N00174.AR.001074
NSWC INDIAN HEAD
5090.3a

FINAL REPORT REMOVAL OF MERCURY CONTAMINATED SOIL SITE 8 NSWC INDIAN HEAD MD

5/1/1995

OHM REMEDIATION SERVICES CORP.

NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland

FINAL REPORT
Removal of Mercury Contaminated Soil

Contract No.
N62470-93-D-3032

Delivery Order 0010

OHM Project 15831

Prepared by:
OHM Remediation Services Corp.

OHM Remediation
Services Corp.

May 1995

2.08 - 5/15/1995 - 00007

FINAL REPORT
FOR
REMOVAL OF MERCURY CONTAMINATED SOIL AND SEDIMENT
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
6500 Hampton Boulevard
Building A (South East Wing) 3rd Floor
Norfolk, Virginia 23508

Prepared by:

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

Reviewed by:

Kenneth Kukkonen

Kenneth W. Kukkonen, P.E.
Project Manager

Daniel Kessler for

George E. Krauter, P.E.
Program Manager

May 15, 1995
Delivery Order 0010
OHM Project 15831FR

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

1.0 INTRODUCTION 1-1

2.0 SUMMARY OF ACTION 2-1

3.0 FINAL HEALTH AND SAFETY REPORT 3-1

4.0 FIELD CHANGES 4-1

5.0 FINAL DOCUMENTS 5-1

6.0 QUALITY CONTROL SUMMARY REPORT 6-1

6.1 EROSION AND SEDIMENT CONTROL 6-1
6.2 TEMPORARY ROADWAY 6-1
6.3 EXCAVATION 6-1
6.4 FILLING AND BACKFILLING 6-1
6.5 BORROW MATERIAL 6-1
6.6 BURIED DRUM TESTING/REMOVAL 6-1
6.7 LOADING/TRANSPORTATION OF CONTAMINATED MATERIAL 6-1
6.8 CONFIRMATION SAMPLING AND ANALYSIS 6-2
6.9 SEEDING AND TURF 6-2
6.10 SUBMITTALS 6-2
6.11 DRAWINGS 6-2
6.12 PROJECT SCHEDULE 6-2
6.13 QA/QC OBSERVATIONS AND SUGGESTIONS FOR FUTURE DELIVERY ORDERS ... 6-2

APPENDICES
APPENDIX A CHEMICAL AND GEOTECHNICAL TESTING RESULTS
APPENDIX B SITE PHOTOGRAPHS

EXECUTIVE SUMMARY

OHM Remediation Services Corp. (OHM) under Delivery Order 0010 from the Atlantic Division of the Department of the Navy, performed a remedial action at the Naval Surface Warfare Center (NSWC), Indian Head, Maryland. The remedial action involved the excavation and removal of 600 tons of mercury contaminated soil/sediment from an intermittent drainage stream (NSWC site #8). Removed contaminated soil was placed in a previously excavated pocket located in the berm surrounding Magazine No. 606 and covered with a one foot layer of low permeability clay soil. Underground ("mercury contaminated soil") warning tape was placed on top of the clay layer as a warning to future excavation.

Following the removal and placement of the mercury contaminated soil, OHM imported 1800 tons of common fill material and 800 tons of topsoil. Common fill material and topsoil were placed over the contaminated soil clay cap and top of Magazine No. 606 to the appropriate depth of cover. Prior to the installation of the topsoil cover, excavated stream areas were backfilled with 12 inch lifts of common fill. The project was completed by the installation of erosion and sediment control measures along with complete revegetation of disturbed areas of the excavated stream channel and Magazine No. 606.

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

1.0 INTRODUCTION

OHM Remediation services Corp. (OHM) was retained by the Department of the Navy, Atlantic Division under Delivery Order 0010 to remove approximately 400 cubic yards of mercury contaminated soil and sediment from an intermittent drainage stream located at the Naval Surface Warfare Center (NSWC), Indian Head, Maryland.

To accomplish the removal of the contaminated soil in an environmentally sound manner, OHM constructed erosion and sediment control measures. Erosion and sediment control measures included the installation of a stream diversion system, tributary pumping system, dike construction, silt fencing and rock stabilized construction entrances. Site preparation tasks were required, including the construction of an access road into site; tree clearing and grubbing. OHM performed the work in such a manner as to minimize the removal and clearing of trees.

The mercury contaminated soil from the stream channel was excavated and hauled to the placement site at Magazine No. 606. Post-excavation sampling of the stream channel was performed to evaluate the effectiveness of contaminated soil/sediment removal. The sampling was conducted by an engineering consultant retained by the Navy.

Following excavation and post-excavation sampling, the stream channel and adjacent areas were reconstructed. Restoration included regrading, revegetation and the removal of the water diversion and erosion sediment control devices.

The following report shall serve as OHM Remediation Services Corp.'s (OHM) Contractor's Close-Out Report. This report includes the following information:

- A summary of the remedial action for the removal of mercury-contaminated soil at the Naval Surface Warfare Center, Indian Head, Maryland, Delivery Order 0010, Contract No. N62470-93-D-3032.
- A final Health and Safety Report.
- A description of field changes.
- A summary of chemical and geotechnical testing (Appendix A).
- The Quality Control Summary Report.
- Project photographs documenting site activities (Appendix B).

As Built Drawings are not included (two sets were previously delivered to the Navy on April 6, 1995).

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

2.0 SUMMARY OF ACTION

OHM mobilized to this project on June 13, 1994. OHM personnel and equipment were utilized to build an access road from the paved plant area to the lower end of the contaminated soil/sediment area. Tree clearing and grubbing was carried out to facilitate the soil/sediment excavation activities. A primary stream diversion system was constructed to divert the water around the soil/sediment removal area. The water was discharged back into the stream below the excavation site.

Approximately 600 tons of mercury-contaminated soil/sediment were excavated from site #8 at the Naval Surface Warfare Center, Indian Head, Maryland. As the soil/sediment was being excavated at the site #8, Haliburton NUS personnel obtained post excavation samples to confirm that the remaining soil in the removal area met the requirements of the removal action. The soil was transported to Magazine No. 606 and stockpiled for inspection by the ROICC office. The ROICC office determined that the soil contained high levels of root matter that was not acceptable as fill. As a result, OHM was instructed to screen the excavated soil/sediment prior to placing it in the fill area.

The excavated soil/sediment was placed into a previously excavated pocket in the earthen berm surrounding Magazine No. 606. The contaminated soil was placed in 12 inch lifts which were compacted by running a large bulldozer back and forth across the excavated material. Once the mercury-contaminated soil was placed, OHM placed and compacted a one foot layer of low permeability soil (clay) over the mercury-contaminated soil. The clay was followed by two feet of common soil. An underground warning tape that indicated "mercury contaminated soil" was placed on top of the clay layer. This will serve as a warning in case future activities disturb this area. OHM and the ROICC office mutually agreed not to pursue the soil compaction tests as it was evident that the contaminated soil/sediment was much to soft to have any hope of meeting the 95% compaction specification.

Three post excavation samples came back with mercury levels that exceeded the removal threshold. At these areas, OHM removed additional material and subsequent analytical tests indicated that the clean-up criteria had been achieved. Having completed the removal action in the stream, OHM personnel placed common fill in one foot lifts in all the excavated areas. Once all common fill was placed, the site was graded to provide drainage to the realigned channel. OHM imported 800 tons of top soil and 1800 tons of fill material to provide the required cover for magazine 606 as well as backfill for the stream. Six inches of top soil was spread over all the disturbed areas except for on the top of magazine 606 where up to 10 inches, was placed to provide the required depth of cover.

During the excavation of contaminated soil/sediment, an abandoned drum was discovered. Testing of soil present in and beneath the drum revealed that no hazard existed at either place. The drum was disposed along with the contaminated sediment screenings at a permitted landfill.

The stream channel and berm were stabilized by installing erosion control devices. These devices included temporary and permanent control mats, riprap and gabion baskets. Revegetation was carried out and winter rye grass was also hand spread over the entire disturbed area.

OHM demobilized off site on November 23, 1994 The Navy conducted a final walk-through inspection in late December 1994 and provided a punch list to OHM in January 1995. The punch list items were corrected in April 1995 with the exception of vegetative plantings along the stream. These plantings will be installed in May 1995 due to the time needed to grow the required number of plants.

OHM also completed field change items of work (see Section 4.0 of this report).

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

3.0 FINAL HEALTH AND SAFETY REPORT

The project was conducted to minimize the exposure of workers to any contaminated soils, or other hazards associated with the project location. Personal protective equipment was used to prevent exposure to contaminated materials and to help prevent insect bites and contact with irritant plant matter (poison ivy). Site specific Job Safety Analyses (JSAs) were prepared to help workers identify all hazards associated with each task; including soil removal, sampling, transport, placement, capping and site restoration.

Safety meetings were conducted each day at the site location to discuss the daily tasks and any new or changing conditions that affect site safety. During the safety meeting, the previous day's Safety Observer would give a brief report on any unsafe acts or conditions observed by him/her. If new tasks were starting, the JSAs for those tasks were discussed with the workers involved with that part of the site activities.

OHM's Northeast Region Health and Safety Department has developed a program of Safety Observation to involve all of its field employees in the safety of their project site. Each worker takes a turn in the process. Twice each day, the safety observer takes ten minutes to inspect his/her work area, looking for unsafe conditions or unsafe acts around it. This process of looking for hazards raises the safety consciousness of workers, enabling them to make safety part of their working habits.

No incident was reported during the course of the project. The concerns were primarily insects and plants in the work location. Mercury was the only chemical substance of concern during the remediation activities.

There was no significant air monitoring associated with the project. OHM was prepared to monitor for airborne dust. However, the sediments of concern were wet, even during placement and compaction. They generated no dust, therefore eliminating the need to perform airborne particulate monitoring.

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

4.0 FIELD CHANGES

- During the excavation of contaminated soil/sediment, an abandoned drum was discovered. Testing of soil present in and beneath the drum revealed that no hazard existed at either place. Drum was removed with an excavator and then it was loaded into an overpack drum. The above mentioned activities were done in level B protection gear. The drum was finally disposed along with the screenings of the contaminated sediment to a permitted landfill.

- Due to the nature of the excavated contaminated soil; OHM was directed by the Navy to screen the stockpile soil to remove the majority of root matter and few out-sites rocks prior to placement of the soil in the area prepares within the magazine 606 berm. This also necessitated an offsite T&D task for 81 tons of debris.

- OHM was directed by the Navy install/remove a crushed stone working platform around the base of Magazine 606 to protect a wetlands that was not identified on the design drawings.

- OHM needed to add two additional rows of gabion baskets at the stream in order to reduce the slope behind the gabions to a reasonable pitch that would not erode.

- OHM was required to supply and install large quantities of topsoil and backfill (800 tons and 1,800 tons respectively). Topsoil and backfill were removed from the project during up-front cost negotiations with the Navy. However, the project, as designed, could not be completed without the items.

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

5.0 FINAL DOCUMENTS

- Chemical Testing - Chemical analytical tests were performed by OHM and another engineering firm Halliburton NUS retained by the Navy. Halliburton NUS carried out tests such as water analysis and post excavation analysis for total mercury. Analytical tests on Backfill material, Geotech Fabric, PPE, Screenings in roll off containers and Soil (inside and outside the abandoned drum) were performed by OHM. The results of these tests are contained in Appendix A.

- Geotechnical Testing - Due to the nature of wet mercury contaminated soil, compaction requirements for the soil at Magazine at 606 could not be met as listed in the original project specifications. This was dicussed with the ROICC office during progress meetings. In order to verify that compaction specifications could not be met, OHM conducted field tests at Magazine 606, the results of which are listed in appendix A. According to nuclear density testing of clay cap, OHM did achieve the 95% compaction requirement.

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

6.0 QUALITY CONTROL SUMMARY REPORT

The purpose of the Quality Control Program was to ensure compliance with the contract specifications and drawings. Due to budgetary constraints the QC responsibilities were primarily fulfilled by the OHM Site Supervisor. The primary duties include; daily inspections, submittal review, and QC Meetings with the ROICC. The Site Supervisor ensured that the preparatory and follow-up inspection attributes were met for all work activities. Initially, QC/Production Meetings were held weekly. Quality concerns encountered associated with field changes and additions were handled by the Site Supervisor, and Project Manager who communicated with the ROICC frequently. Through the effort of the Site Supervisor, the intent of the Quality Control Program was fulfilled.

6.1 EROSION AND SEDIMENT CONTROL

OHM installed the erosion and sediment control system in accordance with the requirements of the Navy Specifications and OHM's Erosion and Sediment Control Plan. Erosion control measures were in place and inspected by the NTR/ROICC and Maryland Department of the Environment before excavation began.

6.2 TEMPORARY ROADWAY

The temporary roadway was completed in accordance with the contract.

6.3 EXCAVATION

Excavation was performed as outlined in the Work Plan incorporated in to Contract No. N62470-93-D-3032, Delivery Order No. 0010. The area requiring excavation was staked out. Post excavation sampling/analyses were performed by a consultant retained by the Navy.

6.4 FILLING AND BACKFILLING

Upon receipt of the NTR/ROICC;s permission, backfilling activities began. A vibratory compactor was used to compact the fill material in the stream, which was placed in one foot lifts. There were few compaction tests as the underlying soil was much too soft to allow adequate compaction. The magazine area was compacted by running a large bulldozer over each lift several times. Anticipating this, OHM procured and installed a higher grade of low permeability fill to ensure that the cap would be water tight with less than optimum compaction of the underlying soil.

6.5 BORROW MATERIAL

The borrow material was taken from a clean offsite source. The borrow material was analyzed to ensure that it was clean.

6.6 BURIED DRUM TESTING/REMOVAL

The uncovered drum was sampled on the inside as well as soil from beneath it. No contaminants of significance were noted. The drum was disposed along with the screened debris forme the magazine area.

6.7 LOADING/TRANSPORTATION OF CONTAMINATED MATERIAL

The screenings generated by the magazine 606 operation, where the contaminated soil from the stream was screened to remove root matter and oversize rocks, were placed into three rolloffs for transportation and

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

disposal. The three rolloffs were to heavy to move and they were partially unloaded into two additional rolloffs for shipment. The three rolloffs were to heavy to move and they were paretically unloaded into two additional rolloffs for shipment. The levels of mercury were low enough to allow for cost effective disposal of this material in a industrial landfill as non hazardous waste.

6.8 CONFIRMATION SAMPLING AND ANALYSIS

Sampling of material to be disposed offsite such as PPE, screenings, and Visquen was conducted to ensure proper disposal. Analytical results for this testing are located in Appendix A.

6.9 SEEDING AND TURF

Top and seeding requirements for site restoration were met. Final grading and seeding was inspected by the NTR/ROICC. Additional seed/fertilizer was placed in spring 1995.

6.10 SUBMITTALS

Several submittals were forwarded to the NTR/ROICC, however proper tracking procedures were not followed. See section OBSERVATIONS AND SUGGESTIONS FOR FUTURE DELIVERY ORDERS.

6.11 DRAWINGS

As-built drawings of the final grade for the stream and magazine 606 areas were completed and transmitted to the Navy on April 6, 1995.

6.12 PROJECT SCHEDULE

This project was impacted by numerous items that served to increase the project duration by approximately 200%. The significant items are listed below.

- Two week delay up-front while awaiting the Navy to receive all site approvals required for this project.
- Severe wet weather.
- Unidentified wetlands at Magazine 606.
- Stockpiling and screening of contaminated soil.
- Excavator equipment failure.
- Lengthy post excavation analytical times.
- Uncovered buried drum.
- The need to furnish and install 800 tons of topsoil and 1,800 tons of backfill after they were negotiated out of the cost proposal.
- Unclear drawings and specifications that were supposed to clearly indicate a significant amount of work on the top of Magazine 606. This was not recognized until very late in the Project.
- Working in the stream area only during non manufacturing work hours (at night and Friday, Saturday, and Sunday).
- Underestimation of the difficulties to be encountered working in the stream.

6.13 QA/QC OBSERVATIONS AND SUGGESTIONS FOR FUTURE DELIVERY ORDERS

In the effort to minimize the cost of QC responsibilities, some activities were not adequately documented.

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

Project Observations:

- The Submittal Register was not maintained, although items on the register were turned over to the Navy; transmittal numbers were not assigned, nor was the register updated. This project had minimal submittal requirements, and this could be the reason for the oversight.

- Inspection documentation varied throughout the project. The Site supervisor was completing the Contractor Quality Control Report on a Daily Basis. While Field changes were discussed and approved, documentation of these changes was not completed in all cases. Future Delivery Orders should try to be more consistent through out the project.

Suggestions for Future Improvement:

- Include a more detailed Quality Control Plan, that outlines the inspections required for each work activity.

- Follow submittals procedures, this is important on all projects. It serves as a permanent documented record of project activities and deliverables.

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

APPENDIX A
CHEMICAL AND GEOTECHNICAL TESTING RESULTS

Analytical Services Corp.

GEO TECH FABRIC
&
PPE

ANALYTICAL REPORT

Client: OHM Remediation Services Corporation
Eastern Region (Trenton, NJ)

Attn: Ken Kukkonen
Ron Kenyon

Project: 15831N - NEESA; Indianhead, MD

Sample(s): G001

Sample Type(s): Solid

Analysis Performed: RCRA TCLP Leachate Parameters

Date Sample Received: September 16, 1994

Date Order Received: September 16, 1994

Joblink(s): 616656

This report is "PROPRIETARY AND CONFIDENTIAL" and delivered to, and intended for the exclusive use of the above named client only. Analytical Services Corporation assumes no responsibility or liability for the reliance hereon or use hereof by anyone other than the above named client.

Reviewed and Approved by: Thomas E. Gran, Ph.D., Vice President *Date:* September 28, 1994

16406 U.S. Route 224 East ■ P.O. Box 1404 ■ Findlay, Ohio 45839-1404 ■ 419-423-3526

PROJECT NARRATIVE

The following items relate to the samples and analytical data contained in this report.

- All sample results are reported on an as received "wet weight" basis.
- Note any and all comments at the bottom of the tables in Appendix B and/or Appendix C.
- **ASC** will retain samples for a maximum of thirty (30) days after completion of the analysis, samples will be held for a longer period of time, if appropriate arrangements are made in advance. A nominal disposal charge of $5.00/ sample will be imposed for unreturned samples.

APPENDIX A

DATA SUMMARY REPORT

NOTE: The Tentatively Identified Volatile (GC/MS) Screen result(s), if applicable, is included in Appendix B.

DATA SUMMARY REPORT

DATE: 09/26/94

Company: OHM REMEDIATION SERVICES CORPORATION

Sample Point ID: G001
ASC Sample Number: JN2399
Sample Date: 940915
Facility Code: 015831N

Parameters	Units	
RCRA TCLP Leachate Herbicide Analysis, GC, (GS52)		
2,4-D	mg/L	<.250
2,4,5-TP (Silvex)	mg/L	<.250
RCRA TCLP Leachate Pesticide Analysis, GC, (GS54)		
Chlordane	mg/L	<.020
Endrin	mg/L	<.002
Heptachlor	mg/L	<.002
Heptachlor epoxide	mg/L	<.002
Lindane	mg/L	<.002
Methoxychlor	mg/L	<.002
Toxaphene	mg/L	<.040
RCRA TCLP Leachate Metals Analysis, (ME52)		
Arsenic	mg/L	<.010
Barium	mg/L	.884
Cadmium	mg/L	.002
Chromium	mg/L	.040
Lead	mg/L	.038
Mercury	mg/L	<.001
Selenium	mg/L	<.005
Silver	mg/L	<.006
RCRA TCLP Leachate Base/Neutral/Acid Analysis, MS, (MS52)		
2,4-Dinitrotoluene	mg/L	<.100
Hexachlorobenzene	mg/L	<.100
Hexachloroethane	mg/L	<.100
Hexachlorobutadiene	mg/L	<.100
2-Methylphenol	mg/L	<.100
4-Methylphenol	mg/L	<.100
Nitrobenzene	mg/L	<.100
Pentachlorophenol	mg/L	<.100
Pyridine	mg/L	<.100
2,4,5-Trichlorophenol	mg/L	<.100
2,4,6-Trichlorophenol	mg/L	<.100

DATA SUMMARY REPORT

Company: OHM REMEDIATION SERVICES CORPORATION

Sample Point ID: G001
ASC Sample Number: JN2399
Sample Date: 940915
Facility Code: 015831N

RCRA TCLP Leachate (ZHE) Volatile Analysis, MS, (MV50)

Parameters	Units	
Benzene	mg/L	<.125
Carbon tetrachloride	mg/L	<.125
Chlorobenzene	mg/L	<.125
Chloroform	mg/L	.133
1,4-Dichlorobenzene	mg/L	<.125
1,2-Dichloroethane	mg/L	<.125
1,1-Dichloroethylene	mg/L	<.125
Methyl ethyl ketone	mg/L	<.250
Tetrachloroethylene	mg/L	<.125
Trichloroethylene	mg/L	<.125
Vinyl chloride	mg/L	<.125

APPENDIX B

QUANTITATIVE RESULTS

RCRA TCLP LEACHATE HERBICIDE ANALYSIS, GC, (GS52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	G001	JN2399

Compounds	**Sample Results** mg/L	**Bias Corrected Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number	Bias Recov
2,4-D	ND	-	.250	ND	N7H41314	73
2,4,5-TP (Silvex)	ND	-	.250	ND	N7H41314	59

RCRA TCLP Leachate Pesticide Analysis, GC, (GS54)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	G001	JN2399

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Chlordane	ND	.020	ND	N7P41326A
Endrin	ND	.002	ND	N7P41326A
Heptachlor	ND	.002	ND	N7P41326A
Heptachlor epoxide	ND	.002	ND	N7P41326A
Lindane	ND	.002	ND	N7P41326A
Methoxychlor	ND	.002	ND	N7P41326A
Toxaphene	ND	.040	ND	N7P41326A

RCRA TCLP LEACHATE METALS ANALYSIS, (ME52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	G001	JN2399

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Arsenic	ND	.010	ND	N7M5364
Barium	.884	.001	ND	N7M5364
Cadmium	.002	.001	ND	N7M5364
Chromium	.040	.006	ND	N7M5364
Lead	.038	.003	.004	N7M5364
Mercury	ND	.001	ND	N7G5358
Selenium	ND	.005	ND	N7M5364
Silver	ND	.006	ND	N7M5364

RCRA TCLP Leachate Base/Neutral/Acid Analysis, MS, (MS52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	G001	JN2399

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
2,4-Dinitrotoluene	ND	.100	ND	N7C41325
Hexachlorobenzene	ND	.100	ND	N7C41325
Hexachloroethane	ND	.100	ND	N7C41325
Hexachlorobutadiene	ND	.100	ND	N7C41325
2-Methylphenol	ND	.100	ND	N7C41325
4-Methylphenol	ND	.100	ND	N7C41325
Nitrobenzene	ND	.100	ND	N7C41325
Pentachlorophenol	ND	.100	ND	N7C41325
Pyridine	ND	.100	ND	N7C41325
2,4,5-Trichlorophenol	ND	.100	ND	N7C41325
2,4,6-Trichlorophenol	ND	.100	ND	N7C41325

3-Methyl- and 4-Methylphenol coelute and are reported as the total

RCRA TCLP LEACHATE (ZHE) VOLATILE ANALYSIS, MS, (MV50)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	G001	JN2399

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Benzene	ND	.125	ND	N7V3881
Carbon tetrachloride	ND	.125	ND	N7V3881
Chlorobenzene	ND	.125	ND	N7V3881
Chloroform	.133	.125	ND	N7V3881
1,4-Dichlorobenzene	ND	.125	ND	N7V3881
1,2-Dichloroethane	ND	.125	ND	N7V3881
1,1-Dichloroethylene	ND	.125	ND	N7V3881
Methyl ethyl ketone	ND	.250	ND	N7V3881
Tetrachloroethylene	ND	.125	ND	N7V3881
Trichloroethylene	ND	.125	ND	N7V3881
Vinyl chloride	ND	.125	ND	N7V3881

APPENDIX C

QUALITY ASSURANCE DATA

SUMMARY OF ANALYTICAL METHODOLOGY

Parameter	Reference	Method
RCRA TCLP		
Leachate Preparation	SW-846	1311
Herbicides by GC	SW-846	8150 (1)
Pesticides by GC	SW-846	8080
Metals	SW-846	6010
Mercury by Cold Vapor	SW-846	7470
Semi-volatile Compounds by GC/MS	CLP	SOW
Volatile Compounds by GC/MS	CLP	SOW

METHODOLOGY REFERENCES

ASTM	*American Society for Testing and Materials*, 1985 edition.
CAWW	*Methods for Chemical Analysis of Water and Wastes*, April 1979 and Updated #1 March 1983.
CLP	*USEPA Contract Laboratory Program*, Document #OLMO1.0, updates December 1990 #OLMO1.1 and February 1991 #OLMO1.1.1.
EPA-500	*USEPA Methods for the Determination of Organic Compounds in Drinking Water,* EPA-600/4-88/039 December 1988.
EPA-600	*USEPA Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*, EPA-600/4-82-057 July 1982.
NIOSH	*National Institute for Occupational Safety and Health*, 3rd edition, 1984.
SMEWW	*Standard Methods for the Examination of Water and Wastewater*, 17th edition, 1989.
STOA	*Spot Tests In Organic Analysis*, 7th edition, 1966.
SW-846	*Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*, 3rd edition, September 1986 and Update #1 July 1992.
(1)	This method was modified to incorporate the use of Boron Trifluoride (BF3) as the derivatizing reagent according to Method 6640 in *SMEWW*, 17th edition, 1989.
Title 22	*Waste Extraction Test*, Title 22, Section 66261.126 Appendix 2 of the California Administrative Code, May 1991.

ASC Certifications

State	Agency	Certification #
Alabama	ADEM	40830
California	CADOH	1178
Colorado	CODOH	OH113
Delaware	DEHSS	OH113
Kansas	KSDHE	E-202 & E-1173
Louisiana	LADOHH	92-10
Maryland	MDDHMH	210
Massachusetts	MADEP	M-OH113
New Jersey	NJDEPE	74603
New York	NYDOH	10712
North Carolina	NCDEM	392
Ohio	OHEPA	OH113
Oklahoma	OKDEQ	9216
Pennsylvania	PADER	68-450
South Carolina	SCDEHNR	92002
Tennessee	TNDOH/TNDEC	2978
Virginia	VADGS	00011
Washington	WADOE	C154
Wisconsin	WIDNR	999037160

Validated by:

- US Army Corps of Engineers ..... Chemical Analysis in Various Matrices

Approvals:

- Chemical Waste Management ..... Waste Characterization Analysis
- Envirosafe ..... Waste Characterization Analysis
- USDA ..... Permit for Importing Soils
- Florida DEP ..... Quality Assurance Plan #930034G
- Naval Facilities Engineering Service Center ..... Chemical Analysis in Various Matrices

REPORT KEY

mg/kg	=	milligram per kilogram (ppm)
Mg/m^3	=	milligram per cubic meter
ug/kg	=	microgram per kilogram (ppb)
mg/L	=	milligram per liter (ppm)
ug/L	=	microgram per liter (ppb)
mg/W	=	milligram per wipe
ug/W	=	microgram per wipe
mg/SMP	=	milligram per sample
ug/SMP	=	microgram per sample
um/cm	=	microMho per centimeter
pCi/l	=	picocurie per liter
gm/cc	=	grams per cubic centimeter
ppm	=	parts per million
ppb	=	parts per billion
ND	=	Not detected at or above stated detection limit
<	=	less than
>	=	greater than
%	=	percent
BTU/lb	=	British Thermal Units per pound
Deg. C	=	Degrees Celsius
n/a	=	not applicable
Unk	=	unknown
std	=	result is relative to standard pH units
CV	=	Conventionals
IR	=	Infrared Spectrophotometric
GC	=	Gas Chromatograph Instrument
GC/MS	=	Gas Chromatography/Mass Spectrometer Instrument
GRO	=	Gasoline Range Organics
DRO	=	Diesel Range Organics
PCB	=	Polychlorinated Biphenyls (PCBs)
EP TOX	=	Extraction Procedure Toxicity
TCLP	=	Toxicity Characteristic Leaching Procedure
RCRA	=	Resource Conservation and Recovery Act
SOW	=	Statement of Work

Quality Assurance Data

RCRA TCLP Leachate Herbicide Analysis, GC, (GS52)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
2,4-D	ND	112	ND	73	3	N7H41314
2,4,5-TP (Silvex)	ND	105	ND	59	4	N7H41314

Quality Assurance Data

RCRA TCLP Leachate Pesticide Analysis, GC, (GS54)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
Chlordane	ND	104	ND	103	4	N7P41326A
Endrin	ND	104	ND	105	4	N7P41326A
Heptachlor	ND	105	ND	125	5	N7P41326A
Heptachlor epoxide	ND	105	ND	102	5	N7P41326A
Lindane	ND	106	ND	102	4	N7P41326A
Methoxychlor	ND	109	ND	111	4	N7P41326A

Quality Assurance Data

RCRA TCLP Leachate Metals Analysis, (ME52)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
Arsenic	ND	88	.018	95	2	N7M5364
Barium	ND	90	.693	86	2	N7M5364
Cadmium	ND	93	.023	98	2	N7M5364
Chromium	ND	89	.008	90	2	N7M5364
Lead	.004	89	1.25	93	2	N7M5364
Mercury	ND	85	ND	90	3	N7G5358
Selenium	ND	80	.006	89	4	N7M5364
Silver	ND	100	ND	100	2	N7M5364

QUALITY ASSURANCE DATA

RCRA TCLP LEACHATE BASE/NEUTRAL/ACID ANALYSIS, MS, (MS52)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
2,4-Dinitrotoluene	ND	107	ND	93	2	N7C41325
Hexachlorobenzene	ND	108	ND	91	16	N7C41325
Hexachloroethane	ND	60	ND	53	26	N7C41325
Hexachlorobutadiene	ND	74	ND	67	25	N7C41325
2-Methylphenol	ND	90	ND	82	1	N7C41325
4-Methylphenol	ND	95	ND	90	4	N7C41325
Nitrobenzene	ND	87	ND	74	2	N7C41325
Pentachlorophenol	ND	121	ND	128	3	N7C41325
Pyridine	ND	72	ND	64	9	N7C41325
2,4,5-Trichlorophenol	ND	97	ND	93	3	N7C41325
2,4,6-Trichlorophenol	ND	96	ND	90	3	N7C41325

3-Methyl- and 4-Methylphenol coelute and are reported as the total

Quality Assurance Data

RCRA TCLP Leachate (ZHE) Volatile Analysis, MS, (MV50)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
Benzene	ND	96	ND	102	1	N7V3881
Carbon tetrachloride	ND	100	ND	106	3	N7V3881
Chlorobenzene	ND	96	ND	104	1	N7V3881
Chloroform	ND	101	ND	108	4	N7V3881
1,4-Dichlorobenzene	ND	82	ND	89	3	N7V3881
1,2-Dichloroethane	ND	104	ND	112	3	N7V3881
1,1-Dichloroethylene	ND	99	ND	103	3	N7V3881
Methyl ethyl ketone	ND	94	ND	101	4	N7V3881
Tetrachloroethylene	ND	95	ND	101	2	N7V3881
Trichloroethylene	ND	95	ND	100	1	N7V3881
Vinyl chloride	ND	108	ND	111	0	N7V3881

QUALITY ASSURANCE DATA
SURROGATE SUMMARY REPORT

SURROGATE ID	A159	F107	A121	F110	A158	# OUT
QC BATCH: N7C41325 **Leachate (Semi-Volatile organics by MS)**						
SAMPLE ID						
026 MD	80	68	85	84	80	0
026 MS	76	64	85	81	79	0
BLANK	81	69	82	79	77	0
BLANK SPIKE	83	73	89	83	81	0
G001	64	67	73	66	64	0
QC LIMITS	(21-110)	(10-110)	(10-123)	(35-114)	(43-116)	

SURROGATE ID	F047	# OUT
QC BATCH: N7H41314 **Leachate (Herbicide compounds by GC)**		
SAMPLE ID		
026 MD	118	0
026 MS	121	0
BLANK	117	0
BLANK SPIKE	123	0
G001	118	0
QC LIMITS	(10-150)	

SURROGATE ID	B816	A500	# OUT
QC BATCH: N7P41326A **Leachate (Pesticide compounds by GC)**			
SAMPLE ID			
027 MD	101	113	0
027 MS	97	109	0
BLANK	100	77	0
BLANK SPIKE	99	79	0
G001	96	103	0
G001 MS	101	109	0
QC LIMITS	(30-150)	(30-150)	

SURROGATE ID	A047	B185	B668	# OUT
QC BATCH: N7V3881 **Leachate (Volatile organics by MS)**				
SAMPLE ID				
026 MD	116 *	103	103	1
026 MS	116 *	105	104	1
BLANK	98	98	100	0
BLANK SPIKE	104	98	97	0
G001	113	100	97	0

SURROGATE ID

A047 = 1,2-Dichloroethane-D4
B185 = Toluene-D8
B668 = Bromofluorobenzene
A159 = 2-Fluorophenol
F107 = Phenol-d5
A121 = 2,4,6-Tribromophenol
F110 = Nitrobenzene-d5
A158 = 2-Fluorobiphenyl
B816 = 2,4,5,6-Tetrachloro-m-xylene
A500 = Decachlorobiphenyl
F047 = 2,4-Dichlorophenylacetic-acid

* Values outside of method quality control limits
D Sample was diluted, however, some surrogates may be reported if results were observed.

It is ASC's laboratory policy to allow one surrogate per sample fraction (acid, base-neutral or pesticide) to exceed the stated QC limits. This policy is based upon the USEPA SOW for the Contract Laboratory Program (CLP).

QUALITY ASSURANCE DATA
SURROGATE SUMMARY REPORT

SURROGATE ID	A047	B185	B668	# OUT
QC BATCH: N7V3881 **Leachate (Volatile organics by MS)**				
SAMPLE ID				
QC LIMITS	(76-114)	(88-110)	(86-115)	

SURROGATE ID

A047 = 1,2-Dichloroethane-D4
B185 = Toluene-D8
B668 = Bromofluorobenzene
A159 = 2-Fluorophenol
F107 = Phenol-d5
A121 = 2,4,6-Tribromophenol
F110 = Nitrobenzene-d5
A158 = 2-Fluorobiphenyl
B816 = 2,4,5,6-Tetrachloro-m-xylene
A500 = Decachlorobiphenyl
F047 = 2,4-Dichlorophenylacetic-acid

* Values outside of method quality control limits
D Sample was diluted, however, some surrogates may be reported if results were observed.

It is ASC's laboratory policy to allow one surrogate per sample fraction (acid, base-neutral or pesticide) to exceed the stated QC limits. This policy is based upon the USEPA SOW for the Contract Laboratory Program (CLP).

APPENDIX D

CHAIN-OF-CUSTODY RECORD(S)

TRANSFER 1.

Field technical svcs

138625

OHM Corporation

CHAIN-OF-CUSTODY RECORD

Rev. 08/89

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

PROJECT NAME	Indian Head Naval Base
PROJECT LOCATION	Indian Head MD
PROJ. NO.	15831
PROJECT CONTACT	Al Maze (301) 743-3513
PROJECT TELEPHONE NO.	(301) 743-3513
CLIENT'S REPRESENTATIVE	
PROJECT MANAGER/SUPERVISOR	Ken Kukkonen / Al Maze

ITEM NO.	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE DESCRIPTION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS) Full TCLP	REMARKS
1	Geo 1	9/15	7:00am	X		Sample of Geotech & Personal Protective Equipment	1 X 1 bag	X	
2									
3									
4									
5									
6									
7									
8									
9									
10									

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME
1	1	Edward J Nolan	Fedex	9/15	
2	1	Fedex 2225070		9/16	1000
3					
4					

REMARKS

7 DAY TAT
FAX Results to:
AL MAZE
(301) 743-3454

Temp 23°C

SAMPLER'S SIGNATURE: Edward J Nolan #4163

SEP 14 '94 16:24 .EAYROLL. ---- OHM CORP. P.2

Analytical Services Corp.

SCREENINGS IN ROLL OFF CONTAINERS

ANALYTICAL REPORT

Client: OHM Remediation Services Corporation
Eastern Region (Trenton, NJ)

Attn: Ken Kukkonen
Ron Kenyon

Project: 15831N - NEESA; Indianhead, MD

Sample(s): S001

Sample Type(s): Solid

Analysis Performed: RCRA TCLP Leachate Parameters

Date Sample Received: September 28, 1994

Date Order Received: September 28, 1994

Joblink(s): 616720

This report is "PROPRIETARY AND CONFIDENTIAL" and delivered to, and intended for the exclusive use of the above named client only. Analytical Services Corporation assumes no responsibility or liability for the reliance hereon or use hereof by anyone other than the above named client.

Reviewed and Approved by: _____ *Date:* October 7, 1994
Thomas E. Gran, Ph.D., Vice President

16406 U.S. Route 224 East ■ P.O. Box 1404 ■ Findlay, Ohio 45839-1404 ■ 419-423-3526

PROJECT NARRATIVE

The following items relate to the samples and analytical data contained in this report.

- Note any and all comments at the bottom of the tables in Appendix B and/or Appendix C.

- **ASC** will retain samples for a maximum of thirty (30) days after completion of the analysis, samples will be held for a longer period of time, if appropriate arrangements are made in advance. A nominal disposal charge of $5.00/ sample will be imposed for unreturned samples.

APPENDIX A

DATA SUMMARY REPORT

NOTE: The Tentatively Identified Volatile (GC/MS) Screen result(s), if applicable, is included in Appendix B.

DATA SUMMARY REPORT

Company: OHM REMEDIATION SERVICES CORPORATION

Sample Point ID: S001
ASC Sample Number: JN2682
Sample Date: 940927
Facility Code: 015831N

Parameters	Units	
RCRA TCLP Leachate Herbicide Analysis, GC, (GS52)		
2,4-D	mg/L	<.250
2,4,5-TP (Silvex)	mg/L	<.250
RCRA TCLP Leachate Pesticide Analysis, GC, (GS54)		
Chlordane	mg/L	<.020
Endrin	mg/L	<.002
Heptachlor	mg/L	<.002
Heptachlor epoxide	mg/L	<.002
Lindane	mg/L	<.002
Methoxychlor	mg/L	<.002
Toxaphene	mg/L	<.040
RCRA TCLP Leachate Metals Analysis, (ME52)		
Arsenic	mg/L	<.023
Barium	mg/L	1.18
Cadmium	mg/L	.002
Chromium	mg/L	<.006
Lead	mg/L	.262
Mercury	mg/L	<.001
Selenium	mg/L	<.039
Silver	mg/L	<.006
RCRA TCLP Leachate Base/Neutral/Acid Analysis, MS, (MS52)		
2,4-Dinitrotoluene	mg/L	<.100
Hexachlorobenzene	mg/L	<.100
Hexachloroethane	mg/L	<.100
Hexachlorobutadiene	mg/L	<.100
2-Methylphenol	mg/L	<.100
4-Methylphenol	mg/L	<.100
Nitrobenzene	mg/L	<.100
Pentachlorophenol	mg/L	<.100
Pyridine	mg/L	<.100
2,4,5-Trichlorophenol	mg/L	<.100
2,4,6-Trichlorophenol	mg/L	<.100

DATA SUMMARY REPORT

Company: OHM REMEDIATION SERVICES CORPORATION

Sample Point ID: S001
ASC Sample Number: JN2682
Sample Date: 940927
Facility Code: 015831N

Parameters	Units	
RCRA TCLP Leachate (ZHE) Volatile Analysis, MS, (MV50)		
Benzene	mg/L	<.125
Carbon tetrachloride	mg/L	<.125
Chlorobenzene	mg/L	<.125
Chloroform	mg/L	<.125
1,4-Dichlorobenzene	mg/L	<.125
1,2-Dichloroethane	mg/L	<.125
1,1-Dichloroethylene	mg/L	<.125
Methyl ethyl ketone	mg/L	<.250
Tetrachloroethylene	mg/L	<.125
Trichloroethylene	mg/L	<.125
Vinyl chloride	mg/L	<.125

APPENDIX B

QUANTITATIVE RESULTS

RCRA TCLP Leachate Herbicide Analysis, GC, (GS52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	S001	JN2682

Compounds	Sample Results mg/L	Bias Corrected Results mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number	Bias Recov
2,4-D	ND	-	.250	ND	N7H41403	59
2,4,5-TP (Silvex)	ND	-	.250	ND	N7H41403	61

RCRA TCLP Leachate Pesticide Analysis, GC, (GS54)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	S001	JN2682

Compounds	Sample Results mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Chlordane	ND	.020	ND	N7P41404
Endrin	ND	.002	ND	N7P41404
Heptachlor	ND	.002	ND	N7P41404
Heptachlor epoxide	ND	.002	ND	N7P41404
Lindane	ND	.002	ND	N7P41404
Methoxychlor	ND	.002	ND	N7P41404
Toxaphene	ND	.040	ND	N7P41404

RCRA TCLP LEACHATE METALS ANALYSIS, (ME52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	S001	JN2682

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Arsenic	ND	.023	ND	N7M5415
Barium	1.18	.001	ND	N7M5415
Cadmium	.002	.001	ND	N7M5415
Chromium	ND	.006	ND	N7M5415
Lead	.262	.018	ND	N7M5415
Mercury	ND	.001	ND	N7G5414
Selenium	ND	.039	ND	N7M5415
Silver	ND	.006	ND	N7M5415

RCRA TCLP Leachate Base/Neutral/Acid Analysis, MS, (MS52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	S001	JN2682

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
2,4-Dinitrotoluene	ND	.100	ND	N7C41402
Hexachlorobenzene	ND	.100	ND	N7C41402
Hexachloroethane	ND	.100	ND	N7C41402
Hexachlorobutadiene	ND	.100	ND	N7C41402
2-Methylphenol	ND	.100	ND	N7C41402
4-Methylphenol	ND	.100	ND	N7C41402
Nitrobenzene	ND	.100	ND	N7C41402
Pentachlorophenol	ND	.100	ND	N7C41402
Pyridine	ND	.100	ND	N7C41402
2,4,5-Trichlorophenol	ND	.100	ND	N7C41402
2,4,6-Trichlorophenol	ND	.100	ND	N7C41402

3-Methyl- and 4-Methylphenol coelute and are reported as the total

RCRA TCLP LEACHATE (ZHE) VOLATILE ANALYSIS, MS, (MV50)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	S001	JN2682

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Benzene	ND	.125	ND	N7V3903
Carbon tetrachloride	ND	.125	ND	N7V3903
Chlorobenzene	ND	.125	ND	N7V3903
Chloroform	ND	.125	ND	N7V3903
1,4-Dichlorobenzene	ND	.125	ND	N7V3903
1,2-Dichloroethane	ND	.125	ND	N7V3903
1,1-Dichloroethylene	ND	.125	ND	N7V3903
Methyl ethyl ketone	ND	.250	ND	N7V3903
Tetrachloroethylene	ND	.125	ND	N7V3903
Trichloroethylene	ND	.125	ND	N7V3903
Vinyl chloride	ND	.125	ND	N7V3903

APPENDIX C

QUALITY ASSURANCE DATA

SUMMARY OF ANALYTICAL METHODOLOGY

Parameter	Reference	Method
RCRA TCLP		
Leachate Preparation	SW-846	1311
Herbicides by GC	SW-846	8150 (1)
Pesticides by GC	SW-846	8080
Metals	SW-846	6010
Mercury by Cold Vapor	SW-846	7470
Semi-volatile Compounds by GC/MS	CLP	SOW
Volatile Compounds by GC/MS	CLP	SOW

METHODOLOGY REFERENCES

ASTM	*American Society for Testing and Materials*, 1985 edition.
CAWW	*Methods for Chemical Analysis of Water and Wastes*, April 1979 and Updated #1 March 1983.
CLP	*USEPA Contract Laboratory Program*, Document #OLMO1.0, updates December 1990 #OLMO1.1 and February 1991 #OLMO1.1.1.
EPA-500	*USEPA Methods for the Determination of Organic Compounds in Drinking Water,* EPA-600/4-88/039 December 1988.
EPA-600	*USEPA Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*, EPA-600/4-82-057 July 1982.
NIOSH	*National Institute for Occupational Safety and Health*, 3rd edition, 1984.
SMEWW	*Standard Methods for the Examination of Water and Wastewater*, 17th edition, 1989.
STOA	*Spot Tests In Organic Analysis*, 7th edition, 1966.
SW-846	*Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*, 3rd edition, September 1986 and Update #1 July 1992.
(1)	This method was modified to incorporate the use of Boron Trifluoride (BF3) as the derivatizing reagent according to Method 6640 in *SMEWW*, 17th edition, 1989.
Title 22	*Waste Extraction Test*, Title 22, Section 66261.126 Appendix 2 of the California Administrative Code, May 1991.

ASC Certifications

State	Agency	Certification #
Alabama	ADEM	40830
California	CADOH	1178
Colorado	CODOH	OH113
Delaware	DEHSS	OH113
Kansas	KSDHE	E-202 & E-1173
Louisiana	LADOHH	92-10
Maryland	MDDHMH	210
Massachusetts	MADEP	M-OH113
New Jersey	NJDEPE	74603
New York	NYDOH	10712
North Carolina	NCDEM	392
Ohio	OHEPA	OH113
Oklahoma	OKDEQ	9216
Pennsylvania	PADER	68-450
South Carolina	SCDEHNR	92002
Tennessee	TNDOH/TNDEC	2978
Virginia	VADGS	00011
Washington	WADOE	C154
Wisconsin	WIDNR	999037160

Validated by:

- US Army Corps of Engineers ..... Chemical Analysis in Various Matrices

Approvals:

- Chemical Waste Management ..... Waste Characterization Analysis
- Envirosafe ..... Waste Characterization Analysis
- USDA ..... Permit for Importing Soils
- Florida DEP ..... Quality Assurance Plan #930034G
- Naval Facilities Engineering Service Center ..... Chemical Analysis in Various Matrices

REPORT KEY

mg/kg	=	milligram per kilogram (ppm)
Mg/m^3	=	milligram per cubic meter
ug/kg	=	microgram per kilogram (ppb)
mg/L	=	milligram per liter (ppm)
ug/L	=	microgram per liter (ppb)
mg/W	=	milligram per wipe
ug/W	=	microgram per wipe
mg/SMP	=	milligram per sample
ug/SMP	=	microgram per sample (Tedlar Bag)
ug/smp	=	microgram per sample
um/cm	=	microMho per centimeter
pCi/l	=	picocurie per liter
gm/cc	=	grams per cubic centimeter
ppm	=	parts per million
ppb	=	parts per billion
ND	=	Not detected at or above stated detection limit
<	=	less than
>	=	greater than
%	=	percent
BTU/lb	=	British Thermal Units per pound
Deg. C	=	Degrees Celsius
n/a	=	not applicable
Unk	=	unknown
std	=	result is relative to standard pH units
CV	=	Conventionals
IR	=	Infrared Spectrophotometric
GC	=	Gas Chromatograph Instrument
GC/MS	=	Gas Chromatography/Mass Spectrometer Instrument
GRO	=	Gasoline Range Organics
DRO	=	Diesel Range Organics
PCB	=	Polychlorinated Biphenyls (PCBs)
EP TOX	=	Extraction Procedure Toxicity
TCLP	=	Toxicity Characteristic Leaching Procedure
RCRA	=	Resource Conservation and Recovery Act
SOW	=	Statement of Work

Quality Assurance Data

RCRA TCLP Leachate Herbicide Analysis, GC, (GS52)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
2,4-D	ND	105	ND	59	1	N7H41403
2,4,5-TP (Silvex)	ND	111	ND	61	1	N7H41403

Quality Assurance Data

RCRA TCLP Leachate Pesticide Analysis, GC, (GS54)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
Chlordane	ND	105	ND	108	1	N7P41404
Endrin	ND	109	ND	111	0	N7P41404
Heptachlor	ND	102	ND	106	1	N7P41404
Heptachlor epoxide	ND	108	ND	110	1	N7P41404
Lindane	ND	104	ND	105	1	N7P41404
Methoxychlor	ND	120	ND	123	1	N7P41404

QUALITY ASSURANCE DATA

RCRA TCLP LEACHATE METALS ANALYSIS, (ME52)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
Arsenic	ND	95	ND	96	1	N7M5415
Barium	ND	93	1.18	92	0	N7M5415
Cadmium	ND	103	.002	101	1	N7M5415
Chromium	ND	94	ND	92	1	N7M5415
Lead	ND	98	.262	96	1	N7M5415
Mercury	ND	85	ND	81	8	N7G5414
Selenium	ND	83	ND	87	1	N7M5415
Silver	ND	95	ND	98	1	N7M5415

QUALITY ASSURANCE DATA

RCRA TCLP LEACHATE BASE/NEUTRAL/ACID ANALYSIS, MS, (MS52)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
2,4-Dinitrotoluene	ND	104	ND	96	2	N7C41402
Hexachlorobenzene	ND	117	ND	83	1	N7C41402
Hexachloroethane	ND	81	ND	57	10	N7C41402
Hexachlorobutadiene	ND	89	ND	62	0	N7C41402
2-Methylphenol	ND	98	ND	89	3	N7C41402
4-Methylphenol	ND	96	ND	86	1	N7C41402
Nitrobenzene	ND	99	ND	81	1	N7C41402
Pentachlorophenol	ND	125	ND	115	1	N7C41402
Pyridine	ND	82	ND	72	1	N7C41402
2,4,5-Trichlorophenol	ND	96	ND	90	3	N7C41402
2,4,6-Trichlorophenol	ND	96	ND	89	2	N7C41402

3-Methyl- and 4-Methylphenol coelute and are reported as the total

QUALITY ASSURANCE DATA

RCRA TCLP LEACHATE (ZHE) VOLATILE ANALYSIS, MS, (MV50)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
Benzene	ND	90	ND	88	0	N7V3903
Carbon tetrachloride	ND	89	ND	86	1	N7V3903
Chlorobenzene	ND	91	ND	90	1	N7V3903
Chloroform	ND	90	ND	96	4	N7V3903
1,4-Dichlorobenzene	ND	92	ND	94	4	N7V3903
1,2-Dichloroethane	ND	89	ND	97	3	N7V3903
1,1-Dichloroethylene	ND	78	ND	88	8	N7V3903
Methyl ethyl ketone	ND	81	ND	80	5	N7V3903
Tetrachloroethylene	ND	93	ND	96	4	N7V3903
Trichloroethylene	ND	91	ND	93	3	N7V3903
Vinyl chloride	ND	82	ND	84	8	N7V3903

QUALITY ASSURANCE DATA
SURROGATE SUMMARY REPORT

SURROGATE ID	A159	F107	A121	F110	A158	# OUT
QC BATCH: N7C41402 Leachate (Semi-Volatile organics by MS)						
SAMPLE ID						
BLANK	71	59	72	77	70	0
BLANK SPIKE	79	65	93	85	81	0
S001	76	66	83	79	75	0
S001 MD	76	65	87	81	72	0
S001 MS	75	65	91	82	75	0
QC LIMITS	(21-110)	(10-110)	(10-123)	(35-114)	(43-116)	

SURROGATE ID	F047	# OUT
QC BATCH: N7H41403 Leachate (Herbicide compounds by GC)		
SAMPLE ID		
BLANK	126	0
BLANK SPIKE	126	0
S001	122	0
S001 MD	123	0
S001 MS	124	0
QC LIMITS	(10-150)	

SURROGATE ID	B816	A500	# OUT
QC BATCH: N7P41404 Leachate (Pesticide compounds by GC)			
SAMPLE ID			
BLANK	101	82	0
BLANK SPIKE	95	85	0
S001	98	88	0
S001 MD	100	90	0
S001 MS	96	89	0
QC LIMITS	(30-150)	(30-150)	

SURROGATE ID	A047	B185	B668	# OUT
QC BATCH: N7V3903 Leachate (Volatile organics by MS)				
SAMPLE ID				
BLANK	94	98	97	0
BLANK SPIKE	94	95	98	0
S001	97	100	102	0
S001 MD	99	95	96	0
S001 MS	100	100	98	0

SURROGATE ID

A047 = 1,2-Dichloroethane-D4
B185 = Toluene-D8
B668 = Bromofluorobenzene
A159 = 2-Fluorophenol
F107 = Phenol-d5
A121 = 2,4,6-Tribromophenol
F110 = Nitrobenzene-d5
A158 = 2-Fluorobiphenyl
B816 = 2,4,5,6-Tetrachloro-m-xylene
A500 = Decachlorobiphenyl

F047 = 2,4-Dichlorophenylacetic-acid

* Values outside of method quality control limits
D Sample was diluted, however, some surrogates may be reported if results were observed.

It is ASC's laboratory policy to allow one surrogate per sample fraction (acid, base-neutral or pesticide) to exceed the stated QC limits. This policy is based upon the USEPA SOW for the Contract Laboratory Program (CLP).

QUALITY ASSURANCE DATA
SURROGATE SUMMARY REPORT

SURROGATE ID	A047	B185	B668	# OUT
QC BATCH: N7V3903 Leachate (Volatile organics by MS)				
SAMPLE ID				
QC LIMITS	(76-114)	(88-110)	(86-115)	

SURROGATE ID

A047 = 1,2-Dichloroethane-D4
B185 = Toluene-D8
B668 = Bromofluorobenzene
A159 = 2-Fluorophenol
F107 = Phenol-d5
A121 = 2,4,6-Tribromophenol
F110 = Nitrobenzene-d5
A158 = 2-Fluorobiphenyl
B816 = 2,4,5,6-Tetrachloro-m-xylene
A500 = Decachlorobiphenyl
F047 = 2,4-Dichlorophenylacetic-acid

* Values outside of method quality control limits
D Sample was diluted, however, some surrogates may be reported if results were observed.

It is ASC's laboratory policy to allow one surrogate per sample fraction (acid, base-neutral or pesticide) to exceed the stated QC limits. This policy is based upon the USEPA SOW for the Contract Laboratory Program (CLP).

APPENDIX D

CHAIN-OF-CUSTODY RECORD(S)

LAB COPY

OHM Corporation

CHAIN-OF-CUSTODY RECORD

Form 0019
Field Technical Services
Rev. 08/89

138627

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

PROJECT NAME: INDIAN HEAD NAVAL BASE
PROJECT LOCATION: INDIAN HEAD MD
PROJ. NO.: 15831
PROJECT CONTACT: KEN KUKKONEN
PROJECT TELEPHONE NO.: 301-743-3513
CLIENT'S REPRESENTATIVE:
PROJECT MANAGER/SUPERVISOR: AL MAZE

ITEM NO.	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE DESCRIPTION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS) Full TCLP								REMARKS
1	S001	9/27	12:57		X	SAMPLE OF SCREENED MATERIAL IN ROLL off-SOIL	2X16 oz									
2																
3																
4																
5																
6																
7																
8																
9																
10																

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME
1	1	William SHREWSBURY	fedx	9/27	14:00
2	1	fedx 1465911963	[signature]	9/28 9/29	0958
3					
4					

REMARKS: 7 DAY TAT
fAX RESULTS TO AL MAZE
301-743-3454

SAMPLER'S SIGNATURE: [signature] #3842 Temp 0°C

Analytical Services Corp.

SOIL SAMPLES
INSIDE
&
OUTSIDE
DRUM

ANALYTICAL REPORT

Client: OHM Remediation Services Corporation
Eastern Region (Trenton, NJ)

Attn: Ken Kukkonen
Ron Kenyon

Project: 15831N - NEESA; Indianhead, MD

Sample(s): D001 and S001

Sample Type(s): Solid

Analysis Performed: RCRA TCLP Leachate Parameters

Date Sample Received: September 12, 1994

Date Order Received: September 12, 1994

Joblink(s): 616623

This report is "PROPRIETARY AND CONFIDENTIAL" and delivered to, and intended for the exclusive use of the above named client only. Analytical Services Corporation assumes no responsibility or liability for the reliance hereon or use hereof by anyone other than the above named client.

Reviewed and Approved by: _____ *Date:* September 26, 1994
Thomas E. Gran, Ph.D., Vice President

16406 U.S. Route 224 East ■ P.O. Box 1404 ■ Findlay, Ohio 45839-1404 ■ 419-423-3526

PROJECT NARRATIVE

The following items relate to the samples and analytical data contained in this report.

- All sample results are reported on an as received "wet weight" basis.
- Note any and all comments at the bottom of the tables in Appendix B and/or Appendix C.
- **ASC** will retain samples for a maximum of thirty (30) days after completion of the analysis, samples will be held for a longer period of time, if appropriate arrangements are made in advance. A nominal disposal charge of $5.00/ sample will be imposed for unreturned samples.

APPENDIX A

DATA SUMMARY REPORT

NOTE: The Tentatively Identified Volatile (GC/MS) Screen result(s), if applicable, is included in Appendix B.

DATA SUMMARY REPORT

DATE: 09/22/94

Company: OHM REMEDIATION SERVICES CORPORATION

	Sample Point ID:	**D001**	**S001**
	ASC Sample Number:	JN2200	JN2201
	Sample Date:	940908	940908
	Facility Code:	015831N	015831N
Parameters	Units		
RCRA TCLP Leachate Herbicide Analysis, GC, (GS52)			
2,4-D	mg/L	<.250	<.250
2,4,5-TP (Silvex)	mg/L	<.250	<.250
RCRA TCLP Leachate Pesticide Analysis, GC, (GS54)			
Chlordane	mg/L	<.020	<.020
Endrin	mg/L	<.002	<.002
Heptachlor	mg/L	<.002	<.002
Heptachlor epoxide	mg/L	<.002	<.002
Lindane	mg/L	<.002	<.002
Methoxychlor	mg/L	<.002	<.002
Toxaphene	mg/L	<.040	<.040
RCRA TCLP Leachate Metals Analysis, (ME52)			
Arsenic	mg/L	<.023	<.023
Barium	mg/L	.504	1.35
Cadmium	mg/L	.004	.020
Chromium	mg/L	<.006	<.006
Lead	mg/L	.162	2.74
Mercury	mg/L	<.0001	<.0001
Selenium	mg/L	<.039	<.039
Silver	mg/L	<.006	<.006
RCRA TCLP Leachate Base/Neutral/Acid Analysis, MS, (MS52)			
2,4-Dinitrotoluene	mg/L	<.100	<.100
Hexachlorobenzene	mg/L	<.100	<.100
Hexachloroethane	mg/L	<.100	<.100
Hexachlorobutadiene	mg/L	<.100	<.100
2-Methylphenol	mg/L	<.100	<.100
4-Methylphenol	mg/L	<.100	<.100
Nitrobenzene	mg/L	<.100	<.100
Pentachlorophenol	mg/L	<.100	<.100
Pyridine	mg/L	<.100	<.100
2,4,5-Trichlorophenol	mg/L	<.100	<.100
2,4,6-Trichlorophenol	mg/L	<.100	<.100

DATA SUMMARY REPORT

DATE: 09/22/94

Company: OHM REMEDIATION SERVICES CORPORATION

	Sample Point ID:	**D001**	**S001**
	ASC Sample Number:	JN2200	JN2201
	Sample Date:	940908	940908
	Facility Code:	015831N	015831N
Parameters	Units		
RCRA TCLP Leachate (ZHE) Volatile Analysis, MS, (MV50)			
Benzene	mg/L	<.125	<.125
Carbon tetrachloride	mg/L	<.125	<.125
Chlorobenzene	mg/L	<.125	<.125
Chloroform	mg/L	<.125	<.125
1,4-Dichlorobenzene	mg/L	<.125	<.125
1,2-Dichloroethane	mg/L	<.125	<.125
1,1-Dichloroethylene	mg/L	<.125	<.125
Methyl ethyl ketone	mg/L	<.250	<.250
Tetrachloroethylene	mg/L	<.125	<.125
Trichloroethylene	mg/L	<.125	<.125
Vinyl chloride	mg/L	<.125	<.125

APPENDIX B

QUANTITATIVE RESULTS

RCRA TCLP Leachate Herbicide Analysis, GC, (GS52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	D001	JN2200

Compounds	**Sample Results** mg/L	**Bias Corrected Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number	Bias Recov
2,4-D	ND	-	.250	ND	N7H41298	67
2,4,5-TP (Silvex)	ND	-	.250	ND	N7H41298	57

RCRA TCLP LEACHATE HERBICIDE ANALYSIS, GC, (GS52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	S001	JN2201

Compounds	**Sample Results** mg/L	**Bias Corrected Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number	Bias Recov
2,4-D	ND	-	.250	ND	N7H41298	67
2,4,5-TP (Silvex)	ND	-	.250	ND	N7H41298	57

RCRA TCLP Leachate Pesticide Analysis, GC, (GS54)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	D001	JN2200

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Chlordane	ND	.020	ND	N7P41307
Endrin	ND	.002	ND	N7P41307
Heptachlor	ND	.002	ND	N7P41307
Heptachlor epoxide	ND	.002	ND	N7P41307
Lindane	ND	.002	ND	N7P41307
Methoxychlor	ND	.002	ND	N7P41307
Toxaphene	ND	.040	ND	N7P41307

RCRA TCLP Leachate Pesticide Analysis, GC, (GS54)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	S001	JN2201

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Chlordane	ND	.020	ND	N7P41307
Endrin	ND	.002	ND	N7P41307
Heptachlor	ND	.002	ND	N7P41307
Heptachlor epoxide	ND	.002	ND	N7P41307
Lindane	ND	.002	ND	N7P41307
Methoxychlor	ND	.002	ND	N7P41307
Toxaphene	ND	.040	ND	N7P41307

RCRA TCLP LEACHATE METALS ANALYSIS, (ME52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	D001	JN2200

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Arsenic	ND	.023	ND	N7M5345
Barium	.504	.001	ND	N7M5345
Cadmium	.004	.001	ND	N7M5345
Chromium	ND	.006	ND	N7M5345
Lead	.162	.018	ND	N7M5345
Mercury	ND	.0001	ND	N7G5347
Selenium	ND	.039	ND	N7M5345
Silver	ND	.006	ND	N7M5345

RCRA TCLP LEACHATE METALS ANALYSIS, (ME52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	S001	JN2201

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Arsenic	ND	.023	ND	N7M5345
Barium	1.35	.001	ND	N7M5345
Cadmium	.020	.001	ND	N7M5345
Chromium	ND	.006	ND	N7M5345
Lead	2.74	.018	ND	N7M5345
Mercury	ND	.0001	ND	N7G5347
Selenium	ND	.039	ND	N7M5345
Silver	ND	.006	ND	N7M5345

RCRA TCLP Leachate Base/Neutral/Acid Analysis, MS, (MS52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	D001	JN2200

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
2,4-Dinitrotoluene	ND	.100	ND	N7C41304
Hexachlorobenzene	ND	.100	ND	N7C41304
Hexachloroethane	ND	.100	ND	N7C41304
Hexachlorobutadiene	ND	.100	ND	N7C41304
2-Methylphenol	ND	.100	ND	N7C41304
4-Methylphenol	ND	.100	ND	N7C41304
Nitrobenzene	ND	.100	ND	N7C41304
Pentachlorophenol	ND	.100	ND	N7C41304
Pyridine	ND	.100	ND	N7C41304
2,4,5-Trichlorophenol	ND	.100	ND	N7C41304
2,4,6-Trichlorophenol	ND	.100	ND	N7C41304

3-Methyl- and 4-Methylphenol coelute and are reported as the total

RCRA TCLP LEACHATE BASE/NEUTRAL/ACID ANALYSIS, MS, (MS52)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	S001	JN2201

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
2,4-Dinitrotoluene	ND	.100	ND	N7C41304
Hexachlorobenzene	ND	.100	ND	N7C41304
Hexachloroethane	ND	.100	ND	N7C41304
Hexachlorobutadiene	ND	.100	ND	N7C41304
2-Methylphenol	ND	.100	ND	N7C41304
4-Methylphenol	ND	.100	ND	N7C41304
Nitrobenzene	ND	.100	ND	N7C41304
Pentachlorophenol	ND	.100	ND	N7C41304
Pyridine	ND	.100	ND	N7C41304
2,4,5-Trichlorophenol	ND	.100	ND	N7C41304
2,4,6-Trichlorophenol	ND	.100	ND	N7C41304

3-Methyl- and 4-Methylphenol coelute and are reported as the total

RCRA TCLP Leachate (ZHE) Volatile Analysis, MS, (MV50)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	D001	JN2200

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Benzene	ND	.125	ND	N7V3866
Carbon tetrachloride	ND	.125	ND	N7V3866
Chlorobenzene	ND	.125	ND	N7V3866
Chloroform	ND	.125	ND	N7V3866
1,4-Dichlorobenzene	ND	.125	ND	N7V3866
1,2-Dichloroethane	ND	.125	ND	N7V3866
1,1-Dichloroethylene	ND	.125	ND	N7V3866
Methyl ethyl ketone	ND	.250	ND	N7V3866
Tetrachloroethylene	ND	.125	ND	N7V3866
Trichloroethylene	ND	.125	ND	N7V3866
Vinyl chloride	ND	.125	ND	N7V3866

RCRA TCLP LEACHATE (ZHE) VOLATILE ANALYSIS, MS, (MV50)

Company Name	Facility	Sample Point	ASC Sample No.
OHM REMEDIATION SERVICES CORPORATION	015831N	S001	JN2201

Compounds	**Sample Results** mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Benzene	ND	.125	ND	N7V3866
Carbon tetrachloride	ND	.125	ND	N7V3866
Chlorobenzene	ND	.125	ND	N7V3866
Chloroform	ND	.125	ND	N7V3866
1,4-Dichlorobenzene	ND	.125	ND	N7V3866
1,2-Dichloroethane	ND	.125	ND	N7V3866
1,1-Dichloroethylene	ND	.125	ND	N7V3866
Methyl ethyl ketone	ND	.250	ND	N7V3866
Tetrachloroethylene	ND	.125	ND	N7V3866
Trichloroethylene	ND	.125	ND	N7V3866
Vinyl chloride	ND	.125	ND	N7V3866

APPENDIX C

QUALITY ASSURANCE DATA

SUMMARY OF ANALYTICAL METHODOLOGY

Parameter	Reference	Method
RCRA TCLP		
Leachate Preparation	SW-846	1311
Herbicides by GC	SW-846	8150 (1)
Pesticides by GC	SW-846	8080
Metals	SW-846	6010
Mercury by Cold Vapor	SW-846	7470
Semi-volatile Compounds by GC/MS	CLP	SOW
Volatile Compounds by GC/MS	CLP	SOW

METHODOLOGY REFERENCES

ASTM *American Society for Testing and Materials*, 1985 edition.

CAWW *Methods for Chemical Analysis of Water and Wastes*, April 1979 and Updated #1 March 1983.

CLP *USEPA Contract Laboratory Program*, Document #OLMO1.0, updates December 1990 #OLMO1.1 and February 1991 #OLMO1.1.1.

EPA-500 *USEPA Methods for the Determination of Organic Compounds in Drinking Water,* EPA-600/4-88/039 December 1988.

EPA-600 *USEPA Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*, EPA-600/4-82-057 July 1982.

NIOSH *National Institute for Occupational Safety and Health*, 3rd edition, 1984.

SMEWW *Standard Methods for the Examination of Water and Wastewater*, 17th edition, 1989.

STOA *Spot Tests In Organic Analysis*, 7th edition, 1966.

SW-846 *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*, 3rd edition, September 1986 and Update #1 July 1992.

(1) This method was modified to incorporate the use of Boron Trifluoride (BF3) as the derivatizing reagent according to Method 6640 in *SMEWW*, 17th edition, 1989.

Title 22 *Waste Extraction Test*, Title 22, Section 66261.126 Appendix 2 of the California Administrative Code, May 1991.

ASC Certifications

State	Agency	Certification #
Alabama	ADEM	40830
California	CADOH	1178
Colorado	CODOH	OH113
Delaware	DEHSS	OH113
Kansas	KSDHE	E-202 & E-1173
Louisiana	LADOHH	92-10
Maryland	MDDHMH	210
Massachusetts	MADEP	M-OH113
New Jersey	NJDEPE	74603
New York	NYDOH	10712
North Carolina	NCDEM	392
Ohio	OHEPA	OH113
Oklahoma	OKDEQ	9216
Pennsylvania	PADER	68-450
South Carolina	SCDEHNR	92002
Tennessee	TNDOH/TNDEC	2978
Virginia	VADGS	00011
Washington	WADOE	C154
Wisconsin	WIDNR	999037160

Validated by:

- US Army Corps of Engineers . . . . . Chemical Analysis in Various Matrices

Approvals:

- Chemical Waste Management . . . . . Waste Characterization Analysis
- Envirosafe . . . . . Waste Characterization Analysis
- USDA . . . . . Permit for Importing Soils
- Florida DEP . . . . . Quality Assurance Plan #930034G
- Naval Facilities Engineering Service Center . . . . . Chemical Analysis in Various Matrices

REPORT KEY

mg/kg	=	milligram per kilogram (ppm)
Mg/m^3	=	milligram per cubic meter
ug/kg	=	microgram per kilogram (ppb)
mg/L	=	milligram per liter (ppm)
ug/L	=	microgram per liter (ppb)
mg/W	=	milligram per wipe
ug/W	=	microgram per wipe
mg/SMP	=	milligram per sample
ug/SMP	=	microgram per sample
um/cm	=	microMho per centimeter
pCi/l	=	picocurie per liter
gm/cc	=	grams per cubic centimeter
ppm	=	parts per million
ppb	=	parts per billion
ND	=	Not detected at or above stated detection limit
<	=	less than
>	=	greater than
%	=	percent
BTU/lb	=	British Thermal Units per pound
Deg. C	=	Degrees Celsius
n/a	=	not applicable
Unk	=	unknown
std	=	result is relative to standard pH units
CV	=	Conventionals
IR	=	Infrared Spectrophotometric
GC	=	Gas Chromatograph Instrument
GC/MS	=	Gas Chromatography/Mass Spectrometer Instrument
GRO	=	Gasoline Range Organics
DRO	=	Diesel Range Organics
PCB	=	Polychlorinated Biphenyls (PCBs)
EP TOX	=	Extraction Procedure Toxicity
TCLP	=	Toxicity Characteristic Leaching Procedure
RCRA	=	Resource Conservation and Recovery Act
SOW	=	Statement of Work

Quality Assurance Data

RCRA TCLP Leachate Herbicide Analysis, GC, (GS52)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
2,4-D	ND	113	ND	67	5	N7H41298
2,4,5-TP (Silvex)	ND	96	ND	57	3	N7H41298

Quality Assurance Data

RCRA TCLP Leachate Pesticide Analysis, GC, (GS54)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
Chlordane	ND	116	ND	99	8	N7P41307
Endrin	ND	119	ND	104	9	N7P41307
Heptachlor	ND	118	ND	100	15	N7P41307
Heptachlor epoxide	ND	116	ND	102	10	N7P41307
Lindane	ND	113	ND	101	8	N7P41307
Methoxychlor	ND	118	ND	106	7	N7P41307
Toxaphene	ND	-	-	-	-	N7P41307

Quality Assurance Data

RCRA TCLP Leachate Metals Analysis, (ME52)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
Arsenic	ND	95	ND	91	1	N7M5345
Barium	ND	93	1.35	83	0	N7M5345
Cadmium	ND	112	.020	103	1	N7M5345
Chromium	ND	95	ND	86	1	N7M5345
Lead	ND	98	2.74	89	1	N7M5345
Mercury	ND	107	ND	74	12	N7G5347
Selenium	ND	85	ND	83	3	N7M5345
Silver	ND	99	ND	86	1	N7M5345

QUALITY ASSURANCE DATA

RCRA TCLP LEACHATE BASE/NEUTRAL/ACID ANALYSIS, MS, (MS52)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
2,4-Dinitrotoluene	ND	100	ND	122	2	N7C41304
Hexachlorobenzene	ND	116	ND	121	4	N7C41304
Hexachloroethane	ND	66	ND	52	7	N7C41304
Hexachlorobutadiene	ND	85	ND	52	15	N7C41304
2-Methylphenol	ND	86	ND	98	2	N7C41304
4-Methylphenol	ND	89	ND	103	9	N7C41304
Nitrobenzene	ND	91	ND	98	8	N7C41304
Pentachlorophenol	ND	144	ND	182	-	N7C41304
Pyridine	ND	53	ND	79	6	N7C41304
2,4,5-Trichlorophenol	ND	98	ND	104	-	N7C41304
2,4,6-Trichlorophenol	ND	104	ND	119	-	N7C41304

3-Methyl- and 4-Methylphenol coelute and are reported as the total

- Due to apparent interactions between the spiked compound and sample components, no matrix spike recoveries were observed for the parameters designated with a dash.

Quality Assurance Data

RCRA TCLP Leachate (ZHE) Volatile Analysis, MS, (MV50)

Compounds	Blank Results mg/L	Blank Spike Recov	Unspiked Sample Results mg/L	Matrix Spike Recov	Relative Percent Diff	Batch Number
Benzene	ND	86	ND	88	1	N7V3866
Carbon tetrachloride	ND	85	ND	87	2	N7V3866
Chlorobenzene	ND	96	ND	98	3	N7V3866
Chloroform	ND	94	ND	90	1	N7V3866
1,4-Dichlorobenzene	ND	85	ND	85	4	N7V3866
1,2-Dichloroethane	ND	91	ND	88	1	N7V3866
1,1-Dichloroethylene	ND	82	ND	80	1	N7V3866
Methyl ethyl ketone	ND	86	ND	83	5	N7V3866
Tetrachloroethylene	ND	95	ND	94	4	N7V3866
Trichloroethylene	ND	93	ND	94	5	N7V3866
Vinyl chloride	ND	76	ND	77	1	N7V3866

QUALITY ASSURANCE DATA
SURROGATE SUMMARY REPORT

SURROGATE ID	A159	F107	A121	F110	A158	# OUT
QC BATCH: N7C41304 **Leachate (Semi-Volatile organics by MS)**						
SAMPLE ID						
BLANK	75	68	77	80	76	0
BLANK SPIKE	76	67	87	75	81	0
D001	82	67	87	88	85	0
D001 MD	21	69	27	97	87	0
D001 MS	90	87	96	89	86	0
S001	80	67	84	79	79	0
QC LIMITS	(21-110)	(10-110)	(10-123)	(35-114)	(43-116)	

SURROGATE ID	F047	# OUT
QC BATCH: N7H41298 **Leachate (Herbicide compounds by GC)**		
SAMPLE ID		
BLANK	67	0
BLANK SPIKE	64	0
D001	96	0
D001 MD	73	0
D001 MS	92	0
S001	55	0
QC LIMITS	(10-150)	

SURROGATE ID	B816	A500	# OUT
QC BATCH: N7P41307 **Leachate (Pesticide compounds by GC)**			
SAMPLE ID			
BLANK	97	90	0
BLANK SPIKE	105	102	0
D001	98	126	0
D001 MD	90	118	0
D001 MS	94	120	0
S001	98	125	0
QC LIMITS	(30-150)	(30-150)	

SURROGATE ID

A047 = 1,2-Dichloroethane-D4
B185 = Toluene-D8
B668 = Bromofluorobenzene
A159 = 2-Fluorophenol
F107 = Phenol-d5
A121 = 2,4,6-Tribromophenol
F110 = Nitrobenzene-d5
A158 = 2-Fluorobiphenyl
B816 = 2,4,5,6-Tetrachloro-m-xylene
A500 = Decachlorobiphenyl
F047 = 2,4-Dichlorophenylacetic-acid

* Values outside of method quality control limits
D Sample was diluted, however, some surrogates may be reported if results were observed.

It is ASC's laboratory policy to allow one surrogate per sample fraction (acid, base-neutral or pesticide) to exceed the stated QC limits. This policy is based upon the USEPA SOW for the Contract Laboratory Program (CLP).

QUALITY ASSURANCE DATA
SURROGATE SUMMARY REPORT

QC BATCH: N7V3866 **Leachate (Volatile organics by MS)**

SURROGATE ID	A047	B185	B668	# OUT
SAMPLE ID				
BLANK	92	99	99	0
BLANK SPIKE	101	101	102	0
D001	98	100	100	0
S001	99	100	99	0
S001 MD	95	96	94	0
S001 MS	95	100	100	0
QC LIMITS	(76-114)	(88-110)	(86-115)	

SURROGATE ID

A047 = 1,2-Dichloroethane-D4
B185 = Toluene-D8
B668 = Bromofluorobenzene
A159 = 2-Fluorophenol
F107 = Phenol-d5
A121 = 2,4,6-Tribromophenol
F110 = Nitrobenzene-d5
A158 = 2-Fluorobiphenyl
B816 = 2,4,5,6-Tetrachloro-m-xylene
A500 = Decachlorobiphenyl
F047 = 2,4-Dichlorophenylacetic-acid

* Values outside of method quality control limits
D Sample was diluted, however, some surrogates may be reported if results were observed.

It is ASC's laboratory policy to allow one surrogate per sample fraction (acid, base-neutral or pesticide) to exceed the stated QC limits. This policy is based upon the USEPA SOW for the Contract Laboratory Program (CLP).

APPENDIX D

CHAIN-OF-CUSTODY RECORD(S)

AB COPY

OHM Corporation

CHAIN-OF-CUSTODY RECORD

Form 0019
Field Technical Services
Rev. 08/89

142860

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

PROJECT NAME	PROJECT LOCATION
INDIANHEAD	INDIANHEAD, MD

PROJ. NO.	PROJECT CONTACT	PROJECT TELEPHONE NO.
15831	RON KENYON	(609) 588-~~6433~~ 6344

CLIENT'S REPRESENTATIVE	PROJECT MANAGER/SUPERVISOR
	KEN KUKKONEN / AL MAZE

ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS)

ITEM NO.	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE DESCRIPTION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	TCLP VOC'S	TCLP SEMI-VOC'S	TCLP METALS	TCLP PEST/HERB					REMARKS
1	D001	9.8.94	1745	X		SOIL SAMPLE SOIL INSIDE EXCAVATED DRUM	1x32oz	X	X	X	X					
2	S0001	9.8.94	1740	X		SOIL SAMPLE EXCAVATED SOIL AROUND DRUM	1x32oz	X	X	X	X					
3																
4																
5																
6																
7																
8																
9																
10																

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME
1	1-2	Kara Forozinsky	FedEx # 2290920527	9.9.94	
2	1-2	Fedx	[illegible]	9-4-94	0947
3					
4					

REMARKS

7 DAY TAT

FAX RESULTS TO:

RON KENYON (609) 588-6403

Temp 20°C

SAMPLER'S SIGNATURE

Kara L. Forozinsky #7257

American Environmental Network, Inc.

ANALYTICAL SERVICES FOR THE ENVIRONMENT

FACSIMILE • Page 1

TO: Al

ORGANIZATION: OHM- Indian Head

RECIPIENT'S FAX NO.: 301- 743-3454

FROM: Kristina Yamanik

DATE: 8/1/94

NO. OF PAGES: (including cover page) 15

RE: Results- Indian Head

MESSAGE:

REPORT ON BACKFILL

7-179 OHM

9151 RUMSEY ROAD • COLUMBIA, MARYLAND 21045 • 800-899-8525 • 410-730-8525 • FAX 410-997-2586
29 Green Valley Drive • Green Brook, New Jersey 08812 • 908-805-0929 • FAX 908-302-2592
5 Brookside Circle • St. Davids, Pennsylvania 19087 • 610-971-0468 • FAX 610-971-1820
5000-B University Pkwy, Suite 41 • Winston-Salem, North Carolina 27106 • 910-767-9607 FAX 910-767-9608
963 Concord Drive • Medina, Ohio 44256 • 216-723-7533 • FAX 216-723-0645
28 Springdale Road • Cherry Hill, New Jersey 08003 • 800-879-5221 • FAX 609-751-0824
115 Route 46, Building F • Mountain Lakes, New Jersey 07046 • 201-402-4910 • FAX 201-402-8912
3440 Vincent Road • Pleasant Hill, California 94523 • 510-930-9090 • FAX 510-930-0256

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
#01

Lab Name: AENI MD ontract: 9407-179

Project No.: AENI Site: OHM Location: INDIAN Group: HEAD

Matrix: (soil/water) SOIL Lab Sample ID: #001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: FG537.D

Level: (low/med) Date Received: 7/21/94

% Moisture: not dec. 100 Date Analyzed: 7/28/94

GC Column: W.B. ID: 0.50 (mm) Dilution Factor: 10.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L of Leach	Q
75-01-4	Vinyl Chloride	100	UD
75-35-4	1,1-Dichloroethene	50	UD
67-66-3	Chloroform	50	UD
107-06-2	1,2-Dichloroethane	50	UD
78-93-3	2-Butanone	1000	UD
56-23-5	Carbon Tetrachloride	50	UD
79-01-6	Trichloroethene	150	D
71-43-2	Benzene	50	UD
127-18-4	Tetrachloroethene	50	UD
108-90-7	Chlorobenzene	50	UD

FORM I VOA SW846

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
VBLK01

Lab Name: AENI MD ontract: 9407-179

Project No.: AENI Site: OHM Location: INDIAN Group: HEAD

Matrix: (soil/water) SOIL Lab Sample ID: 0728VBLK

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: FG530.D

Level: (low/med) Date Received: N.A.

% Moisture: not dec. 100 Date Analyzed: 7/28/94

GC Column: W.B. ID: 0.50 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L of Leach	Q
75-01-4	Vinyl Chloride	10	U
75-35-4	1,1-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
56-23-5	Carbon Tetrachloride	5	U
79-01-6	Trichloroethene	5	U
71-43-2	Benzene	5	U
127-18-4	Tetrachloroethene	5	U
108-90-7	Chlorobenzene	5	U

FORM I VOA SW846

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
TCLPBLK

Lab Name: AENI MD ontract: 9407-179

Project No.: AENI Site: OHM Location: INDIAN Group: HEAD

Matrix: (soil/water) SOIL Lab Sample ID: 0727TCLP

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: FG538.D

Level: (low/med) Date Received: N.A.

% Moisture: not dec. 100 Date Analyzed: 7/28/94

GC Column: W.B. ID: 0.50 (mm) Dilution Factor: 10.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L of Leach	Q
75-01-4	Vinyl Chloride	100	UD
75-35-4	1,1-Dichloroethene	50	UD
67-66-3	Chloroform	50	UD
107-06-2	1,2-Dichloroethane	50	UD
78-93-3	2-Butanone	1000	UD
56-23-5	Carbon Tetrachloride	50	UD
79-01-6	Trichloroethene	50	UD
71-43-2	Benzene	50	UD
127-18-4	Tetrachloroethene	50	UD
108-90-7	Chlorobenzene	50	UD

FORM I VOA SW846

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
#01

Lab Name: AENI MD Contract: 9407-179

Project No.: AENI Site: OHM Location: INDIAN Group: HEAD

Matrix: (soil/water) SOIL Lab Sample ID: #001

Sample wt/vol: 500.0 (g/mL ML Lab File ID: CG094.D

Level: (low/med) Date Received: 7/21/94

% Moisture: 100 decanted: (Y/N): N Date Extracted: 7/26/96

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 7/28/94

Injection Volume: 1.0 (uL) Dilution Factor: 5.0

GPC Cleanup: (Y/N) N pH: 2

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L of Leachate	Q
110-86-1	Pyridine	100	UD
106-46-7	1,4-Dichlorobenzene	100	UD
95-48-7	2+3-Methylphenol	100	UD
67-72-1	Hexachloroethane	100	UD
106-44-5	4-Methylphenol	100	UD
98-95-3	Nitrobenzene	100	UD
87-68-3	Hexachlorobutadiene	100	UD
88-06-2	2,4,6-Trichlorophenol	100	UD
95-95-4	2,4,5-Trichlorophenol	500	UD
121-14-2	2,4-Dinitrotoluene	100	UD
118-74-1	Hexachlorobenzene	100	UD
87-86-5	Pentachlorophenol	500	UD

FORM I SV SW846

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
SBLK01

Lab Name: AENI MD Contract: 9407-179

Project No.: AENI Site: OHM Location: INDIAN Group: HEAD

Matrix: (soil/water) SOIL Lab Sample ID: 0726-LA

Sample wt/vol: 1000.0 (g/mL ML Lab File ID: CG087.D

Level: (low/med) Date Received: N.A.

% Moisture: 100 decanted: (Y/N): N Date Extracted: 7/26/96

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 7/28/94

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 2

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L of Leachate	Q
110-86-1	Pyridine	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-48-7	2+3-Methylphenol	10	U
67-72-1	Hexachloroethane	10	U
106-44-5	4-Methylphenol	10	U
98-95-3	Nitrobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
121-14-2	2,4-Dinitrotoluene	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U

FORM I SV SW846

AMERICAN ENVIRONMENTAL NETWORK, INC.

Organic Analysis Data Sheet

TCLP PESTICIDES

Case No.:——— 9407179

Project Name:——— INDIAN HEAD

Client Name:——— OHM CORPORATION

Sample Number
01

AENI # 9407179-001

Concentration:——— Low

Date Sampled:——— 7/19/94

Date Received:——— 7/21/94

Date Ext Prepared:——— 7/26/94

Date Analyzed:——— 7/28/94

Conc/Dil Factor:——— 1

GPC Cleanup	Yes	X No
Seperatory Funnel Extraction		Yes
Continuous Liquid - Liquid Extration		X Yes
Percent Moisture	N/A	

CAS Number	Compound	Concentration ug/L	Detection Limit	Qualifier
58-89-9	gamma-BHC (Lindane)		0.10	U
75-44-8	Heptachlor		0.10	U
1024-57-3	Heptachlor epoxide		0.10	U
72-20-8	Endrin		0.20	U
72-43-5	Methoxychlor		1.0	U
5103-71-9	alpha-Chlordane		0.10	U
5103-74-2	gamma-Chlordane		0.10	U
8001-35-2	Toxaphene		10	U

Vi - Volume of extract injected (ul) - _____ 4

Vs - Volume of Water extracted (ml) - _____ 500

Ws - Weight of sample extracted (g) - _____ N/A

Vt - Volume of total extract (ul) - _____ 10,000

FORM I

AMERICAN ENVIRONMENTAL NETWORK, INC.

Organic Analysis Data Sheet

TCLP PESTICIDES

Case No.:——— 9407179

Project Name:——— INDIAN HEAD

Client Name:——— OHM CORPORATION

Sample Number

BLANK

AENI # BLK 0726JA

Concentration:——— Low

Date Sampled:——— N/A

Date Received:——— N/A

Date Ext Prepared:— 7/26/94

Date Analyzed:——— 7/26/94

Conc/Dil Factor:——— 1

GPC Cleanup	Yes	X No
Seperatory Funnel Extraction		Yes
Continuous Liquid - Liquid Extration	X	Yes
Percent Moisture	N/A	

CAS Number	Compound	Concentration ug/L	Detection Limit	Qualifier
58-89-9	gamma-BHC (Lindane)		0.050	U
75-44-8	Heptachlor		0.050	U
1024-57-3	Heptachlor epoxide		0.050	U
72-20-8	Endrin		0.10	U
72-43-5	Methoxychlor		0.50	U
5103-71-9	alpha-Chlordane		0.050	U
5103-74-2	gamma-Chlordane		0.050	U
8001-35-2	Toxaphene		5.0	U

Vi - Volume of extract injected (ul) - _____ 4

Vs - Volume of Water extracted (ml) - _____ 1000

Ws - Weight of sample extracted (g) - _____ N/A

Vt - Volume of total extract (ul) - _____ 10,000

FORM I

AMERICAN ENVIRONMENTAL NETWORK INC.
ORGANIC ANALYSIS DATA SHEET
HERBICIDES

Case No.: 9407179
Client Name: OHM

Sample Number
01

AENI # 9407179-001

Concentration: Low
Date Sampled: 7/19/94
Date Extract Prepared: 7/27/94
Date Analyzed: 7/28/94
Conc/Dil Factor: 1
Matrix: LEACH

GPC Cleanup No
Separatory Funnel Ext.: Yes
Continuous Liq Liq Ext.: No
Percent Moisture (decanted) N/A

Compound	Concentration ug/L	Reporting Limit	Qualifier
SILVEX		50	U
2,4 D		50	U

Vi - Volume of extract injected (ul) 1
Vs - Volume of water extracted (ml) 500
Ws - Mass of soil extracted (g) N/A
Vt- Volume of total extract (ul) 5000

FORM I

AMERICAN ENVIRONMENTAL NETWORK INC.
ORGANIC ANALYSIS DATA SHEET
HERBICIDES

Sample Number
TCLP BLANK

Case No.:_____ 9407179
Client Name:_____ OHM

AENI # TCLP BLANK

Concentration: _____ Low
Date Sampled:_____ N/A
Date Extract Prepared:_ 7/27/94
Date Analyzed:_____ 7/28/94
Conc/Dil Factor:_____ 1
Matrix_____ LEACH

GPC Cleanup _____ No
Separatory Funnel Ext.: _____ Yes
Continuous Liq-Liq Ext.: ____ No
Percent Moisture (decanted)_ N/A

Compound	Concentration ug/L	Reporting Limit	Qualifier
SILVEX		50	U
2,4 D		50	U

Vi - Volume of extract injected (ul)___ 1
Vs - Volume of water extracted (ml)__ 500
Ws - Mass of soil extracted (g)_____ N/A
Vt- Volume of total extract (ul)_____ 5000

FORM I

AMERICAN ENVIRONMENTAL NETWORK OF MARYLAND

TCLP METALS

CLIENT: OHM CORPORATION

ARNI SAMPLE #: 9407179-001

CLIENT SAMPLE #: 01

DATE: 28-Jul-94

UNITS: ug/L in LEACHATE

ANALYTE	METHOD	REPORT LIMIT	SAMPLE RESULT
ARSENIC	6010	500	<500
BARIUM	6010	100	113
CADMIUM	6010	40	<40
CHROMIUM	6010	100	<100
LEAD	6010	100	205
MERCURY	7470	1	<1
SELENIUM	6010	250	<250
SILVER	6010	500	<500

AMERICAN ENVIRONMENTAL NETWORK INC.
ORGANIC ANALYSIS DATA SHEET
HERBICIDES

Case No.:_____ 9407179
Client Name:_____ OHM

Sample Number
BLANK

AENI # BLK 0727RA

Concentration: _____ Low
Date Sampled:_____ N/A
Date Extract Prepared:_ 7/27/94
Date Analyzed:_____ 7/28/94
Conc/Dil Factor:_____ 1
Matrix_____ WATER

GPC Cleanup _____ No
Separatory Funnel Ext.: _____ Yes
Continuous Liq-Liq Ext.: ____ No
Percent Moisture (decanted)_ N/A

Compound	Concentration ug/L	Reporting Limit	Qualifier
SILVEX		25	U
2,4 D		25	U

Vi - Volume of extract injected (ul)___ 1
Vs - Volume of water extracted (ml)__ 1000
Ws - Mass of soil extracted (g)_____ N/A
Vt- Volume of total extract (ul)_____ 5000

FORM I

AMERICAN ENVIRONMENTAL NETWORK OF MARYLAND

METHOD BLANK AND %RECOVERY LCS

CLIENT: OHM CORPORATION

DATE: 28-Jul-94

UNITS: ug/L IN LEACHATE

ANALYTE	METHOD	METHOD BLANK	% RECOVERY LABORATORY CONTROL SAMPLE
ARSENIC	6010	<500	93
BARIUM	6010	<100	95
CADMIUM	6010	<40	105
CHROMIUM	6010	<100	105
LEAD	6010	<100	100
MERCURY	7470	<1.0	91
SELENIUM	6010	<250	85
SILVER	6010	<500	95

BOB TAYLOR ENGINEERING, INC.
317 Great Mills Lane
LEXINGTON PARK, MARYLAND 20653

(301) 862-4300
(301) 932-5575

JOB NO.	94-236
DATE	09/29/94
PROJECT	INDIAN HEAD 15831
LOCATION	INDIAN HEAD, MARYLAND
PRESENT AT SITE	MYRON CUTCHEMBER
	BTE BILLABLE TIME: 4.0 HOURS

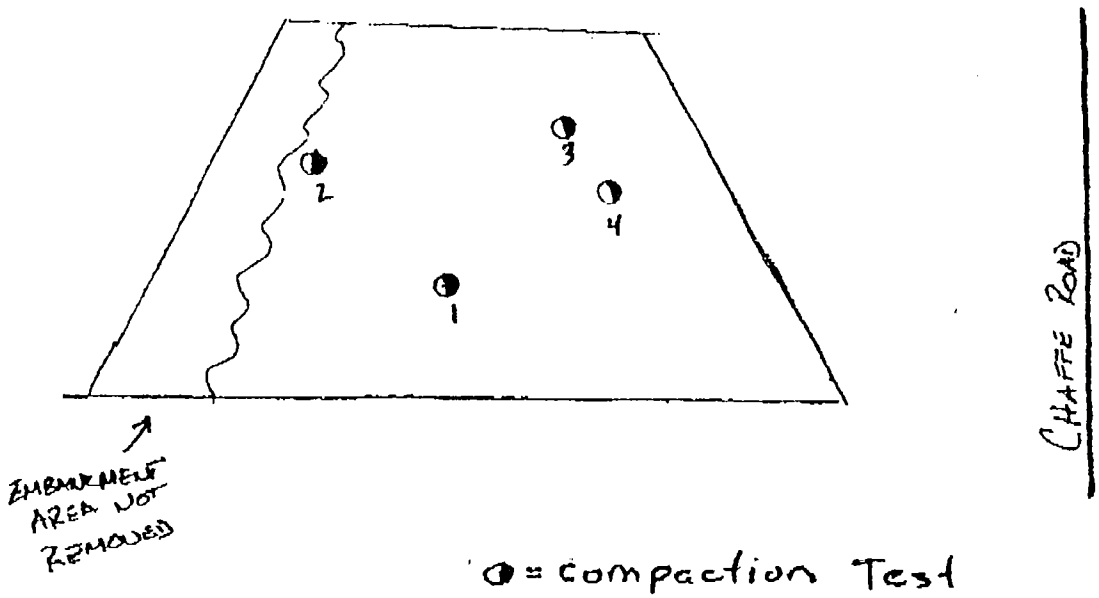
OHM CORPORATION

P.O. BOX 4647

TRENTON, NEW JERSEY 08650-1904

FIELD REPORT

Four (04) in-place field density tests numbered 01 - 04 inclusive, were performed per ASTM D-2922 using a nuclear gauge on the embankment backfill. These tests were performed to determine the existing percent of compaction. All test results were within a range of eighty percent (80%) to ninety percent (90%) of compaction per ASTM D-698. These test locations are shown below.



B.T
REVIEWER'S INITIALS

Myron J. Cutchember
TECHNICIAN'S SIGNATURE

9/29/94
DATE

BOB TAYLOR ENGINEERING, INC.
317 Great Mills Lane
LEXINGTON PARK, MARYLAND 20653

COMPACTION REPORT

NO. 94-236 TECHNICIAN M. CUTCHEMBER

TYPE OF MATERIAL: SILT

DATA					
DATE	09-29-94	09-29-94	09-29-94	09-29-94	
FIELD TEST NUMBER	1	2	3	4	
SEE DATED FIELD REPORT(S) FOR TEST LOCATION(S)					
PROPOSED HEIGHT AT POINT OF TEST	F.S.G.	F.S.G.	F.S.G.	F.S.G.	
HEIGHT OF FILL AT POINT OF TEST	FSG-3'	FSG-3'	FSG-3'	FSG-3'	
% COMPACTION REQUIRED	95.0	95.0	95.0	95.0	
% COMPACTION OBTAINED	87.0	90.3	85.0	80.3	
IN-PLACE DENSITY DETERMINATION					
1. WET SOIL WT + CONTAINER WT					
2. CONTAINER WT					
3. TOTAL WET SOIL WT FROM TEST HOLE					
4. DRY SAND DENSITY (LBS/CU FT)	NUCLEAR GAUGE	NUCLEAR GAUGE	NUCLEAR GAUGE	NUCLEAR GAUGE	
5. INITIAL DRY SAND WT + CONTAINER WT					
6. FINAL DRY SAND WT + CONTAINER WT					
7. DRY SAND WT IN HOLE + SAND IN CONE					
8. DRY SAND WT IN CONE					
9. DRY SAND WT IN HOLE					
10. VOLUME OF TEST HOLE					
11. IN-PLACE WET DENSITY (LBS/CU FT)	111.8	117.1	109.4	100.8	
12. IN-PLACE DRY DENSITY (LBS/CU FT)	93.8	97.3	91.6	86.6	
MAXIMUM DENSITY					
13. MAX DRY DENSITY (LBS/CU FT)	107.8	107.8	107.8	107.8	
13A. OPTIMUM MOISTURE, %	9.3	9.3	9.3	9.3	
MOISTURE CONTENT					
14. WET SOIL WT (GRAMS)					
15. DRY SOIL WT (GRAMS)					
16. MOISTURE WT (GRAMS)					
17. MOISTURE %	19.2	20.3	19.4	16.4	

TOTAL P.03

BOB TAYLOR ENGINEERING, INC.
317 Great Mills Lane
LEXINGTON PARK, MARYLAND 20653

(301) 862-4300
(301) 932-5575

JOB NO.	94-236
DATE	10/20/94
PROJECT	INDIAN HEAD 15831
LOCATION	INDIAN HEAD, MARYLAND
PRESENT AT SITE	MYRON CUTCHEMBER

OHM CORPORATION

P.O. BOX 4647

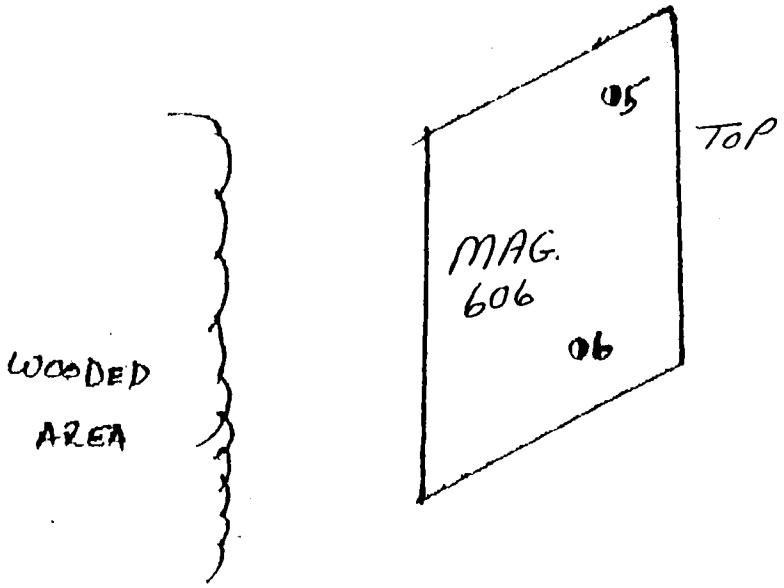
TRENTON, NEW JERSEY 08650-1904

BTE BILLABLE TIME: 3.0 HOURS

FIELD REPORT

Two (02) in-place field density tests numbered 05 and 06, were performed per ASTM D-2922 using a nuclear gauge on the embankment backfill. Using a client supplied maximum dry density of 119.7 lbs./cu.ft., all tests achieved the required ninety-five percent of compaction per AASHTO T-180. These test locations are shown below.

THIS IS ON THE CLAY CAP PLACED OVER SOIL.



CHAFFE RD

REVIEWER'S INITIALS

TECHNICIAN'S SIGNATURE DATE 10/20/94

BOB TAYLOR ENGINEERING, INC.
Geotechnical Services • Materials Testing

317 Great Mills Lane
Lexington Park, MD 20653
(301) 862-4300 • (301) 932-5575
Fax (301) 862-5764
Robert F. Taylor, P.E., President

ASTM C-136
TESTS ON FINE AGGREGATE FOR SIEVE ANALYSIS

CLIENT: OHM Corporation

JOB NUMBER: 94-236

PROJECT: Indian Head 15831

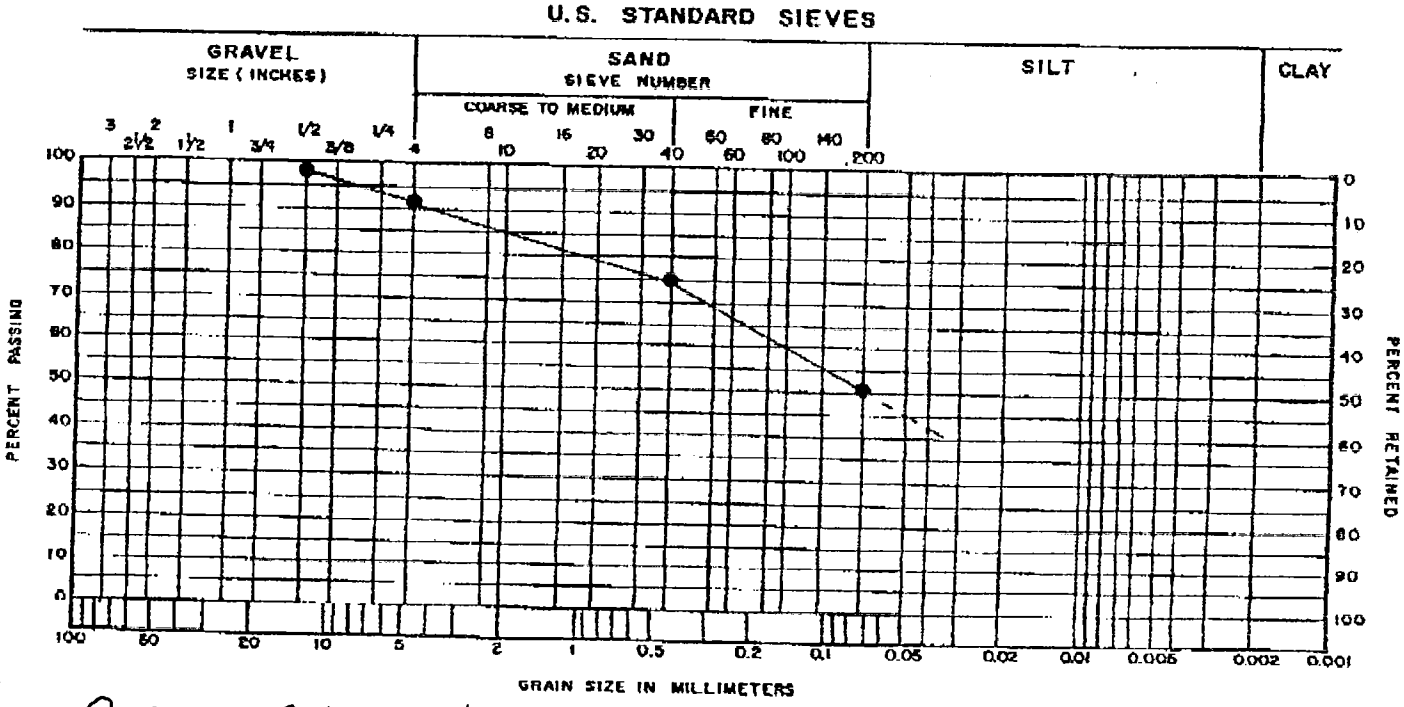
SIEVE NUMBER: One

DATE OF TESTING: September 12, 1994

MATERIAL: CL

SAMPLE LOCATION: Sample No. 1 Upper Stream Clay

SIEVE	WT. G	%	% PASS	% RET.
1/2"	8.10	.81	99.19	.81
	.00	.00	99.19	.81
No. 4	80.50	8.04	91.15	8.85
	.00	.00	91.15	8.85
No. 40	155.40	15.52	75.62	24.38
	.00	.00	75.62	24.38
No. 200	246.80	24.66	50.97	49.03
Elut.	510.20	50.97	.00	100.00
TOTAL	1001.00	100.00		



PERMEABILITY IS .05 INCHES PER HR.

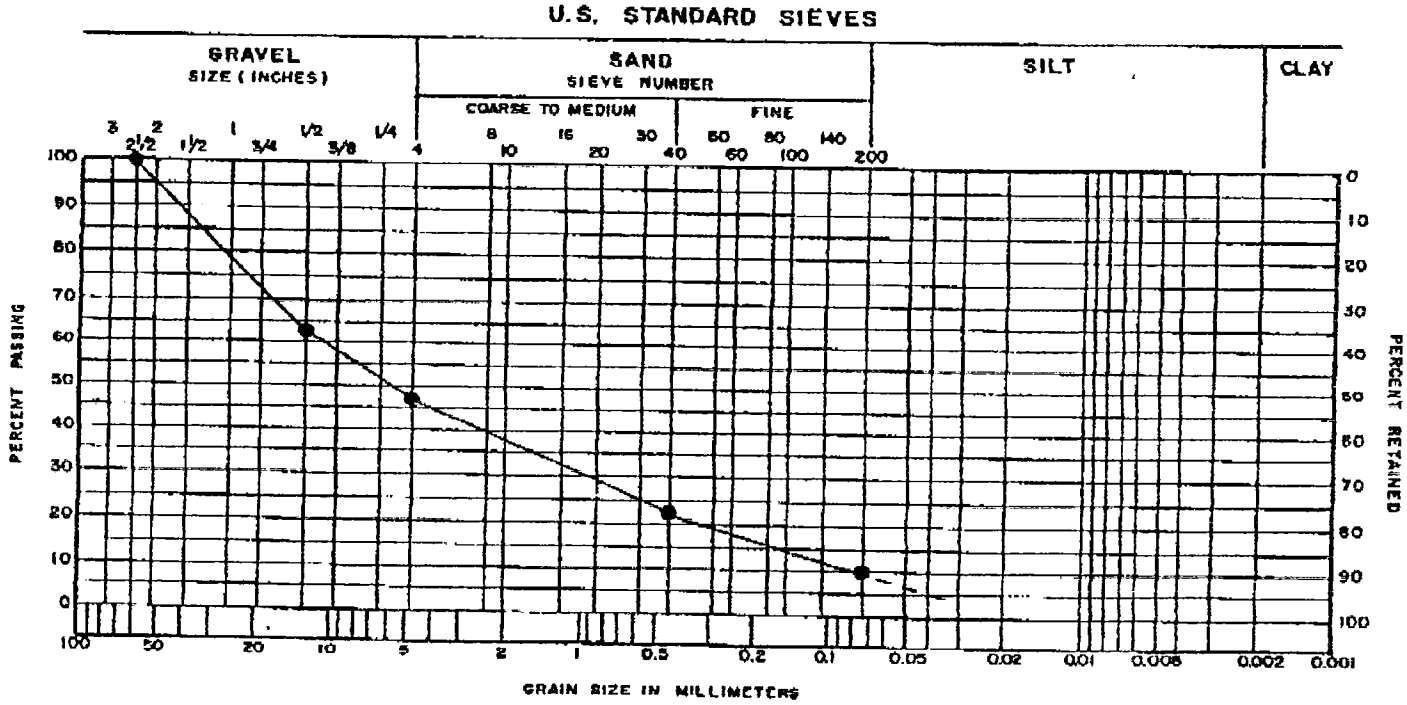
BOB TAYLOR ENGINEERING, INC.
Geotechnical Services • Materials Testing

317 Great Mills Lane
Lexington Park, MD 20653
(301) 862-4300 • (301) 932-5575
Fax (301) 862-5764
Robert F. Taylor, P.E., President

ASTM C-136
TESTS ON FINE AGGREGATE FOR SIEVE ANALYSIS

CLIENT: OHM Corporation
JOB NUMBER: 94-236
PROJECT: Indian Head 15831
SIEVE NUMBER: Two
DATE OF TESTING: September 12, 1994
MATERIAL: SM-SC
SAMPLE LOCATION: Sample No. 2 Lower Stream Soil (BRG)

SIEVE	WT. G	%	% PASS	% RET.
1/2"	454.30	35.81	64.19	35.81
	.00	.00	64.19	35.81
No. 4	226.90	17.88	46.31	53.69
	.00	.00	46.31	53.69
No. 40	292.90	23.08	23.23	76.77
	.00	.00	23.23	76.77
No. 200	160.30	12.63	10.59	89.41
Elut.	134.40	10.59	.00	100.00
TOTAL	1268.80	100.00		



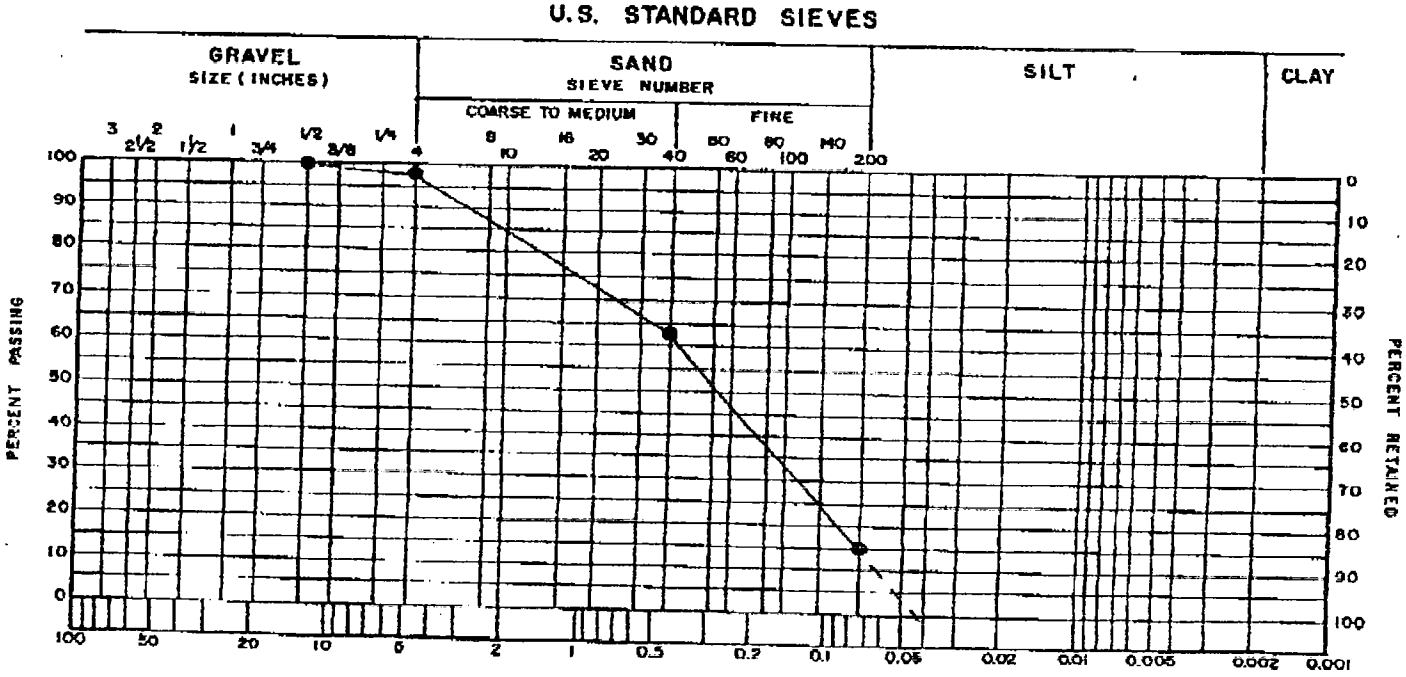
BOB TAYLOR ENGINEERING, INC.
Geotechnical Services • Materials Testing

317 Great Mills Lane
Lexington Park, MD 20653
(301) 862-4300 • (301) 932-5575
Fax (301) 862-5764
Robert F. Taylor, P.E., President

ASTM C-136
TESTS ON FINE AGGREGATE FOR SIEVE ANALYSIS

CLIENT: OHM Corporation
JOB NUMBER: 94-236
PROJECT: Indian Head 15831
SIEVE NUMBER: Three
DATE OF TESTING: September 12, 1994
MATERIAL: SM
SAMPLE LOCATION: Sample No. 3 Stream Soil Silt

SIEVE	WT. G	%	% PASS	% RET.
1/2"	.00	.00	100.00	.00
	.00	.00	100.00	.00
No. 4	.80	.11	99.89	.11
	.00	.00	99.89	.11
No. 40	270.90	36.64	63.25	36.75
	.00	.00	63.25	36.75
No. 200	355.10	48.03	15.22	84.78
Elut.	112.50	15.22	.00	100.00
TOTAL	739.30	100.00		



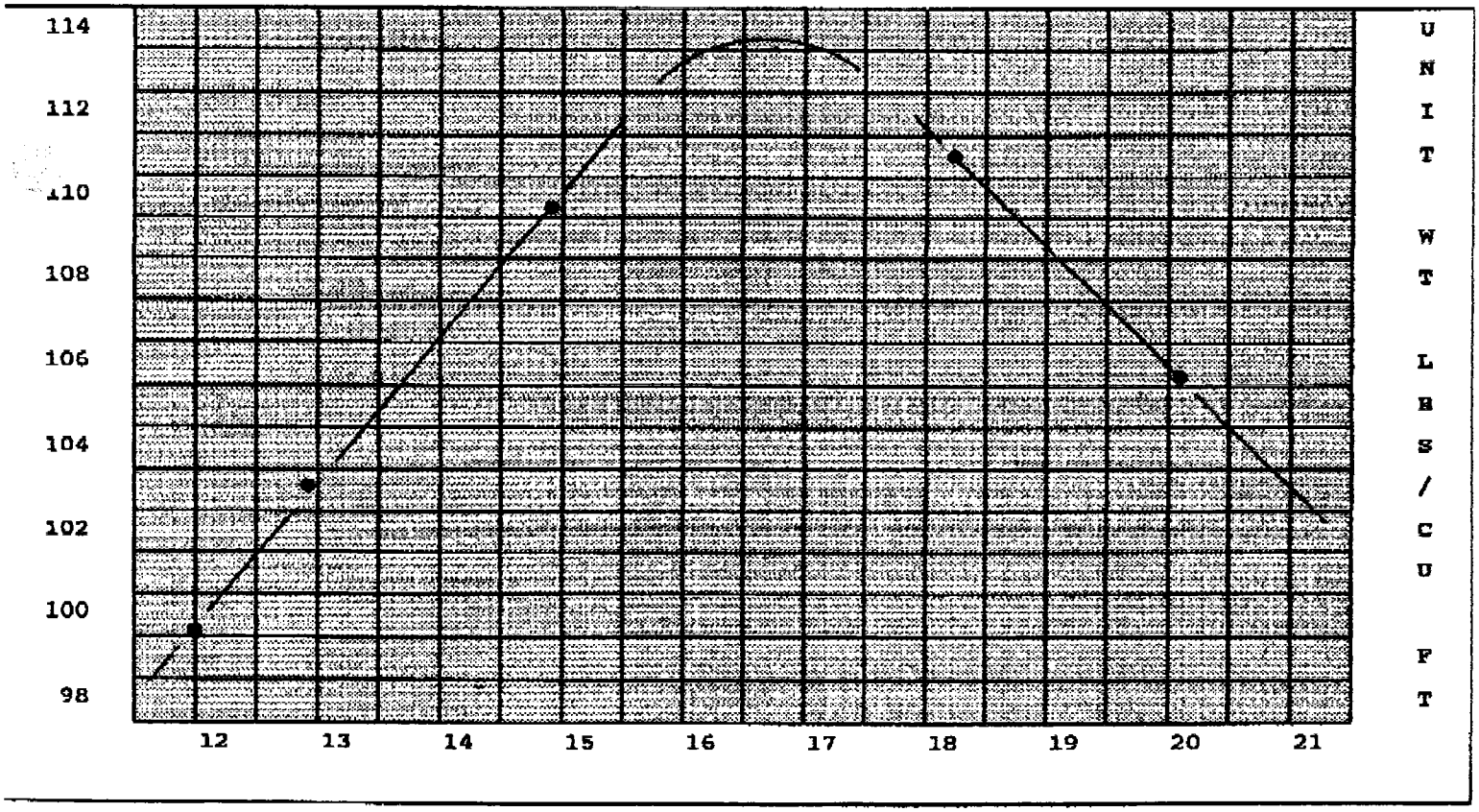
BOB TAYLOR ENGINEERING, INC.
317 Great Mills Lane
LEXINGTON PARK, MARYLAND 20653

COMPACTION TEST
Moisture/Density Relationship

PROJECT INDIAN HEAD 15831 LAB NO. 94-236

TYPE OF MATERIAL CLAY DATE 09-12-94

Cylinder No.	1	2	3	4	5
Volume - Cu. Ft.	1/30	1/30	1/30	1/30	1/30
Method of Compaction ASTM	D-698	D-698	D-698	D-698	D-698
Wt. Cylinder + Soil (lbs.)	13.24	13.40	13.72	13.90	13.75
Wt. Cylinder (lbs.)	9.54	9.54	9.54	9.54	9.54
Wt. Compacted Soil (lbs.)	3.70	3.86	4.18	4.36	4.21
Unit Wt. Wet (lbs./cu. ft.)	111.0	115.6	125.4	130.8	126.3
Water Content (%)	12.0	12.9	14.9	18.3	20.1
Unit Wt. Dry (lbs./cu. ft.)	99.1	102.6	109.3	110.6	105.2



Water Content (%)

Optimum Water Content 16.7%

Max. Unit Weight, Dry (lbs./cu. ft.) 113.2 lbs./cu. ft.

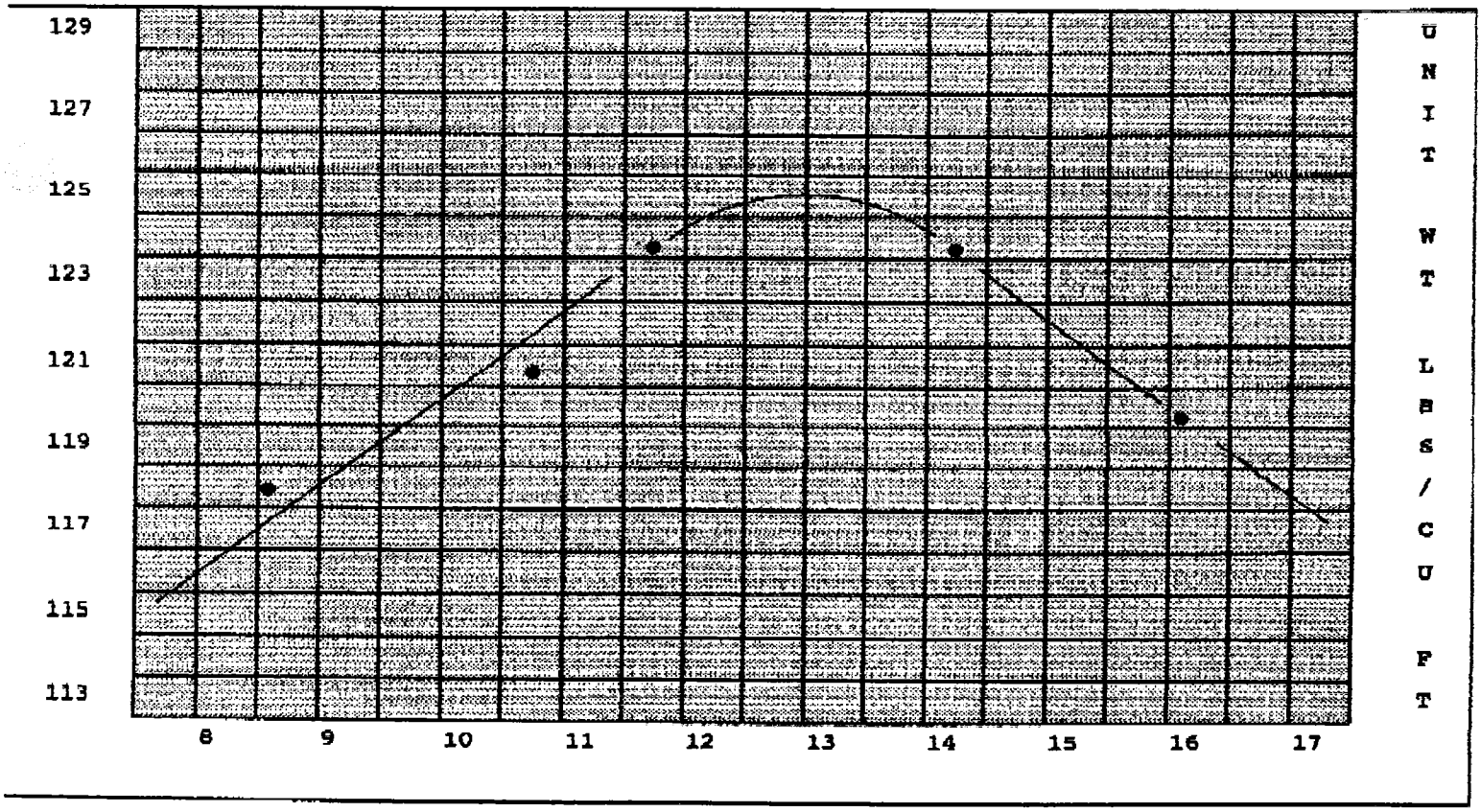
BOB TAYLOR ENGINEERING, INC.
317 Great Mills Lane
LEXINGTON PARK, MARYLAND 20653

COMPACTION TEST
Moisture/Density Relationship

PROJECT INDIAN HEAD 15831 LAB NO. 94-236

TYPE OF MATERIAL BANK RUN GRAVEL DATE 09-09-94

Cylinder No.	1	2	3	4	5
Volume - Cu. Ft.	1/30	1/30	1/30	1/30	1/30
Method of Compaction ASTM	D-698	D-698	D-698	D-698	D-698
Wt. Cylinder + Soil (lbs.)	22.29	22.72	23.05	23.28	23.10
Wt. Cylinder (lbs.)	12.72	12.72	12.72	12.72	12.72
Wt. Compacted Soil (lbs.)	9.56	10.00	10.33	10.56	10.38
Unit Wt. Wet (lbs./cu. ft.)	127.6	133.3	137.7	140.8	138.4
Water Content (%)	8.6	10.7	11.7	14.3	16.2
Unit Wt. Dry (lbs./cu. ft.)	117.5	120.4	123.3	123.2	119.1



Optimum Water Content 13.0%

Max. Unit Weight, Dry (lbs./cu. ft.) 124.3 lbs./cu. ft.

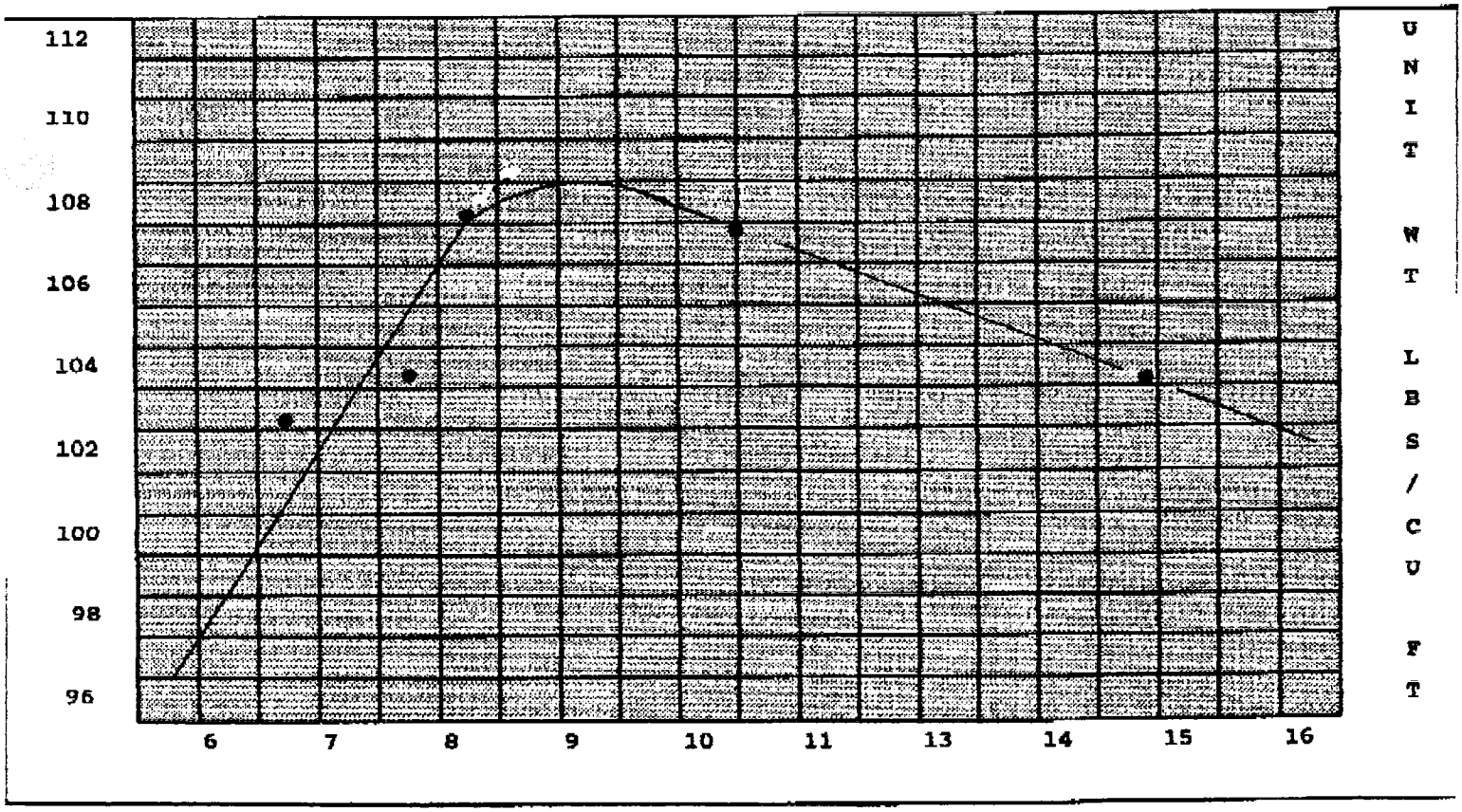
BOB TAYLOR ENGINEERING, INC.
317 Great Mills Lane
LEXINGTON PARK, MARYLAND 20653

COMPACTION TEST
Moisture/Density Relationship

PROJECT INDIAN HEAD 15831 LAB NO. 94-236

TYPE OF MATERIAL SILT DATE 09-12-94

Cylinder No.	1	2	3	4	5
Volume - Cu. Ft.	1/30	1/30	1/30	1/30	1/30
Method of Compaction ASTM	D-698	D-698	D-698	D-698	D-698
Wt. Cylinder + Soil (lbs.)	13.18	13.25	13.41	13.48	13.49
Wt. Cylinder (lbs.)	9.54	9.54	9.54	9.54	9.54
Wt. Compacted Soil (lbs.)	3.64	3.71	3.87	3.94	3.95
Unit Wt. Wet (lbs./cu. ft.)	109.2	111.3	116.1	118.2	118.5
Water Content (%)	6.7	7.7	8.4	10.5	14.9
Unit Wt. Dry (lbs./cu. ft.)	102.3	103.3	107.1	106.9	103.1



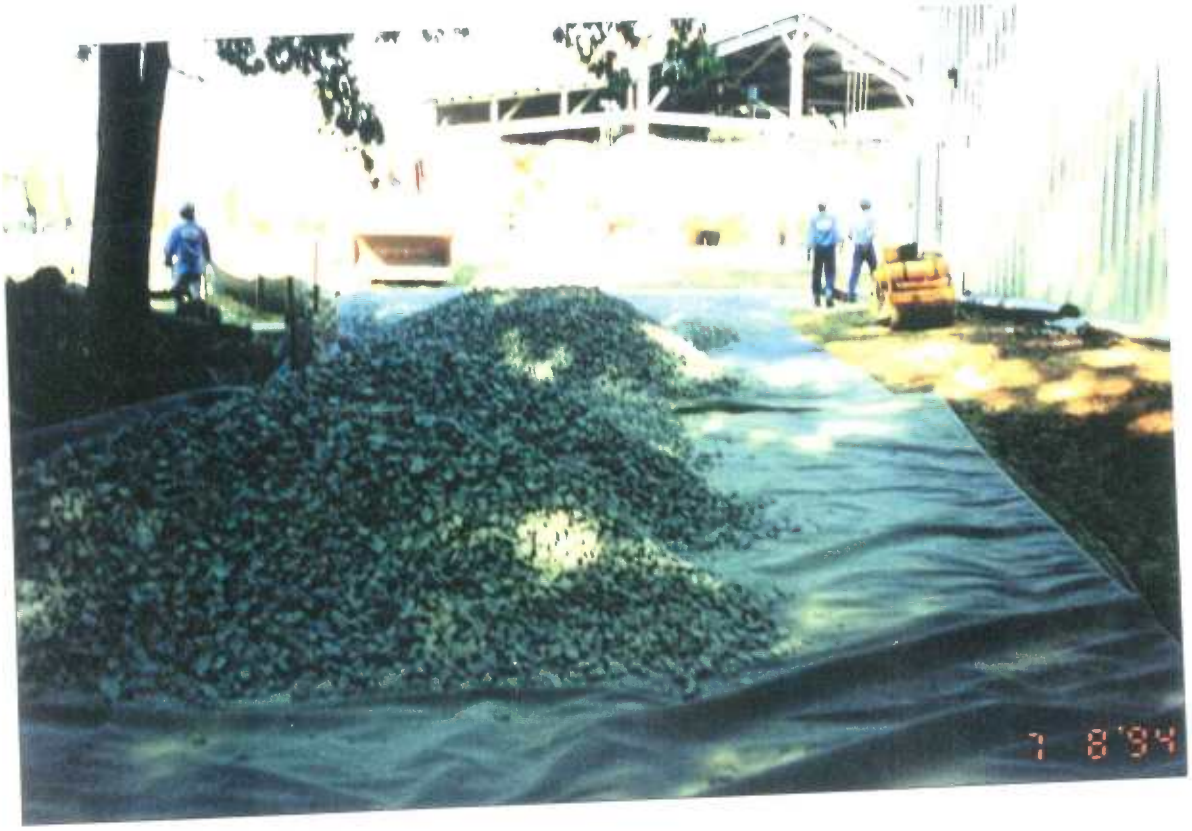
Water Content (%)

Optimum Water Content 9.3 %

Max. Unit Weight, Dry (lbs./cu. ft.) 107.8 lbs./cu. ft.

TOTAL P.04

APPENDIX B
SITE PHOTOGRAPHS



1: CONSTRUCTION OF SITE ACCESS ROAD, JULY 1994

2: CONSTRUCTION OF SITE ACCESS ROAD, JULY 1994

3: CLEARING OF TREES, JULY 1994

4: CLEARING OF TREES, JULY 1994

5: CLEARING OF TREES, JULY 1994

6: CLEARING OF TREES, JULY 1994

7: CONFINED SPACE ENTRY TO CLEAN PIPE, JULY 1994

8: CONFINED SPACE ENTRY TO CLEAN PIPE, JULY 1994

9: INSTALLING SWAMP MAT ACCESS, JULY 1994

10: COMPLETED SWAMP MAT ACCESS INSTALLATION, JULY 1994

11: CONSTRUCTION SITE AFTER A HEAVY RAIN, JULY 1994

12: CONSTRUCTION SITE AFTER A HEAVY RAIN, JULY 1994

13: SITE CONDITIONS AFTER A HEAVY RAIN, JULY 1994

14: LOADING OUT MERCURY CONTAMINATED SOIL, JULY 1994

15: LOADING OUT MERCURY CONTAMINATED SOIL, AUGUST 1994

16: CONSTRUCTION OF MERCURY CONTAMINATED SOIL STOCKPILE PRIOR TO SCREENING AND PLACEMENT INTO MAGAZINE 606 BERM, AUGUST 1994

17: LOADING OUT MERCURY CONTAMINATED SOIL, AUGUST 1994

18: MERCURY CONTAMINATED SOIL REMOVAL ABOUT 1/2 WAY COMPLETE, AUGUST 1994

19: PROTECTING DAMAGED TREES, SEPTEMBER 1994

20: DISCOVERY OF A BURIED DRUM, SEPTEMBER 1994

21: UNCOVERED BURIED DRUM, SEPTEMBER 1994

22: LOAD OUT OF UNCOVERED DRUM, SEPTEMBER 1994

25: MAGAZINE 606 AFTER RESTORATION PRIOR TO GRASS COMING UP, FEBRUARY 1995

26: STREAM RESTORATION, FEBRUARY 1995

27: STREAM RESTORATION, FEBRUARY 1995

28: STREAM RESTORATION, FEBRUARY 1995