with plants of the poison ivy group, including poison oak and poison sumac. Such plants produce severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim may develop a high fever and feel very ill. Ordinarily, the rash begins within a few hours after exposure, but may be delayed 24 to 48 hours.

Distinguishing Features of Poison Ivy Group Plants

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each. Both plants have greenish-white flowers and berries that grow in clusters (see Figure 3.1).

First Aid

a. Remove contaminated clothing; wash all exposed areas thoroughly with soap and water, followed by rubbing alcohol.

b. Apply calamine or other soothing lotion if rash is mild.

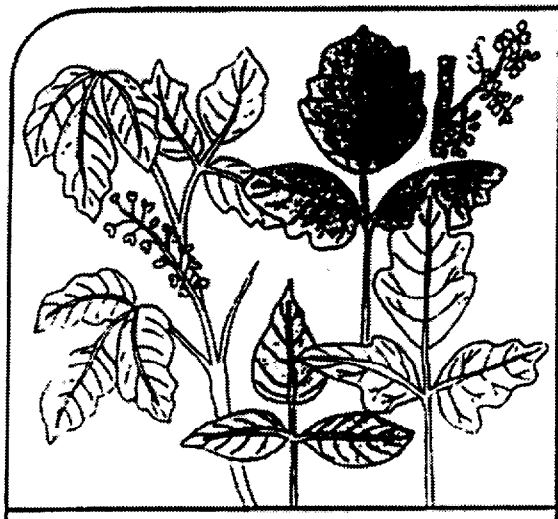
c. Seek medical advice if a severe reaction occurs, or if there is a known history of previous sensitivity.

- TICKS

Heavily vegetated areas of a site may have ticks. It is highly recommended that all personnel walking through such areas wear a tyvek coverall and latex boot covers taped at all joints. The ticks will stand out against the light colors. A tick or insect repellent containing DEET is recommended.

Ticks can transmit several diseases, including Rocky Mountain spotted fever, a disease that occurs in the eastern portion of the United States as well as the western portion, and Lyme disease. Ticks adhere tenaciously to the skin or scalp. There is some evidence that the longer an infected tick remains attached, the greater is the chance that it will transmit disease.

FIGURE 3.1
POISONOUS PLANTS

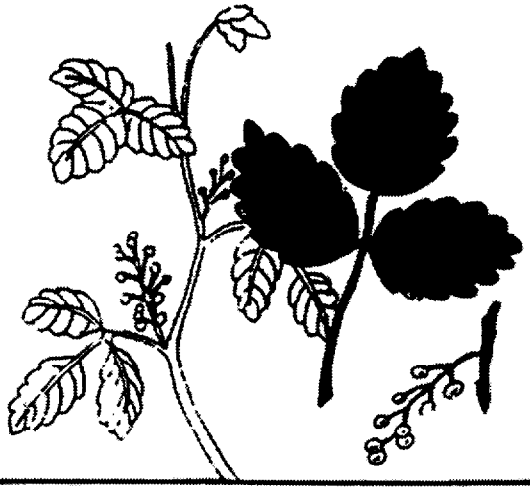


COMMON POISON IVY
(RHUS RADICANS)

- Grows as a small plant, a vine, and a shrub.
- Grows everywhere in the United States except California and parts of adjacent states. Eastern oak leaf poison ivy is one of its varieties.
- Leaves always consist of three glossy leaflets.
- Also known as three-leaf ivy, poison creeper, climbing sumac, poison oak, markweed, picry, and mercury.

WESTERN POISON OAK
(RHUS DIVERSILOBA)

- Grows in shrub and sometimes vine form.
- Grows in California and parts of adjacent states.
- Sometimes called poison ivy, or yeara.
- Leaves always consist of three leaflets.



POISON SUMAC
(RHUS VERNIX)

- Grows as a woody shrub or small tree from 5 to 25 feet tall.
- Grows in most of eastern third of United States.
- Also known as swamp sumac, poison elder, poison ash, poison dogwood, and thunderwood.

First Aid

a. Carefully (slowly and gently) remove the tick with tweezers, taking care that all parts are removed.

b. With soap and water, thoroughly, but gently, scrub the area from which the tick has been removed, because disease germs may be present on the skin; also wipe the bite area with an antiseptic.

c. If you have been bitten, place the tick in a jar labeled with the date, location of the bite, and the location acquired. If any symptom appears, such as an expanding red rash, contact a physician immediately.

- LYME DISEASE

Lyme disease may cause a number of medical conditions, including arthritis, that can be treated if you recognize the symptoms early and see your doctor. Early signs may include a flu-like illness, an expanding skin rash and joint pain. If left untreated, Lyme disease can cause serious nerve and heart problems as well as a disabling type of arthritis.

You are more likely to spot early signs of Lyme disease rather than see the tick or its bite. This is because the tick is so small (about the size of the head of a common pin or a period on this page and a little larger after they fill with blood), you may miss it or signs of a bite. However, it is also easy to miss the early symptoms of Lyme disease.

In its early stage, Lyme disease may be a mild illness with symptoms like the flu. It can include a stiff neck, chills, fever, sore throat, headache, fatigue, and joint pain. But this flu-like illness is usually out of season, commonly happening between May and October when ticks bite.

Most people develop a large, expanding skin rash around the area of the bite. Some people may get more than one rash. The rash may feel hot to the touch and may be painful. Rashes vary in size, shape, and color, but often look like a red ring with a clear center. The outer edges expand in size. Its easy to miss the rash and the connection between the rash and the tick bite. The rash develops from three days to as long as a month after the tick bite. Almost one third of those with Lyme disease never get the rash.

Joint or muscle pain may be another early sign of Lime disease. These aches and pains may be easy to confuse with the pain that comes from other types of arthritis. However, unlike many other types of arthritis, this pain seems to move or travel from joint to joint.

In later stages, Lyme disease may be confused with other medical problems. These problems can develop months to years after the first tick bite.

Early treatment of Lyme disease symptoms with antibiotics can prevent the more serious medical problems of later stages. If you suspect that you have symptoms of Lime disease, contact your doctor.

Lyme disease can cause problems with the nervous system that look like other diseases. These include symptoms of stiff neck, severe headache, and fatigue usually linked to meningitis. They may also include pain and drooping of the muscles on the face, called Bell's Palsy. Lyme disease can also mimic symptoms of multiple sclerosis or other types of paralysis.

Lyme disease can also cause serious but reversible heart problems, such as irregular heart beat. Finally, Lyme disease can result in a disabling, chronic type of arthritis that most often affects the knees. Treatment is more difficult and less successful in later stages. Researchers think these more serious problems may be linked to how the body's defense or immune system responds to the infection.

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.

3.4.1 JOB SAFETY ANALYSIS FOR SITE PREPARATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3<5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Clearing, Grubbing	Struck By/ Against Heavy Equipment	• Use reflective warning vests, caution flags when exposed to vehicular traffic • Place barricades to isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals	Hard hat, safety glasses	
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, vegetation and debris • Mark, identify, or barricade other obstructions		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Eye Injuries	• Wear face shield, goggles when operating powered clearing / grubbing equipment	Face Shield, Goggles	
	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 • Close doors, windows on heavy equipment to prevent injuries from tree branches and other vegetation	Leather gloves, re-enforced palms	

3.4.1 JOB SAFETY ANALYSIS FOR SITE PREPARATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Clearing/ Grubbing (Continued)	Insect/ Snake Bites	• Review injury potential and types of snakes with workers • Avoid insect nests areas, likely habitats of snakes outside work areas • Emphasize The Buddy System where such injury potential exists • Use insect repellant, wear PPE to protect against sting/bite injuries	Tyvek coveralls, duct tape bottom of coveralls to boots	
	Contact Dermatitis	• Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants • Identify and review poisonous plants with workers	Tyvek coveralls, duct tape bottom of coveralls to boots	
	Operations of power clearing tools (chain saws, brush saws, etc.)	• Wear eye, face, hand & hearing protection when operating power clearing equipment • Shut-off chain saws between work areas (>20 feet) • Store flammable liquids in well ventilated areas, away from work areas • Shut off equipment during re-fueling • Prohibit smoking while operating clearing equipment • Provide ABC (or equivalent) fire extinguishers for all work locations	Hard hat, face shield and goggles, leather gloves, ear plugs	
	Operation of chippers	• Lockout/tagout/de-energize any electrical circuits on chippers before performing maintenance • Identify staging area for debris • Keep chipper approach free of ground debris • Follow all manufacturer precautions for operation of chipper	Hard hat, face shield and goggles, leather gloves, ear plugs	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)	Ear plugs	

3.4.1 JOB SAFETY ANALYSIS FOR SITE PREPARATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; >1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Clearing/ Grubbing (Continued)	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	
Grading	Struck By/ Against Heavy Equipment	• Use reflective warning vests, caution flags when exposed to vehicular traffic • Place barricades to isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals	Hard hat, warning vests, safety glasses	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)	Ear plugs	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	
Equipment/ Facility Set-up	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, vegetation and debris • Mark, identify, or barricade other obstructions		

3.4.1 JOB SAFETY ANALYSIS FOR SITE PREPARATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Equipment/ Facility Set-up (Continued)	Electrical Shock	• Lockout/tagout/de-energize utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with OHM Health and Safety Procedures #38	Insulated gloves	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	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	Leather gloves, re-enforced palms	

3.4.1 JOB SAFETY ANALYSIS FOR SITE PREPARATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Equipment/ Facility Set-up (Continued)	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 db A over an 8-hour work period)	Ear plugs	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	

3.4.2 JOB SAFETY ANALYSIS FOR SITE ROAD INSTALLATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M, LEVEL D; ≥ 0.5 MG/M, <5.0 MG/M, LEVEL C; >5.0 MG/M, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Road Installation	Struck by/Against Heavy Equipment, Protruding Objects	• Use reflective warning vests, caution flags when exposed to vehicular traffic • Place barricades to isolate equipment swing areas • Make eye contact with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel during paving activities • 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	Hard hat, goggles and face shield,	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, debris, & other materials • Mark, identify, or barricade other obstructions		
	Fires	• Eliminate sources of ignition from the work area • Prohibited smoking • Provide ABC (or equivalent) fire extinguishers in all work areas, flammable storage areas, generator and compressor locations • Store flammable liquids in well ventilated areas • Post "NO SMOKING" signs • Store combustible materials away from flammables		

3.4.2 JOB SAFETY ANALYSIS FOR SITE ROAD INSTALLATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Road Installation (Continued)	High/Low Ambient Temperature	• Monitor for Heat/Cold Stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing, fluid consumption	
	Contact Dermatitis	• Wear PPE to avoid skin contact with contaminated soil, or other skin irritants	Tyvek coveralls, duct tape bottom of coveralls to boots	

3.4.3 JOB SAFETY ANALYSIS FOR EROSION CONTROL INSTALLATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B
LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Silt Fence, Hay Bale Installation	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools and debris • Mark, identify, or barricade other obstructions		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Struck/ Struck-by Hand Tools, Flying Debris	• Hold stakes in place with tongs, vice-pliers or other remote grasping tools • Wear safety goggles when using sledge hammer, hatchet, maul or axe	Hard hat, face shield and goggles, leather or cloth gloves	
	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	Leather gloves, re-enforced palms	
	Contact Dermatitis	• Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants (See Section 5.0 HASP) • Identify and review poisonous plants with workers	Tyvek coveralls, duct tape bottom of coveralls to boots	
	High/Low Ambient Temperature	• Monitor for Heat/Cold Stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	

3.4.4 JOB SAFETY ANALYSIS FOR DECONTAMINATION PAD CONSTRUCTION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTELATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5MG/M^3, LEVEL C, >2.5MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Concrete Slab Formation	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, debris, and excavated material • Mark, identify, or barricade other obstructions		
	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Use reflective warning vests, caution flags when exposed to vehicular traffic • Place barricades to isolate equipment swing areas • Isolate areas under suspended loads • Make eye contact with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel during concrete pouring activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots at all times • Understand and review hand signals	Hard hat, warning vests, goggles and face shields	
	Inhalation and Contact with Concrete Dust	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present (See Section 5.0 HASP) • Review hazardous properties of site contaminants with workers before operations begin	Tyvek coveralls, nitrile gloves, air purifying respirator, depending on "action levels"	Mini-RAM
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	

3.4.5 JOB SAFETY ANALYSIS FOR WATER TREATMENT OPERATIONS

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
System Set-up	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand cart, truck) to move large awkward loads		
	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	Leather gloves, re-enforced palms	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)	Ear plugs	
	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar motions • Assure guards are in place to protect from these parts of equipment during operation • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service		
	Struck By/ Against Vehicles & Equipment	• Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Isolate areas under suspended loads	Hard hat, safety glasses	

3.4.5 JOB SAFETY ANALYSIS FOR WATER TREATMENT OPERATIONS

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
System Set-up (Continued)	Slips, Trips, Falls	• Clear walkways, work areas of equipment, ground debris, tools, and other materials • Mark, identify, or barricade other obstructions		
	High/Low Ambient Temperature	• Monitor for heat/cold stress in accordance with OHM Health & Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	
System Operation & Maintenance	Inhalation & Contact with Hazardous Substances	• Provide workers proper skin, eye, respiratory & splash protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before treatment operations begin	Select type of respirator, based on exposure levels (See Section 5.0 HASP)	

3.4.5 JOB SAFETY ANALYSIS FOR WATER TREATMENT OPERATIONS

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B
LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
System Operation & Maintenance (Continued)	Electrical Shock	• Lockout/tagout/de-energize utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with OHM Health and Safety Procedures #38	Insulated gloves	
	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar motions • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service		

3.4.5 JOB SAFETY ANALYSIS FOR WATER TREATMENT OPERATIONS

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
System Operation & Maintenance (Continued)	Pressurized Vessels, Hoses, Lines	• Prepare written operating instructions for water treatment system • Train all water treatment operators in conducting site operations • Assign qualified engineer to design water treatment system • Prepare process flow diagram and P and I D • All changes to equipment and procedures approved by qualified engineer • All water treatment system components shall be designed according to applicable codes • Maintain equipment according to manufacturer's recommendations • Wire quick connections, temporary lines closed before operating	Hard hat, face shield and goggles	
	Fires	• Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers for all work and flammable storage areas, fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, secure, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum		

3.4.5 JOB SAFETY ANALYSIS FOR WATER TREATMENT OPERATIONS

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B
LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
System Operation & Maintenance (Continued)	Confined Space Entry: 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, safety observer before starting work • 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	Level of protection shall be based on atmospheric testing results and tank contents (See section 5.0 HASP)	LEL/0$_2$, PID
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, ground debris, tools, and other materials • Mark, identify, or barricade other obstructions • Clean up spills immediately		
	High/Low Ambient Temperature	• Monitor for heat/cold stress in accordance with OHM Health & Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	
Treatment Chemical Handling	Inhalation & Contact with Hazardous Substances	• Provide workers proper skin, eye, respiratory & splash protection based on the exposure hazards present (See Section 5.0 HASP) • Review water treatment chemical MSDSs with workers before treatment operations begin	Saranex-coated Tyvek coveralls, nitrile gloves, neoprene or latex boots, air purifying respirator, depending on "action levels"	

3.4.5	JOB SAFETY ANALYSIS FOR WATER TREATMENT OPERATIONS			
AIR MONITORING: "ACTION LEVELS" **PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B** **MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B** **LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING** **INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B**				
Task Breakdown	**Potential Hazards**	**Hazard Control Measures**	**Personal Protective Equipment**	**Air Monitoring Devices**
Treatment Chemical Handling (Continued)	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand cart, truck) to move large awkward loads		
	Fires	• Eliminate sources of ignition from the work area • Prohibit smoking in work areas • Provide ABC (or equivalent) fire extinguishers in all work and flammable storage areas, fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum		
	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar motions • Provide and use proper work gloves when the possibility of pinching or similar injury may be caused by moving/handling drums or heavy objects • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service	Leather gloves, re-enforced palms	

3.4.5	JOB SAFETY ANALYSIS FOR WATER TREATMENT OPERATIONS			
AIR MONITORING: "ACTION LEVELS" **PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B** **MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B** **LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING** **INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B**				
Task Breakdown	**Potential Hazards**	**Hazard Control Measures**	**Personal Protective Equipment**	**Air Monitoring Devices**
Treatment Chemical Handling (Continued)	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	Leather gloves, re-enforced palms	
System Breakdown & Decontamination	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand cart, truck) to move large awkward loads		
	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	Leather gloves, re-enforced palms	
	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar motions • Assure guards are in place to protect from these parts of equipment during operation • Provide and use proper work gloves when the possibility of pinching or similar injury may be caused by moving/handling drums or heavy objects • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service	Leather gloves, re-enforced palms	

3.4.5 JOB SAFETY ANALYSIS FOR WATER TREATMENT OPERATIONS

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B
LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
System Breakdown & Decontamination (Continued)	Struck By/ Against Vehicles & Equipment	• Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Isolate areas under suspended loads	Hard hat, safety glasses,	
	Inhalation & Contact with Hazardous Substances	• Provide workers proper skin, eye, respiratory & splash protection based on the exposure hazards present • Review hazardous properties of site contaminants before starting work	Saranex-coated Tyvek coveralls, nitrile gloves, neoprene or latex boots, air purifying respirator, supplied air respirator, depending on "action levels"	LEL/O$_2$, PID
	Confined Space Entry: 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 contaminant MSDS with entrants and safety observer before starting work • 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	Level of protection shall be based on atmospheric results and tank contents (See section 5.0 HASP) Saranex-coated Tyvek coveralls, nitrile gloves, neoprene or latex boots, air purifying respirator, supplied air respirator, depending on "action levels"	LEL/O$_2$, PID
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period	Ear plugs	

3.4.5	JOB SAFETY ANALYSIS FOR WATER TREATMENT OPERATIONS			
AIR MONITORING: "ACTION LEVELS" **PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B** **MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B** **LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING** **INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B**				
Task Breakdown	**Potential Hazards**	**Hazard Control Measures**	**Personal Protective Equipment**	**Air Monitoring Devices**
System Breakdown & Decontamination (Continued)	High/Low Ambient Temperature	• Monitor for heat/cold stress in accordance with OHM Health & Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing, fluid consumption	

3.4.6 JOB SAFETY ANALYSIS FOR SOIL EXCAVATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B
LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5MG/M^3, LEVEL C, >2.5MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Excavation of Soil	Underground Utilities	• Identify all underground utilities around the excavation site before work commences • Cease work immediately if unknown utility markers are uncovered		
	Struck By/ Against Heavy Equipment	• Use reflective warning vests, caution flags when exposed to vehicular traffic • Place barricades to isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals	Hard hat ,safety glasses	
	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	Leather gloves, re-enforced palms	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)	Ear plugs	

3.4.6	JOB SAFETY ANALYSIS FOR SOIL EXCAVATION			
AIR MONITORING: "ACTION LEVELS" **PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B** **MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B** **LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING** **INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5MG/M^3, LEVEL C, >2.5MG/M^3, LEVEL B**				
Task Breakdown	**Potential Hazards**	**Hazard Control Measures**	**Personal Protective Equipment**	**Air Monitoring Devices**
Excavation of Soil (Continued)	Excavation Wall Collapse	• Construct diversion ditches or dikes to prevent surface water from entering excavation • Provide good drainage of area adjacent to excavation • Collect ground water/rain water from excavation and dispose of properly • Store excavated material at least 2 feet from the edge of the excavation; prevent excessive loading of the excavation face • Provide sufficient stairs, ladders, or ramps when workers enter excavations over 4 feet in depth • Place ladders no more than 25 feet apart laterally • Treat excavations over 4 feet deep as confined spaces • Complete confined space permit entry procedure • Monitor atmosphere for flammable/toxic vapors, and oxygen deficiency • Slope, bench, shore, or sheet excavations over 5 feet deep if worker entry is required • Assign a competent person to inspect, decide soil classification, proper sloping, the correct shoring, or sheeting • Inspect excavations (when personnel entry is required) daily, any time conditions change • Provide at least two means of exit for personnel working in excavations		
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions		

3.4.6 JOB SAFETY ANALYSIS FOR SOIL EXCAVATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5MG/M^3, LEVEL C, >2.5MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Excavation of Soil (Continued)	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present (see Section 5.0 HASP) • Review hazardous properties of site contaminants with workers before operations begin • Dampen soil using light water spray to prevent fugitive dust emissions • Cover stockpiled soil with plastic sheeting to prevent fugitive dust emissions	Sarancx-coated Tyvek coveralls, nitrile gloves, neoprene or latex boots, air purifying respirator, depending on "action levels"	Mini-RAM; Personal sampling pump
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	
Backfilling	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris • Mark, identify, or barricade other obstructions		
	Struck By/ Against Heavy Equipment	• Use reflective warning vests, caution flags when exposed to vehicular traffic • Place barricades to isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals	Hard hat, safety glasses	

3.4.6 JOB SAFETY ANALYSIS FOR SOIL EXCAVATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5MG/M^3, LEVEL C, >2.5MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Backfilling (Continued)	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	Leather gloves, re-enforced palms	

3.4.7 JOB SAFETY ANALYSIS FOR INSTALLATION OF RIPRAP, GEOTEXTILE, CONCRETE WEIR

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M, LEVEL D; ≥ 0.5 MG/M, <5.0 MG/M, LEVEL C; >5.0 MG/M, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTELATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5MG/M^3, LEVEL C, >2.5MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Install Riprap, Concrete Weir, Geotextile	Slips, Trips & Falls	• Clear walkways, work areas of vegetation, equipment, tools, debris, excavated material • Mark, identify, or barricade other obstructions • Wear rubber boots in areas of standing water, mud, marsh		
	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Use reflective warning vests, caution flags when exposed to vehicular traffic • Place barricades to isolate equipment swing areas • Isolate areas under suspended loads • Make eye contact with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel during work activities • Wear hard hats, safety glasses with side shields, face shields and goggles and steel-toe safety boots at all times • Understand and review hand signals	Hard-hat, goggles and face shield or safety glasses if conditions permit	
	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	Leather gloves, re-enforced palms	
	Handling Heavy Objects	• Observe proper lifting techniques • Avoid sudden movements, jerking motions • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Prohibit running, jumping during geotextile deployment • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		

3.4.7 JOB SAFETY ANALYSIS FOR INSTALLATION OF RIPRAP, GEOTEXTILE, CONCRETE WEIR

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTELATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5MG/M^3, LEVEL C, >2.5MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Install Riprap, Concrete Weir, Geotextile (Continued)	Caught In/ Between Moving Parts	• Identify equipment operations which may cause crushing, pinching, rotating or similar motions • Provide and use proper work gloves when the possibility of pinching or similar injury may be caused by moving/handling drums or heavy objects • Maintain communication between equipment operators and ground personnel • Maintain all equipment in a safe condition • Keep all guards in place during use • Review positioning plan with workers before weir, riprap placement begins	Leather gloves, re-enforced palms	
	Contact Dermatitis	• Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants (See Section 5.0 HASP) • Identify and review poisonous plants with workers	Tyvek coveralls, duct tape bottom of coveralls to boots	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)	Ear plugs	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	

3.4.8 JOB SAFETY ANALYSIS VITRIFIED PIPE DECONTAMINATION, LINER INSTALLATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B
LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Pipe Cleaning	Confined Space Entry: 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 emergency procedures before work commences • Review MSDS information with entrants and safety observer • 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	Level of protection shall be based on atmospheric testing results and tank contents (See section 5.0 HASP)	LEL/0$_2$; PID
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present (See Section 5.0 HASP) • Review hazardous properties of site contaminants before beginning work	Saranex-coated Tyvek coveralls, nitrile gloves, neoprene boots, air purifying respirator, depending on "action levels"	Mini-RAM, Personal Air Sampling
	Struck by, Against Heavy Equipment, Protruding Objects	• Use reflective warning vests, caution flags when exposed to vehicular traffic • Place barricades to isolate equipment swing areas • Make eye contact with operators before approaching equipment • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review hand signals	Hard hat, warning vests, goggles and face shield	

3.4.8 JOB SAFETY ANALYSIS VITRIFIED PIPE DECONTAMINATION, LINER INSTALLATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Pipe Cleaning (Continued)	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools and debris • Mark, identify, or barricade other obstructions		
	Handling Heavy Objects	• Observe proper lifting techniques • Avoid sudden movements, jerking motions • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	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	Leather gloves, re-enforced palms	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)	Ear plugs	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	
Install Pipe Liner	Burns	• Use proper gloves, face shield/safety goggles, and splash suits to protect workers from skin burns and injury when heat setting pipe liner	Goggles and face shield, insulated gloves, coveralls	

3.4.8 JOB SAFETY ANALYSIS VITRIFIED PIPE DECONTAMINATION, LINER INSTALLATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Install Pipe Liner (Continued)	Confined Space Entry 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 emergency procedures before work commences • Review MSDS information with entrants and safety observer • 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	Level of protection shall be based on atmospheric testing results and tank contents (See section 5.0 HASP)	LEL/0_2; PID
	Handling Heavy Objects	• Observe proper lifting techniques • Avoid sudden movements, jerking motions • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)	Ear plugs	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	

3.4.9 JOB SAFETY ANALYSIS FOR EQUIPMENT DECONTAMINATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M_3 LEVEL D; ≥ 0.5 MG/M_3 <5.0 MG/M_3, LEVEL C; >5.0 MG/M_3, LEVEL B
LEL/O_2: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O_2, LEVEL B; <19.5% O_2, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Heavy Equipment & Vehicles	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools and debris • Mark, identify, or barricade other obstructions		
	Struck by, Against Heavy Equipment, Protruding Objects, & Splashes	• Use reflective warning vests, caution flags when exposed to vehicular traffic • Place barricades to isolate equipment swing areas • Make eye contact with operators before approaching equipment • Wear hard hats, safety glasses with side shields, or goggles with splash shields and steel-toe safety boots • Understand and review hand signals	Hard hat, goggles and face shield, warning vests,	
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin	Saranex-coated Tyvek coveralls, nitrile gloves, neoprene boots, air purifying respirator, depending on "action levels"	
	Burns	• Use proper gloves, face shield/safety goggles, shin and toe guards, and splash suits to protect workers from skin burns and injury when operating laser (high pressure washers)	Goggles, face shield, shin and toe guards, splash suits	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		

3.4.9 JOB SAFETY ANALYSIS FOR EQUIPMENT DECONTAMINATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B
LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Heavy Equipment & Vehicles (Continued)	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	Leather gloves, re-enforced palms	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dB A over an 8-hour work period)	Ear plugs	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	
Roll-offs & Containers	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools and debris • Mark, identify, or barricade other obstructions		
	Struck by, Against Heavy Equipment, Protruding Objects, & Splashes	• Use reflective warning vests, caution flags when exposed to vehicular traffic • Place barricades to isolate equipment swing areas • Make eye contact with operators before approaching equipment • Wear hard hats, safety glasses with side shields, or goggles with splash shields and steel-toe safety boots • Understand and review hand signals	Hard hat, goggles and face shields, warning vests, barricades, caution flags	

3.4.9 JOB SAFETY ANALYSIS FOR EQUIPMENT DECONTAMINATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B
LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Roll-offs & Containers (Continued)	Flammable, Toxic, Oxygen deficient Atmospheres	• Test vessel atmosphere for flammable/toxic vapors, and oxygen deficiency • Review hazardous properties of site contaminants with workers and observer before starting work • Wear proper level of PPE for the type of atmospheric contaminants • Use body harness, safety belt with tripod wench for possible rescue		LEL/O$_2$; PID
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants before starting work	Saranex-coated Tyvek coveralls, nitrile gloves, neoprene of latex boots, air purifying respirator, depending on "action levels"	
	Burns	• Use proper gloves, face shield/safety goggles, shin and toe guards, and splash suits to protect workers from skin burns and injury when operating laser (high pressure washers)	Goggles, face shield, shin and toe guards, splash suits	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	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	Leather gloves, re-enforced palms	

3.4.9 JOB SAFETY ANALYSIS FOR EQUIPMENT DECONTAMINATION

AIR MONITORING: "ACTION LEVELS"
PID: <1 PPM, LEVEL D; ≥1 PPM <5 PPM, LEVEL C; >5 PPM LEVEL B
MINI-RAM: <0.5 MG/M$_3$ LEVEL D; ≥ 0.5 MG/M$_3$ <5.0 MG/M$_3$, LEVEL C; >5.0 MG/M$_3$, LEVEL B
LEL/O$_2$: ≥10% LEL, STOP WORK, EVACUATE; <20.9% O$_2$, LEVEL B; <19.5% O$_2$, MECHANICAL VENTILATION, CONSTANT MONITORING
INTEGRATED AIR SAMPLING: (LEAD) <0.03MG/M^3 LEVEL D, >0.03MG/M^3 ≤ 2.5 MG/M^3, LEVEL C, >2.5 MG/M^3, LEVEL B

Task Breakdown	Potential Hazards	Hazard Control Measures	Personal Protective Equipment	Air Monitoring Devices
Roll-offs & Containers (Continued)	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)	Ear plugs	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 22, 23 • Provide fluids to prevent worker dehydration	Seasonal clothing	

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 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 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 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 the interior of the pits, the sand swale area and the holding impoundments for contaminated sediments and water.

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 the entrance/exit routes of the EZ and the decontamination stations for equipment and personnel.

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 office, equipment and crew trailers, vehicle parking areas and site access roads.

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 Preparation, Erosion Controls, Roads Construction, Decontamination Pad	Level D+/D	Hardhat, steel-toe work boots, safety eye wear (safety glasses with side shields or goggles and face shield if splash or flying particles are likely), Tyvek coveralls, (clearing brush) and hearing protection >85 dB A
Water Treatment Operations	Level D/C	Polyethylene-coated Tyvek Coveralls, splash shield for wet operations and maintenance, upgrade to Level C when in direct contact with contaminated sediments, liquids
Excavation of soils, Piping	Level C/D	Polyethylene-coated Tyvek Coveralls, splash shield for wet operations, downgrade to Level D when air monitoring "action levels" permit (see Section 7.0 HASP)
Install Riprap, Geotextile, Concrete Weir	Level C/D	Polyethylene-coated Tyvek Coveralls, splash shield for wet operations and maintenance, upgrade to Level C when in direct contact with contaminated sediments
Decontaminate Clay Pipe, Install Liner	Level C/D	Polyethylene-coated Tyvek Coveralls, continuous air monitoring for confined space entry evacuate work area if "action levels" are exceeded (see Section 7.0 HASP)
Stabilize Contaminated Sediments	Level C/D	Polyethylene-coated Tyvek Coveralls, Neoprene boots, nitrile gloves, downgrade to Level D when not in direct contact with contaminated sediments
CRZ Workers, Equipment Decontamination	Level D/C	Polyethylene-coated Tyvek Coveralls, splash shield for wet operations and maintenance, upgrade to Level C when in direct contact with contaminated sediments
SZ Workers	Level D	

5.2 PROTECTION LEVEL DESCRIPTIONS

This sections 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 overboots
- 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 overboots
- 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
- Radionuclides

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

No personnel who have facial hair which interferes with the respirator's sealing surface will 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, Health and Safety Manager, project CIH and the ROICC will direct changes in PPE based on changing conditions. The site specific HASP will serve 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, HSM, 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. a. Wash outer boots (Tingley or Robars) and stage to let dry; or
   b. 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

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
Integrated Air Sampling	>0.03 mg/m^3 (TWA)	Level C; implement Federal Lead Standard*

* Personal Air Monitoring; Biological monitoring for blood lead and ZPP; Site dedicated work clothing and special laundering; Showers required before leaving site; Designated clean areas for eating and breaks

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 INTEGRATED AIR MONITORING PROGRAM

Air samples may be collected at all active work zones in the exclusion zone if real-time monitoring instruments indicate elevated levels of particulates. Air Samples will be collected for airborne lead. 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 of contaminants will be evaluated based on OSHA/ACGIH PELs and threshold limit values.

TWA sampling will be performed during soil excavation, vitrified pipe decontamination and liner installation. The integrated sampling strategy will target task exposure potential, the number of workers involved in that task and the specific assignments of those workers. The most "at risk" individual(s) will be monitored. Samples will be taken daily during the these activities. The initial two days samples will analyzed for lead. Additionally two samples per week will be analyzed based on worst case readings of real-time monitoring instruments for the duration of these activities. The remainder of the samples will be kept on site and analyzed if submitted samples return elevated lead readings. Samples will be analyzed by NIOSH Method 7300.

7.4.1 Type and Operational Aspects

- 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
    - Filter cassettes--heavy metal dust
    - Connect collection media/holder to air sampling pump using Tygon tubing; comprises the sampling train that must be assembled to calibrate the pump.

7.4.2 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.

7.4.3 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.

7.5 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.

7.6 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.

7.7 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.
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). • Cold stress (Hypothermia). • 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/Cold 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 Fire, Security, Medical	Ext. 4333
Local Agencies -- Indian Head, MD Fire Department Police	 301-743-3900 301-870-3232 (County Sheriff)
Hospital -Physicians Memorial Hospital *Directions:* Take Rt 225 to US Rt 301 turn RIGHT on 301 toward Laplata, MD; entering Laplata, 2nd traffic light turn LEFT to Route 6 (East Charles St) hospital is ¼ mile ahead	301-609-4000
Regional Poison Control Center	800-962-1253
State Agencies Maryland Department of the Environment	 800-633-6101
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 Lt. Jim Croom	 301-743-4112
National Response Center	800-424-8802
OHM Personnel Project Manager - Gordon Miller Director, Health and Safety - Kevin McMahon District Health & Safety Manger - Bob Brooks	 609-588-6392 609-588-6375 609-588-6423
OHM Corporation (24 hour)	800-537-9540
Additional Phone #'s in Section 2 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/Snow
- 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 Naval Surface Warfare Center, Indian Head, Maryland, which 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 (as required): (PCB blood or fat, urine mercury, urine arsenic, urine phenol, urine halomethanes, blood cyanide, cholinesterase-pseudo-cholesterase, nerve conduction velocity tests, 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.

10.2 BLOOD LEAD MONITORING

In accordance with the Federal Lead Standard 29 CFR 1910.1025, if workers are exposed to airborne lead levels exceeding 0.03 mg/m3 medical monitoring for blood lead and Zinc Protoporphryn will be implemented at that site. Other health considerations will be required in addition to the medical monitoring requirements. These will include site dedicated clothing and laundry, showers prior to leaving the project site, clean food and break areas.

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 the Naval Warfare Center Site site.

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

APPENDIX B
OHM HAZARD COMMUNICATION PROGRAM

APPENDIX B
OHM HAZARD COMMUNICATION PROGRAM

1. OBJECTIVE

A Hazard Communication (Employee Right-To-Know) Program will be instituted at all OHM Remediation Services Corp. (OHM) facilities and job-sites. A copy of the written Hazard Communication Program contained in this procedure will be present at all OHM job-sites, shops, and facilities.

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

Genium Publishing Corp.
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Schenectady, NY 12304-4690
(518) 377-8854

Section 1 - Chemical Product and Company Identification 44

Product/Chemical Name: Lead Monoxide
Chemical Formula: PbO
CAS No.: 1317-36-8
Synonyms: lead (II) oxide; lead oxide, yellow; lead protoxide; litharge; massicot; plumbous oxide
Derivation: An oxide of lead made by controlled heating of metallic lead; various forms of lead and various temperatures from 932-1832 °F (500-1000 °C) are used.
General Use: Used in ointments, plasters, varnishes; preparing solution of lead subacetate; glazing pottery; glass flux for painting on porcelain and glass; with glycerol as metal cement; as a heat stabilizer for plastics; to produce iridescent colors on brass and bronze; in coloring sulfur-containing substances, e.g. hair, nails, wool, horn; in manufacturing of storage battery plates, paints, ink, acid-resisting compositions, match-head compositions, and artificial tortoise shell and horn; as a pigment for rubber; in manufacturing boiled linseed oil; in assay of gold and silver ores.
Vendors: Consult the latest *Chemical Week Buyers' Guide.* (73)

Section 2 - Composition / Information on Ingredients

Lead Monoxide, ca 100 %wt; 92.8% Pb, 7.17% O
The following exposure limits are for lead elemental and inorganic compounds, as Pb:

OSHA PELs
8-hr TWA: 0.05 mg/m^3
29 CFR 1910.1025

ACGIH TLVs
TWA: 0.15 mg/m^3
Notice of Intended Change:
0.05 mg/m^3

NIOSH REL
10-hr TWA: <0.1 mg/m^3
IDLH: 700 mg/m^3

DFG (Germany) MAK*
TWA: 0.1 mg/m^3, total dust
Category III: Substances with systemic effects, onset of effect > 2 hr, half-life > shift length (strongly cumulative)
Peak Exposure Limit: 1 mg/m^3, 30 min, average value, 1 per shift
Group B: According to currently available information, a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed even when MAK and BAT values are adhered to.

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Lead monoxide exists in two forms as red to reddish-yellow or yellow crystals. Lead poisoning is the primary health hazard. Occupational lead poisoning is due to inhalation of dust and fumes. Major affected organs are the nervous, blood, renal (kidneys), and reproductive systems. Health impairment or disease may result from a severe acute short-term or chronic exposure. Occupational exposure to lead monoxide dust can occur during its production and use as well as from smelting, refining, and other operations in which metallic lead is heated in the presence of air such as metal cutting, welding, and burning off lead paint.

Wilson Risk Scale
R 1
I 4
S 1
K 1

HMIS
H 3*
F 0
R 0

*Chronic effects
PPE†
†Sec. 8

Potential Health Effects

Primary Entry Routes: Inhalation, ingestion.
Target Organs: Blood, central and peripheral nervous systems, kidneys, and gastrointestinal tract.
Acute Effects
Inhalation: Inhalation is the most important way lead enters the body. An acute, short-term dose of lead may cause acute encephalopathy with seizures, coma, and death. However, short-term exposures of this magnitude are rare. Reversible kidney damage can occur from acute exposure, as well as anemia. Dust inhalation may also cause mucous membrane and upper respiratory tract irritation.
Eyes: Irritation.
Skin: Irritation.
Carcinogenicity: IARC, NTP, and OSHA do not list lead monoxide as a carcinogen. The IARC and EPA list lead elemental and inorganic compounds as Pb as (IARC-2B) possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals and (EPA-B2) probable human carcinogen: sufficient evidence from animal studies, inadequate evidence or no data from epidemiological studies.
Medical Conditions Aggravated by Long-Term Exposure: Lead may aggravate nervous system disorders (e.g., epilepsy, neuropathies), kidney diseases, high blood pressure (hypertension), infertility, and anemia. Lead-induced anemia and its effect on blood pressure can aggravate cardiovascular disease.

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Chronic Effects: Symptoms of chronic long-term overexposure include appetite loss, nausea, metallic taste in the mouth, lead line on gingival (gum) tissue, constipation, anxiety, anemia, pallor of the face and the eye grounds (the part of the eye opposite the pupil, i.e. the retina), excessive tiredness, weakness, insomnia, headache, nervous irritability, fine tremors, numbness, muscle and joint pain, and colic accompanied by severe abdominal pain. Paralysis of wrist and less often, ankle extensor muscles may occur after years of increased lead absorption. Kidney disease may also result from chronic overexposure, but few, if any, symptoms appear until severe kidney damage has occurred. Reproductive damage is characterized by decreased sex drive, impotence, and sterility in men; and decreased fertility, abnormal menstrual cycles, and miscarriages in women. Unborn children may suffer neurological damage or developmental problems due to excessive lead exposure in women who are or may become pregnant. Lead poisoning's severest result is encephalopathy manifested by severe headache, convulsions, coma, delirium, and possibly death.

Comments: Lead concentrates and remains in bone tissue for many years. The amount of lead the body stores increases as exposure continues, with possibly cumulative effects. Depending on the dose entering the body, lead can be deadly within several days or affect health after many years. Certain conditions such as aging, pregnancy, or menopause may cause release of stored lead. Lead may also be released if a worker who has had considerable lead exposure is immobilized sufficiently (as with a broken leg) to allow mineral loss from the bones.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 min. Consult an ophthalmologist if irritation or pain persist.

Skin Contact: *Quickly* remove contaminated clothing. Flush with water to remove solid particles; wash exposed areas with soap and water. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For diagnosis, obtain blood pressure, blood lead level (PbB), zinc protoporphyrin (ZPP), complete blood count for microcytic anemia and basophilic stippling, urinalysis, and blood urea nitrogen (BUN) of creatinine. Examine peripheral motor neuropathy, pallor, and gingival lead line. For acute intoxication, use chelating agents like $CaNa_2$ EDTA (edetate calcium disodium, Versenate), but *never* use chelates prophylactically as severe side effects may occur. Consult an occupational physician or toxicologist.

Special Precautions/Procedures: Emergency personnel should protect against contact.

Section 5 - Fire-Fighting Measures

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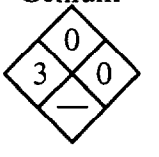

Flash Point: Not flammable

Autoignition Temperature: None reported.

LEL: None reported.

UEL: None reported.

Extinguishing Media: For small fires, use dry chemical, CO_2, water spray or standard foam. For large fires, use water spray, fog or standard foam.

Unusual Fire or Explosion Hazards: None reported.

Hazardous Combustion Products: Highly toxic, lead fume.

Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways.

Fire-Fighting Equipment: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighter's protective clothing will provide limited protection.

Section 6 - Accidental Release Measures

Spill /Leak Procedures: Notify safety personnel of large spills, evacuate all unnecessary personnel, and provide adequate ventilation. Cleanup personnel should protect against dust inhalation.

Small Spills: For dry spills, place material into a clean, dry container with a clean shovel. For liquid spills, take up with sand or other noncombustible absorbent material and place into containers for later disposal. Move containers from spill area.

Large Spills

Containment: For large spills, dike far ahead of liquid spill for later disposal. Do not release into sewers or waterways.

Cleanup: Avoid generating dusty conditions. *Do not* sweep! To minimize dust, use a vacuum or wet mop.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid breathing dust. Lead monoxide is dangerous when heated because it emits highly toxic lead fume. Practice good personal hygiene; wash and change clothes after contamination with lead compounds.

Storage Requirements: Store in a cool, well-ventilated area away from areas of high fire hazard and incompatibles (Sec. 10).

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Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Enclose all processes to minimize dust dispersion into work areas.

Ventilation: Provide general or local exhaust ventilation systems to maintain airborne concentrations as low as possible. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.[103]

Administrative Controls: Consider preplacement and periodic medical exams with emphasis on the teeth, gums, and hematologic, gastrointestinal, renal, cardiovascular, neurological, and pulmonary systems. Measurement of blood lead level (PbB) and zinc protoporphyrin (ZPP) are useful indicators of the body's lead absorption level. As per the *Notice of Intent to Establish BEIs for 1994-1995*, ACGIH recommends a BEI of 30 µg/100 mL for lead in blood.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. The following respirator requirements are for lead (as Pb). For concentrations ≤ 0.5 mg/m^3, wear any supplied-air respirator with high-efficiency particulate filter or a SCBA. For concentrations ≤ 1.25 mg/m^3, wear any powered, air-purifying respirator with a high-efficiency particulate filter or any supplied-air respirator operated in a continuous-flow mode. For concentrations ≤ 2.5 mg/m^3, wear any air-purifying, full-facepiece respirator with a high-efficiency particulate filter; or any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter, or any SCBA with a full facepiece, or any supplied-air respirator operated in a continuous-flow mode, or any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode. For concentrations ≤ 50 mg/m^3, wear any supplied-air respirator operated in a pressure-demand or other positive-pressure mode. For concentrations ≤ 100 mg/m^3, wear any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. *Do not* wear cotton overalls as they retain more dust than other materials. Also avoid cuffs, pleats, and pockets in which lead dust may collect. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Contaminated Equipment: Change protective clothing at least daily at the end of each work shift or more frequently if it becomes grossly contaminated. Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. *Do not* store cigarettes or food in work areas where they may become contaminated. Practice good personal hygiene after using lead monoxide, especially before eating, drinking, smoking, using the toilet, or applying cosmetics. Wash daily at the end of each work shift.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance and Odor: Exists in two forms: red to reddish-yellow, tetragonal crystals (litharge) and yellow, orthothrombic crystals (massicot).

Vapor Pressure: 10 mm Hg at 1985 °F (1085 °C)

Formula Weight: 223.21

Density (H_2O=1, at 4 °C): 9.53 (litharge); 8.0 (massicot)

Melting Point: 1630 °F (888 °C)

Water Solubility: 0.001 g/100 cc at 68 °F (20 °C) (litharge); 0.0023 g/100 cc at 75 °F (23 °C) (massicot)

Other Solubilities: ammonium chloride, acetic acid, dilute nitric acid, in warm solutions of fixed alkali hydroxide; insoluble in alcohol

pH: strong base

Refractive Index: 2.51 (massicot)

Section 10 - Stability and Reactivity

Stability: Lead monoxide is stable at room temperature in closed containers under normal storage and handling conditions. Litharge is stable at ordinary temperatures and massicot is stable above 912 °F (489 °C).

Polymerization: Hazardous polymerization cannot occur.

Chemical Incompatibilities: Chlorine, perchloric acid, metals, non-metals, metal acetylides, strong oxidizers, hydrogen peroxide, and violent or explosive reactions occur when heated with aluminum powder, chlorinated rubber [above 392 ° F (200 °C)], peroxyformic acid, fluoroelastomers (at 200 °C), rubidium acetylide (at 200 °C), silicon + aluminum + heat, zirconium + heat, chlorine + ethylene [at 212 °F (100 °C)], perchloric acid + glycerol, hydrogen trisulfide, linseed oil, fluorine + glycerol, dichloromethylsilane, and silicon + heat. Mixtures of lead oxide with glycerol as a jointing compound may explode when exposed to powerful oxidizers. Incandescent reactions occur with boron, warm aluminum carbide, lithium acetylide, sulfur trioxide, and seleninyl chloride.

Conditions to Avoid: Incompatibles and heat and ignition sources.

Hazardous Decomposition Products: Thermal oxidative decomposition of lead monoxide can produce highly toxic lead fume.

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Section 11- Toxicological Information

Toxicity Data:*

Skin Effects:
Rabbit: 100 mg/24 hr caused mild irritation.

Genetic Effects:
Hamster embryo: 50 µmol/L caused oncogenic transformation.

Acute Oral Effects:
Dog, oral, LD_{Lo}: 1400 mg/kg

* See NIOSH, *RTECS* (OG1750000), for additional toxicity data for lead monoxide. Also consult NIOSH RTECS (OF7525000) for additional toxicity data for lead.

Section 12 - Ecological Information

Aquatic toxicity: >56,000 ppm/96 hr/mosquito fish/TLm/turbid water
Environmental Transport: Aquatic biota, both invertebrate and vertebrate, have been shown to bioconcentrate lead at levels greater than in water, and sometimes similar to those in sediments.
Environmental Degradation: Lead monoxide is released to the atmosphere in particulate matter and is subject to washout and gravitational settling. Transformations to the carbonate are expected. If released into water, lead monoxide will partly settle out due to its fairly low solubility and partially dissolve. In the dissolved state it will form ligands, the dominant ones varying with pH. The amount of lead that can remain in solution in water is a function of the pH of the water and the dissolved salt content. Much of the lead carried by river water is in the form of suspended solids. Volatilization of lead monoxide from soil or water will be negligible due to its low vapor pressure and relative insolubility.
Soil Absorption/Mobility: Lead in soil is relatively immobile and can persist for long periods of time. Lead monoxide will not leach in soil because of its relative insolubility. The soil's capacity to remove lead from solution is correlated with the soil pH, cation exchange capacity, organic matter and the available phosphorus level.

Section 13 - Disposal Considerations

Disposal: Dissolve in nitric acid, precipitate as the sulfide, and return to the supplier for reprocessing. Contact your supplier or a licensed contractor for detailed recommendations. For a water spill, neutralize with agricultural lime, crushed limestone, or sodium bicarbonate. Adjust pH to neutral and use mechanical dredges or lifts to remove immobilized masses of pollutants and precipitates. Follow applicable Federal, state, and local regulations.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101): Not listed

Section 15 - Regulatory Information

EPA Regulations:
Classified as a RCRA Hazardous Waste (as lead) (40 CFR 261.24), Characteristic of Toxicity, Hazardous Waste No. D008, Regulatory Level: 5.0 mg/L
Listed as a CERCLA Hazardous Substance (as lead and compounds) (40 CFR 302.4) per CWA, Sec. 307(a)
CERCLA Reportable Quantity (RQ): No RQ is being assigned to the generic or broad class; Statutory RQ is 1 lb (0.454 kg)
Listed as a SARA Toxic Chemical (as lead compounds) (40 CFR 372.65)
SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed
OSHA Regulations:
Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A)
Listed as an OSHA Specifically Regulated Substance (as lead) (29CFR 1910.1025)

Section 16 - Other Information

References: 73, 103, 124, 132, 136, 140, 148, 149, 159, 167, 168, 176, 184, 186, 187, 189, 192

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Medical Review ..... T Thoburn, MD, MPH

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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.

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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)

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	(Light)	Less than 500	10	12
Air cutting	(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. CLIENT OR SUBCONTRACTOR REPRESENTATIVE AUTHORIZING EQUIPMENT USE:

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

   Company Name_____

   Sign Name_____

   Print Name_____

   Title_____

3. INDIVIDUAL USING EQUIPMENT: 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 C
QUALITY CONTROL PLAN

QUALITY CONTROL PLAN
FOR
REMOVAL OF LEAD-CONTAMINATED SOIL AT SITE 56
NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0058

Prepared by:

OHM Remediation Services Corp.
Trenton, New Jersey

Gordon Miller, P.E.
Project Manager

John P. Franz, P.E.
Program Manager

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

May 8, 1996
OHM Project 16773QC

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1.0 INTRODUCTION

This document, the Contractor Quality Control Plan (CQCP), presents the overall quality control program to be implemented for the installation restoration of Site 56, located at the Naval Surface Warfare Center (NSWC), Indian Head, Maryland. The project consists of the removal of lead-contaminated sediment/soil from a stormwater drainage pipe/discharge area. The stormwater drainage pipe relining is to be installed using an *in situ* method.

OHM Remediation Services Corp. (OHM), a subsidiary of OHM Corporation, will provide and maintain an effective Contractor Quality Control (QC) 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 tests or inspections specified, unless the required inspection and/or test is specifically designated to be performed by the Government.

2.0 *QA/QC ORGANIZATION, RESPONSIBILITIES, AND AUTHORITIES*

OHM will implement the CQCP by establishing a QA/QC organization which works directly with the Navy's on-site representative and reports to the OHM Team program QA/QC Manager. The QA/QC organization will consist of a QA/QC person who will be on the job site on an as-needed basis to verify compliance with the contract requirements. The QA/QC organization will be supplemented by additional QA/QC personnel as may be necessary.

The Navy Technical Representative (NTR) will be notified in writing prior to proposed changes to the CQCP, and the proposed changes will be subject to the NTR's approval prior to implementation.

OHM defines quality assurance (QA) as the overall system of controls applied to a project and quality control (QC) as the individual actions taken within the system on a daily basis. Each OHM employee who contributes to the performance of a project effects the quality of the final product, therefore everyone is involved in control of quality. It is the responsibility of the individuals within the quality program organization to communicate, organize, teach, and direct the individual employee contributions toward the common goal of QA/QC.

2.1 INDIAN HEAD QC PROGRAM ORGANIZATION

The OHM project team functions under a project management structure. This ensures that each delivery order is managed by a single individual, the Project Manager, who is responsible for all activities throughout the delivery order planning, design and development, and construction phases. OHM's QA/QC organization chart for Delivery Order 0058 is included as Figure 2-1, which illustrates the organizational structure that provides the basic foundation under which the project will be managed. Separate lines of responsibility and reporting are indicated on the quality program organization chart so that issues related to quality, as well as health and safety, can be discussed and resolved independently, without the interference of project budget and schedule constraints. QA/QC and health and safety officials have a direct reporting line from the project site to the corporate office of OHM.

Overall project QA/QC will be monitored by the NTR. The NTR is the point of contact for the Navy and is responsible for the management, technical, quality assurance, administrative, and financial aspects of the project. All levels of OHM Team personnel will participate in ensuring compliance with all project QA/QC plans.

2.2 PROJECT LEVEL QA/QC ORGANIZATION

At the project level, the quality assurance team will include the Project Manager, Site QA/QC Officer, and Site Supervisor. The responsibilities, reporting requirements, and authorities of these individuals are discussed in the following subsections. As necessary, on a part-time basis, the Site QA/QC Officer, Laboratory Technician, and Health and Safety Officer will supplement the project QA/QC team. These personnel will not be on site full-time.

Project Manager

Overall project coordination and management of project activities is the Project Manager's responsibility. The Project Manager will serve as the Program Manager's on-site representative and will coordinate and communicate with the on-site NTR. Additionally, the Project Manager will be responsible for the coordination of extensive

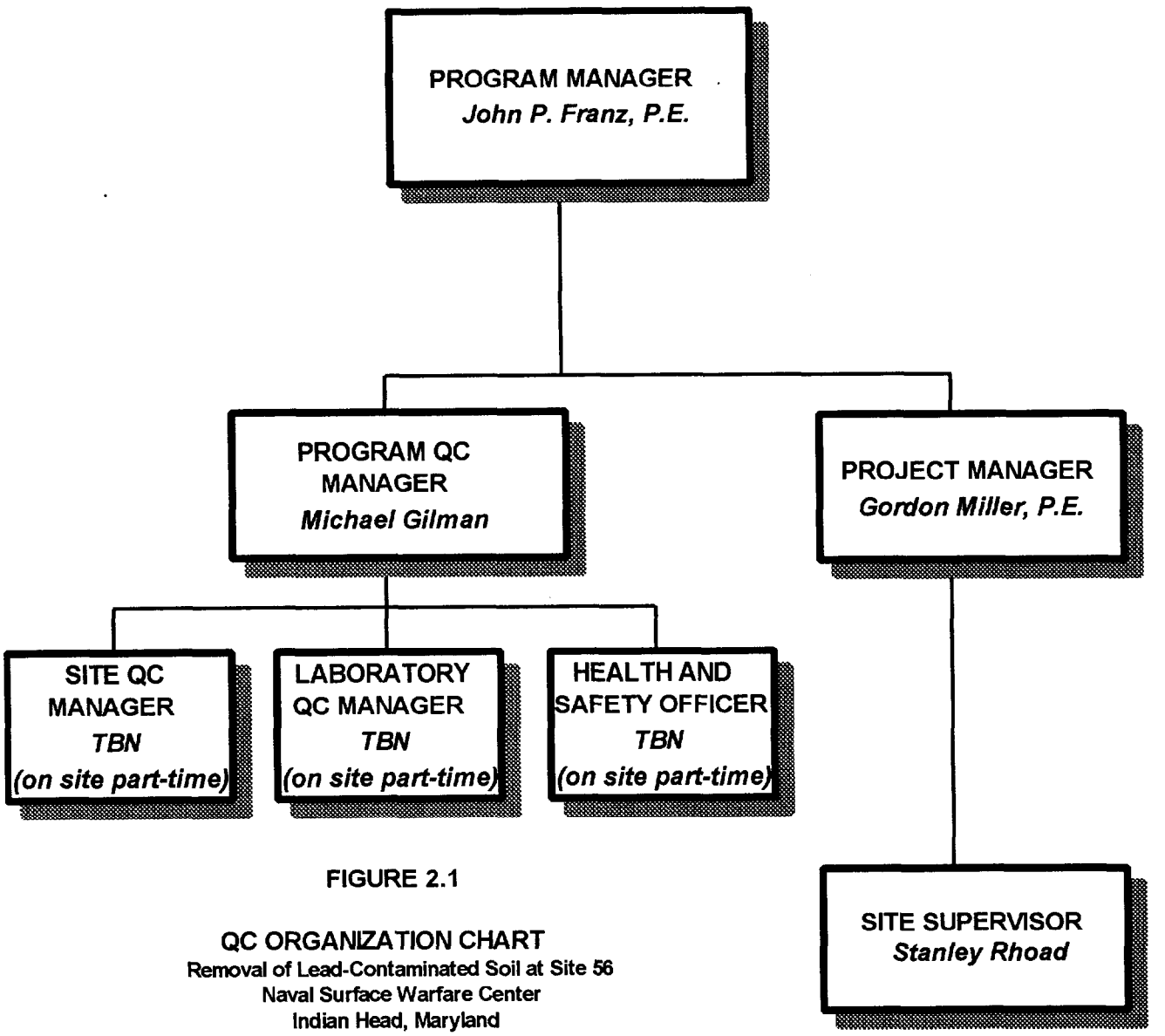

FIGURE 2.1

QC ORGANIZATION CHART
Removal of Lead-Contaminated Soil at Site 56
Naval Surface Warfare Center
Indian Head, Maryland
Delivery Order 0058
OHM Project 16773

Prepared for

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

TBN = To be named

off-site activities involving OHM technical staff. The Project Manager will report directly to the OHM Progam Manager.

Site QA/QC Officer

The Site QA/QC Officer is responsible for the execution of the site-specific QPP and communicates the on-site quality assurance program policies, objectives, and procedures to the project personnel and subcontractors during project meetings and informal discussions. The Site QA/QC Officer will be free of production and budget related influences. On-site technical QA/QC staff, which may include engineers, chemists, hydrogeologists, and scientists will assist the Site QA/QC Officer in monitoring, controlling, and documenting the quality of the on-site remedial activities. All documentation related to the control of the quality of the project including analytical test results, inspections, material test results, and audits will be reviewed by the Site QA/QC Officer. The Site QA/QC Officer reports to the Program QA/QC Manager.

The Site QA/QC Officer has the authority to stop work on all or any project work activity due to non-conformance with the QPP. All on-site personnel will be encouraged to discuss any concerns with the QA/QC technical staff. In the event that the Site QA/QC Officer is informed of and/or detects an incident of project non-conformance, the Site QA/QC Officer shall perform an initial investigation, determine the course of corrective action required, document the incident, and report the incident to the Program QA/QC Manager. The Site QA/QC Officer will not be on site full-time, but will supplement the Project QA/QC Team on an as-needed basis.

Site Superintendent

The Site Superintendent is the project remedial construction expert responsible for the day-to-day supervision of the on-site remedial activities. He directs the on-site project resources through the task specific project supervisors to complete the daily work activities. The Site Superintendent is responsible for maintaining clear, effective, up-to-date communications with the Project Manager concerning the project progress. The Site Superintendent's involvement in QA/QC includes communicating the necessity of quality in performance of all remedial activities to the on-site project staff. The Site Superintendent reports directly to the Project Manager.

3.0 PROJECT QUALITY CONTROL

The basis of OHM's quality control system for engineering and construction is comprised of four main areas of control:

- Project document control
- Project procurement control
- Inspection and testing
- Subcontractor quality control

The project specific mechanisms and protocols for each of these QC functions is presented in detail below.

3.1 DEFINABLE FEATURES OF WORK

The initial exercise in developing the QC system is to identify the definable features of work within the project. A definable feature of work is a distinct activity, task, or set of tasks with separate control requirements. The criteria for a definable feature of work is:

- The work has similar materials, equipment, remedial procedures, inspection techniques, or is governed by a single section of the specification.

- The same skilled labor or technical expertise performs the work.

- When completed and inspected, it is not covered by other work.

3.2 PROJECT DOCUMENT CONTROL

Essential to a successful remediation project is rigid document control systems both in the project field offices and the supporting regional office. The system governs the receipt, updating, distribution, and ultimate archiving of all project submittals, documents, and designs.

At the project site, the site QA/QC officer will be responsible for the maintenance and compliance with the established system. At a minimum, their responsibilities include:

- Maintenance of design document control logs or registers for drawings, specifications, submittals and vendor prints indicating current revision status, dates of the document and distribution to appropriate parties.

- Control of superseded or revised documents through recall, destruction, or marking as obsolete.

- Documentation of any field changes to designs or plans and the concurrence of the qualified technical oversight and/or originators.

All project documentation will be maintained on site and off site according to an established OHM project filing system, which includes subsections for such tasks as correspondence, accounting and purchasing, drawings, laboratory data and generated reports.

3.3 PROCUREMENT QUALITY CONTROL

All outside services or materials procured by OHM are done so following the OHM Procurement and Policies and Procedures Manual and the Federal Acquisition Regulations (FAR).

OHM technical personnel are responsible for developing the initial scope of work or technical specifications for the procurement, and advising on suitable vendors. OHM purchasing is then responsible for issuing and receiving the cost quotations. The appropriate in house technical person or site QA/QC representative is then used to technically evaluate the incoming bids as necessary. The review shall verify that the following provisions are met:

- The material or service is adequate, understandable, and meets project schedules.
- Quality control requirements are established (inspection, testing and acceptance requirements).
- Documentation requirements are met including drawings, certificates of performance, inspection or test results, and operation and maintenance manuals.

At the site, the procedures for handling and storage of material will be monitored by the site QA/QC staff to prevent damage and deterioration, and to verify accomplishment of the suppliers storage and pre-installation recommendations.

3.4 INSPECTION AND TESTING

OHM'S quality inspection program utilizes the widely accepted " three phases of control" for the receipt and inspection of all subcontracted services or purchased materials which are:

- Preparatory inspection
- Initial inspection
- Follow-up inspection

The types of activities which occur in this system are described as follows:

- *Preparatory*: Performed prior to beginning each definable feature of work. This phase includes:
  - Reviewing contract/delivery order requirements, shop drawings, specifications, and submittals; verifying approvals and conformance
  - Verifying that all materials and equipment are available, tested, conforming documentation verified, submitted and approved; verifying qualifications of personnel; verifying that provisions are made to provide required QC testing and inspection
  - Examining the work area to assure that all preliminary work has been accomplished in compliance with the contract, including interfacing with other work
  - Physically examining required materials, equipment and sample work to assure that they conform to shop drawings/data and are stored properly
  - Reviewing potential safety and environmental hazards

- Discussing procedures for conducting the work and quality concerns with project personnel, including subcontractors, who will perform the work

- Ensuring that the portion of the plan for the work to be performed has been submitted to and accepted by the customer prior to start of work

- The results of the preparatory phase actions will be documented and attached to the daily QC report.

- *Initial*: Performed when work begins on a representative portion of a definable feature of work. These inspections include:

  - Examining the quality of workmanship
  - Verifying full contract compliance
  - Reviewing control testing
  - Resolving all differences
  - Checking for use of a defective or damaged materials
  - Checking for omissions
  - Checking dimensional requirements
  - Checking for compatibility with subsequent or adjacent work
  - Verifying that safety procedures are strictly enforced and in full compliance with the safety plan and activity hazard analysis

  The customer is notified prior to the beginning of the initial phase. The minutes of this phase will be documented and attached to the daily QC report.

- *Follow-up*: Performed continuously to ensure compliance with contract and regulatory requirements, including cost effectiveness, efficiency of operations, and control testing, until completion of the definable feature of work.

  Daily safety inspections of the site and the work in progress are performed to ensure compliance with the occupational health and safety requirements of OSHA, the customer, and OHM's site safety and health plan. These inspections are incorporated into daily QC reports and appropriate corrective actions are documented in a noncompliance check-off list.

  Final follow-up checks are conducted to ensure that all deficiencies have been corrected prior to the start of additional features of work, which may be affected by the deficient work. Deficiency status log updates are documented in a QC daily report, along with the results of the safety inspections.

Table 3-1 presents the inspection schedule for construction and engineering tasks as identified by OHM under the current scope of work.

3.4.1 Field Verification Testing

The Inspection/Testing as outlined in Table 3-1 will be performed by the OHM QC representative 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 QC representative are described in Section 2.0 and the Program QC Plan.

TABLE 3-1
INSPECTION SCHEDULE
REMOVAL OF LEAD CONTAMINATED SOIL AT SITE 56
NAVAL SURFACE WARFARE CENTER, INDIAN HEAD, MARYLAND
Delivery Order #0058, OHM Project #16773

ACTIVITY	PREPARATORY	DONE	INITIAL	DONE	FOLLOWUP	DONE
Earthwork/Excavation	Initial limits of area and depth defined Sampling and laboratory procedures established		Survey control Visual inspection of excavation Field screening of excavation Dust control Chain of custody Field QC testing • Imported material inspection		Remove material from site as required. (Also see "Transportation of contaminated Material") Verification of sampling Data inspection/evaluation Grades Material thickness Daily logs maintained	
Sediment Control/Removal (Including Cleaning of Pipes)	Method (mechanically/hydraulic) of sediment removal established.		Proper control/removal		Proper maintenance and ongoing inspection.	
Water Treatment System	Limits of work established Material meets requirements		Proper installation Leak test lines Startup of system		Proper installation Ongoing testing	
Geotextile/HDPE Membrane	Material meets requirements.		Proper installation Alignment and location		Proper installation Alignment and location	
Confirmation Sampling and Analysis	Sampling and laboratory procedures established		Site limits verified.		Data inspection evaluation	
Transportation of Contaminated Material	Specified trucks being utilized permits obtained as required		Monitoring for spillage during loading and transportation		Roadway spillage and condition at completion Records of Manifests maintained.	
Clearing and Grubbing	Limits of work established		Survey control		Remove material from site as required	
Topsoil and Seeding	Proper mixture meets specifications Topsoil composition tests		Topsoil thickness Limits of placement Seeding per specification requirements		Sufficient growth Proper placement	

TABLE 3-1
INSPECTION SCHEDULE
REMOVAL OF LEAD CONTAMINATED SOIL AT SITE 56
NAVAL SURFACE WARFARE CENTER, INDIAN HEAD, MARYLAND
Delivery Order #0058, OHM Project #16773

ACTIVITY	PREPARATORY	DONE	INITIAL	DONE	FOLLOWUP	DONE
Decontamination Facility	Materials meet specification requirements Location defined		Proper installation Proper clearing		Decontamination liquids and solids recovered Area restored	
Erosion Control	Materials meet specification requirements Location defined		Proper installation Proper grades		Decontamination liquids and solids recovered Area restored	
Flow Diversion	Limits of work established		Field QC testing		Proper maintenance and ongoing inspection	
Filling and Backfilling	Initial limits of area and depth defined		Survey control Dust control Field QC testing		Material thickness Daily logs maintained	
Access Roads, Drainage Swales, Fence	Materials meet specifications • Aggregate surface course Layout and dimensions established		Survey control Location and grade Dust control		Ongoing Temporary access road removal and restoration	

3.4.2 Field Sampling

Samples of materials will be obtained in the field for verification testing. The site technician will collect the specified samples, as appropriate, as soon as areas are deemed clean or a portion of the work is completed to obtain results as promptly as possible. See Table 3-1.

3.5 SUBCONTRACTOR QUALITY CONTROL

All on site services and materials subcontracted by OHM require that the awarded subcontractor to fully comply with this project specific CQP. The subcontractors personnel qualifications, technical performance capabilities, QC program, and QA/QC manuals and procedures will all be reviewed by the appropriate QA/QC team member who will also assure that all pertinent project QA/QC requirements were presented as part of the procurement.

If required, the subcontractor may be required to provide a qualified QA/QC representative on site to document the quality of the subcontractors services. The subcontractor would be required to complete the established project documentation including inspection logs, non conformance reports, and corrective action reports.

4.0 PROJECT QUALITY AUDITS

The OHM QA/QC Manager for the project will be responsible for verifying compliance of all engineering design, construction, and data acquisition activities. The QA/QC Manager will also call on various technical personnel within the company as appropriate.

In general, the audits serve to evaluate the effectiveness and implementation of the project QC requirements, work areas and activities, and project documentation. All audit results are presented to the project manager and other management as necessary.

4.1 AUDIT PROCEDURES

For Delivery Order 0058, OHM has identified the following areas for inclusion into the project audit program. Additional tasks may be added or deleted as they are identified during the course of the project. The project QA/QC Team will review all work scope changes to identify the applicable QA/QC controls and the resulting audit needs.

4.1.1 Subcontractor Audits

Subcontractor audit actually begins upon review of the vendors bid proposal. Technical evaluation will identify any potential future performance problems of the subcontractor.

Additional audit items may include the subcontractors past safety records and credit history. In the field, the subcontractors compliance with site documents such as the HASP, records of labor, equipment and time, and documentation of work performed are all audit activities.

Any certifications or warranties regarding on site work will be reviewed prior to allowing demobilization of the subcontractor.

4.1.2 Field Operations Audits

Field operation audits are conducted at the project location and can involve a wide variety of areas to investigate including:

- Implementation of accepted and approved work procedure
- Calibration of equipment and records of calibration
- Equipment maintenance and associated records
- Observation of site safety rules (see HASP)
- Compliance with applicable local electrical and building codes
- Equipment operator training records
- On site project files

In particular, auditing against the inspection activities presented in Table 3-1 will occur.

4.1.3 Data Acquisition Audits

All audits regarding the assurance that site analytical data is collected in representative, accepted and defensible manner is discussed in detail within the project QAPP.

4.2 AUDIT REPORTING AND NON-CONFORMANCE

During the audit procedure and at its conclusion, the project QA/QC Team will review the findings with the appropriate personnel for each activity audited and offer a potential corrective action. Minor deviations which can be resolved on site to all parties' satisfaction during the audit will not be documented in the final report as requiring formal corrective action. All other non-conformance findings regarding project quality will documented in final audit report.

The final audit report will be prepared by the Project QA/QC Manager for submission to the Project Manager and applicable management. The Project QA/QC Manager will call on the other team members as necessary to prepare the report. A standard format for the final report is as follows:

- Date of audit
- Member(s) of the audit team
- Project personnel involved
- List of activities audited
- Audit results
- Description of non-conformance items or variations and appropriate reference (i.e. plan or specification section)
- Possible corrective action and completion date for implementing the corrective action.
- Format and completion date for audit response by project

Open discussion between the audit team and project personnel will serve to set completion dates that are satisfactory to all and will include the variables of schedule, cost, and technical magnitude of the corrective action.

4.3 CORRECTIVE ACTION

Upon identification of a non-conformance items in the final audit report, the project team will respond in writing to the Project QA/QC Manager by the agreed upon completion date. The response will clearly state the corrective action selected, the reasoning for the selection, and the expected completion date. The standard procedure for determining the appropriate corrective action is:

- Define the problem
- Assign responsibility for investigating or researching the problem
- Investigate and determine the problem
- Determine or design the proper corrective action
- Assign the implementation of the corrective action and schedule
- Establish method and schedule for assessing the effectiveness of the corrective action

Corrective action(s) which will have a significant impact on cost or project schedule, or result in a deviation from or amendment to the Navy approved plans will be presented to OHM management and appropriate Navy personnel as soon as possible for approval prior to implementation.

The completion of the corrective action and its effectiveness will be documented by the QA/QC Team through written documentation or a re-audit.

All documentation of correspondence, reports, forms and designs resulting from the audit process will be transferred to the project central files as discussed in Section 5.3.

TABLE 4.1
SUBMITTAL REGISTER

Delivery Order .0058 | Project Number 16773 | Revision date: May 7, 1996
Contract No. N62470-93-D-3032 | Project Title: Removal of Lead Contaminated Soil | Location: Indian Head Division, NSWC, Indian Head, MD | Contractor: OHM Remediation Services Corp.

Spec Section No.	Material or Product	Spec Para No.	Approving Authority	Transmittal Control No.	Planned Submittal Date	Contractor Action: Date Forwarded From Contractor	Approving Authority Action: Action Code	Approving Authority Action: Date of Action	Contractor: Contractor/ Received from Approved Authority	Remarks
(a)	(b)	(c)	(d)	(f)	(g)	(j)	(m)	(n)	(o)	(p)
	Reports									
	Work plan (WP)		G		05/09/96					
	Construction Schedule (WP)		G		05/09/96					
	Environmental Protection Plan (WP)		G		05/09/96					
	Health and safety plan (WP)		G		05/09/96					
	CQC plan (WP)		G		05/09/96					
	Sampling & analysis plan (WP)		G		05/09/96					
	Testing Laboratory Qualifications		G		05/27/96					
	Site Plan		G		05/09/96					
	Stormwater Discharge Area Plan		G		05/09/96					
	Water Filtration System Process Layout		G		05/09/96					
	Records									
	As-built records		G							
	Construction Schedule		G		01/06/00					
	Monthly Progress Reports		G		Monthly					
	QC meeting minutes		G		Weekly					
	Test results summary report		G		As Req'd					
	QC report		G		Daily					
	Production Report		G		Daily					
	Rework items list		G		As Req'd					
	Permits		G		As Req'd					
	Contractor's closeout report		G		09/30/96					
	Solid waste disposal permit		G		05/31/96					
	Disposal permit for hazardous waste		G		05/31/96					
	Design Data									
	Bypass Pump Sizing		QC		05/24/96					
	Pipe Liner Selection Data		QC		05/31/96					
	SD-08, Statements									
	Water Diversion Plan (WP)		G		05/09/96					
	Pipe Lining Installation Specifications		QC		05/31/96					
	PipeLiner Material Specifications		QC		05/31/96					
	SD-02, Manufacturer's Catalog Data									
	Concrete repair mortar		QC		05/31/96					
	Pipe liner material		QC		05/31/96					
	SD-12, Field Test Reports									
	Fill and backfill tests		QC		06/07/96					
	WTS sampling analytical results		G		As req'd					
	Confirmation sampling anlalytical data		G		08/23/96					

(Others may be prescribed by Transmittal Form)

Approved By:
G: Contracting Officer
QC: CQC Manager
A/E: Design Engineering Firm

TABLE 4.1
SUBMITTAL REGISTER

5.0 PROJECT QUALITY CONTROL DOCUMENTATION

Documentation of on-site construction QA/QC activities must be maintained to provide evidence that the quality of the completed project meets the requirements of the project design criteria, construction plans and specifications. The Site QA/QC Officer will be responsible for preparing, reviewing, and organizing the construction QA/QC files. At a minimum, the following documentation will be included in the construction QA/QC files:

- Daily QA/QC Inspection Reports
- Weekly QA/QC Summary Reports
- As-Built Documentation
- Project Submittals
- Inspection and Testing Reports
- Non-conformance and Corrective Action Reports
- Analytical Test Results

Samples of reports and forms to be utilized are included in the Program QC Plan.

5.1 DAILY REPORTS

The basic document for recording the daily QA/QC activities is the Daily QA/QC Inspection Report. The report provides information regarding the work activity completed, the job-site location, work performance, weather conditions, results of inspections and tests, descriptions of non-conformance, corrective actions and other inspection comments. The report includes work completed by the OHM Team, subcontractors, and suppliers. The Daily QA/QC Inspection Report is completed and signed by the Site QA/QC Officer.

5.2 WEEKLY REPORTS

The Site QA/QC Officer will prepare weekly QA/QC summary reports for the Project Manager's review and subsequent submittal to the Navy. These reports will include a general discussion summarizing the work activities and inspections completed during the week. As necessary, the reports will include the following:

- Inspection and Test Reports
- Non-conformance and Corrective Action Reports
- Analytical Test Results

5.3 RECORD DOCUMENTATION

All appropriate records will be retained in the project file to provide documentation of how remedial action activities were actually performed. Throughout the duration of on-site activities, the QA/QC staff will frequently review the project construction plans and specifications and incorporate design changes and field revisions onto a final as-built set of construction plans and specifications. As-built documentation will include a listing of the changes to the original construction plans and specifications on the front cover of the construction drawings. To verify that the changes are correct, the Project QA/QC Manager will review and approve each change. Upon project completion, the final as-built documentation will be submitted to the Navy as a permanent record of the final location, dimensions and orientation of the project work.

5.4 PROJECT SUBMITTALS

The OHM Team will create and maintain a Master Document List (MDL) that includes all documents prepared during the course of the DO. Submittals generated during the construction activities, including the weekly QA/QC summary reports and the as-built project files will be included on the MDL. Copies of all of submittals will be kept in the on-site project files. Upon completion of the project, all project documentation will be relocated to a central file location.

All documentation required for submittal to the Navy is listed in the Submittal Register, Table 4-1.

APPENDIX D
SAMPLING AND ANALYSIS PLAN

SAMPLING AND ANALYSIS PLAN
FOR
REMEDIAL ACTION
AT SITE 56
SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0058

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OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

May 8, 1996
OHM Project 16773SAP

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1.0 INTRODUCTION

OHM Remediation Services Corporation, Inc. (OHM) is pleased to submit this Sampling and Analysis Plan (SAP) to the U.S. Navy, Naval Facilities Engineering Command, under RAC N62470-93-D-3032. This SAP pertains to all soil sampling and related activities at Site 56, Indian Head, Maryland, as per Delivery Order No. 058. These activities include all soil removal, verification, and disposal sampling.

1.1 SITE DESCRIPTION

Site 56 is commonly referred to as Industrial Outfall 87 (IW 87), which consists of a brick and mortar pit, a 700 feet (approx.) terra cotta pipe, and 30 feet of overland flow along a sandy swale. Influent water to IW 87 is primarily storm water; but also consists of water from plant operations and a sump pump. Sediment located in the pit, pipe, and swale have been shown to be contaminated with lead at levels which are hazardous, based upon Toxicity Characteristic Leaching Parameter (TCLP) tests. Monitoring of effluent discharge from the pipe have established regular exceedance of the permit level of 0.082 mg/l lead.

1.2 OVERVIEW OF SAMPLING AND ANALYSIS

OHM will remove approximately 20 cubic yards (CY) of sediment from the pipe, 20 CY of sediment from the outfall, and less than 1 CY of sediment from the pit. In addition, OHM will remove approximately 15 cy of soil from a berm adjacent to the outfall. OHM will perform water treatment of effluent from IW 87.

The scope of work for sampling and analytical requirements at the Indian Head Site will include:

- Mobilization of an OHM sample technician to the site.
- Post-excavation sampling of trench soil.
- Sampling of effluent water at the water treatment system (WTS).
- Accurate documentation of each sampling event.
- Obtaining of QA/QC samples, as per NEESA Levels C and E criteria.
- Waste characterization of all disposal materials.

The scope of work will be elaborated in Section 2.0 of this SAP.

Previous monitoring of pipe effluent discharge has demonstrated frequent lead concentrations above the permit level of 0.082 mg/L. It has been established that lead contaminated sediment within the pipe and outfall swale are the source.

2.0 SAMPLING AND ANALYSIS SCOPE OF WORK

2.1 MOBILIZATION

OHM will mobilize one (1) sample technician from the OHM Virginia Divisional Office, Glen Allen, VA. Additional support of personnel and/or materials will be provided by the OHM Regional Office in Trenton, NJ.

2.2 POST-EXCAVATION SAMPLING

Upon completion of the excavation of all sediment in the pit, pipe, and outfall, and after the 70 foot section pipe section is removed, the OHM sample technician will conduct post-excavation sampling of the surface soil/sediment. Post-excavation sampling will be conducted at the floor and walls of both the 30 foot by six foot stream trench excavation, as well as the 70 foot trench created by the pipe removal task. One composite sample will be developed for each 25 foot length of trench, with each composite sample developed from grab samples taken from the trench centerline and both walls.

20 feet centers

Post-excavation grab samples will consist of obtaining soil at a depth of 0-3-inches from the surface. The OHM sample technician will utilize a stainless steel auger or disposable polypropylene scoop to sample the soil. The soil will be transferred to a stainless steel or aluminum bowl or tray. All twigs, vegetation, and loose non-soil materials will be removed manually from the sample. The soil will be mixed and "quartered" and then transferred to a 500-ml glass or polypropylene container.

The OHM sample technician will don a clean pair of sample gloves for each sample grid. All sample gloves and disposable scoops will be disposed after one use. All stainless steel apparatus will be decontaminated between sample points. Decontamination procedures are discussed in Section 6.2 of this SAP.

2.3 WTS SAMPLING

Water samples shall be collected by the OHM sample technician from the final 12,000 gallon pool and analyzed for lead and nitrated esters in accordance with the IHDNSWC permit discharge requirements. Samples shall be turned over to the IHDNSWC on-site laboratory for analysis. It is anticipated that OHM will receive analytical results within 24 hours of sampling.

2.4 DISPOSAL SAMPLES

Upon completion of all remediation activities, all contaminated soil and remaining wastewater generated on-site will be sampled for the disposal parameters listed in Table 2-1 below. OHM Transportation and Disposal Group will use the analytical results in the determination of the proper disposal option.

TABLE 2-1
OHM GUIDELINES FOR DISPOSAL ANALYSES

Analysis	Method(s)
PACKAGE A [ALL SAMPLES]	
Total Solids	160.3
Corrosivity, pH	150.1, 9040, 9045
Flash Pt. Ignitability	1010, 1020
Reactive Sulfide	Sec. 7.3.4.1
Reactive Cyanide	Sec. 7.3.3.2
TCLP Volatile Organics	1311 - 8240, 8260
TCLP Semi-Volatile Organics	1311 - 8270
TCLP Metals	1311 - 6010, 7000's
TCLP Pesticide/Herbicides	1311 - 8080/8150
TCL Volatile Organics	8240, 8260
TCL Semi-Volatile Organics	8270
TCL Pesticide/PCBs	8080
TCL Herbicides	8150
PACKAGE B [INCINERATION DISPOSAL] Package A plus the following:	
% Ash	160.4
BTU	ASTM
Total Halides	9020
Total Sulfur	ASTM
Total Cyanide	9010
TAL Metals and Molybdenum	6010, 7000's
PACKAGE C [LANDFILL DISPOSAL] Package A plus the following:	
Paint Filter Test	9095
Total Cyanide	9010
Total Organic Halogens (TOX)	9020
PACKAGE D [WASTEWATER TREATMENT] Package A plus the following:	
Total Sulfide	3762, 9030
Total Cyanide	9010
Total Phenols	420.1, 9065
TAL Metals and Molybdenum	6010, 7000's

3.0 DATA QUALITY OBJECTIVES

The data quality objectives for all post-excavation and WTS sampling and analysis will be performed within the appropriate NEESA quality control procedures.

- *WTS Sampling*. All on-site analyses of effluent water associated with the WTS will be performed within NEESA Level E criteria.

- *Post-excavation soil sampling*. All post-excavation soil sampling and analysis will be performed within NEESA Level C criteria.

3.1 NEESA LEVEL C

This QC level is requires a duplicate frequency of 10%, one equipment rinsate per day, and one field blank per matrix.

3.2 NEESA LEVEL E

This QC level requires the use of EPA-approved, or equivalent, laboratory procedures. A duplicate sample will analyzed at a frequency of 5%; and one solvent blank will be analyzed daily.

3.3 QA OBJECTIVES FOR MEASUREMENT

The quality of the sampling and analytical data can be evaluated based on the following parameters:

- *Representativeness*: This expresses the degree to which the data accurately and precisely represents the characteristics of the sampling matrix, a unique sample point, or environmental conditions. The representativeness of a sample location is assured by careful planning of the sampling event, in that the number of sample points and the frequency of sampling will be adequate to establish the site conditions.

- *Comparability*: The degree to which a set of data can be compared to another data set. Reporting units (i.e, milligrams per kilogram (mg/kg), micrograms per liter (µg/L), will be the same for all analytical data generated, unless noted otherwise. The instrumentation and analytical methods used will be as required by EPA/SW-846, or other standard methods. Standard reference material will be used to document traceability of calibration standards, and to allow comparison of the data with that obtained by other laboratories.

- *Accuracy*: The degree to which the laboratory data agrees with a standard reference, or true, value. Accuracy is, generally, accessed by the use a matrix spike (MS) determination. A known quantity of the analyte is added ("spiked") to the sample; the spiked sample is analyzed by the same method as the sample. The recovery is determined by the difference between the results; recovery is typically expressed as a percentage.

- *Precision*: The extent of agreement among individual measurements for like parameters. Precision can be determined upon replicate analysis of the same analyte by the same procedure. The acceptance of data may be based upon the standard deviation, of the results of duplicate analysis. More commonly, the relative percent age difference (RPD) between results is used to evaluate precision.

Precision and accuracy can be evaluated by the use of matrix spike duplicate (MSD) analysis.

- *Completeness*: The proportion of valid data as compared to the total quantity of data obtained. Data validation is, generally, performed by an external QA organization. The goal for completeness is project specific; greater than 90% is a typical completeness goal for most sampling and analytical activities.

3.4 DATA VALIDATION

The results of all post-excavation sample analysis will be validated as per NEESA Level C QA/QC criteria. Data validation will examine the laboratory data and ensure that:

- Each sample was analyzed within specific holding times.
- The correct laboratory method was used to analyze each sample.
- Every sample on the COC was analyzed, and logged onto the data sheets with the correct sample number, or cross referenced accurately.
- Absorbance data correlate with sample concentration for instrument calibration.
- Dates and times of instrument calibration will be verified.
- Instrumental standards were properly prepared and appropriately logged with dates and times.
- All laboratory blank and matrix spike analysis will be evaluated for acceptance within control ranges.

4.0 PROJECT ORGANIZATION

4.1 OHM FIELD ANALYTICAL SERVICES

OHM provides sampling services through the Northeast Region's Field Analytical Services (FAS) Group. The FAS group consists of five sample technicians, three field chemists, three project chemists, and a senior project chemist. These individuals are capable of providing a quality sampling effort, from the initial site characterization through the sampling event.

Sample Technician

An OHM sample technician will perform all post-characterization soil sampling, and all WTS sampling at the Indian Head Site. 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 based in the Glen Allen, Virginia office — Debra Burkett and Paul Cavannaugh — who will be utilized, if available. Otherwise, a sample technician or a field chemist will be mobilized from the Trenton, New Jersey Regional office.

Project Chemist

Bob Lynch will be the project chemist for this project. As project chemist, he will be able to provide support for the sample technician from the Trenton office. This may be in the form of technical assistance or placing an order for required sampling materials.

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 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

The OHM Project Manager is Gordon Miller. He serves 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 the corrective action 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 DOCUMENTATION QA/QC AND SAMPLE MANAGEMENT

Sample integrity is a key element in any project. Sample integrity strengthens the validity of the analytical data, and can be used for legal documentation if needed. Sample integrity is maintained by OHM through proper sample collection, documentation, and sampling equipment maintenance.

5.1 SAMPLE LABELS

Correct sample labeling and the corresponding notation of the sample ID numbers in the field logbook are necessary to prevent misidentification of samples and their eventual results. All sample labels will be filled out legibly and with indelible ink. They will be affixed to the sample container and covered with clear tape. The following presents an example of a sample label.

LABEL SAMPLE	
PROJECT NO.: 16773	DATE:
SAMPLE:	
TAKEN BY:	TIME:
WITNESS:	

The following information is recorded on the label using indelible ink:

- Project number — 16773
- Date — month, day, and year
- Time — Military hours (e.g., 1000, 1400, 2320) for Eastern Standard Time
- Samples — Description of sample
- Analyte — Analysis which will be performed, if more than one analysis is being done on samples from that project
- Preservative — If used
- Taken By — Initials of person taking sample
- Witness — Initials of person witnessing or assisting in taking sample
- Sample Number — Assigned from laboratory log book. Write number in blank corners of label. Sample numbers will be assigned numerically starting with 001. The OHM project number (16773) will be used as prefix

  Example: 16773-001
- Number of Jars — Used with duplicate samples or when one jar cannot hold all the sample.

Every sample collected will be labeled in the above manner. Information will be printed neatly, except for initials which can be written. After the sample is collected and the label is securely attached, the sample is logged into the sample log book with the sample number written on the sample label.

5.2 SAMPLE CUSTODY AND HANDLING

An important consideration for the collection of environmental data is the ability to demonstrate that analytical samples have been obtained from predetermined locations and that they have reached the laboratory without alteration. Evidence of collection, shipment, laboratory receipt, and laboratory custody until disposal must be documented to accomplish this. Documentation is accomplished through an Analysis Request and Chain-of-Custody Record that records each sample and the individuals responsible for sample collection, shipment, and receipt. A sample is considered in custody if it is:

- In a person's actual possession
- In view after being in physical possession
- Sealed so that no one can tamper with it after having been in physical custody
- In a secured area, restricted to authorized personnel

Overall, chain-of-custody documentation will begin when laboratory personnel record bottle lot numbers during the transfer of bottles to field personnel. Field personnel will then maintain custody of the bottles until sample collection, at which time they will record in their field notes the lot numbers of all bottles used for each sample. A copy of the lot number information will accompany the samples to the laboratory and will be included in the data packages.

Sample custody will be initiated by field personnel upon collection of samples. Labels and log information will be checked to verify that identification is correct. Samples will be packaged to prevent breakage or leakage during transport. Chain-of-custody information will be supplied with the samples and shipped by commercial carriers. The standard OHM Chain-of-Custody is presented in Appendix A.

5.3 FIELD DOCUMENTATION

Several types of documentation will be prepared in the field by the project chemist in order to record the sampling activities and observations.

5.3.1 Field Notebooks

Field notes regarding all sampling and field activities will be kept in a bound notebook with pre-numbered pages. Indelible ink will be used for all entries. It will include among other things:

- Field parameter observations
- Locations of sampling points and corresponding sample numbers
- Documentation of individual samples comprising the composite samples
- Descriptions of deviations from sampling plan
- Signatures of personnel responsible for observations.

5.4 FIELD MANAGEMENT AND SHIPMENT

Upon collection in the field, samples will be properly labeled as discussed and stored in a cool place away from sunlight. Field samples will tighten all container lids, place each sample container in a sealed polyethylene bag, and store the samples in insulated containers, which will be used to transport samples to the

laboratory. The containers, preservative, and holding times for this project are presented in Table 5.1. Sufficient incombustible, absorbent, cushioning material will be packed in the shipping container to minimize the possibility of sample container breakage. The insulated containers will be secured using nylon strapping tape and custody seals to ensure that samples have not been disturbed during transport. Samples for chemical analysis will be promptly shipped to the laboratory so that they arrive within 24 hours of collection. Samples for geotechnical analysis may be held on site for longer periods. Transportation of samples must be accomplished not only in a manner designed to protect the integrity of the sample, but also to prevent any detrimental effects from the potentially hazardous nature of the samples.

TABLE 5.1
SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Matrix	Analyte	Container	Preservative	Holding Time
Soil	Lead	500 mL glass/polypropylene	HNO_3 to pH <2, 4°C	6 months
Water	Lead	500 mL glass/polypropylene	HNO_3 to pH <2, 4°C	6 months
Disposal	Lead	1000 mL glass	4°C	28 days to leaching

Regulations for packaging, marking, labeling, and shipping of hazardous materials, substances and wastes are promulgated by the U.S. Department of Transportation (DOT) and described in the 49 CFR 171 through 177. In general, these regulations were not intended to cover the shipment of environmental samples collected at hazardous waste sites. Environmental samples usually contain low concentrations of hazardous substances when compared with most of the concentrated materials regulated by the DOT. However, the U.S. EPA has deemed it prudent to package, mark, label, and ship samples observing these DOT procedures, as appropriate.

6.0 FIELD SAMPLING CONTROL

Adherence to rigid quality control/quality assurance (QA/QC) protocols is a necessary component of sampling and analysis activities is support of this project.

Sampling QA/QC is assured by the performance of the following tasks:

- Adequate planning of the sampling event, to include the choice of sample locations.
- Accurate documentation of the sampling event, as described in Section 5 of this SAP.
- Decontamination of sampling apparatus prior to each location.
- The use of QA/QC samples: duplicates, matrix spike, matrix spike duplicate, equipment rinsate blanks, field blanks, and trip blanks, as necessary.

NEESA Level E and Level C QA/QC criteria require the following QC samples to be obtained.

6.1 QA/QC SAMPLES

The following QA/QC samples are anticipated for this removal action:

- *Duplicates*. Field duplicates will be generated to access the precision of the sampling and analysis results. The percentage difference between analysis of duplicate samples is a measure of precision; the results of analysis of duplicate samples should not vary outside of accepted criteria.

  - Duplicate samples will be obtained at a frequency of 10% for post-excavation activities. One (1) soil duplicate is anticipated for this removal action.

  - Duplicate samples will be obtained at a frequency of 10% for the WTS. One (1) duplicate water sample is anticipated for the water treatment phase of this project.

  - Duplicate analysis for lead field screening will be performed at a frequency of 5%.

- *Equipment rinsates*. A field equipment rinsate will be performed, once a day, for all non-disposable sampling equipment (e.g. sampling trowels). After decontaminating the sampling apparatus, distilled/de-ionized (DI) water will be passed over the apparatus; the water will be collected into an EPA-clean glass container. Analysis of the rinsate water should indicate that lead is not transferred from the sampling apparatus, i.e. cross-contamination between sampling points does not occur.

- *Field blank*. A field blank is generated by collecting the DI water, used for decontamination of the sampling apparatus, into a container. The field blank water is analyzed for the parameters of interest.

6.2 DECONTAMINATION PROCEDURES

All non-disposable sampling equipment (e.g. stainless steel trowels) will be decontaminated prior to each sample point. The following procedures will be used:

- Detergent (non-phosphate) and water wash
- Tap water rinse
- DI-water rinse

- 10% nitric acid rinse
- DI-water rinse
- Acetone (pesticide grade) rinse
- Air dry.

All disposable sampling equipment (e.g. polypropylene scoops) will be discarded immediately after each sampling point.

7.0 ANALYTICAL PROCEDURES

The analytical parameter of interest for this removal action is lead.

7.1 POST-EXCAVATION SAMPLE

The lead in the soil will be extracted utilizing EPA/SW-846 Method 3050 prior to analysis. Nitric acid and hydrogen peroxide are used as the extraction solvents. Upon filtering through Whatman No. 41 paper and centrifuging, the extract is analyzed for lead by EPA/SW-846 Method 7421. This is a flame atomic absorption method which has an optimum concentration range of 1-20 mg/L, a sensitivity of 0.5 mg/L, and a detection limit of 0.1 mg/L.

The removal action criteria for post-excavation soil is the NOAA screening guidance of 35 mg/kg (ppm). SW-846 Method 7421 provides applicability to the analysis for lead at this level. Details of methods 3050 and 7420 can be found in the latest edition of SW-846, Volume 1A.

7.2 WTS EFFLUENT ANALYSIS

7.2.1 Lead

Measurement of lead shall be as total recoverable lead per EPA Method 239.2.

7.2.2 Nitrated Esters

Analysis for nitrated esters will be performed by IHDNSWC's on-site laboratory. Results will be reviewed for conformance with the IW87 discharge limits.

7.3 SAMPLE FREQUENCY

OHM will submit samples for analysis for the filled tank prior to discharge. OHM will discharge treated waters only after analytical results have been reviewed and approved by the Navy.

7.4 TURN-AROUND TIME

7.4.1 Post-Excavation Samples

The laboratory will provide verbal (faxed) results within a seven day turn-around time. Written results will be provided within 21 days.

7.4.2 WTS Effluent Analysis

The laboratory will provide written results within a 24 hour turn-around time for lead and nitrated esters.

8.0 LABORATORY QUALITY CONTROL

Quality control related to the acquisition of the chemical, geotechnical engineering, and geosynthetic material 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 all samples and determine if proper temperature has been maintained during shipment. 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 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.

The VTSR is the verified time of sample receipt at the laboratory. The date and time the samples are logged in by the Sample Custodian or designee will agree with the date and time recorded by the person relinquishing the samples. Holding times for the samples associated with this project will begin at the VTSR.

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 specified in Table 2 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 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 DATA VALIDATION

All post-excavation sampling and analysis data will be validated to assure using NEESA Level C QA/QC criteria, as indicated in Section 3.4 of this SAP. All background and post-excavation soil sample and analysis data will be reviewed by the OHM project chemist to assure that:

- The samples arrived at the laboratory at 4°C.
- The COC forms were accurate and complete.
- QA/QC samples, which included duplicates, field blanks, and equipment rinsate blanks, were analyzed.
- That detection limits were met.
- Precision of the sampling event is evaluated upon analysis of duplicate samples.

- Accuracy is evaluated based upon the results of MS analysis.
- Precision of the analysis is evaluated based upon the results of MSD.

9.0 PROBLEMS ENCOUNTERED AND CORRECTIVE ACTION

Any and all problems encountered which relate to sampling in the field, or analysis in the laboratory, will be addressed immediately. The OHM sample technician will note any deviations from standard operating procedures and this SAP.

Corrective action will occur in the form of:

- Notification of problem to site supervisor.
- Notification of senior project chemist.
- Contact of necessary subcontractors.

Any modifications to the existing scope of work or SAP will be documented.

10.0 DELIVERABLES

The final results of all sampling and analysis activities which relate to the Indian Head site will be summarized by the project chemist or senior project chemist. The summary will include an overview of sampling goals, sampling methods, sampling dates, sampling matrices, laboratory methods, laboratory results, quality control procedures for sampling and analysis, and any other pertinent information.

All sampling information will be incorporated into a Final Report written by the Project Manager. If necessary, a stand alone Sampling and Analysis Final Report will be submitted.

All laboratory data will be copies for inclusion in the Final Report.

11.0 REFERENCES

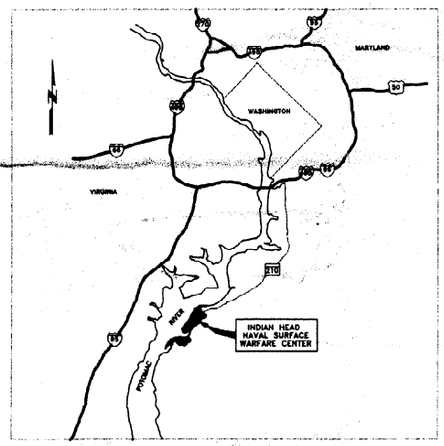
The following reference were used in the preparation of this SAP:

- Naval Facilities Engineering Command, Code 1811 SP, Bid Specifications for Delivery Order 058 to OHM, under Contract N62470-93-D-3032.
- EPA Standard Methods for Hazardous Waste, SW-846.
- OHM Field Sampling Manual.

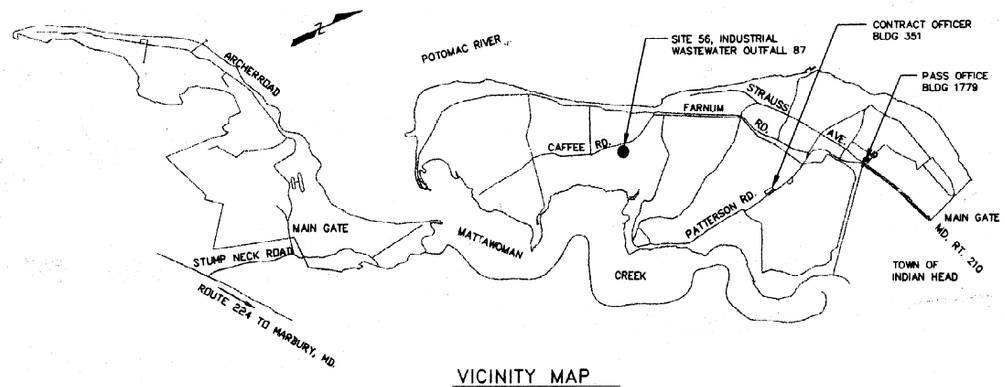
APPENDIX E
DRAWINGS

REMOVAL OF LEAD CONTAMINATED SEDIMENT AT SITE 56
INDIAN HEAD DIVISION, NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND

CONTRACT NO. N62470-93-D-3032



LOCATION MAP
SCALE 1" = 6 MILES



VICINITY MAP
SCALE 1" = 2000'

LIST OF DRAWINGS

SHEET NO.	DRAWING TITLE
1	COVER SHEET, LOCATION AND VICINITY MAPS
2	TOPOGRAPHY/ SITE LAYOUT
3	STORMWATER DISCHARGE AREA PLAN & MISCELLANEOUS DETAILS
4	WATER FILTRATION SYSTEM PROCESS LAYOUT
5	WETLAND DELINEATION

0071I07X
BOX 3
APP. E 1 of 5

X-REF TOPO-1 | OHM CORPORATION TRENTON, NJ | DRAWING NUMBER 16773-D5

PLOT SCALE: 1 = 1.25

REVISIONS

NUMBER	DESCRIPTION	DATE	APPROVED BY

OHM Remediation Services Corp.
OHM PROJECT NO.16773

DRAWN BY	CHECKED BY	APPROVED BY	DATE
D. Lanch	G. Miller	G. Miller	5/9/96

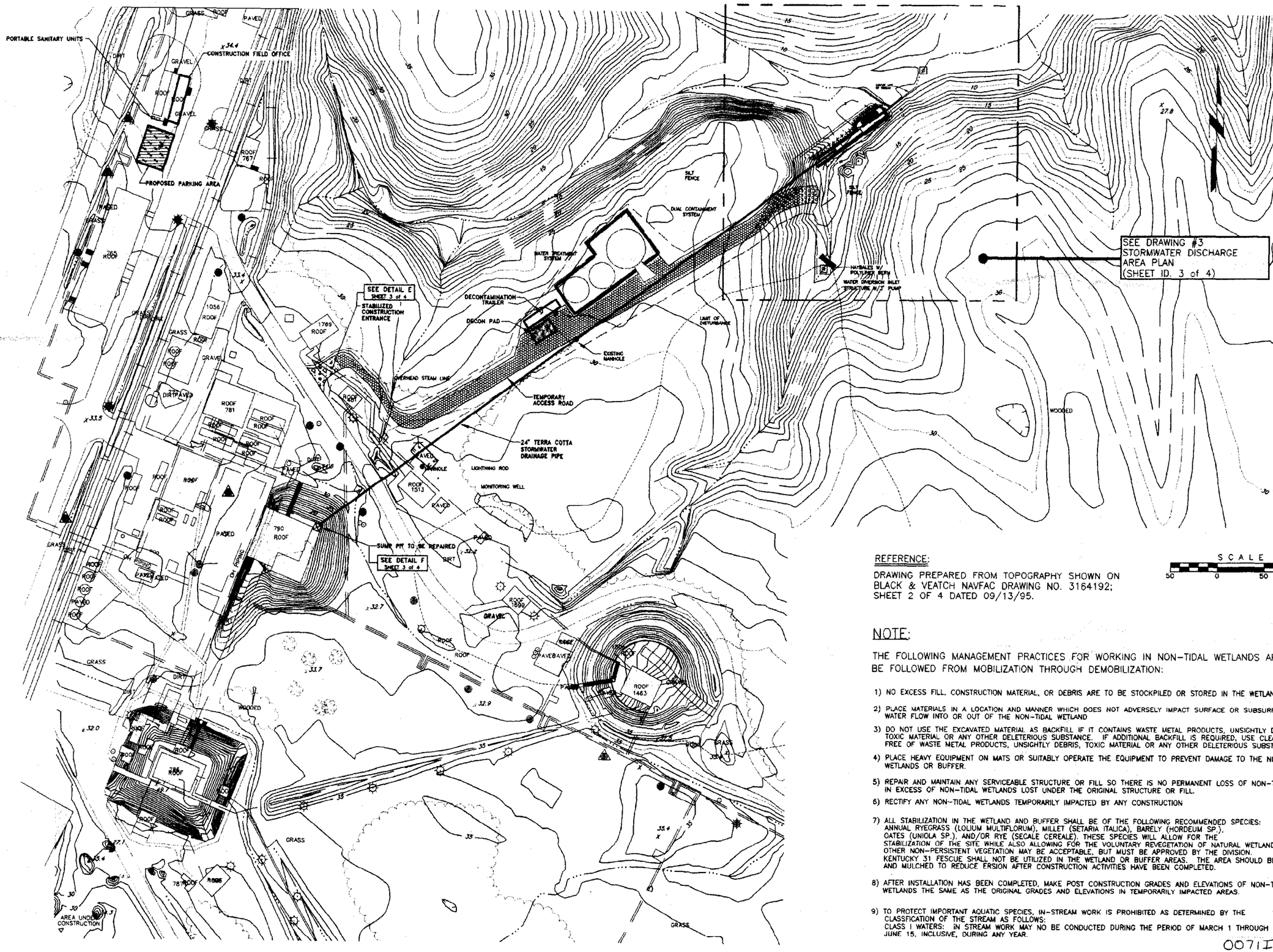
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION ATLANTIC DIVISION NORFOLK, VIRGINIA
NAVAL SURFACE WARFARE CENTER INDIAN HEAD, MARYLAND
LOCATION AND VICINITY MAPS
SITE 56

CODE ID. NO. 80091 | SIZE: D
SCALE: AS SHOWN
EFD NO.
STA. PROJECT NO.
SPEC NO.
CONSTR. CONTRACT NO. N62470-93-D-3032
NAVFAC DRAWING NO.
SHEET I.D. 1 of 5

X-REF TOPO-1

OHM CORPORATION TRENTON, NJ

DRAWING NUMBER 16773-D1



LEGEND

- STABILIZED CONSTRUCTION ENTRANCE
- TEMPORARY ACCESS ROAD
- SWAMP MATS
- SF SILT FENCE
- SUMP PIT
- LIMITS OF DISTRUBANCE
- INDEX CONTOUR
- INTERMEDIATE CONTOUR
- SUB AREA #1 WATERSHED
- X SPOT ELEVATION
- CONCRETE SLAB
- WOODED AREA
- CONCRETE SIDEWALK
- ACCESS ROAD
- 1570 EXISTING BUILDING
- EXISTING PIPE
- EARTH COVERED BUILDING
- MANHOLE
- RAILROAD
- HAYBALE W/ POLY LINER BERM
- WATER DIVERSION OUTLET/INLET DIVERSION STRUCTURE

SCALE

50 0 50 100 FEET

REFERENCE:

DRAWING PREPARED FROM TOPOGRAPHY SHOWN ON BLACK & VEATCH NAVFAC DRAWING NO. 3164192; SHEET 2 OF 4 DATED 09/13/95.

NOTE:

THE FOLLOWING MANAGEMENT PRACTICES FOR WORKING IN NON-TIDAL WETLANDS ARE TO BE FOLLOWED FROM MOBILIZATION THROUGH DEMOBILIZATION:

1) NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS ARE TO BE STOCKPILED OR STORED IN THE WETLANDS BUFFER.

2) PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF THE NON-TIDAL WETLAND

3) DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIAL FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL OR ANY OTHER DELETERIOUS SUBSTANCE.

4) PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO THE NON-TIDAL WETLANDS OR BUFFER.

5) REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NON-TIDAL WETLANDS IN EXCESS OF NON-TIDAL WETLANDS LOST UNDER THE ORIGINAL STRUCTURE OR FILL.

6) RECTIFY ANY NON-TIDAL WETLANDS TEMPORARILY IMPACTED BY ANY CONSTRUCTION

7) ALL STABILIZATION IN THE WETLAND AND BUFFER SHALL BE OF THE FOLLOWING RECOMMENDED SPECIES: ANNUAL RYEGRASS (LOLIUM MULTIFLORUM), MILLET (SETARIA ITALICA), BARELY (HORDEUM SP.), OATES (UNIOLA SP.), AND/OR RYE (SECALE CEREALE). THESE SPECIES WILL ALLOW FOR THE STABILIZATION OF THE SITE WHILE ALSO ALLOWING FOR THE VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE DIVISION. KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN THE WETLAND OR BUFFER AREAS. THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE ERSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.

8) AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST CONSTRUCTION GRADES AND ELEVATIONS OF NON-TIDAL WETLANDS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.

9) TO PROTECT IMPORTANT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSFICATION OF THE STREAM AS FOLLOWS:
CLASS I WATERS: IN STREAM WORK MAY NO BE CONDUCTED DURING THE PERIOD OF MARCH 1 THROUGH JUNE 15, INCLUSIVE, DURING ANY YEAR.

0071I08
Box 3
APP. E 2 of 5

NUMBER	DESCRIPTION	DATE	APPROVED BY
1	REVISED PRIMC DISCHARGE AREA DENOTED PARKING AND OFFICE TRAILER	5/8/96	

REVISIONS

OHM Remediation Services Corp.

OHM PROJECT NO. 16773

DRAWN BY D. Lynch | CHECKED BY G. Miller | APPROVED BY G. Miller | DATE 5/8/96

FOR EFD FOR COMMANDER NAVFAC

SEAL AREA

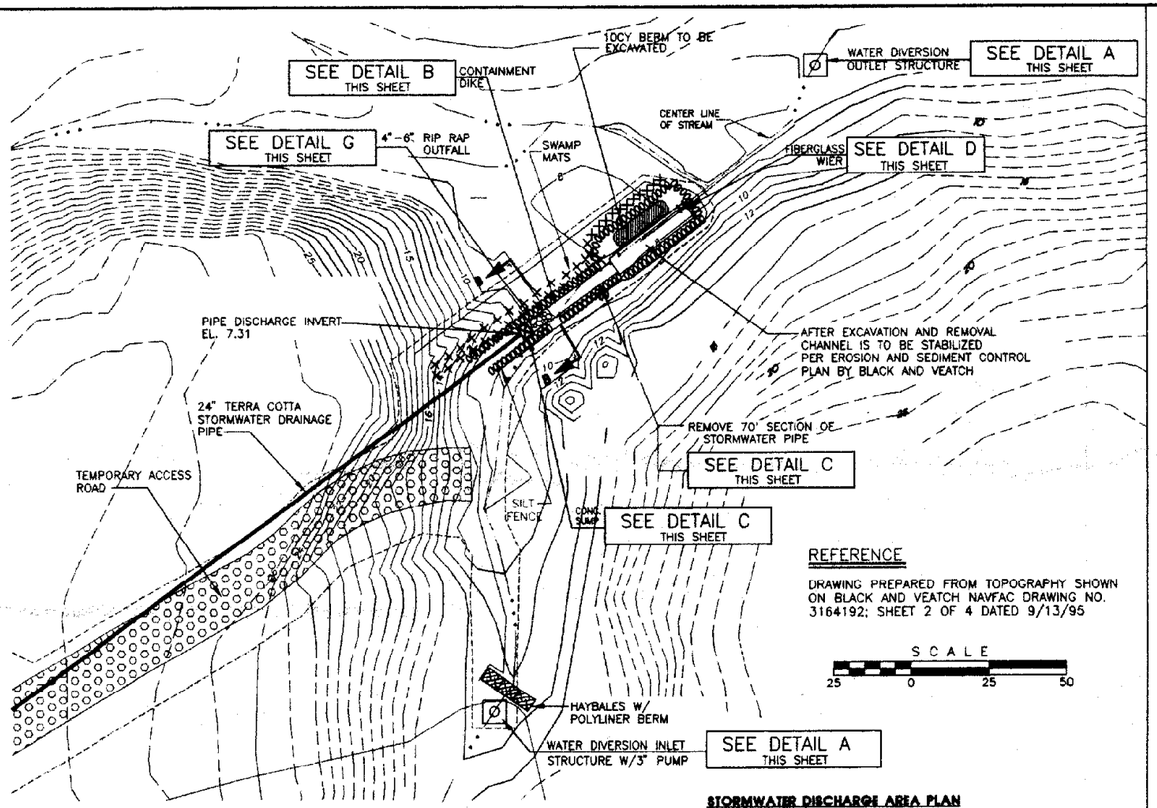
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION ATLANTIC DIVISION NORFOLK, VIRGINIA
NAVAL SURFACE WARFARE CENTER INDIAN HEAD, MARYLAND

TOPOGRAPHY/SITE LAYOUT

SITE 56

CODE ID. NO. 80091 | SIZE: D
SCALE: AS SHOWN
EFD NO.
STA. PROJECT NO.
SPEC NO.
CONSTR. CONTRACT NO. N62470-93-D-3032
NAVFAC DRAWING NO.
SHEET I.D. 2 of 5

PLOT SCALE: 1" = 50'



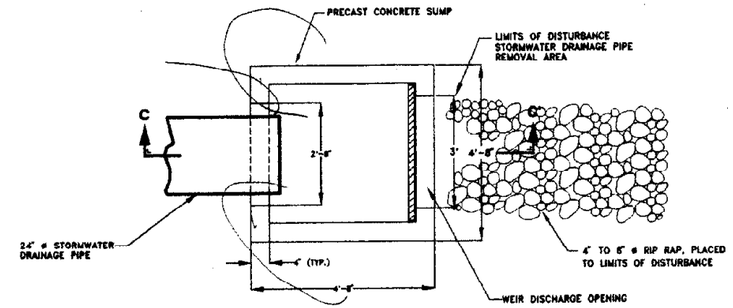
REFERENCE

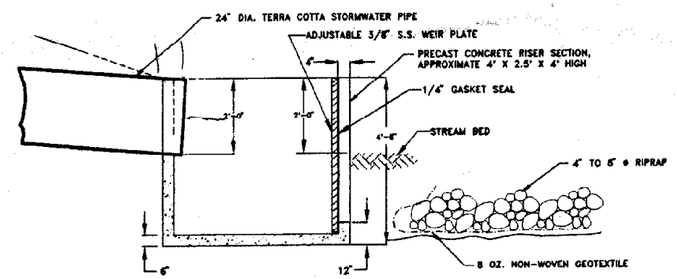
DRAWING PREPARED FROM TOPOGRAPHY SHOWN ON BLACK AND VEATCH NAVFAC DRAWING NO. 3164192; SHEET 2 OF 4 DATED 9/13/95

SCALE
25 0 25 50

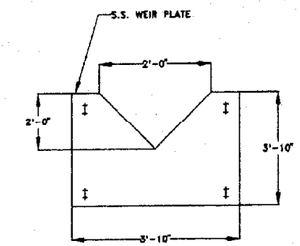
STORMWATER DISCHARGE AREA PLAN

DETAIL C: PRECAST SUMP AND CHANNEL RESTORATION DETAIL



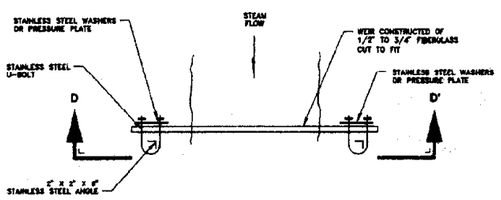


SECTION C-C'
N.T.S.



WEIR DETAIL
N.T.S.

DETAIL D: WEIR DETAIL



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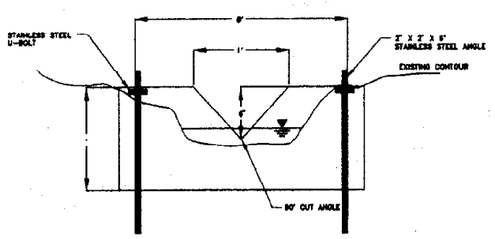
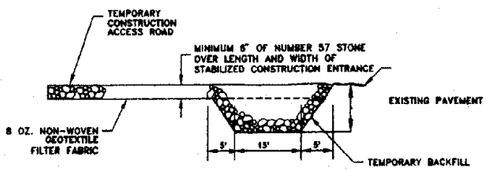


SECTION D-D'
N.T.S.

NOTE: EXACT LOCATION AND PLACEMENT TO BE COORDINATED WITH THE NAVY TECHNICAL REPRESENTATIVE.

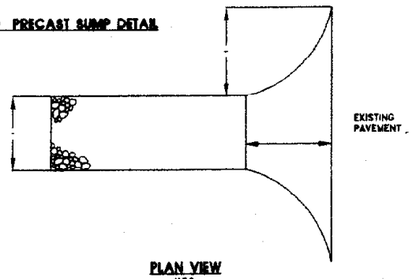
WEIR WILL BE TRIMMED FOR APPROPRIATE FIELD SELECTED AT INSTALLATION LOCATION

DETAIL E: STABILIZED CONSTRUCTION ENTRANCE AND TEMPORARY ACCESS ROAD



STABILIZED CONSTRUCTION ENTRANCE
N.T.S.

DETAIL G: PRECAST SUMP DETAIL



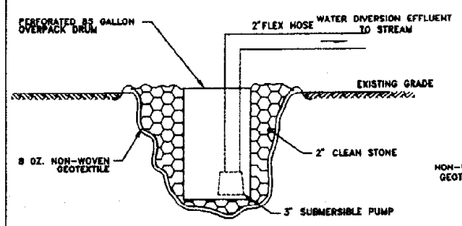
PLAN VIEW
N.T.S.

NOTES:

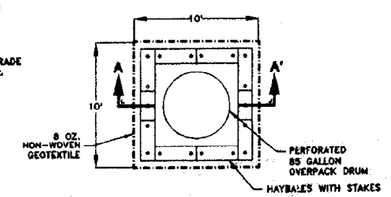
1. MINIMUM WIDTH OF 15'. ENTRANCE TURNS SHOULD BE FLARED TO PROVIDE A TURNING RADIUS.
2. NON-WOVEN GEOTEXTILE FABRIC (8 OZ.) SHALL BE PLACED OVER THE EXISTING GROUND PRIOR TO PLACING STONE.
3. A MINIMUM OF 6" OF NUMBER 57 STONE WILL BE USED FOR A STABILIZED ENTRANCE.
4. THE TEMPORARY ACCESS ROAD WILL BE CONSTRUCTED OF
5. CULVERTS MAY BE REQUIRED UNDER ACCESS ROAD AND CONSTRUCTION ENTRANCE, DEPENDING ON DRAINAGE.

6" MINIMUM THICKNESS OF QUARRY PROCESS STONE.

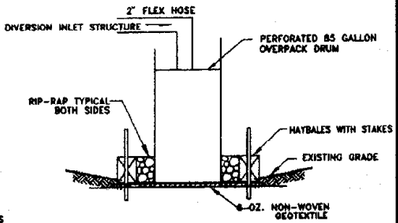
DETAIL A: WATER DIVERSION DETAILS



TEMPORARY WATER DIVERSION INLET STRUCTURE
N.T.S.

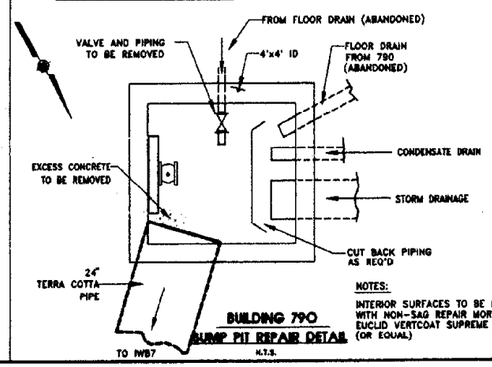


OUTLET STRUCTURE PLAN VIEW
N.T.S.



OUTLET STRUCTURE SECTION A-A'
N.T.S.

DETAIL F: SUMP PIT REPAIR

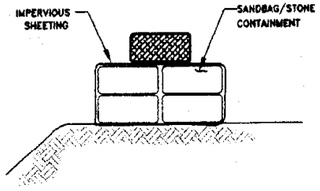


BUILDING 790 SUMP PIT REPAIR DETAIL
N.T.S.

NOTES:

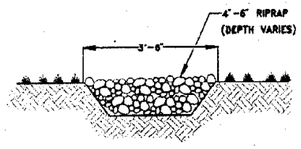
INTERIOR SURFACES TO BE REFACED WITH NON-SAG REPAIR MORTAR, EUCLID VERTICOAT SUPREME (OR EQUAL)

DETAIL B: CONTAINMENT DIKE



CONTAINMENT DIKE
N.T.S.

DETAIL G: RIP-RAP OUTFALL



SECTION B-B
N.T.S.

REVISIONS			
NUMBER	DESCRIPTION	DATE	APPROVED BY
1	REVISED DETAILS AND SECTIONS PER ENGR.	1/5/96	

OHM Remediation Services Corp.
OHM PROJECT NO.16773

DRAWN BY: D. Leach | CHECKED BY: C. Miller | APPROVED BY: C. Miller | DATE: 5/5/96

THIS DWG WAS ORIGINALLY ISSUED ON: | SCALE:

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND, NORFOLK, VIRGINIA
NAVAL STATION — INDIAN HEAD, MARYLAND
NAVAL SURFACE CENTER
ATLANTIC DIVISION
STORMWATER DISCHARGE AREA PLAN AND MISCELLANEOUS DETAILS
SITE 56

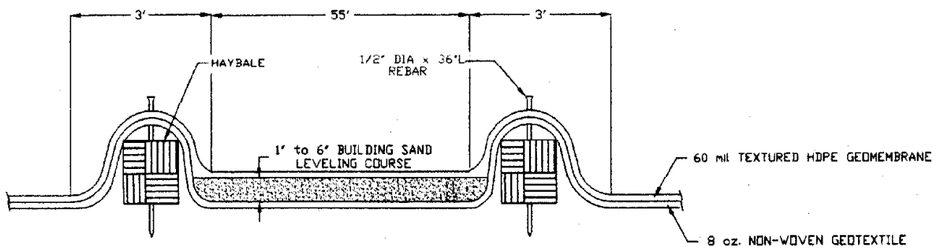
SEAL AREA

CODE ID. NO. 80091	SIZE: D
SCALE:	AS SHOWN
EFD NO.	
STA. PROJECT NO.	
SPEC NO.	
CONSTR. CONTRACT NO.	N62470-93-D-3032
NAVFAC DRAWING NO.	
SHEET I.D.	3 of 5

X-REF: TOPO-1 | OHM CORPORATION TRENTON, NJ | DRAWING NUMBER 16773-D4

PLOT SCALE: 1 = 1

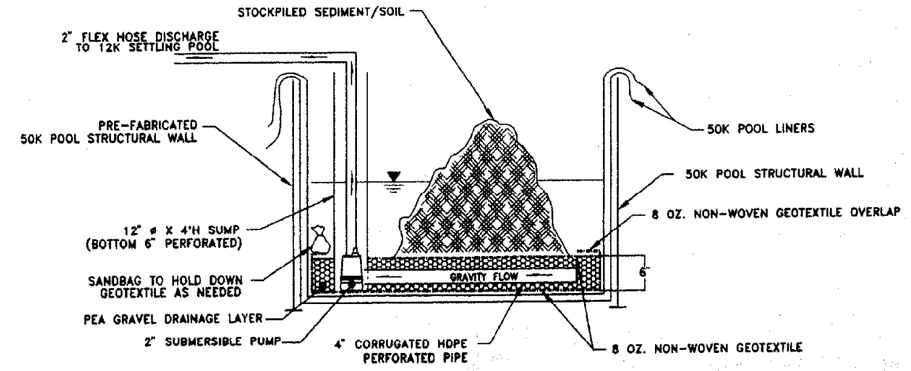
0071I09X
Box 3
APP E 3 of 5



SECTION H-H

DUAL CONTAINMENT SYSTEM

N.T.S.

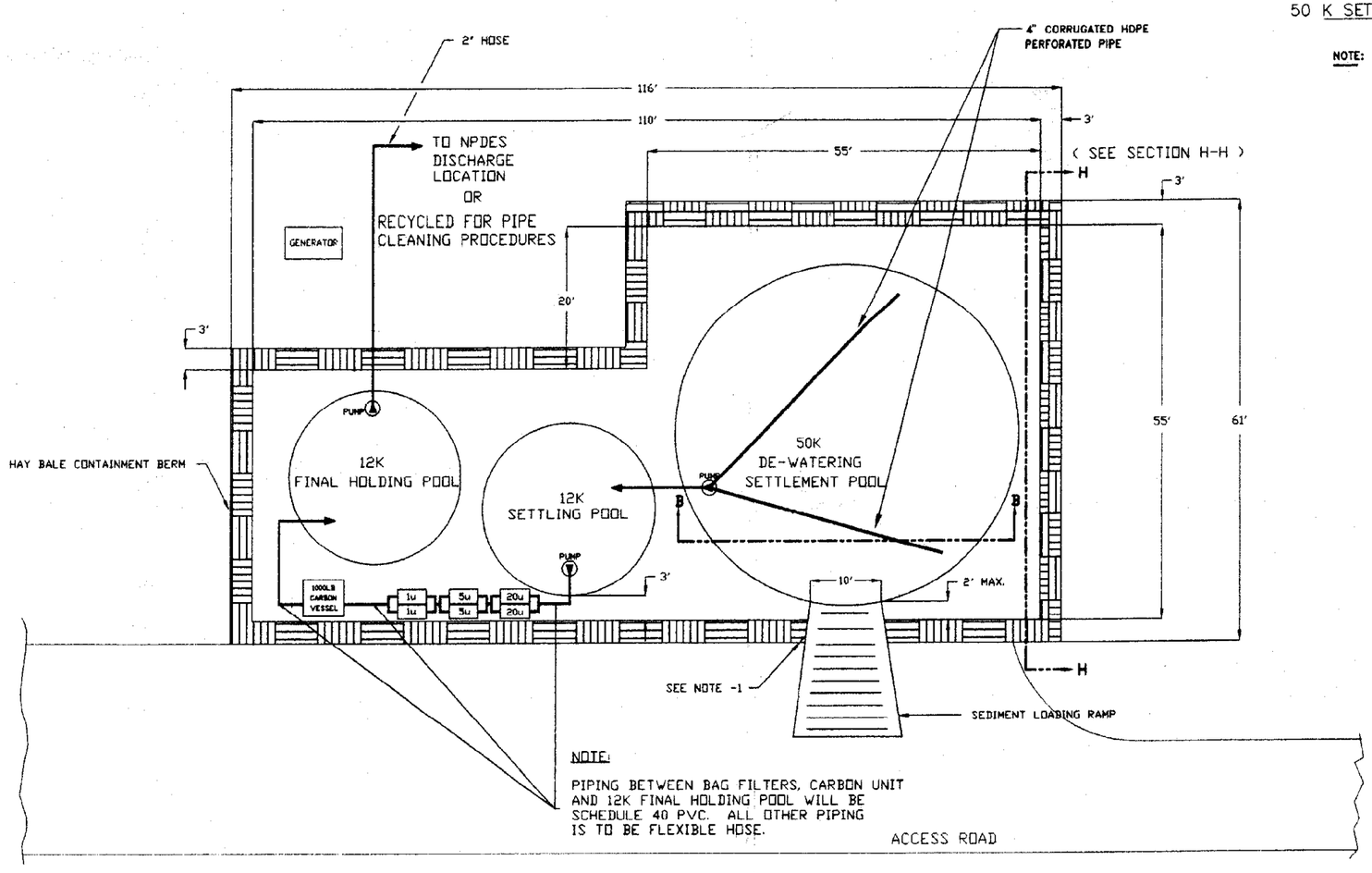


SECTION B-B

50 K SETTLING/DEWATERING POOL

N.T.S.

NOTE: SUMP LOCATION WILL BE FIELD LOCATED AT POOL LOW SPOT.



NOTE:

PIPING BETWEEN BAG FILTERS, CARBON UNIT AND 12K FINAL HOLDING POOL WILL BE SCHEDULE 40 PVC. ALL OTHER PIPING IS TO BE FLEXIBLE HOSE.

WATER FILTRATION SYSTEM

SCALE
0 10 20

0071I10X
BOX 3
APP E 4 of 5

NUMBER	DESCRIPTION	DATE	APPROVED BY
1	REMOVED FLEX HOSE FROM 50K POOL	5/8/96	

REVISIONS

OHM Remediation Services Corp.
OHM PROJECT NO.16773

DRAWN BY	CHECKED BY	APPROVED BY	DATE
D. Lasch	G. Miller	G. Miller	3/8/96

FOR EFD FOR COMMANDER NAVFAC — DATE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA
NAVAL SURFACE WARFARE CENTER INDIAN HEAD, MARYLAND

WATER FILTRATION SYSTEM PROCESS LAYOUT

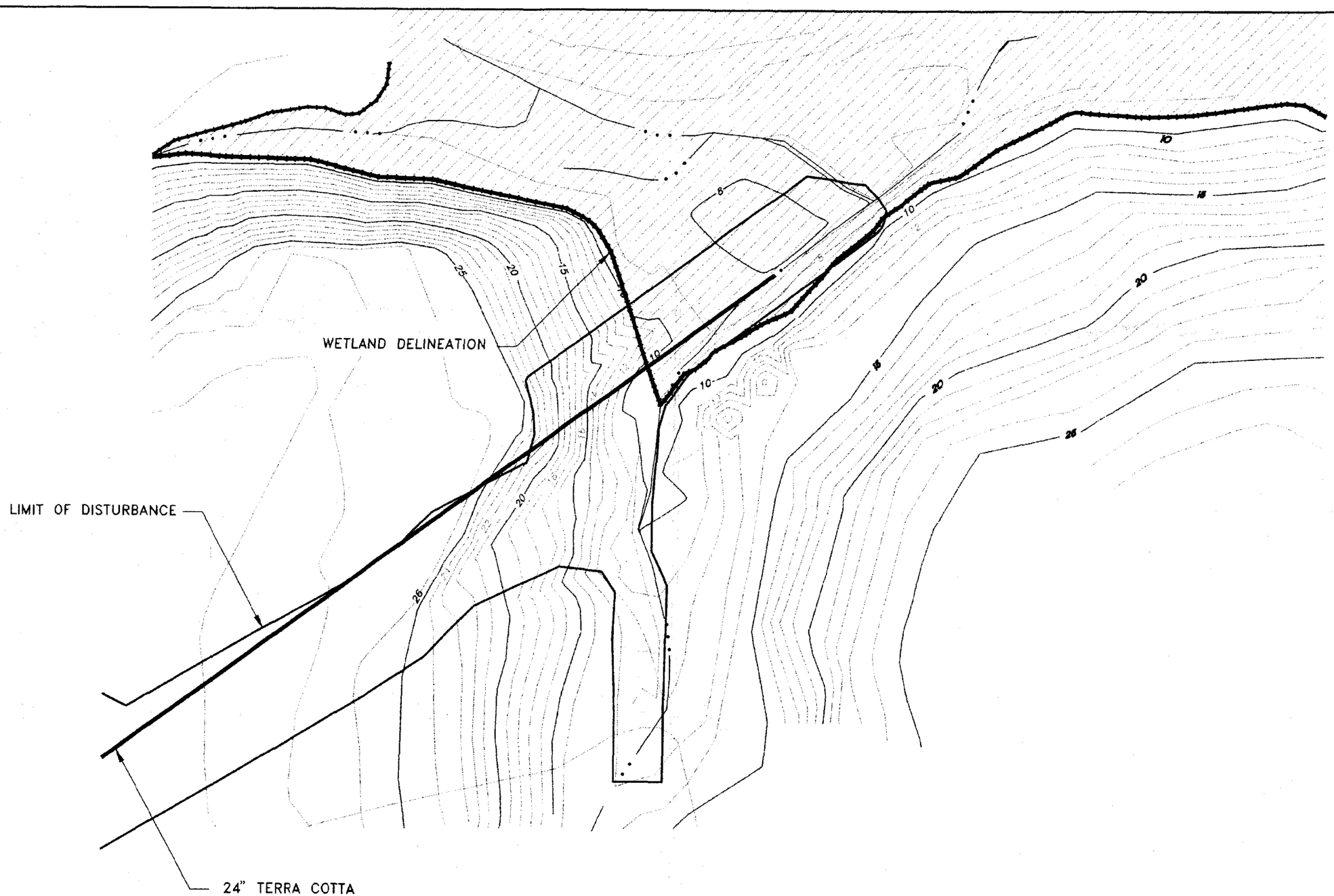
SITE 56

CODE ID. NO. 80091 SIZE: D
SCALE: AS SHOWN
EFD NO.
STA. PROJECT NO.
SPEC NO.
CONSTR. CONTRACT NO. N62470-93-D-3032
NAVFAC DRAWING NO.
SHEET I.D. 4 of 5

X-REF TOPO-1 | OHM CORPORATION TRENTON, NJ | DRAWING NUMBER 16773-D3

PLOT SCALE: 1" = 10'

X-REF TOPO-1 | OHM CORPORATION TRENTON, NJ | DRAWING NUMBER 16773-D6



WETLAND DELINEATION

SCALE
15 0 15 30 FEET

0071I11X
Box 3
APP E 5 of 5

PLOT SCALE: 1 = 25

NUMBER	DESCRIPTION	DATE	APPROVED BY
	REVISIONS		

OHM Remediation Services Corp.
OHM PROJECT NO. 16773
DRAWN BY: C. Agdell | DESIGNED BY: G. Miller | APPROVED BY: G. Miller | DATE: 3/14/96
FILE IN FOR COMMENTS RANGE: | DATE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION NORFOLK, VIRGINIA
NAVAL SURFACE CENTER INDIAN HEAD, MARYLAND

WETLAND DELINEATION

SITE 56

CODE ID. NO. 80091 | SIZE: D
SCALE: AS SHOWN
EFD NO.
STA. PROJECT NO.
SPEC NO.
CONSTR. CONTRACT NO. N62470-93-D-3032
NAVFAC DRAWING NO.
SHEET I.D. 5 of 5