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INTERIM RCRA FACILITY INVESTIGATION

FINAL REPORT

NAVAL AIR STATION, OCEANA
VIRGINIA BEACH, VIRGINIA

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PREFACE

This report describes an Interim Resource Conservation and Recovery Act Facility Investigation (Interim RFI) of the Naval Air Station, Oceana in Virginia Beach, Virginia, conducted by CH2M HILL from June to October 1990. The purpose of the Interim RFI is to continue the investigation of six sites at Oceana, which began under the Navy's Installation Restoration Program, and to initiate work at four additional sites in order to guide the scope of work of the RFI. Field activities at each of the ten sites were geared toward obtaining sufficient information to determine whether a given site should remain within the scope of the RFI. The ten sites investigated in this Interim RFI are:

- Site 1--West Woods Oil Disposal Pit
- Site 2A--Line Shack 31-33 Disposal Area
- Site 2B--Line Shack 130-131 Disposal Area
- Site 2C--Line Shack 400 Disposal Area
- Site 2D--Line Shack 125 Disposal Area
- Site 2E--Line Shack 109 Disposal Area
- Site 6--Naval Exchange Maintenance Building Oil Disposal Area
- Site 7--Fifth Green Landfill
- Site 8--North Station Landfill
- Site 11--Firefighting Training Area

Field activities performed during this investigation included: monitoring-well installation; groundwater, soil, and sediment sampling; and insitu hydraulic conductivity measurement. The data obtained during this investigation are presented along with the results of previous investigations to support recommendations specific to each site. The following is a brief summary of those recommendations.

- A release of contaminants to the environment was not detected; no further sampling required; removal from the RFI: Site 2A, Site 6.

- A release of contaminants to the environment was not detected; annual sampling from existing facilities should continue for 2 years; sampling after 2 years contingent upon results; removal from the RFI: Site 7, Site 8.

- A release of contaminants to the soil was detected; no release of contaminants to the groundwater detected; additional soil sampling required to guide remediation; additional groundwater sampling to confirm results; retain in the RFI: Site 2E, Site 11.

- A release of contaminants to the environment detected; confirmation sampling from the existing three monitoring wells to confirm results; retain in the RFI: Site 2D.

- A release of contaminants to the environment detected; additional sampling required to identify and characterize the contaminant source, and determine the lateral and vertical extent of contamination; retain in the RFI: Site 1, Site 2B, Site 2C.

The last group of sites (Sites 1, 2B, and 2C) require additional field investigation. The installation of both shallow (20 feet) and deep (60 feet) monitoring wells is recommended at all three of these sites: 3 shallow and 3 deep wells at Site 1; 5 shallow and 1 deep at Site 2B; and 3 shallow and 2 deep at Site 2C. In addition, a program of insitu groundwater sampling coupled with a mobile laboratory is recommended at Sites 2B and 2C to both guide the contaminant source investigation, and to help determine the extent of contamination and the placement of monitoring wells. Soil sampling will also be conducted as part of the contaminant source investigation at Site 2B and Site 2C.

At Site 1 a comprehensive soil investigation is recommended to determine the extent of contaminated soil which, in turn, is a source of contaminated groundwater. The soil investigation should involve sample collection at depths of 10 feet over prescribed lateral intervals in a grid-like pattern centered on the approximate location of the former waste-oil pit.

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Chapter 1
INTRODUCTION

This report describes an Interim Resource Conservation and Recovery Act (RCRA) Facility Investigation of the Naval Air Station (NAS), Oceana in Virginia Beach, Virginia, conducted by CH2M HILL from June to October 1990. The work is a continuation of previous investigations performed under the Navy's Installation Restoration Program (IRP) at NAS Oceana and its companion facility the Naval Auxiliary Landing Field (NALF), Fentress.

This study initiates the conversion from IRP procedures to a RCRA format for conducting environmental investigations of selected sites at these two facilities. The IRP was designed to identify and correct problems of environmental contamination caused by past operating procedures at Naval facilities. The first stage of the program at NAS Oceana was the completion of an Initial Assessment Study (IAS) in 1984 (RGH, 1984). The IAS recommended field investigations at eight sites at NAS Oceana and one site at Fentress to confirm whether hazardous constituents were released to the environment. In response to the IAS, the Round 1 Verification Step study was performed in 1986 (CH2M HILL,1986). A third IRP investigation at NAS Oceana, the Line Shack Site Inspection, followed in 1988 (CH2M HILL, 1989). That work focused on the areas around line shacks 130 and 400, sites 2B and 2C respectively.

RCRA involvement at Oceana began in June, 1988, when U.S. Environmental Protection Agency (EPA) contractors conducted a RCRA Facility Assessment (RFA) of the base. The RFA identified all sites previously studied under the IRP as solid waste management units (SWMUs). Several additional SWMUs were also identified at that time. Under the RCRA program a RCRA Facility Investigation (RFI) will be required to study 17 SWMUs included in the final negotiated Consent Order from the EPA to the Navy.

The purpose of the Interim RFI is to continue the investigations of six sites at Oceana, which began under the IRP, and to initiate work at four additional sites in order to guide the scope of work of the RFI. Field activities at each of the ten sites were geared toward obtaining sufficient information to determine whether a given site should remain within the scope of the RFI. If a particular site is identified as being, or having been, the source of environmental contamination, then specific recommendations are made for additional work to be conducted in the RFI. For four of the sites (2A, 6, 7, and 8), the recommendations do not include further investigation in the RFI. The recommendations for no further RFI action at these sites are based on data collected during this and previous investigations, and these data indicate that contaminant releases to the environment have not occurred at these sites.

The ten sites investigated in this Interim RFI are:

- Site 1--West Woods Oil Disposal Pit
- Site 2A--Line Shack 31-33 Disposal Area
- Site 2B--Line Shack 130-131 Disposal Area
- Site 2C--Line Shack 400 Disposal Area
- Site 2D--Line Shack 125 Disposal Area
- Site 2E--Line Shack 109 Disposal Area
- Site 6--Naval Exchange Maintenance Building Oil Disposal Area
- Site 7--Fifth Green Landfill
- Site 8--North Station Landfill
- Site 11--Firefighting Training Area

Following this introductory section, the organization of this report proceeds accordingly: Chapter 2 describes the general environmental setting of NAS Oceana; Chapter 3 presents an overview of the field activities performed during this investigation; and Chapter 4 contains a complete description of the investigation results and recommendations for each site individually. Appendices to this document contain soil boring logs, in-situ hydraulic conductivity results, and analytical data.

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Chapter 2
ENVIRONMENTAL SETTING

LOCATION AND TOPOGRAPHY

The NAS Oceana is a 5,000-acre master jet base located in Virginia Beach, Virginia (FIGURE 2-1). It is bounded on the north, east, and west by residential and light industrial areas and on the south by farm land. Highway 44, and State Routes 632 and 615 roughly border the base on the north, west and east sides, respectively. The mission of NAS Oceana is to monitor and operate facilities and provide services to support Naval aviation and other activities. NAS Oceana is home to several training squadrons and to a number of attack and fighter squadrons assigned to aircraft carriers in the Atlantic Fleet. The base has been operated continuously since the early 1940's.

The elevation of NAS Oceana ranges from approximately 5 feet above mean sea level (MSL) in the drainage ditches to approximately 25 feet in the open fields, with elevations in the main area of the base ranging from 10 to 25 feet. In general, there is an easterly slope to the land surface in the Virginia Beach area, with local relief caused by natural and artificial drainages. Surface runoff from the base is aided by a system of drainage ditches and surface canals, especially west and south of the base.

REGIONAL GEOLOGY

NAS Oceana is on the outer edge of the Atlantic Coastal Plain physiographic province. The Atlantic Coastal Plain is a broad wedge of unconsolidated sediments that dip and thicken to the east. In the vicinity of NAS Oceana these sediments consist of several thousand feet of unconsolidated sand, clay, silt, and gravels and are underlain by granite basement rock. The sediments range in age from late Cretaceous to Recent.

From oldest to youngest, the five principal geologic units are the Potomac Formation, the Unnamed Upper Cretaceous deposits, the Pamunkey Group, the Chesapeake Group, and the Columbia Group (Meng and Harsh, 1984). The Chesapeake Group has been differentiated further into five formations, which are, from oldest to youngest, the Calvert, Choptank, St. Marys, Eastover, and Yorktown Formations. The Columbia Group sediments overlying the Yorktown Formation have also been differentiated into several units (Oaks and Coch, 1973).

The geologic units of concern in the environmental investigations at NAS Oceana are the Yorktown Formation and the Columbia Group. The upper Yorktown Formation consists of interbedded layers of shelly, very fine to coarse sands, clayey sands and sandy clay of Tertiary age. Shell layers are common in the Yorktown (Meng and Harsh, 1984). Sidulya et al (1981) divided the Yorktown into three sand units each overlain by a confining layer of silt and clay.

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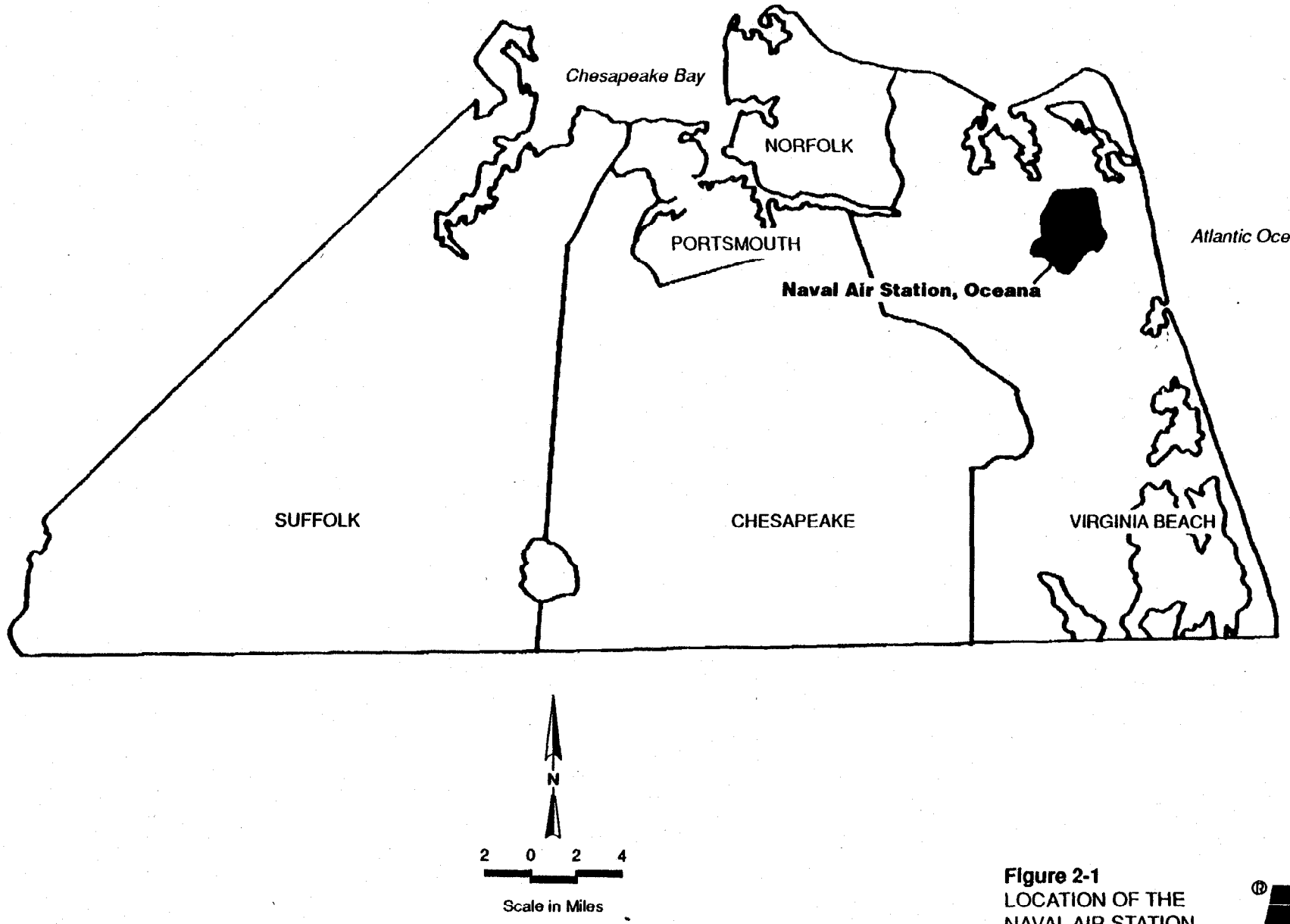

Figure 2-1
LOCATION OF THE
NAVAL AIR STATION,
Oceana

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Regionally, the uppermost of these silt and clay beds separates the Yorktown Formation from the sediments of the Columbia Group that overlie it. This uppermost bed consists of massive well-bedded yellow gray to greenish gray clays and silty clays, commonly containing shells, fine sand, and mica. The clay layers within the confining bed are generally extensive but are a series of coalescing clay beds rather than a single deposited unit. This unit was deposited in a shallow open-marine environment of broad lagoons and quiet bays (Meng and Harsh, 1984).

The sediments of the Columbia Group consist of interbedded gravels, sands, silts, and clays of Pleistocene and Holocene age. The Pleistocene and Holocene sediments were deposited in fluvial-marine terrace and near-shore marine environments such as lagoons, beaches, tidal flats and barrier islands (Oaks and Coch, 1973; Hamilton and Larson, 1988).

The geology of the near surface sediments at NAS Oceana is quite variable laterally, even within individual study sites. However, in general the sediments, in order of increasing depth, consist of (1) approximately 5 feet of fine material, primarily sandy silts, (2) a 5- to 15-feet thick layer of sand, (3) a second layer of fine material primarily silty sands, and (4) the shelly sands and silty sands of the Yorktown formation. The clay layer reported to overlie the upper Yorktown sands regionally was not encountered at NAS Oceana. The specific geology of individual sites is described in Chapter 4 of this report.

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Chapter 3
DESCRIPTION OF FIELD ACTIVITIES

Field activities during this investigation included the drilling and installation of 23 monitoring wells, sampling of soil, surface water and groundwater, and in-situ measurements of hydraulic conductivity. The field activities at each of the ten sites studied in this investigation are summarized in Table 3-1. The general locations of each site on the base are shown in Figure 3-1. The location and designation of the various sampling points are shown in figures of the individual sites, which are presented in Chapter 4.

DRILLING AND WELL INSTALLATION

The drilling and installation of 23 monitoring wells at NAS Oceana took place from June 26 to August 2, 1990. The drilling was performed by ATEC Associates of Norfolk, Virginia, under the supervision of CH2M HILL. Twenty-one of the 23 wells were shallow wells drilled to depths that ranged from 14 to 22.5 feet using hollow-stem augers. These wells were designed to sample groundwater from the upper-most part of the local unconfined aquifer (Columbia Group sediments). Two deep wells, 07-MW3D and 07-MW4D at the Fifth Green Landfill, were drilled using a combination of hollow-stem augers and mud rotary drilling to final depths of 50 and 55 feet, respectively. These wells were designed to sample groundwater from the Yorktown Formation which locally underlies the surficial deposits. Soil samples were collected from all boreholes every five feet of depth using 24-inch long split-spoon samplers. Drilling was performed using a Mobile B-57 rig and a Mobile B-53 all terrain rig. The lithologies and geotechnical characteristics of the sediments encountered during drilling were recorded by CH2M HILL personnel. Complete soil-boring logs of each borehole are included in Appendix A.

SHALLOW MONITORING WELLS

The boreholes for all shallow monitoring wells were drilled using hollow-stem augers. In order to collect soil samples every five feet of depth, and avoid the runup of fluid sands within the augers, each borehole was first drilled and sampled using 4.25-inch inside diameter (ID) augers. The entire length of the borehole was then reamed using 6.25-inch ID augers with a wooden plug fitted in the bottom. The well installation depth was determined by CH2M HILL hydrogeologists in the field based on the depth to the water table encountered during drilling. The borehole was reamed to slightly over 10 feet below the water table at which point a 10-foot section of screen was installed. The top of the screen was generally a few inches to two feet below the water

Table 3-1
SUMMARY OF INTERIM RFI FIELD ACTIVITIES

	West Woods (Site 1)	Line Shack 31-33 (Site 2a)	Line Shack 130-131 (Site 2b)	Line Shack 400 (Site 2c)	Line Shack 125 (Site 2d)	Line Shack 109 (Site 2e)
Groundwater Monitoring Wells:						
Shallow (20')	2	-	5	5	3	3
Deep (60')	-	-	-	-	-	-
In-Situ Hydraulic Conductivity Test	-	-	6	6	-	-
Sample Collection:						
Groundwater Samples[a]	5	3	11	9	3	3
Surface-water Samples	3	-	2	-	-	-
Soil Samples	3	-	-	-	-	4
Field QA/QC Samples:						
Trip Blanks	1	1	-	-	1	-
Equipment Blanks	-	-	1	-	1	-
Field Blanks	-	-	-	-	-	-
Groundwater Field Duplicates	1	1	1	1	-	-
Analytical Parameters:[b]	VOC, TPH, EDB, PCB, TCDD,	VOC, TPH, EDB	VOC, TPH, EDB	VOC, TPH, EDB	VOC, TPH, EDB	VOC, TPH, EDB

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Table 3-1
SUMMARY OF INTERIM RFI FIELD ACTIVITES

	Navy Exchange (Site 6)	Fifth Green Landfill (Site 7)	North Station Landfill (Site 8)	Fire Fighting Training Area (Site 11)
Groundwater Monitoring Wells:				
Shallow (20')	-	2	-	1
Deep (60')	-	2	-	-
In-Situ Hydraulic Conductivity Test	-	-	-	-
Sample Collection:				
Groundwater Samples[a]	-	7	3	1
Surface-water Samples	-	2	-	-
Soil Samples	3	-	-	4
Field QA/QC Samples:				
Trip Blanks	-	1	-	1
Equipment Blanks	-	1	-	-
Field Blanks	-	1	-	-
Groundwater Field Duplicates	-	1	-	-
Soil Field Duplicates	-	-	-	1
Analytical Parameters:[b]	VOC, TPH, Pb	TCL, EDB, TOX, TOC, Cr^{+6}, Ions	TCL, EDB, TOX, TOC, Cr^{+6}, Ions	VOC, TPH, B/N, Pb, Ignit

[a]Groundwater samples to be collected at new and existing wells at each site.
[b]Parameters Abbreviations:

TCL	Target Compound List	Ions	Chloride, Sulfates and Alkalinity
VOC	Volatile Organic Compounds from TCL	Cr^{+6}	Hexavalent Chromium
TPH	Total Petroleum Hydrocarbons	B/N	Base-Neutral Extractable Compounds from TCL
Pb	Lead	PCB	Polychlorinated Biphenyls
EDB	Ethylene Dibromide	TCDD	2,3,7,8-Dioxin
TOX	Total Organic Halogens	Ignit	Ignitability
TOC	Total Organic Carbon		

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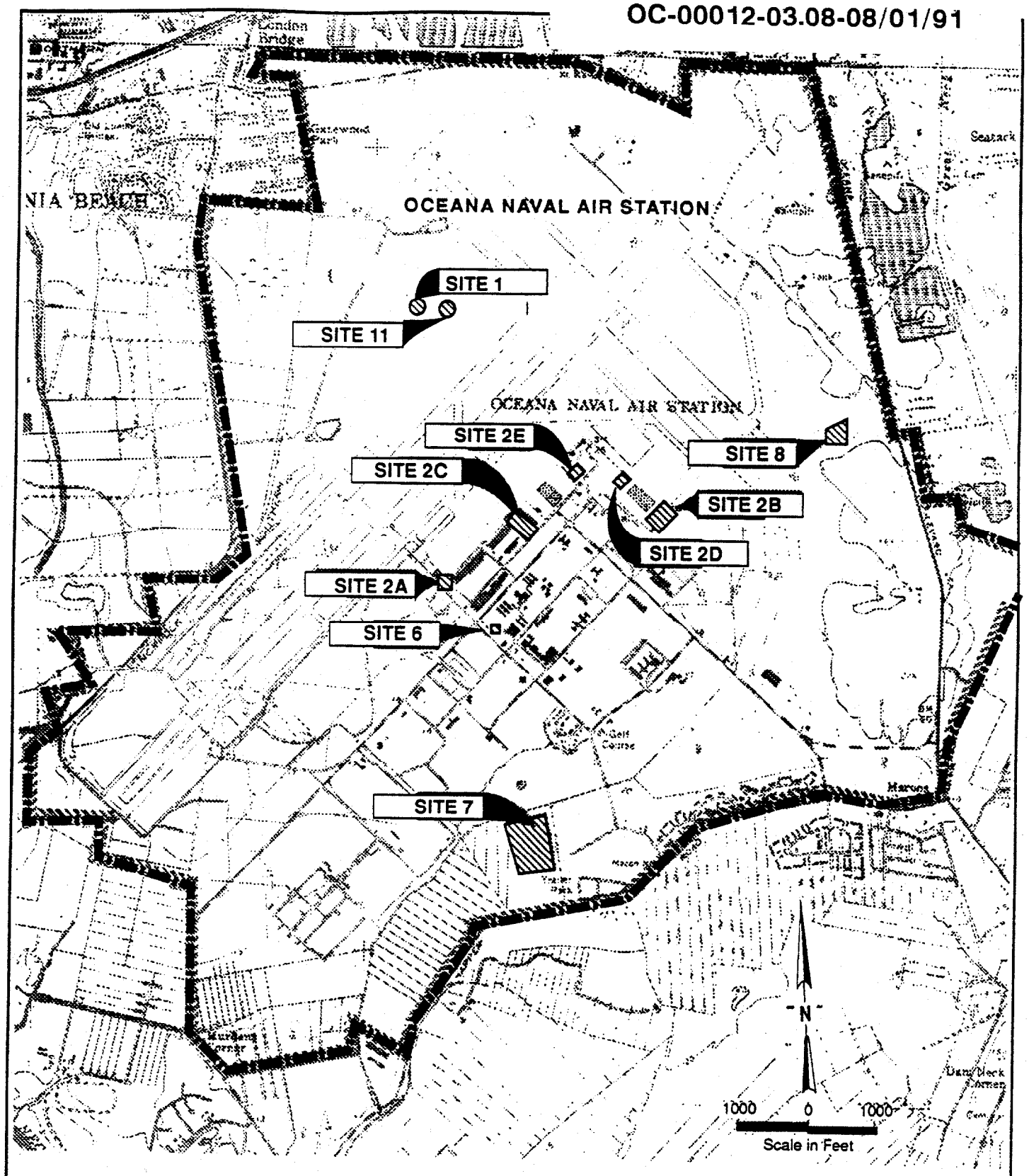

LEGEND

Base Boundary

Site Boundary

Figure 3-1
SITE LOCATIONS
Naval Air Station, Oceana

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table after well completion. The only exceptions to this were 2B-MW7, where a 5-foot section of screen was set from 4 to 9 feet below the water table, and 01-MW4 and 01-MW5, where the well screens intersect the water table. The screens were generally installed over intervals of sands and silty sands. The casing and screen were 2-inch ID Schedule 40 PVC, with a screen slot size of 0.010 inches.

After placement of the screen and casing to the specified depth, a sand pack of coarse No. 2 sand was placed in the annulus between the PVC casing and screen and the borehole wall. The sand pack was added to a depth approximately 1 to 3 feet above the top of the screen. A 1- to 2-foot thick layer of bentonite pellets was then added to the annular space above the sand pack to form a plug capable of supporting the cement grout seal. The borehole was filled with grout from the top of the bentonite to the ground surface. Powdered bentonite was added to the grout to control shrinkage. A protective steel casing with a locking cap and a concrete pad with 3 or 4 guard posts was installed at 15 of the 23 wells to prevent tampering with and damage to the wells. The remaining 8 wells were located in areas of high traffic, and were completed with flush-mounted steel covers and locking caps.

DEEP MONITORING WELLS

A system of temporary double-casing was used for drilling the two deep wells to inhibit the influence of the shallow zone on these wells. This procedure began by drilling with 4.25-inch hollow-stem augers down to the top of the Yorktown Formation. Upon the completion of drilling and sampling to the top of the Yorktown Formation, the hole was redrilled to the same depth with 6.25-inch hollow-stem augers. The depth to the Yorktown Formation was 30 feet in 07-MW3D and 35 feet in 07-MW4D.

Drilling was then continued by mud rotary methods using a 5 7/8-inch bit inside the augers to a depth of 15 to 20 feet into the Yorktown Formation. Prior to initiating this step the inside of the augers were flushed out to prevent sediments from the upper interval being carried downward during the mud rotary drilling. The augers served as a temporary casing to prevent sediments and fluid from the shallow zone from circulating with the drilling mud and potentially contaminating the lower interval. Split-spoon sampling at 5-foot intervals was continued down to the final depth during mud rotary drilling.

The screen length in both deep wells was 10 feet. The well installation procedure in 07-MW3D was similar to that used in the shallow wells. Problems with borehole cave-in and sand bridging were encountered during the installation of 07-MW4D. As a result, the 6.25-inch augers were advanced to the final depth of 55 feet and well installation followed the procedure used in the shallow wells. Each deep well was completed with an above grade protective casing, a concrete pad, and 4 guard posts. All shallow and deep wells were developed after installation to remove fine-grained material from around the sand pack.

Construction diagrams of the shallow and deep wells are shown in Figure 3-2. The well installation specifics for the 23 wells installed during this investigation are summarized in Table 3-2.

DECONTAMINATION PROCEDURES

The drill rig and all equipment used during drilling were decontaminated before drilling began and after it was completed, as well as between boreholes to avoid cross-contamination. The decontamination procedure consisted of rinsing with a high pressure washer until all soil was visibly removed. The equipment was then washed with a detergent solution and rinsed a second time with a high pressure washer.

ENVIRONMENTAL SAMPLING

Groundwater, surface water, and soils at NAS Oceana were sampled from August 6 to 16, 1990. Additional samples were collected on October 18, and November 5 through 9, 1990. The sampling was performed by CH2M HILL personnel using the sampling procedures described in the work plan. The number of samples and the associated analytical parameters used in the interim RFI are listed by site in Table 3-1. At some sites the analytical parameters included Target Compound List (TCL) and Target Analyte List (TAL) chemicals. A complete list of TCL and TAL compounds is given in Table 3-3.

GROUNDWATER SAMPLING

A total of forty-five monitoring wells were sampled at nine of the ten investigated sites. This represents all of the IRP/RCRA investigation wells installed to date at NAS Oceana. Before sampling at each site, the water levels in all monitoring wells at that site were measured to the nearest 0.01 feet.

Prior to sampling, all shallow wells except 01-MW4 were purged with a QED submersible bladder pump until the values of in-line measurements of pH, temperature, and conductivity were relatively stable for at least three well volumes. This was done to ensure that the samples collected were representative of the groundwater in the aquifer near the well. Because of the high levels of contamination observed during the sampling of 01-MW4, this well was purged with a Teflon bailer. After purging was complete, the samples were collected in sample bottles provided by CH2M HILL's laboratory in Montgomery, Alabama. Each bottle came with the required preservative, as appropriate for the type of sample. All metals (TAL) and hexavalent chromium samples were filtered with a 0.45 micron filter.

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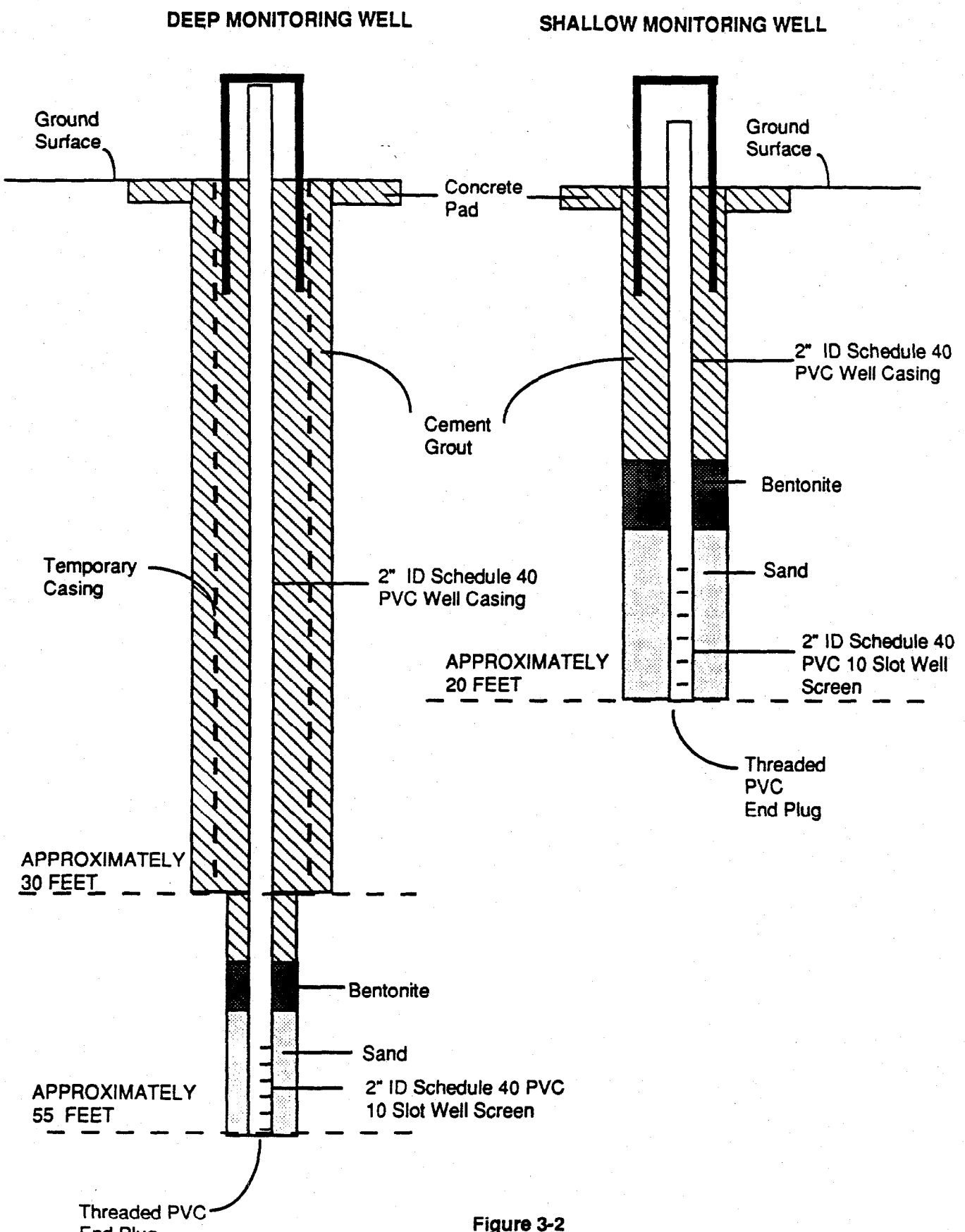

Figure 3-2
SCHEMATIC DIAGRAM OF SHALLOW AND DEEP MONITORING WELL CONSTRUCTION
NAS OCEANA

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Table 3-2
INSTALLATION RECORD OF MONITORING WELLS INSTALLED DURING INTERIM RFI

Well	Ground Elevation (ft. above MSL)	Grout Interval	Bentonite Interval	Sand Interval	Screened Interval	Total Borehole Depth
O1-MW4	16.9	0-5'	5'-6'6"	6'6"-18'6"	8'-18'	18'6"
O1-MW5	16.7	0-3'10"	3'10"-5'8"	5'8"-17'10"	7'10"-17'10"	18'6"
2B-MW7	18.7	0-3'6"	3'6"-5'	5'-9'	9'-19'	14'
2B-MW8	18.0	0-5'	5'-7'	7'-10'	10'-20'	22'6"
2B-MW9	20.5	0-4'4"	4'4"-6'4"	6'4"-20'4"	10'-20'	20'
2B-MW10	22.1	1-3'11"	3'11"-5'11"	5'11"-18'	8'-18'	18'
2B-MW11	22.1	1-3'8"	3'8"-6'	6'-18'	8'2"-18'2"	18'2"
2C-MW5	20.4	1'2"-2'6"	2'6"-3'10"	3'10"-16'	6'-16'	16'
2C-MW6	20.7	0-5'	5'-7'	7'-21'	11'-21'	22'
2C-MW7	20.8	1'-4'6"	4'6"-6'6"	6'6"-19'6"	9'-19'	19'6"
2C-MW8	19.0	1'4"-4'	4'-5'8"	5'8"-18'	7'3"-17'3"	18'
2C-MW9	17.0	0-3'6"	3'6"-4'6"	4'6"-18'	7'6"-17'6"	18'
2D-MW1	18.9	0-3'	3'-4'	4'-17'	7'-17'	17'
2D-MW2	22.3	1'-5'	5'-7'	7'-19'	9'-19'	19'
2D-MW3	22.1	1'-5'6"	5'6"-7'6"	7'6"-19'	9'-19'	19'
2E-MW1	20.3	2'-3'6"	3'6"-4'6"	4'6"-19'	9'-19'	19'
2E-MW2	19.4	1'-3'6"	3'6"-5'7"	5'7"-18'6"	8'-18'	18'6"
2E-MW3	18.9	0-3'6"	3'6"-5'	5'-18'	8'-18'	18'
07-MW3D	17.6	0-20'	34'-36'	36'-50'	38'-48'	50'
07-MW4S	16.1	0-4'6"	4'6"-6'2"	6'2"-18'6"	8'1"-18'1"	18'6"
07-MW4D	16.2	0-40'	40'-45'	42'-55'	45'-55'	55'
07-MW5	17.8	0-4'	4'-5'7"	5'7"-18'	7'6"-17'6"	18'
11-MW1	17.1	0-4'	4'-5'11"	5'11"-18'6"	8'2"-18'2"	18'6"

Table 3-3
TARGET COMPOUND LIST AND T[illegible]

TARGET COMPOUNDS LIST	
Volatile Organic Compounds	Base-Neutral Extractable Organic Compounds
Acetone	Acenaphthene
Benzene	Acenaphthylene
Bromodichloromethane	Anthracene
Bromoform	Benzo(a)anthracene
Bromomethane	Benzo(a)pyrene
Carbon disulfide	Benzo(b)fluoranthene
Carbon tetrachloride	Benzo(k)fluoranthene
Chlorobenzene	Benzo(g,h,i)perylene
Chloroethane	Benzyl alcohol
Chloroform	bis(2-Chloroethl) ether
Chloromethane	bis(2-Chloroethoxy) methane
Dibromochloromethane	bis(2-Chloroisopropyl) ether
1,1-Dichloroethane	bis(2-Ethylhexyl)phthalate
1,2-Dichloroethane	4-Bromophenyl phenyl ether
1,1-Dichloroethene	Butyl benzyl phthalate
1,2-Dichloroethene (total)	4-Chloroaniline
trans-1,2-Dichloroethene	2-Chloronaphthalene
1,2-Dichloropropane	4-Chlorophenyl phenyl ether
cis-1,3-Dichloropropene	Chrysene
trans-1,3-Dichloropropene	Dibenzo(a,h)anthracene
Ethylbenzene	Dibenzofuran
2-Hexanone	Dibutyl phthalate
Methyl ethyl ketone (2-Butanone)	1,2-Dichlorobenzene
4-Methyl-2-pentanone	1,3-Dichlorobenzene
Methylene chloride	1,4-Dichlorobenzene
Styrene	3,3'-Dichlorobenzidine
1,1,2,2-Tetrachloroethane	Diethyl phthalate
Tetrachloroethene	Dimethyl phthalate
1,1,1-Trichloroethane	2,4-Dinitrotoluene
1,1,2-Trichloroethane	2,6-Dinitrotoluene
Trichloroethene	Di-n-octyl phthalate
Toluene	Fluoranthene
Vinyl acetate	Fluorene
Vinyl chloride	Hexachlorobenzene
Xylene (total)	Hexachlorobutadiene
	Hexachlorocyclopentadiene
Acid Extractable Organic Compounds	Hexachloroethane
	Indeno(1,2,3-cd)pyrene
Benzoic Acid	Isophorone
4-Chloro-3 methyl phenol	2-Methylnaphthalene
2-Chlorophenol	Naphthalene
2,4-Dichlorophenol	2-Nitroaniline
2,4-Dimethylphenol	3-Nitroaniline
2-Methyl-4,6-dinitrophenol	4-NitroanilineNitrobenzene
2,4-Dinitrophenol	N-Nitrosodi-n-propylamine
2-Methyl phenol	N-NitrosodiphenylaminePhenanthrene
4-Methyl phenol	Pyrene
2-Nitrophenol	1,2,4-Trichlorobenzene
4-Nitrophenol	2,4,6-Trichlorophenol
Pentachlorophenol	
Phenol	
2,4,5-Trichlorophenol	

Table 3-3
TARGET COMPOUND LIST AND TARGET ANALYTE LIST

TARGET COMPOUNDS LIST

Pesticides and PCBs

Alpha-BHC	4,4'-DDT
Beta-BHC	Methoxychlor
Delta-BHC	Endrin ketone
Gamma-BHC (lindane)	α-Chlordane
Heptachlor	γ-Chlordane
Aldrin	Toxaphene
Heptachlor epoxide	PCB-1016
Endosulfan I	PCB-1221
Dieldrin	PCB-1232
4,4'-DDE	PCB-1242
Endrin	PCB-1248
Endosulfan II	PCB-1254
4,4'-DDD	PCB-1260
Endosulfan sulfate	

Target Analyte List

Aluminum*	Magnesium*
Antimony	Manganese
Arsenic	Mercury
Barium	Nickel
Beryllium	Potassium*
Cadmium	Selenium
Calcium*	Silver
Chromium	Sodium*
Cobalt	Thallium
Copper	Vanadium
Cyanide	Zinc
Iron*	
Lead	

*Analyzed in water samples only.

The two deep wells at the Fifth Green Landfill site were purged using a large internal air-lift pump. This allowed for faster purging of these larger volume wells. The QED bladder pump was then used to collect the samples from each well after the parameters restabilized to the values recorded at the end of purging.

After each well, the sampling equipment was decontaminated according to the following procedure: (1) non-phosphate detergent wash, (2) 10-percent methanol solution rinse, (3) tap water rinse, and (4) deionized water rinse. One gallon of each of these four fluids was pumped in sequence through the sampling pump between wells.

SURFACE WATER AND SOIL SAMPLING

Surface water samples were collected from ditches with perennial flow at Sites 1, 2B, and 7. All surface water samples were taken by dipping the sample bottles directly into the water body. The water was disturbed as little as possible during sampling to prevent potential volatile chemicals from escaping. The metals samples, including hexavalent chromium at Site 7, were pumped through the metals filter using a clean pressurized garden sprayer. The Site 1 surface water samples were collected at 3 locations: upstream, adjacent to, and downstream of the probable location of the oil disposal pit. The two surface water samples collected at both Site 2B and Site 7 were taken upstream of and adjacent to the areas of discharge of potentially contaminated groundwater at these two sites.

Soil samples were collected at Sites 1, 2E, 6, and 11. The soil samples were collected using a hand auger at a depth of 12 to 18 inches at Site 11, and 6 to 12 inches at Sites 1, 2E, and 6. The samples were disturbed as little as possible to avoid driving off potential volatile organic compounds. The hand auger was decontaminated between samples according to the following procedure: (1) wiping away loose soil, (2) spraying with a non-phosphate detergent, (3) spraying with a 10-percent methanol rinse, and (4) spraying with a deionized water rinse.

QUALITY ASSURANCE SAMPLING

Several types of quality assurance samples were collected during field sampling to confirm the validity of the chemical data obtained during the investigation. These quality assurance samples included: trip blanks, equipment blanks, field blanks, soil duplicates, and water duplicates. One set of VOC and/or EDB trip blanks, supplied by CH2M HILL's Montgomery Laboratory was sent with each sample shipment containing VOC and/or EDB samples. Equipment blanks, designed to confirm that the decontamination of the sampling equipment is effective in preventing cross-contamination between monitoring wells, were collected at sites 2B, 2D, and 7. A field blank sample of the tap water source at Site 7 used for drilling and decontamination of drilling equipment was also taken.

The Navy's quality assurance/quality control program requires that duplicate samples be collected at a frequency of 10 percent of the total samples collected of each medium. A total of 52 groundwater and surface water samples, 14 soil, and 2 sediment samples were collected during the investigation. Five groundwater duplicates, 1 surface water duplicate (site 1 ditch), and 2 soil duplicates (sites 1 and 11) were collected during field sampling in conformity with Navy requirements.

SAMPLE HANDLING

All samples were immediately packed in ice after sampling, and with the exception of hexavalent chromium, were shipped by overnight Federal Express to CH2M HILL's laboratory in Montgomery, Alabama within 24 hours of sample collection. Hexavalent chromium samples were packed in ice and driven to the Reed & Associates laboratory in Newport News, Virginia, to ensure that the 24-hour holding time for this parameter was not exceeded.

OTHER FIELD ACTIVITIES

Monitoring well surveying and in-situ hydraulic conductivity tests were also performed during the interim RFI, following groundwater sample collection. The surveying was performed by Baldwin & Gregg of Norfolk, Virginia, during the week of October 15, 1990. The elevation of each of the 23 newly installed monitoring wells was surveyed to an accuracy of ± 0.01 feet. Where possible, the reference datum and benchmarks were the same as those used in previous investigations. The surveyed elevations of the monitoring wells are given in Table 3-2.

In-situ hydraulic conductivity tests were performed in six wells at Site 2B and six wells at Site 2C from August 16 to 22, 1990, by CH2M HILL personnel. These conductivity tests, known as slug tests, consisted of recording the water level response to the rapid introduction of (distilled) water to the well column. The rise and fall of the water level was recorded using a high-speed Campbell 21X datalogger equipped with a 5 pounds per square inch pressure transducer. To ensure a representative test was achieved, a minimum of two tests were performed at each well. The water-level data were then input into a computer program in which slug-test data were analyzed using the method of Bouwer and Rice (1976) for unconfined conditions. This method of analysis gives an approximate value of the horizontal hydraulic conductivity of groundwater flowing through sediment in the immediate vicinity of the well screen. The complete graphical results of the analyses are presented in Appendix B.

Table 3-1
SUMMARY OF INTERIM RFI FIELD ACTIVITIES

	West Woods (Site 1)	Line Shack 31-33 (Site 2a)	Line Shack 130-131 (Site 2b)	Line Shack 400 (Site 2c)	Line Shack 125 (Site 2d)	Line Shack 109 (Site 2e)
Groundwater Monitoring Wells:						
Shallow (20')	2	-	5	5	3	3
Deep (60')	-	-	-	-	-	-
In-Situ Hydraulic Conductivity Test	-	-	6	6	-	-
Sample Collection:						
Groundwater Samples[a]	5	3	11	9	3	3
Surface-water Samples	3	-	2	-	-	-
Soil Samples	3	-	-	-	-	4
Field QA/QC Samples:						
Trip Blanks	1	1	-	-	1	-
Equipment Blanks	-	-	1	-	1	-
Field Blanks	-	-	-	-	-	-
Groundwater Field Duplicates	1	1	1	1	-	-
Analytical Parameters:[b]	VOC, TPH, EDB, PCB, TCDD,	VOC, TPH, EDB	VOC, TPH, EDB	VOC, TPH, EDB	VOC, TPH, EDB	VOC, TPH, EDB

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Table 3-1
SUMMARY OF INTERIM RFI FIELD ACTIVITES

	Navy Exchange (Site 6)	Fifth Green Landfill (Site 7)	North Station Landfill (Site 8)	Fire Fighting Training Area (Site 11)
Groundwater Monitoring Wells:				
Shallow (20')	-	2	-	1
Deep (60')	-	2	-	-
In-Situ Hydraulic Conductivity Test	-	-	-	-
Sample Collection:				
Groundwater Samples[a]	-	7	3	1
Surface-water Samples	-	2	-	-
Soil Samples	3	-	-	4
Field QA/QC Samples:				
Trip Blanks	-	1	-	1
Equipment Blanks	-	1	-	-
Field Blanks	-	1	-	-
Groundwater Field Duplicates	-	1	-	-
Soil Field Duplicates	-	-	-	1
Analytical Parameters:[b]	VOC, TPH, Pb	TCL, EDB, TOX, TOC, Cr^{+6}, Ions	TCL, EDB, TOX, TOC, Cr^{+6}, Ions	VOC, TPH, B/N, Pb, Ignit

[a]Groundwater samples to be collected at new and existing wells at each site.
[b]Parameters Abbreviations:

TCL	Target Compound List	Ions	Chloride, Sulfates and Alkalinity
VOC	Volatile Organic Compounds from TCL	Cr^{+6}	Hexavalent Chromium
TPH	Total Petroleum Hydrocarbons	B/N	Base-Neutral Extractable Compounds from TCL
Pb	Lead	PCB	Polychlorinated Biphenyls
EDB	Ethylene Dibromide	TCDD	2,3,7,8-Dioxin
TOX	Total Organic Halogens	Ignit	Ignitability
TOC	Total Organic Carbon		

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Table 3-2
INSTALLATION RECORD OF MONITORING WELLS INSTALLED DURING INTERIM RFI

Well	Ground Elevation (ft. above MSL)	Grout Interval	Bentonite Interval	Sand Interval	Screened Interval	Total Borehole Depth
O1-MW4	16.9	0-5'	5'-6'6"	6'6"-18'6"	8'-18'	18'6"
O1-MW5	16.7	0-3'10"	3'10"-5'8"	5'8"-17'10"	7'10"-17'10"	18'6"
2B-MW7	18.7	0-3'6"	3'6"-5'	5'-9'	9'-19'	14'
2B-MW8	18.0	0-5'	5'-7'	7'-10'	10'-20'	22'6"
2B-MW9	20.5	0-4'4"	4'4"-6'4"	6'4"-20'4"	10'-20'	20'
2B-MW10	22.1	1-3'11"	3'11"-5'11"	5'11"-18'	8'-18'	18'
2B-MW11	22.1	1-3'8"	3'8"-6'	6'-18'	8'2"-18'2"	18'2"
2C-MW5	20.4	1'2"-2'6"	2'6"-3'10"	3'10"-16'	6'-16'	16'
2C-MW6	20.7	0-5'	5'-7'	7'-21'	11'-21'	22'
2C-MW7	20.8	1'-4'6"	4'6"-6'6"	6'6"-19'6"	9'-19'	19'6"
2C-MW8	19.0	1'4"-4'	4'-5'8"	5'8"-18'	7'3"-17'3"	18'
2C-MW9	17.0	0-3'6"	3'6"-4'6"	4'6"-18'	7'6"-17'6"	18'
2D-MW1	18.9	0-3'	3'-4'	4'-17'	7'-17'	17'
2D-MW2	22.3	1'-5'	5'-7'	7'-19'	9'-19'	19'
2D-MW3	22.1	1'-5'6"	5'6"-7'6"	7'6"-19'	9'-19'	19'
2E-MW1	20.3	2'-3'6"	3'6"-4'6"	4'6"-19'	9'-19'	19'
2E-MW2	19.4	1'-3'6"	3'6"-5'7"	5'7"-18'6"	8'-18'	18'6"
2E-MW3	18.9	0-3'6"	3'6"-5'	5'-18'	8'-18'	18'
07-MW3D	17.6	0-20'	34'-36'	36'-50'	38'-48'	50'
07-MW4S	16.1	0-4'6"	4'6"-6'2"	6'2"-18'6"	8'1"-18'1"	18'6"
07-MW4D	16.2	0-40'	40'-45'	42'-55'	45'-55'	55'
07-MW5	17.8	0-4'	4'-5'7"	5'7"-18'	7'6"-17'6"	18'
*11-MW1	17.1	0-4'	4'-5'11"	5'11"-18'6"	8'2"-18'2"	18'6"

Table 3-3
TARGET COMPOUND LIST AND TARGET ANALYTE LIST

TARGET COMPOUNDS LIST	
Volatile Organic Compounds	Base-Neutral Extractable Organic Compounds
Acetone	Acenaphthene
Benzene	Acenaphthylene
Bromodichloromethane	Anthracene
Bromoform	Benzo(a)anthracene
Bromomethane	Benzo(a)pyrene
Carbon disulfide	Benzo(b)fluoranthene
Carbon tetrachloride	Benzo(k)fluoranthene
Chlorobenzene	Benzo(g,h,i)perylene
Chloroethane	Benzyl alcohol
Chloroform	bis(2-Chloroethl) ether
Chloromethane	bis(2-Chloroethoxy) methane
Dibromochloromethane	bis(2-Chloroisopropyl) ether
1,1-Dichloroethane	bis(2-Ethylhexyl)phthalate
1,2-Dichloroethane	4-Bromophenyl phenyl ether
1,1-Dichloroethene	Butyl benzyl phthalate
1,2-Dichloroethene (total)	4-Chloroaniline
trans-1,2-Dichloroethene	2-Chloronaphthalene
1,2-Dichloropropane	4-Chlorophenyl phenyl ether
cis-1,3-Dichloropropene	Chrysene
trans-1,3-Dichloropropene	Dibenzo(a,h)anthracene
Ethylbenzene	Dibenzofuran
2-Hexanone	Dibutyl phthalate
Methyl ethyl ketone (2-Butanone)	1,2-Dichlorobenzene
4-Methyl-2-pentanone	1,3-Dichlorobenzene
Methylene chloride	1,4-Dichlorobenzene
Styrene	3,3'-Dichlorobenzidine
1,1,2,2-Tetrachloroethane	Diethyl phthalate
Tetrachloroethene	Dimethyl phthalate
1,1,1-Trichloroethane	2,4-Dinitrotoluene
1,1,2-Trichloroethane	2,6-Dinitrotoluene
Trichloroethene	Di-n-octyl phthalate
Toluene	Fluoranthene
Vinyl acetate	Fluorene
Vinyl chloride	Hexachlorobenzene
Xylene (total)	Hexachlorobutadiene
	Hexachlorocyclopentadiene
Acid Extractable Organic Compounds	Hexachloroethane
	Indeno(1,2,3-cd)pyrene
Benzoic Acid	Isophorone
4-Chloro-3 methyl phenol	2-Methylnaphthalene
2-Chlorophenol	Naphthalene
2,4-Dichlorophenol	2-Nitroaniline
2,4-Dimethylphenol	3-Nitroaniline
2-Methyl-4,6-dinitrophenol	4-NitroanilineNitrobenzene
2,4-Dinitrophenol	N-Nitrosodi-n-propylamine
2-Methyl phenol	N-NitrosodiphenylaminePhenanthrene
4-Methyl phenol	Pyrene
2-Nitrophenol	1,2,4-Trichlorobenzene
4-Nitrophenol	2,4,6-Trichlorophenol
Pentachlorophenol	
Phenol	
2,4,5-Trichlorophenol	

Table 3-3
TARGET COMPOUND LIST AND TARGET ANALYTE LIST

TARGET COMPOUNDS LIST

Pesticides and PCBs

Alpha-BHC	4,4'-DDT
Beta-BHC	Methoxychlor
Delta-BHC	Endrin ketone
Gamma-BHC (lindane)	α-Chlordane
Heptachlor	γ-Chlordane
Aldrin	Toxaphene
Heptachlor epoxide	PCB-1016
Endosulfan I	PCB-1221
Dieldrin	PCB-1232
4,4'-DDE	PCB-1242
Endrin	PCB-1248
Endosulfan II	PCB-1254
4,4'-DDD	PCB-1260
Endosulfan sulfate	

Target Analyte List

Aluminum*	Magnesium*
Antimony	Manganese
Arsenic	Mercury
Barium	Nickel
Beryllium	Potassium*
Cadmium	Selenium
Calcium*	Silver
Chromium	Sodium*
Cobalt	Thallium
Copper	Vanadium
Cyanide	Zinc
Iron*	
Lead	

*Analyzed in water samples only.

Chapter 4
SITE INVESTIGATIONS

This section describes the history, environmental setting, and investigative results at each of the ten individual sites studied during the Interim RFI. The chemical data obtained during this current investigation are presented along with the data obtained in previous studies in order to support recommendations for potential future work at each site. Only the most recent analytical results, however, are compared to relevant federal and Virginia water quality standards. The discussion of current conditions at each site concludes with specific recommendations for the next phase of the RFI.

SITE 1--WEST WOODS OIL DISPOSAL PIT

SITE HISTORY

The West Woods oil disposal pit is located in the northwest portion of NAS Oceana, adjacent to and west of abandoned runway 9 and the fire fighting training area (Figures 3-1 and 4-1). According to the IAS, the site was originally an open pit, into which an estimated 100,000 gallons of waste oil, fuel, aircraft maintenance chemicals, and other liquid wastes were disposed from the mid 1950s to the late 1960s (RGH, 1984). Based on an air photo of site, the pit appears to have been tens of feet in diameter in 1958. In the late 1960s, after flooding caused the pit to overflow and wash the contents toward properties off of the base, disposal was stopped, and the pit was filled with soil.

ENVIRONMENTAL SETTING

The site is relatively flat, and currently wooded with mature trees and shrubs. There is no visible evidence of the previous disposal activity. Surface drainage is directed toward a north-south oriented ditch, approximately 4.5 feet deep, in which water flows perennially to the north. Based on shallow boreholes drilled at the site during this and previous investigations, the near-surface geology consists of a 5- to 7-foot thick layer of silts, clays and fine silty sands that is underlain by an 11- to 13-foot thick layer of clean fine to coarse sand. Monitoring wells at this site are screened in this sand layer. Locally, the depth to groundwater ranges from approximately 8 to 11 feet below grade.

INTERIM RFI ACTIVITIES

For this investigation the field activities at this site included the installation of two shallow monitoring wells (01-MW4, 01-MW5) between the drainage ditch and the approximate location of the original pit. These wells were sampled along with three

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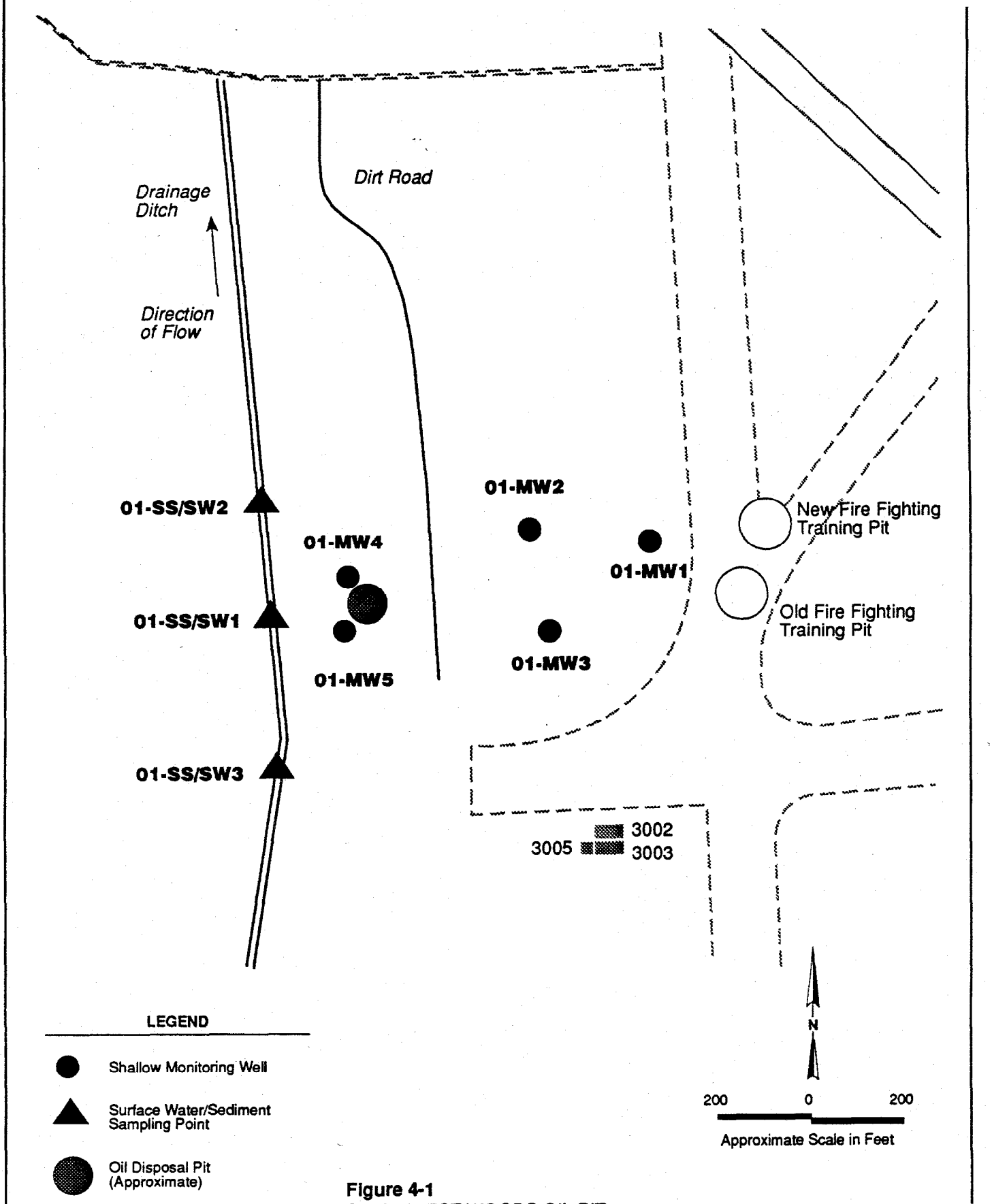

Figure 4-1
SITE 1 WEST WOODS OIL PIT
GENERAL LOCATION MAP SHOWING MONITORING WELLS AND SURFACE WATER/SEDIMENT SAMPLING POINTS
Naval Air Station, Oceana

CH2M HILL

other wells (01-MW1, 01-MW2, and 01-MW3) which were installed previously during the Round 1 Verification Step Investigation (CH2M HILL, 1986). The details of each monitoring well located at this site are summarized in Table 4-1. The locations of all monitoring wells are shown in Figure 4-1. The groundwater samples were analyzed for volatile organic compounds (VOCs), ethylene dibromide (EDB), polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), and 2,3,7,8-dioxin (dioxin).

Table 4-1
SITE 1 MONITORING WELL SUMMARY

Well Number	Date Installed	Ground Elevation (feet above MSL)	Total Depth (feet)	Screened Interval (feet below ground surface)
01-MW1	4/2/86	15.3	20	10-20
01-MW2	4/2/86	17.1	19	9-19
01-MW3	4/1/86	17.2	19	9-19
01-MW4	6/27/90	16.9	18	8-18
01-MW5	6/27/90	16.7	18	8-18

Approximately 6 weeks after the monitoring wells were sampled, surface water and sediment samples were collected from three locations in the adjacent drainage ditch. The sampling locations for these media are also shown in Figure 4-1. The time elapsed after sampling the wells enabled the results of the groundwater analyses to be obtained prior to collecting samples from the ditch. As a result, those parameters that were not detected in the groundwater were not analyzed for in the ditch samples. Only VOC, TPH, and PCBs were analyzed for in the surface water and sediment samples.

INVESTIGATION RESULTS

Water-Level Data

Water-level data collected in August, 1990 are shown in Table 4-2. These data are contoured in Figure 4-2 to create a map of the local water-table surface. The water-level data collected in 1986 are consistent with the data collected during this investigation, and indicate that groundwater flow in the shallow unconfined aquifer at this site is generally toward the west, and most likely discharges locally into the drainage ditch.

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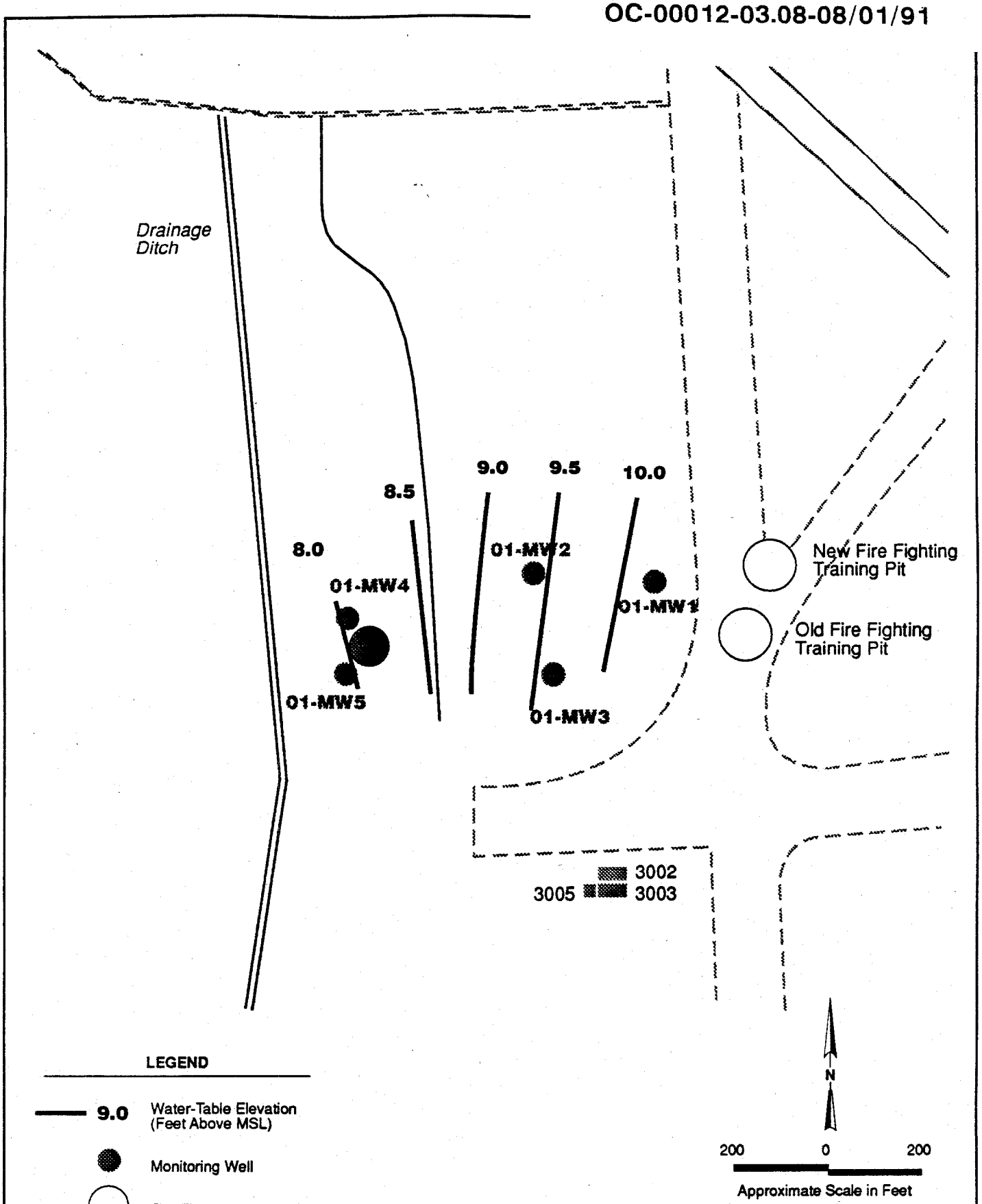

LEGEND

- 9.0 Water-Table Elevation (Feet Above MSL)
- Monitoring Well
- Fire Fighting Pits
- Oil Disposal Pit (Approximate)

Figure 4-2
SITE 1
WATER-TABLE ELVATIONS
NOVEMBER, 1990
Naval Air Station, Oceana

CH2M HILL

Chemical Data

During the installation and sampling of 01-MW4 and 01-MW5, there was evidence of contamination in the subsurface. During drilling, this evidence included the presence of strong hydrocarbon odors, the observation of oil-stained soil, and the detection of volatiles in the soil cuttings by an HNu organic vapor analyzer. As a result, these wells were constructed such that their well screens intersected the water table. During the sampling of these wells a distinct immiscible liquid phase of free product hydrocarbons was observed. Both light weight and dense non-aqueous phase liquids may be present in the shallow aquifer at this site based on the observations made in the field.

Table 4-2
SITE 1 WATER-LEVEL DATA
NOVEMBER, 1990

Well	Depth to Water (Feet Below Survey Datum)	Water-Level Elevation (Feet Above Mean Sea Level)
01-MW1	7.09	10.12
01-MW2	9.46	10.37
01-MW3	9.53	9.85
01-MW4	11.82	8.12
01-MW5	11.44	8.39

The values of the physical parameters of the groundwater (i.e, temperature, electrical conductivity, and pH) which were measured in the field during sampling are presented for all sites in Appendix C. The values of the physical parameters in themselves are not necessarily indicative of contamination, but they can be used in conjunction with laboratory data to understand the conditions affecting the local groundwater quality.

A summary of the chemical data from the monitoring wells at Site 1 is presented in Table 4-3. Only those compounds that were detected in the laboratory are included in the table, which also includes the data obtained during the previous investigation at this site (CH2M HILL, 1986). The chemical data from the surface water and sediment samples obtained during this investigation are presented in Table 4-4. Appendix D contains a complete listing of all the laboratory data from all sites obtained during this investigation.

Table 4-3
ORGANIC COMPOUNDS IN GROUNDWATER AT SITE 1, WEST WOODS OIL DISPOSAL PIT
(All Concentrations in μg/l)

Analyte	Detection Limit	01-MW1		01-MW2		01-MW3		01-MW4		01-MW5
		5/86	8/90	5/86	8/90	5/86	8/90	8/90	8/90 Duplicate	8/90
EDB	0.02	--	--	--	--	--	--	--	--	--
PCBs:										
Aroclor-1254	0.2	--	--	--	--	--	--	0.4	0.3	--
Aroclor-1260	0.2	--	--	--	--	--	--	0.2	--	--
TCDD		<0.0002	<0.0006	<0.00017	<0.0008	<0.00021	<0.0007	<0.0038	<0.0017	<0.0008
Oil and Grease	3,000	6,000	NA	--	NA	15,000	NA	NA	NA	NA
TPH	60-8,060[a]	NA	--	NA	140	NA	140	254,000	307,000	6,770
Volatile Organic Compounds:										
Acetone	10	--	6[b,j]	--	24[b]	--	6[b,j]	16[b]	15[b]	55[b]
Benzene	5	--	--	--	--	--	--	4[c]	--	1[c]
Carbon Disulfide	5	--	--	--	--	--	--	--	7	1[c]
Ethylbenzene	5	--	--	--	--	--	--	9	42	3[c]
Methylene Chloride	5	--	3[b,j]	--	8[b]	--	6[b,j]	25[b]	5[b]	3[b,c]
4-Methyl-2-pentamone	10	--	--	--	--	--	--	--	--	3[c]
Xylenes (Total)	5	--	--	--	--	--	--	26	120	14

Notes:

All volatile compounds not reported were below detection limits in all samples.
EDB = Ethylene Dibromide
TCDD = 2,3,7,8-dioxin
TPH = Total Petroleum Hydrocarbons
NA = Not analyzed

[a]Detection limit range for TPH samples is particular to this site
[b]Compound found in laboratory blank as well as sample; sample concentration is less than 10 times blank concentration.
[j]Estimated value--measured value is less than the accurately quantitative detection limit.
(--) = Concentration below detection limit

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Table 4-4
ORGANIC COMPOUNDS IN SEDIMENT/SURFACE WATER
AT SITE 1 WEST WOODS OIL PIT
NOVEMBER 1990

Surface Water (μg/l)					
Parameter	**Detection Limit**	**01-SW1**	**01-SW2**	**01-SW3**	**01-SW3 Duplicate**
PCBs	0.20-2.0[a]	--	--	--	--
TPH	50	540	--	--	--
Volatile Organic Compounds:					
Methylene Chloride	5	9[b]	5[b]	11[b]	NA
Acetone	10	9[b,j]	7[b,j]	10[b]	NA
Carbon Disulfide	5	3[j]	--	--	NA
Chloroform	5	2[j]	--	--	NA
Xylenes (Total)	5	2[j]	--	--	NA
Bromodichloromethane	5	--	--	1[j]	NA

Sediment (μg/kg)					
Parameter	**Detection Limit**	**01-SD1**	**01-SD2**	**01-SD3**	**01-SD3 Duplicate**
PCBs	41-210	--	--	--	--
TPH	12,900-44,100[d]	1,260,000	1,180,000	153,000	85,300
Volatile Organic Compounds:					
Methylene Chloride	28	--	24[e]	90[e]	330[e]
Acetone	28	--	410[e]	31[b]	24[b]
MEK	14	44	110	14[j]	--
Ethylbenzene	14	95	--	--	--
Xylenes (Total)	14	110	--	--	--
Toluene	14	--	--	23	--

Notes:

All volatile compounds not reported were below detection limits in all samples.

TPH = Total Petroleum Hydrocarbons
NA = Not analyzed; VOC duplicate not collected at this site.

[a]Detection limit range in water for AROCLOR-1016, 1221, 1232, 1242, 1248, 1254, and 1260
[b]Compound was found in laboratory blank as well as in sample; sample concentration was less than 10 times the blank concentration.
[d]Detection limit range in soil for TPH samples was particular to this site.
[e]Compound was found in laboratory blank as well as in sample; sample concentration was more than 10 times the blank concentration.
[j]Estimated value; measured value is less than the accurately quantitative limit.

The groundwater data from 01-MW1 through 01-MW3 indicate that the resulting concentrations of the parameters analyzed in these wells were either: (1) not detected, (2) below the accurately quantifiable detection limit, (3) detected at levels not significantly different than the concentration in the laboratory blank (i.e., a difference of less than a factor of ten), or (4) detected at concentrations that fell below potentially applicable regulatory standards (as discussed below).

The data from 01-MW4 and 01-MW5, however, indicate the presence of VOCs and high concentrations (6,770 and 254,000 micrograms per liter μg/l) respectively of TPH. These results support the observations made in the field that hydrocarbons are present in the groundwater at these two locations. Low concentrations of PCBs were also detected in 01-MW4.

Regarding the analytical data from the surface-water samples, the results do not indicate, based on the parameters analyzed, the presence of significant contamination. It is worth noting that the only sample to have TPH identified above the detection limit is the one sample that is downstream from the former pit (01-SW1).

All of the sediment samples yielded very high levels of TPH. The concentrations progressively increased from upstream to downstream locations. An order of magnitude increase in the concentration was observed between the upstream sample and those collected adjacent to and downstream of the former pit. The highest value (1,260 milligrams per kilogram, mg/kg) was reported at the downstream location (01-SD1).

Of the parameters analyzed and detected at Site 1 none exceed the federal standards typically used by the EPA to determine whether interim corrective measures (ICM) or a corrective measures study (CMS) should be implemented under RCRA (EPA, 1989). However, based on the high concentrations of TPH in the groundwater and sediment, the EPA will most likely require further study to determine the specific contaminants that comprise the TPH values, and base their Health and Environmental Assessment (which is part of the RFI process) on the results of that study.

The concentrations of TPH at 01-MW4 and 01-MW5 exceed Virginia standards for groundwater (1,000 μg/l; Virginia Code, Section 62.1-44.15(3)) and all three sediment samples (01-SD1 through 01-SD3) exceed the Virginia standard for soil (100 mg/kg) according to the Virginia Water Control Board (WCB) Underground Storage Tank Regulation, Part VI. Although the TPH soil standard is under underground storage tank regulations, it applies to all soil regardless of how it became contaminated (Braden, 1990).

RECOMMENDATIONS

Future work at this site should address both soil and groundwater contamination, and each medium will require a different investigative approach.

Soil Contamination

Chemicals in the soil at this site represent a continuing source of contamination to the local shallow aquifer, and groundwater flow, in turn, is potentially a major pathway for the offsite migration of dissolved contaminants. Eliminating the soil contamination will, therefore, assist the eventual approach to groundwater remediation. Consequently, characterizing the nature and extent of soil contamination at this site is important.

Defining the extent of soil contamination will require a systematic approach of soil sample collection and analysis. Soil samples are proposed to be collected at prescribed lateral intervals in a grid-like pattern centered over the approximate location of the former pit. At a minimum, the corners of the grid should be surveyed for horizontal control in order to have a relatively permanent frame or reference within the heavily wooded area. In order to minimize the sample points, the spacing between points should be greatest (approximately 20 feet apart) at the center of the grid, and decrease (to approximately 10 feet) toward the periphery.

The samples can be collected by hand augers advanced to a depth of approximately 10 feet, or to obvious contamination, whichever is shallower. The samples can be screened in the field for contamination by direct observation (i.e., color and odor) and by performing head-space analyses using an organic vapor analyzer (OVA). In addition to scanning in the field, a limited number of samples should be shipped to a laboratory for more specific chemical analyses. These analyses should include VOC, TPH, PCBs, and base neutral extractable compounds (BN). The more contaminated samples of soil should also be analyzed for dioxin.

Groundwater Contamination

At this site, future work investigating groundwater should focus on determining the extent of contamination, both laterally and vertically, and on identifying the hydraulic conductivity of the shallow aquifer materials. This will require the installation of additional monitoring wells both shallow (approximately 20 feet) and deep (approximately 70 feet), and conducting in-situ hydraulic conductivity tests on selected wells.

Specifically, three shallow and two deep wells are proposed to be installed initially. The need for subsequent wells will depend on the chemical data obtained from those proposed here. The approximate locations of the proposed wells are shown in Figure 4-3. The rationale for the well locations is outlined as follows:

- 01-MW6, 01-MW7 are proposed to be located laterally away from the former pit and hydraulically down gradient, in order to help define the lateral extent of shallow groundwater contamination.

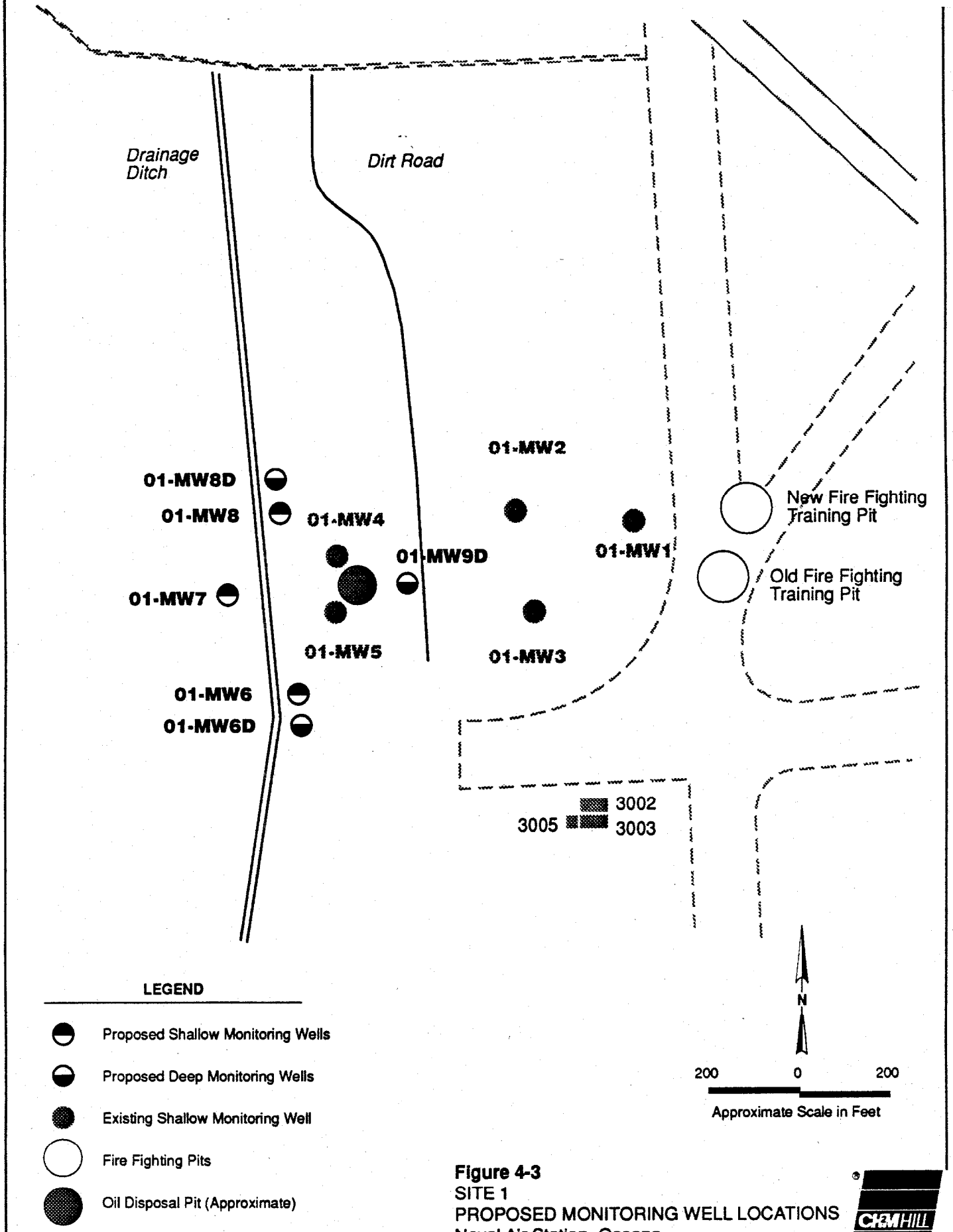

Figure 4-3
SITE 1
PROPOSED MONITORING WELL LOCATIONS
Naval Air Station, Oceana

CH2M HILL

- 01-MW6D, 01-MW7D are proposed deep wells to be located adjacent to the shallow wells just described in order to determine whether contamination exists at greater depths locally.

- 01-MW8 is a shallow well to be located on the other side of the drainage ditch from the former pit. This location will help determine whether the ditch affects to local groundwater hydrodynamics, and hence contaminant migration.

- 01-MW9 is a deep well to be located east of the pit adjacent to the dirt access road. The purpose of this well is to obtain upgradient chemical data from deeper in the aquifer. The well is necessary because deep down-gradient wells are proposed.

Samples of groundwater collected from these wells should be analyzed for VOC, BN, TPH, and PCBs. Wells 01-MW1 and 01-MW2 do not need to be routinely included in future work at this site; 01-MW3 is sufficiently located to serve as the only upgradient groundwater monitoring point. The free product in Wells 01-MW4 and 01-MW5 should be measured for thickness and analyzed for BN, PCB and dioxin. Insitu conductivity tests should be performed on 01-MW3, and proposed wells 01-MW7, and 01-MW8. Lastly, the surface water in the drainage ditch should be resampled at the same locations for VOC, BN, PCBs, and TPH. In addition, the elevation of water level in the ditch should be surveyed in order to verify the relationship between shallow groundwater flow and the water level in the ditch.

SITE 2A--LINE SHACK 31-33 DISPOSAL AREA

SITE HISTORY

Site 2A consists of the area in the immediate vicinity of Line Shacks 31 and 33 (Figure 4-4). According to the IAS, these line shacks were built in 1963, and they remain in use to support general aircraft maintenance. Between 1963 and 1981, waste oils and aircraft maintenance chemicals were reportedly discarded onto the ground adjacent to these line shacks in unknown amounts (RGH, 1984).

ENVIRONMENTAL SETTING

The site is almost entirely on the flight line. As a result, the ground is flat, and partially covered with asphalt or concrete. No natural surface drainage features are present. Water collects in drains which flow to nearby oil-water separators. Based on boreholes drilled previously to install monitoring wells at this site, the upper-most 5 to 10 feet of the soil profile is comprised of silts and clays, and silty sands. These sediments, in turn, are underlain by a 5- to 25-foot thick layer of sand. Locally, the depth to groundwater is approximately 9 feet below grade.

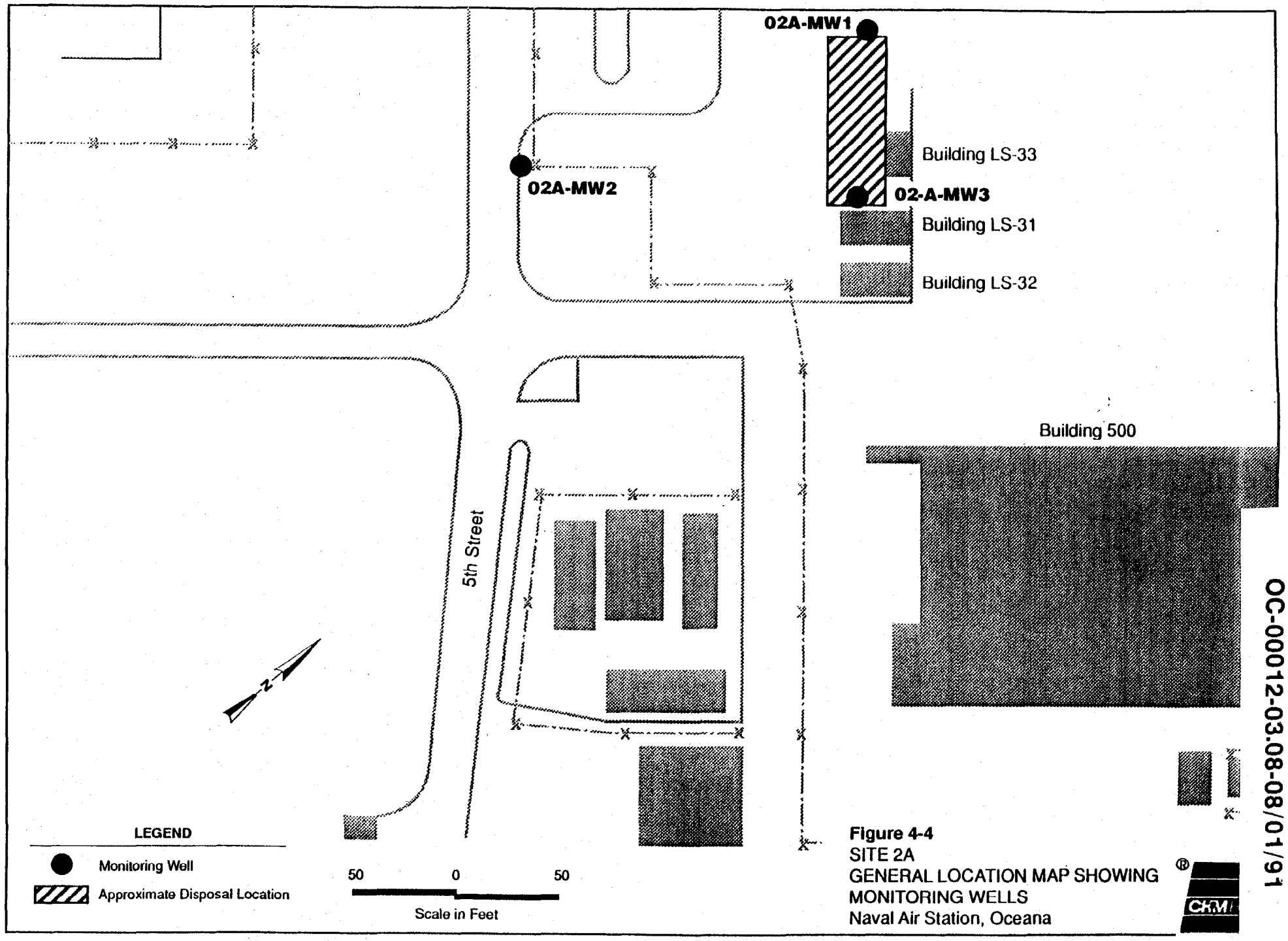

Figure 4-4
SITE 2A
GENERAL LOCATION MAP SHOWING
MONITORING WELLS
Naval Air Station, Oceana

CH2M

INTERIM RFI ACTIVITIES

Field activities performed at Site 2A as part of this investigation consisted of measuring water levels and collecting groundwater samples at the three existing wells shown in Figure 4-4. The details of each monitoring well located at this site are summarized in Table 4-5. The groundwater samples were analyzed for VOCs, EDB, and TPH.

Table 4-5
SITE 2A MONITORING WELL SUMMARY

Well Number	Date Installed	Ground Elevation (feet above MSL)	Total Depth (feet)	Screened Interval (feet below ground surface)
2A-MW1	3/27/88	18.1	20	10-20
2A-MW2	3/31/88	17.7	20	10-20
2A-MW3	3/26/88	19.4	20	10-20

INVESTIGATION RESULTS

Water-level data collected at Site 2A in August, 1990, are shown in Table 4-6. These data are contoured in Figure 4-5 to create a map of the local water-table surface. The water-level data collected both in 1986 and in this investigation consistently indicate that the principal direction of groundwater flow in the shallow unconfined aquifer at this site is generally toward the south.

Table 4-6
SITE 2A WATER-LEVEL DATA
AUGUST, 1990

Well	Depth to Water (Feet Below Survey Datum)	Water-Level Elevations (Feet Above Mean Sea Level)
2A-MW1	9.31	9.95
2A-MW2	8.77	8.66
2A-MW3	11.25	9.78

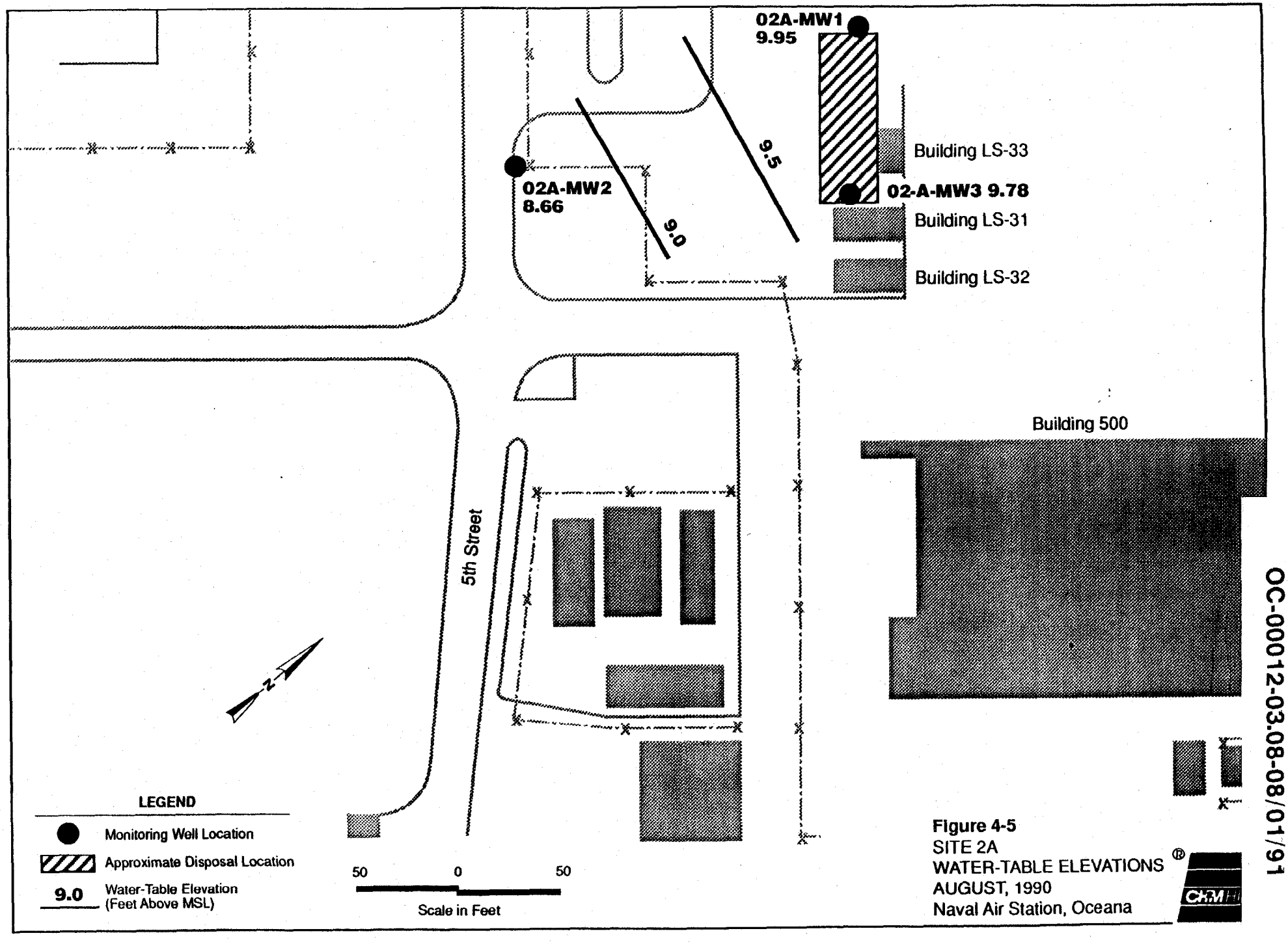

Figure 4-5
SITE 2A
WATER-TABLE ELEVATIONS
AUGUST, 1990
Naval Air Station, Oceana

OC-00012-03.08-08/01/91

All of the chemical data from the three wells at this site are presented in Table 4-7. The analytical results obtained both in 1986 and during this investigation indicate that the concentrations of all of the analyzed parameters were either: (1) not detected, (2) below the accurately quantifiable detection limit, or (3) detected at levels not significantly different than the concentration in the laboratory blank (i.e., a difference of less than a factor of ten). For TPH, the resulting values are less than the Virginia action level in groundwater of 1,000 μg/l.

RECOMMENDATIONS

The chemical data from the groundwater sampling at this site suggest that the waste disposal practices reported to have occurred in the past have not resulted in contaminants entering the groundwater at least since 1986. As a result, no further action is recommended at this site, and future RFI activities at NAS Oceana should not include this site in the scope of work.

SITE 2B--LINE SHACK 130-131 DISPOSAL AREA

SITE HISTORY

This site is comprised of the area in the vicinity of Line Shacks 130 and 131 (Figure 4-6). It includes aircraft maintenance areas and five aircraft cleaning stations. The line shacks were constructed in 1963, and according to the IAS, up until the early 1980s waste oils and aircraft maintenance chemicals were reportedly discarded onto the ground adjacent to these line shacks in unknown amounts (RGH, 1984).

ENVIRONMENTAL SETTING

Much of the site is on the flight line. As a result, much of the ground surface is flat, and covered with concrete or asphalt. Cores through the concrete reveal that it is approximately 18 inches thick with large aggregate up to 4 inches in diameter. Off the flight line, the site includes an adjacent open field, and wooded areas. Surface runoff on the flight line portion of the site is directed toward drains which discharge to oil-water separators. Off the flight line, there are two drainage ditches which direct surface water off the site. Only one of these ditches carries perennial flow, the other channels storm runoff and flows intermittently.

Based on boreholes drilled during this and previous investigations, the shallow (approximately 20 feet deep) subsurface geology generally consists of three stratigraphic layers. The first is a 7- to 10-foot thick unit of fine sediments, mainly silty clay and sandy silt. This unit is underlain by a 5- to 10-foot thick layer of fine to medium sand, which in turn is underlain by a layer of silty sand. All monitoring wells at this site are screened over portions of the middle sand and lower silty sand units. Locally the average depth to groundwater ranges from approximately 5 to 8 feet below grade.

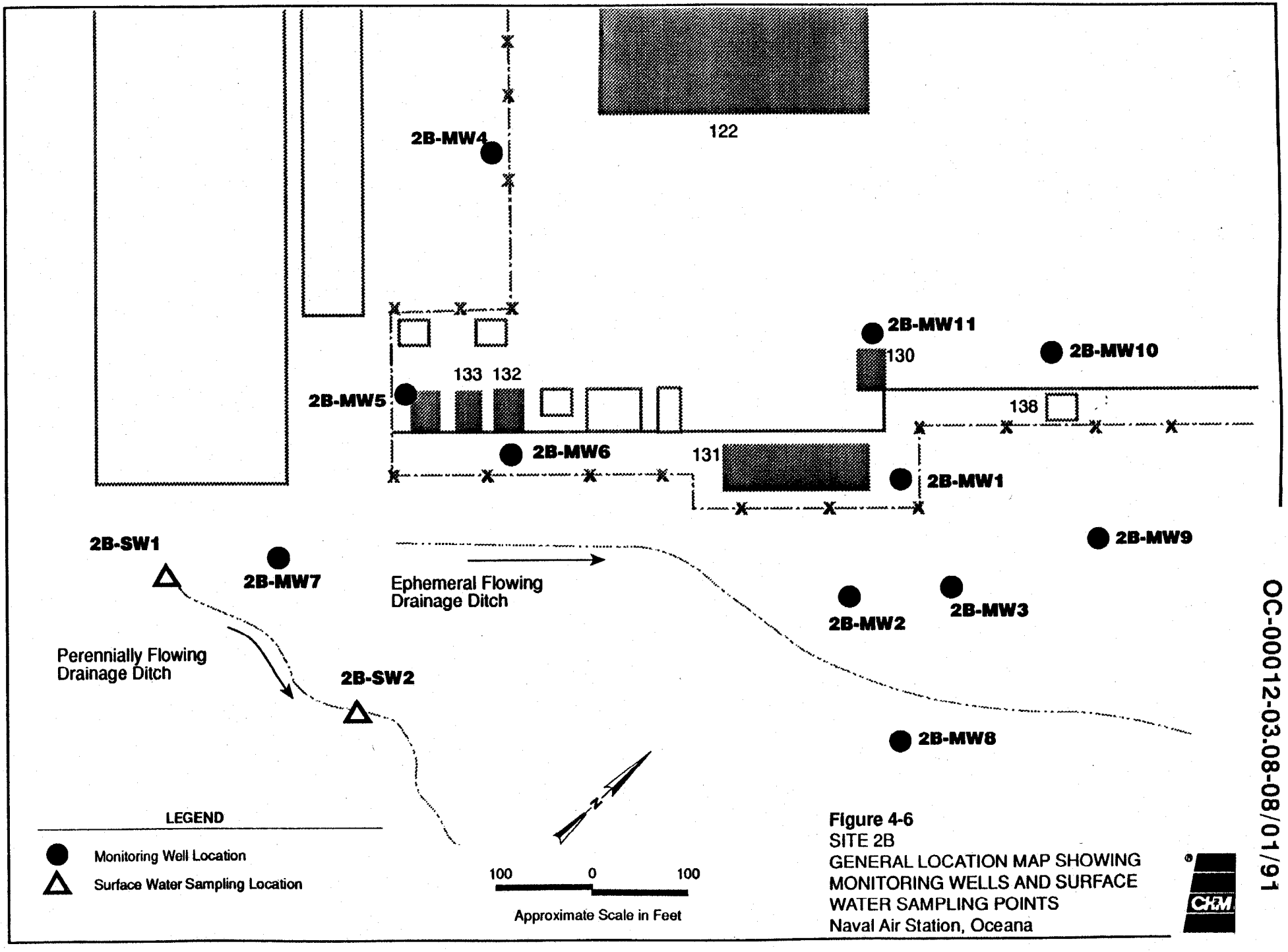

Figure 4-6
SITE 2B
GENERAL LOCATION MAP SHOWING
MONITORING WELLS AND SURFACE
WATER SAMPLING POINTS
Naval Air Station, Oceana

CH2M

Table 4-7
ANALYTICAL RESULTS--SITE 2A, LINE SHACK 31-33 DISPOSAL AREA
(All Concentrations in $\mu g/l$)

Analyte	Detection Limit ($\mu g/l$)	2A-MW1			2A-MW2		2A-MW3	
		5/86	8/90	8/90 Duplicate	5/86	8/90	5/86	8/90
EDB	0.02	--	--	--	--	--	--	--
Oil and Grease	3,000	5,000	NA	NA	14,000	NA	5,000	NA
TPH	70	NA	240	--	NA	90	NA	330
Volatile Organic Compounds:								
Acetone	10	--	10^{b}	12^{b}	--	7^{bj}	--	8^{b}
Methylene Chloride	5	--	4^{bj}	6^{b}	--	7^{b}	--	6^{b}
Xylenes (Total)	5	--	2^{j}	2^{j}	--	--	--	2^{j}

Notes:
All volatile compounds not reported were below detection limits in all samples.
EDB = Ethylene Dibromide
TPH = Total petroleum hydrocarbons
(--) = Below detection limit
NA = Sample not analyzed
^{b} = Compound found in laboratory blank as well as sample; sample concentration less than 10 times blank concentrations
^{j} = Estimated value; measured value is less than the accurately quantitative detection limit.

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INTERIM RFI ACTIVITIES

For this investigation, the field activities at Site 2B included the installation and sampling of five shallow monitoring wells (2B-MW7 through 2B-MW11), the sampling of six other monitoring wells installed during previous investigations (2B-MW1 through 2B-MW6), the sampling of water in the perennially flowing drainage ditch at two locations (2B-SW1 and 2B-SW2), and performing in-situ hydraulic conductivity tests in six of the monitoring wells (2B-MW5, 2B-MW7, and 2B-MW8 through 2B-MW11). The details of each monitoring well located at this site are summarized in Table 4-8. The locations of all sampling points are shown in Figure 4-6. All water samples were analyzed for VOCs, EDB, and TPH.

INVESTIGATION RESULTS

The field work performed to date at this site has produced a large amount of data. This section summarizes the results obtained to date in order to support the recommendations outlined in a subsequent section.

Water-Level Data

Water-level data for all wells at this site collected in August, 1990, are presented in Table 4-9. The water-level elevations from this table are contoured in Figure 4-7 to create a map of the water-table surface over this site. The 1990 data are consistent with the water-level measurements made in 1986 and 1988, and indicate that the principal directions of shallow, unconfined, groundwater at this site generally ranges along an arc from the southwest to the southeast.

Hydraulic Conductivity Data

In-situ hydraulic conductivity tests were performed at six of the eleven monitoring wells at Site 2B. These tests which yield an estimate of the horizontal hydraulic conductivity in the immediate vicinity of the screened zone, are summarized in Table 4-10. The values calculated at this site ranges from 1×10^{-3} centimeters per second (cm/s) to 4×10^{-3} cm/s. This range is typical of the hydraulic conductivity in clean to silty sands (Freeze and Cherry, 1979), which is consistent with the stratigraphy encountered at this site.

A range of average linear groundwater velocities can be calculated based on: (1) the results of the in-situ permeability tests performed at this site (e.g., a geometric mean of hydraulic conductivity values of 2×10^{-3} cm/s), (2) a range of approximated values of the local hydraulic gradient (0.002 to 0.004) obtained from Figure 4-7, and (3) a range of approximated effective porosity values (0.1 to 0.3). Using these numbers, the resulting range of average linear groundwater velocities in Area 1 is between approximately 14 and 84 feet per year.

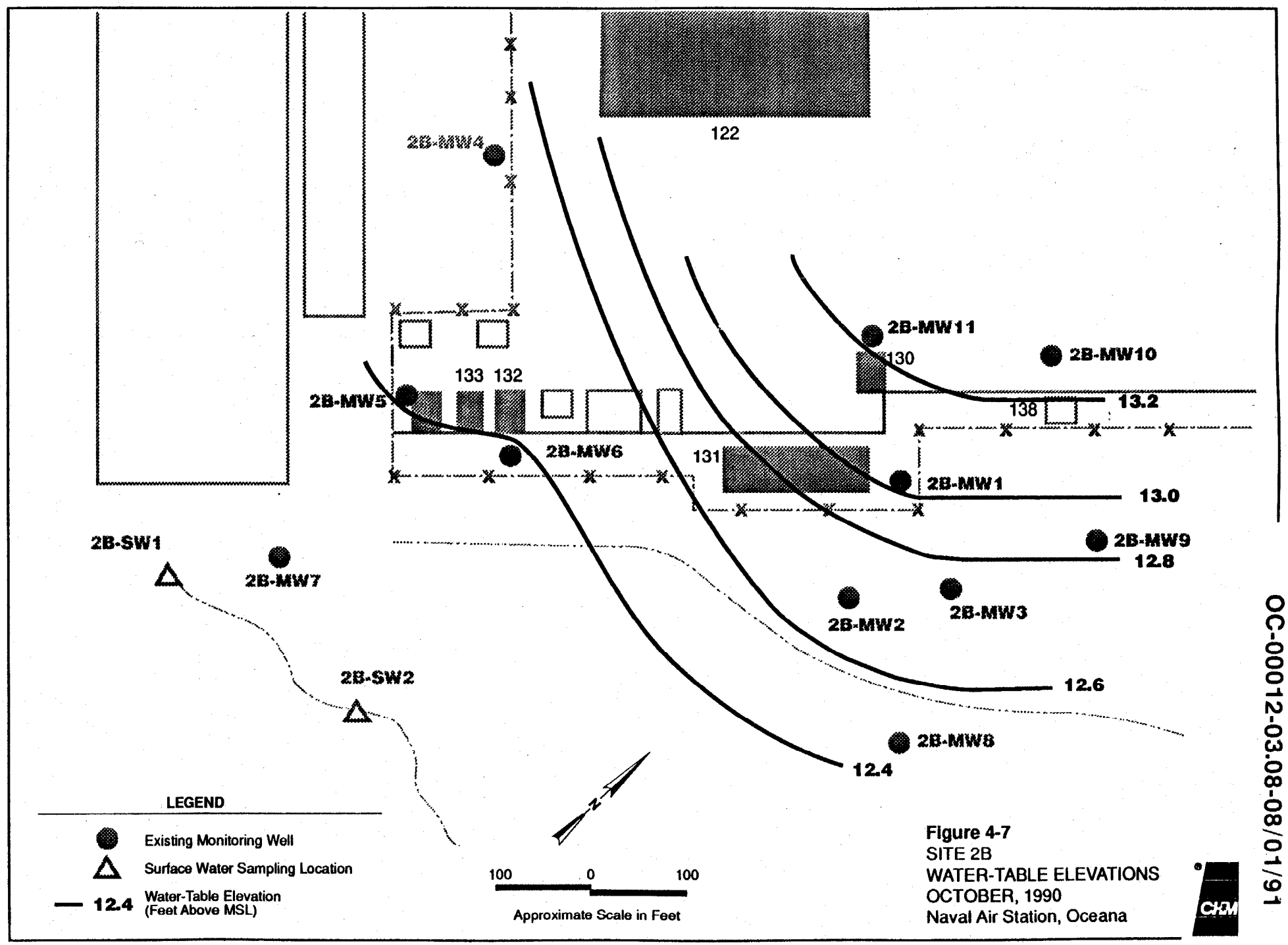

Figure 4-7
SITE 2B
WATER-TABLE ELEVATIONS
OCTOBER, 1990
Naval Air Station, Oceana

CH2M

Table 4-8
SITE 2B MONITORING WELL SUMMARY

Well Number	Date Installed	Ground Elevation (feet above MSL)	Total Depth (feet)	Screened Interval (feet below ground surface)
28-MW1	4/3/86	21.8	19	9-19
28-MW2	4/1/86	18.0	25	15-25
28-MW3	4/2/86	18.8	20	10-20
28-MW4	9/2/88	21.5	19	9-19
28-MW5	9/1/88	22.0	18	8-18
28-MW6	9/6/88	21.5	15	5-15
28-MW7	6/27/90	18.7	14	9-14
28-MW8	6/29/90	18.0	20	10-20
28-MW9	6/29/90	20.5	20	10-20
28-MW10	7/11/90	22.1	18	8-18
28-MW11	7/10/90	22.1	18	8-18

Table 4-9
SITE 2B WATER-LEVEL DATA
OCTOBER, 1990

Well	Depth to Water (Feet Below Survey Datum)	Water-Level Elevation (Feet Above Mean Sea Level)
2B-MW1	8.50	13.09
2B-MW2	7.70	12.64
2B-MW3	6.44	12.79
2B-MW4	8.41	12.52
2B-MW5	9.06	12.43
2B-MW6	8.64	12.37
2B-MW7	8.73	12.22
2B-MW8	7.46	12.56
2B-MW9	9.46	12.81
2B-MW10	8.71	13.36
2B-MW11	8.88	13.19

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Chemical Data

The organic chemical data obtained to date from all monitoring wells are shown in Table 4-11. Data on dissolved metals concentrations collected in 1988 from the six previously installed wells are summarized from CH2M HILL (1989) in Table 4-12. The analytical data on the two surface water samples are presented in Table 4-13. Lastly, VOC data from CH2M HILL (1989) on soil samples collected from 14 shallow boreholes in 1988 are presented in Table 4-14. The locations of these boreholes are shown in Figure 4-8.

Table 4-10
SITE 2b IN-SITU HYDRAULIC CONDUCTIVITY TEST RESULTS

Well	Hydraulic Conductivity (cm/sec)
2B-MW5	2×10^{-3}
2B-MW7	4×10^{-3}
2B-MW8	3×10^{-3}
2B-MW9	3×10^{-3}
2B-MW10	3×10^{-3}
2B-MW11	1×10^{-3}

The chemical data indicate that various VOCs, particularly chlorinated hydrocarbons, are present in the groundwater at Site 2B. The most commonly detected contaminants include vinyl chloride (VC), trichloroethylene (TCE), 1,2-dichloroethylene (1,2-DCE), and 1,1-dichloroethane (1,1-DCA).

Figure 4-9 shows the concentrations of TCE and VC at each sampling point as of August, 1990. The data shown in the figure indicate that the distribution of these two contaminants appears to be concentrated into two separate areas of the site. One area (Area 1) is located immediately east of Line Shack 131, and is identified by the contaminants in wells 2B-MW1 through 2B-MW3. The other area (Area 2) is south of Buildings 132 and 133, where wells 2B-MW5 through 2B-MW7 are located. Given the general pattern of shallow groundwater flow across the site, the two localized areas of contamination suggest the presence of at least two separate sources for the chemicals detected in the groundwater.

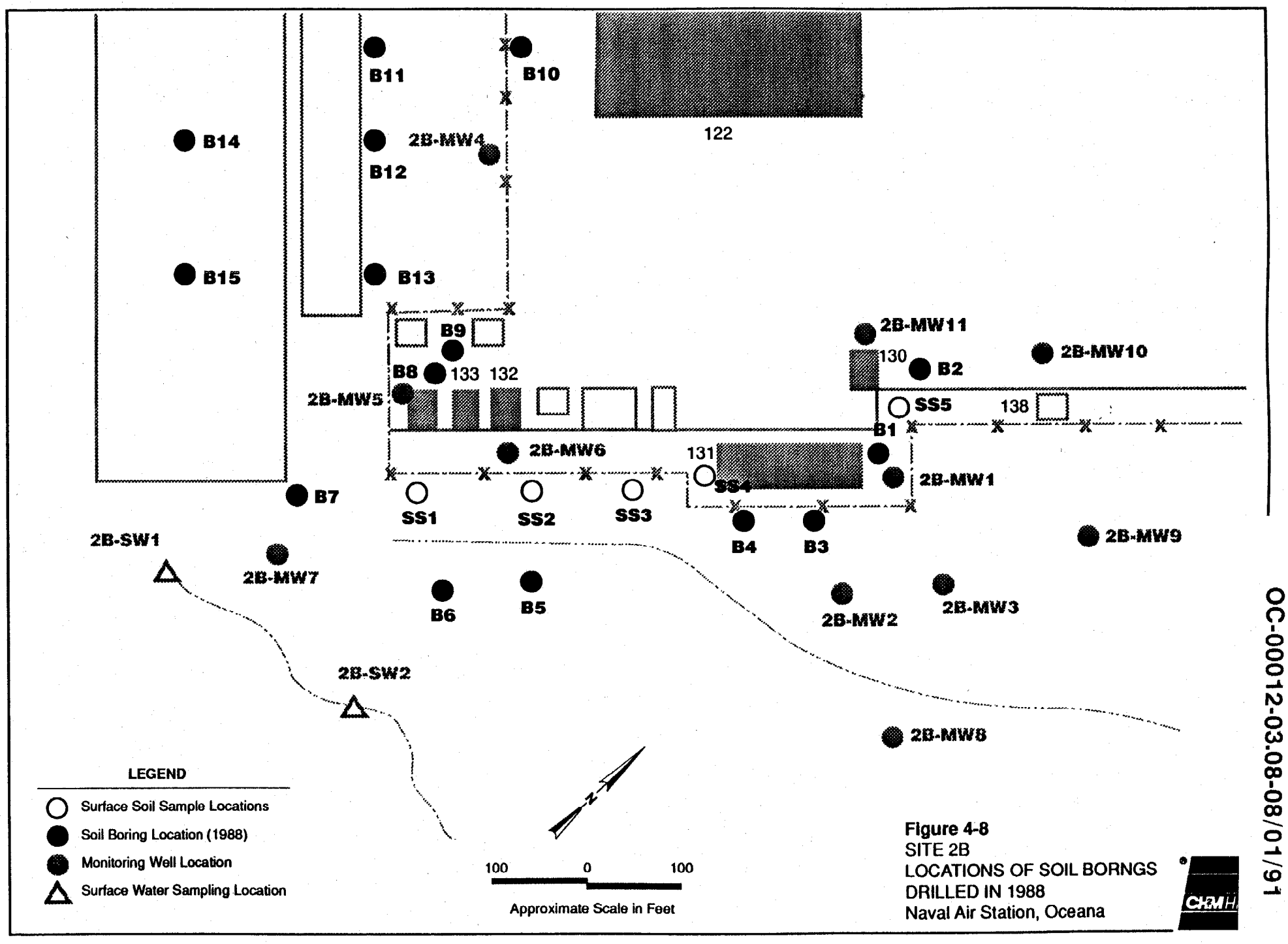

Figure 4-8
SITE 2B
LOCATIONS OF SOIL BORNGS
DRILLED IN 1988
Naval Air Station, Oceana

CH2M HILL

OC-00012-03.08-08/01/91

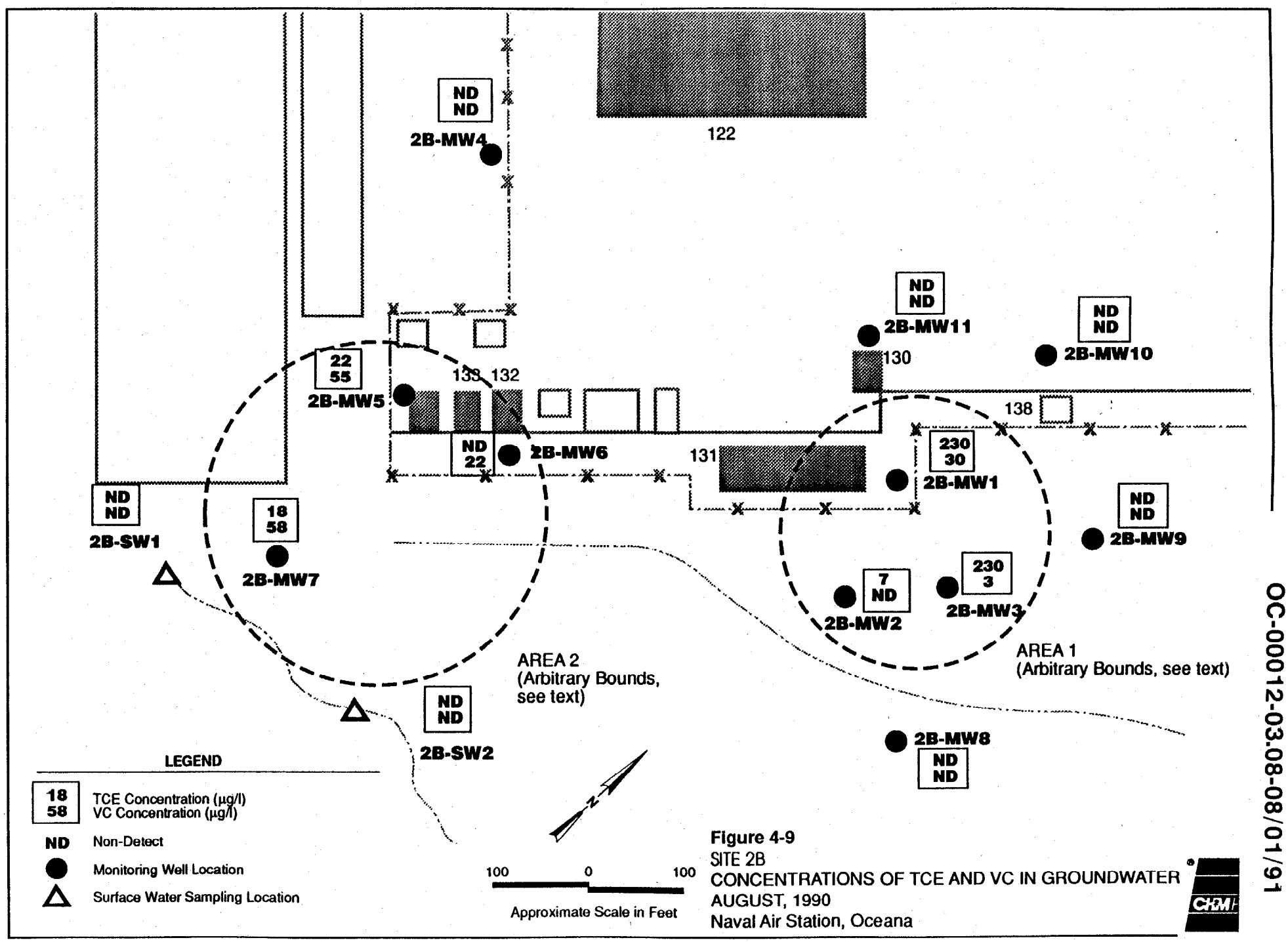

Figure 4-9
SITE 2B
CONCENTRATIONS OF TCE AND VC IN GROUNDWATER
AUGUST, 1990
Naval Air Station, Oceana

CH2M

OC-00012-03.08-08/01/91

Table 4-11
ORGANIC COMPOUNDS IN GROUNDWATER AT SWMU 2b, LINE SHACK 130-131 DISPOSAL AREA
(All concentrations in μg/l)

ANALYTE	Detection limit	2B-MW1					2B-MW2			2B-MW3		
		5/86	9/88	Duplicate 9/88	8/90	Duplicate 8/90	5/86	9/88	8/90	5/86	9/88	8/90
EDB	0.02	--	NA	NA	--	--	--	NA	--	--	NA	--
Oil and Grease	3,000	3,000	NA	NA	NA	NA	5,000	NA	NA	5,000	NA	NA
TPH	60	NA	NA	NA	220	210	NA	NA	110	NA	NA	70
Volatile Organic Compounds:												
Acetone	10	--	--	--	22[b,j]	24[b,j]	--	--	5[b,j]	--	--	35[b]
Benzene	5	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	10	--	--	--	--	--	--	--		21	--	--
Carbon disulfide	5	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	10	2.0	--	--	--	--	--	--	--	--	--	--
Chloroform	5	--	--	--	--	--	2.8	--	--	--	--	--
1,1-Dichloroethane	5	170	82	52	50	49	--	--	--	3.2	44	18
1,2-Dichloroethane	5	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethylene	5	25	13	6	10[j]	11[j]	--	--	--	--	420	--
1,2-Dichloroethylene (total)	5	NA	340	290	400	400	NA	--	5	NA	--	140
Trans-1,2-dichloroethylene	5	800	NA	NA	NA	NA	--	NA	NA	29	NA	NA
2-Hexanone	10	--	--	--	--	--	--	--	--	9.1	--	--
4-Methyl-2-pentanone (MIBK)	10	--	--	--	--	--	--	--	--	6.6	--	--
Methylene chloride	5	--	--	--	6[b,j]	7[b,j]	--	--	5[b]	--	--	10[b]
1,1,2,2-Tetrachloroethane	5	--	--	--	--	--	--	--	--	2.4	--	--
Toluene	5	--	--	--	--	--	--	--	--	3.4	--	--
Trichloroethylene	5	1,300	330	340	230	280	3.7	5	7	58	820	230
Vinyl chloride	10	99	31	27	30	37	--	--	--	3.0	--	--

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Table 4-11
ORGANIC COMPOUNDS IN GROUNDWATER AT SWMU 2b, LINE SHACK 130-131 DISPOSAL AREA
(All concentrations in $\mu g/l$)

ANALYTE	Detection limit	2B-MW4		2B-MW5		2B-MW6		2B-MW7	2B-MW8	2B-MW9	2B-MW10	2B-MW11
		9/88	8/90	9/88	8/90	9/88	8/90	8/90	8/90	8/90	8/90	8/90
EDB	0.02	NA	--	NA	--	NA	--	--	--	--	--	--
Oil and Grease	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH	60	NA	390	NA	200	NA	290		130	300	140	240
Volatile Organic Compounds:												
Acetone	10	--	$6^{b,j}$	--	$6^{b,j}$	--	$8^{b,j}$	14^{b}	26^{b}	$5^{b,j}$	$5^{b,j}$	$6^{b,j}$
Benzene	5	--	--	--	1^{j}	--	--	2^{j}	--	--	1^{j}	--
2-Butanone (MEK)	10	--	--	--	--	--	--	--		--	--	--
Carbon disulfide	5	--	3^{j}	--	--	--	--	--	--	--	--	--
Chloroethane	10	--	--	--	--	--	--	4^{j}	--	--	--	--
Chloroform	5	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	5	--	--	7	12	--	--	110	--	--	16	--
1,2-Dichloroethane	5	--	--	--	--	--	--	3^{j}	--	--	--	--
1,1-Dichloroethylene	5	--	--	49	4^{j}	--	--	4^{j}	--	--	2^{j}	--
1,2-Dichloroethylene (total)	5	--	--	--	6	--	3	40	--	--	24	--
Trans-1,2-dichloroethylene	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone (MBK)	10	--	--	--	--	--	--	--		--	--	--
4-Methyl-2-pentanone (MIBK)	10	--	--	--	--	--	--	27	--	--	--	--
Methylene chloride	5	--	5^{b}	--	5^{b}	--	5^{b}	$4^{b,j}$	$8^{b,j}$	$5^{b,j}$	$3^{b,j}$	$4^{b,j}$
1,1,2,2-Tetrachloroethane	5	--	--	--	--	--	--	--		--	--	--

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Table 4-11
ORGANIC COMPOUNDS IN GROUNDWATER AT SWMU 2b, LINE SHACK 130-131 DISPOSAL AREA
(All concentrations in μg/l)

ANALYTE	Detection limit	2B-MW4		2B-MW5		2B-MW6		2B-MW7	2B-MW8	2B-MW9	2B-MW10	2B-MW11
		9/88	8/90	9/88	8/90	9/88	8/90	8/90	8/90	8/90	8/90	8/90
Toluene	5	--	--	--	--	--	--	1[j]	--	--	--	--
Trichlorethylene	5	--	--	22	3[j]	--	--	18	--	2[j]	--	--
Vinyl chloride	10	--	--	55	--	--	22	58	--	--	--	--

Notes:
EDB = Ethylene Dibromide
NA = Not analyzed
TPH = Total Petroleum Hydrocarbons
[b]Compound found in laboratory blank as well as sample. Sample concentration is less than 10 times blank concentration.
[j]Estimated value. Measured value is less than the accurately quantitative detection limit.
(--) = Concentration below detection limit

WDCR503/028.51

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Table 4-12
RESULTS OF METALS ANALYSIS OF GROUNDWATER AT SITE 2B, LINE SHACK 130-131 DISPOSAL AREA
LINE SHACK SITE INSPECTION, SEPTEMBER 1988
(All concentrations in μg/l)

Parameter	2B-MW1	2B-MW1 Duplicate	2B-MW2	2B-MW3	2B-MW4	2B-MW5	2B-MW6
Silver	<3	<3	<3	<3	<3	<3	<3
Aluminum	<200	<200	<200	<200	<200	<200	<200
Arsenic	<5	<5	<5	<5	<5	13	17
Barium	<200	<200	<200	<200	<200	<200	<200
Beryllium	<5	<5	<5	<5	<5	<5	<5
Calcium	14,500	13,500	42,200	104,000	47,500	37,600	16,800
Cobalt	<50	<50	<50	<50	<50	<50	<50
Chromium	<10	<10	<10	<10	<10	<10	<10
Copper	<25	<25	<25	<25	<25	70	<25
Iron	5,840	5,670	1,340	7,470	12,100	23,400	13,700
Mercury	0.4	<0.2	<0.2	1.0	<0.2	<0.2	0.5
Potassium	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000
Magnesium	15,700	14,800	5,600	10,000	16,300	26,300	8,200
Manganese	190	190	310	640	420	1,000	390
Sodium	42,800	40,300	24,000	62,900	25,600	23,300	14,000
Nickel	<40	<40	<40	<40	<40	<40	<40
Lead	<5	<5	<5	<5	<5	<5	<5
Antimony	<5	<5	<5	<5	<5	<5	<5
Selenium	<5	<5	<5	<5	<5	<5	<5
Thallium	<5	<5	<5	<5	<5	<5	<5
Vanadium	<50	<50	<50	<50	<50	<50	<50
Zinc	170	160	50	160	220	170	130

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Table 4-13
ORGANIC COMPOUNDS IN SURFACE WATER AT SITE 2B, LINE SHACK 130-131 DISPOSAL AREA, AUGUST 1990
(All Concentrations in μg/l)

Analyte	Detection Limit	2B-SW1	2B-SW2
EDB	0.02	--	--
TPH	60	1,770	2,610
Volatile Organic Compounds:			
Acetone	10	19[b]	12[b]
2-Hexanone	10	1[j]	--
Methylene Chloride	5	4[b,j]	4[b,j]
Xylenes (Total)	5	2[b,j]	--

Notes:
EDB = Ethylene Dibromide
TPH = Total Petroleum Hydrocarbons
(--) = Concentration below detection limit
[b]Compound found in laboratory blank as well as sample; concentration is less than 10 times blank concentration.
[j]Estimated value; measured value is less than the accurately quantitative detection limit.

Table 4-14
VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES AT SITES 2B, LINE SHACK 130-131 DISPOSAL AREA
September 1988
(Concentrations in μg/kg)

Soil Boring No.	Acetone	Methylene Chloride	Benzene	Ethylbenzene	Toluene	Xylenes (Total)	2-Butanone (MEK)	4-Methyl-2-pentanone	Carbon Disulfide	Trichloroethylene
B1 - S1	--	64	--	--	--	--	--	--	--	--
S2	--	580	--	--	--	--	--	--	--	--
S3	--	15	--	--	--	--	--	--	--	--
B2 - S1	--	--	--	--	--	--	--	--	--	--
S2	--	--	--	--	--	--	--	--	--	--
S3	140	840	--	--	--	--	--	--	--	--
B3 - S1	--	130	--	85	--	480	--	--	--	--
S2	--	--	--	--	--	--	--	--	10	--
S3	180	660	--	--	--	--	--	--	--	32
B4 - S1	65	390	--	11	10	18	--	--	--	--
S2	26	30	--	--	--	--	--	--	13	--
S3	--	78	--	--	--	--	--	--	--	54
B5 - S1	--	--	--	--	--	--	--	--	--	--
S2	--	--	--	--	--	--	--	--	--	--
S3	--	--	--	--	--	--	--	--	--	--
B6 - S1	--	220	--	--	6	--	--	--	--	--
S2	--	300	--	--	--	--	--	--	--	--
S3	--	260	--	--	--	--	--	--	--	--
B7 - S1	--	160	--	--	--	--	--	--	--	--
S2	--	180	--	--	--	--	--	--	--	--
S3	--	26	--	--	--	--	--	30	--	--
B8 - S1	38	12[a]	--	7	--	7	--	--	--	--
S2	63	17[a]	12	32	110	7	--	--	10	--
S3	--	160	--	--	--	--	--	--	--	--

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Table 4-14
VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES AT SITES 2B, LINE SHACK 130-131 DISPOSAL AREA
September 1988
(Concentrations in μg/kg)

Soil Boring No.	Acetone	Methylene Chloride	Benzene	Ethylbenzene	Toluene	Xylenes (Total)	2-Butanone (MEK)	4-Methyl-2-pentanone	Carbon Disulfide	Trichloroethylene
B9 - S1	82	12[a]	--	--	--	--	--	--	--	--
S2	--	13[a]	--	--	--	--	--	--	--	--
S3	57	31[a]	--	--	--	--	--	--	--	--
B10 - S1	92	41[a]	--	--	--	--	--	--	--	--
S2	240	--	--	--	--	--	27	--	--	--
S3	--	--	--	--	--	--	--	--	--	--
B11 - S1	--	14[a]	--	--	--	--	--	--	--	--
S2	--	460[e]/140[b]	--	--	17[b]/6[a]	--	--	--	--	--
S3	--	150[b]	--	--	--	--	--	--	--	--
B12 - S1	--	17[a]	--	--	--	--	--	--	--	--
S2	47[a]	16[a]	--	--	--	--	17	--	18	--
S3	28[a]		--	--	--	--	--	--	--	--
B13 - S1	--	24	--	--	--	--	--	--	--	--
S2	--	69	--	--	--	--	--	--	--	--
S3	--	--	--	--	--	--	--	--	--	--
B14 - S1	--	55[a]	--	--	--	--	--	--	--	--
S2	57	--	--	--	--	--	--	--	--	--
S3	--	15[a]	--	--	--	--	--	--	--	--
B15 - S1	14	17[a]	--	--	--	--	--	--	--	--
S2	--	17[a]	--	--	--	--	--	--	--	--
S3	--	12[d]/21[a]	--	--	--	--	--	--	--	--

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Table 4-14
VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES AT SITES 2B, LINE SHACK 130-131 DISPOSAL AREA
September 1988
(Concentrations in μg/kg)

Soil Boring No.	Acetone	Methylene Chloride	Benzene	Ethylbenzene	Toluene	Xylenes (Total)	2-Butanone (MEK)	4-Methyl-2-pentanone	Carbon Disulfide	Trichloroethylene
MW4 - S1	34[a]	36[a]	--	--	--	--	--	--	--	--
S2	49[a]	19[a]	--	--	--	--	--	--	--	--
S3	39[a]	32[a]	--	--	--	--	--	--	--	--
MW5 - S1	47[a]	--	--	--	--	--	--	--	--	--
S2	120[a]	120[b]	--	--	--	--	--	--	--	--
S3	--	--	--	--	--	--	--	--	--	--
MW6 - S1	--	--/20[a]	--	--	--	--	--	--	--	--
S2	41[a]	--	--	--	--	--	--	--	--	--
S3	--	490[b]	--	--	--	--	--	--	--	--
Surface Soil No.										
SS1	--	430	--	--	--	--	--	--	--	--
SS2	--	--	--	--	--	--	--	--	--	--
SS3	--	--	--	--	--	--	--	--	--	--
SS4	57	42[a]	--	--	--	--	--	--	--	--
SS5	--	21[a]	--	--	--	--	--	--	--	--

Notes:

12/12 Indicates sample result and duplicate sample result.
All values not reported were below detection limits.

Sample Depths:
S1--0 to 2 feet
S2--3 to 5 Feet
S3--8 to 10 feet

[a]Compound found in blank as well as in sample. Sample concentration less than 10 times blank concentration.
[b]Compound found in blank as well as in sample. Sample concentration greater than 10 times blank concentration.
(--) = not detected

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The contamination in Area 1 was first identified in 1986 (CH2M HILL, 1986). Since then, the VOC concentrations in this area have changed over time, but the relative difference in concentrations between the three affected wells has changed little. Well 2B-MW1 has typically contained the highest level of VOC contamination at this site, suggesting that it is located relatively close to a contaminant source. However, the total concentration of VOCs detected in 2B-MW1 declined by more than half (from roughly 2,400 to approximately 750 μg/l) between 1986 and 1988, and between 1988 and 1990 there has been essentially no change in the total VOC concentration in 2B-MW1. The variation in total VOC concentration with time suggests that the source may be inactive or at least less active than at previous times.

The nearest wells downgradient of 2B-MW1 (2B-MW2 and 2B-MW3) have very different records of contamination from each other. Concentrations of total VOCs in 2B-MW2 have consistently remained at least 2 orders of magnitude less than in 2B-MW1, despite the apparent direction of groundwater flow from 2B-MW1 toward 2B-MW2 and the relatively short distance (less than 150 feet) between these wells. One possible explanation for this may be the fact that 2B-MW2 is screened over a slightly (5 feet) deeper interval than 2B-MW1, and this difference may just be enough for 2B-MW2 to miss the portion of the aquifer with a higher level of contamination.

Another possible explanation may be that the contaminants have not had sufficient time to reach 2B-MW2 from 2B-MW1. Using the values of average linear groundwater velocity determined for this site, one can generate a range of estimated travel times for groundwater to migrate from 2B-MW1 to 2B-MW2, a distance of approximately 120 feet. The resulting travel times range from 1.5 to 8.5 years. As described above, these values correspond to values of average linear groundwater velocities, and do not take into account various physical and chemical mechanisms such as sorption, which are likely to occur and would act to increase the travel time figures. As a result, the absence of significant VOC contamination in 2B-MW2 may be because the contaminant plume has not yet arrived.

The total concentration of VOCs in 2B-MW3 is variable between 1986 and 1990. The VOC concentrations were highest in 1988 when the concentrations of 1,1-DCE and TCE were particularly high (420 and 820 μg/l, respectively). Well 2B-MW3 is not along a downgradient streamline from 2B-MW1, but the source of contamination to both wells could be the same. The elevated TCE concentration in 1988 could be the result of a discontinuous source, which resulted in a pulse of contamination passing by the well at that time. This result would also be consistent with the chemical data in 2B-MW1. It is not obvious what caused the one time occurrence of high levels of 1,1-DCE in 2B-MW3 in 1988.

The extent of contamination in Area 1 is generally bounded laterally to the north and east by wells 2B-MW8 through 2B-MW11. The chemical data from each of these wells do not indicate the presence of VOC contamination with the exception of 2B-MW10. Although 2B-MW10 is the most upgradient well in the area, the compounds detected in

this well, 1,1-DCA (16 μg/l) and 1,2-DCE (24 μg/l), do not suggest that the source of the principal VOC contamination in Area 1 (i.e., TCE and VC) is located any longer this far upgradient.

The contamination in Area 2 is less well defined because this area lacks the concentration of monitoring wells found in Area 1. The initial evidence of VOC contamination in this area was discovered in 1988 with the Line Shack Investigation report (CH2M HILL, 1989). At that time, however, VC was not detected in 2B-MW6.

A comparison of the concentrations of contaminants detected in groundwater to relevant federal and state standards is presented in Table 4-15. The federal standards presented in this table are based on the criteria used by the EPA in their determination of whether ICMs or a CMS is appropriate to implement at this site (EPA, 1989). If available, the Safe Drinking Water Act Maximum Contaminant Level (MCL) is used as the principal criterion in the EPA's Health and Environmental Assessment under RCRA. Should a particular contaminant not have an MCL, then the EPA's assessment will use other criteria such as specific health-based standards for carcinogens and systemic toxicants, or Clean Water Act water quality criteria.

With the exception of 1,1-DCA, all of the detected contaminants have either an associated MCL, a proposed MCL, a MCL goal (MCLG), or a Virginia groundwater standard (Virginia Code, Section 62.1-44.15(3)). As a result, the analytical data were only compared against these standards. There are no federal or state health-based or other environmental standards for 1,1-DCA. The concentrations of four VOCs exceed at least one standard at Site 2B. TCE concentrations exceed the MCL for this compound (5 μg/l) in four wells (2B-MW1, 2B-MW2, WB-MW3, and 2B-MW7). Two of these (2B-MW1, 230 μg/l; and 2B-MW3, 230 μg/l) exceed the MCL by two orders of magnitude. VC concentrations exceed the MCL (2 μg/l) in three wells (2B-MW1, 30 μg/l; 2B-MW6, 22 μg/l; and 2B-MW7, 58 μg/l).

In 1988, groundwater samples were collected from 2B-MW1 through 2B-MW6 for metals analysis (Table 4-12). The results show that arsenic was detected below its respective MCL of 50 μg/l in 2B-MW5 (13 μg/l) and 2B-MW6 (17μg/l). The MCLG for arsenic is zero. Mercury was detected in groundwater at levels below its MCL (2 μg/l) in 2B-MW1 (0.4 μg/l), 2B-MW3 (1.0 μg/l), and 2B-MW6 (0.5 μg/l).

Zinc was detected at or above the Virginia groundwater standard (50 μg/l) in all six wells sampled at this site in 1988. The concentrations of dissolved zinc, however, were all below the national secondary drinking water standard of 5,000 μg/l set under the federal Safe Drinking Water Act. Secondary standards are non-enforceable and set limits for contaminants in drinking water which may affect its aesthetic quality. In addition, there was no obvious trend in zinc concentrations between upgradient and downgradient wells, which suggests that the zinc concentrations are independent of past waste disposal activities at the site and may be attributed to natural background conditions.

Table 4-15
CONTAMINANTS DETECTED AT SITE 2B COMPARED AGAINST POTENTIALLY APPLICABLE FEDERAL AND STATE STANDARDS
August 1990
(Concentrations in $\mu g/l$)

Chemical	Location Detected	Concentration	MCL	MCLG	Proposed MCL	Virginia Groundwater Standard
Benzene	2B-MW5 2B-MW7 2B-MW10	1[j] 2[j] 1[j]	5	Zero	-	-
1,1-Dichloroethylene	2B-MW1	10[j]	7	7	--	-
1,2-Dichloroethylene (total)	2B-MW1 2B-MW3	400 140	--	--	70/100[a]	-
Trichloroethylene	2B-MW1 2B-MW2 2B-MW3 2B-MW7	230 7 230 18	5	Zero	--	-
1,1-Dichloroethane	2B-MW1 2B-MW3 2B-MW5 2B-MW7 2B-MW10	50 18 12 110 16	-	-	-	-
1,2-Dichloroethane	2B-MW7	3[j]	-	-	-	-
Vinyl chloride	2B-MW1 2B-MW6 2B-MW7	30 22 58	2	Zero	--	-

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Table 4-15
CONTAMINANTS DETECTED AT SITE 2B COMPARED AGAINST POTENTIALLY APPLICABLE FEDERAL AND STATE STANDARDS
August 1990
(Concentrations in μg/l)

Chemical	Location Detected	Concentration	MCL	MCLG	Proposed MCL	Virginia Groundwater Standard
TPH	2B-MW1	220				
	2B-MW2	110				
	2B-MW3	70				
	2B-MW4	390				
	2B-MW5	200				
	2B-MW6	290	-	-	-	1,000
	2B-MW7	185				
	2B-MW8	130				
	2B-MW9	300				
	2B-MW10	140				
	2B-MW11	240				

Notes:

Chemicals detected in laboratory blanks are not included.
MCL = Safe Drinking Water Act Maximum Contaminant Level is the maximum permissible level of a contaminant in water, which is delivered to any user of a public water system. Standards current as of April 1990.
MCLG = Safe Drinking Water Act Maximum Contaminant Level Goal is a nonenforceable concentration of a drinking water contaminant that is protective of adverse human health effects and allows an adequate margin of safety. Standard given is current as of April 1990.
Virginia groundwater standards: Virginia Code, Section 62.1-44.15(3).
(-) = Concentration below detection limit

[a]70 μg/l and 100 μg/l are standards for cis- and trans-isomers, respectively. "Total" includes both isomers.
[j]Estimated value. Measured value was less than the quantitative detection limit.

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Both iron and manganese were detected in all wells above their respective national secondary drinking water standards of 300 μg/l and 50 μg/l. There are no federal or state standards for calcium, sodium, or magnesium, concentrations of which were detected in all wells.

The analytical results from the two samples of surface water collected during this investigation indicated that the VOC contamination detected in the local groundwater is not currently entering the perennially flowing ditch on the south side of the site. Concentrations of TPH at both surface-water locations (1,770, and 2,610 μg/l) were elevated above the Virginia standard for TPH of 1,000 μg/l. Based on the location of the samples and the direction of flow in the ditch (toward the east), this TPH contamination is most likely not generated at Site 2B.

RECOMMENDATIONS

Future work at this site should address the two different areas of groundwater contamination separately. At Area 1 the existing data base is sufficient to begin a systematic investigation to identify the source of groundwater contamination. Although the existing data infer a general location for the groundwater contamination in this area, a more detailed identification is important to guide remediation. The source may no longer exist at a scale that can be positively identified, but that conclusion can only be made after initiating a program that combines in-situ groundwater sampling with soil sampling and chemical analysis in the field. This program should consist of: (1) collecting samples of groundwater at a minimum of five locations using in-situ techniques such as that made possible by Geoprobe and Hydropunch equipment, (2) using a mobile laboratory to analyze the groundwater samples for selected VOCs (e.g., TCE, 1,2-DCE, VC, etc.), (3) collecting samples of soil from approximately 2 to 3 feet in depth using hand augers in the immediate vicinity of where the in-situ groundwater samples indicate the highest concentration of contaminants, and (4) using the mobile laboratory to analyze the soil samples for selected VOCs and shipping selected soil samples to a properly certified laboratory for more specific VOC analyses. The general location where the Area 1 source investigation should focus is shown in Figure 4-10. The spatial distribution of soil samples should be uniform, and follow a rectangular grid with sample points not more than 10-feet apart.

In addition to this work, it is recommended that two more wells be installed. First, in order to determine the potential vertical extent of contamination at this site a single deep well (approximately 60 feet deep) is proposed adjacent to 2B-MW1 (Figure 4-10). Second, to reduce the uncertainties raised by the lack of detection of significant VOC contamination in 2B-MW2, a single shallow well is proposed for the south side of the drainage ditch, west of 2B-MW8. It is recommended that insitu groundwater samples be collected and analyzed in a mobile lab to determine the best location of this monitoring well. No well is proposed upgradient of 2B-MW10 at this time, the parameters

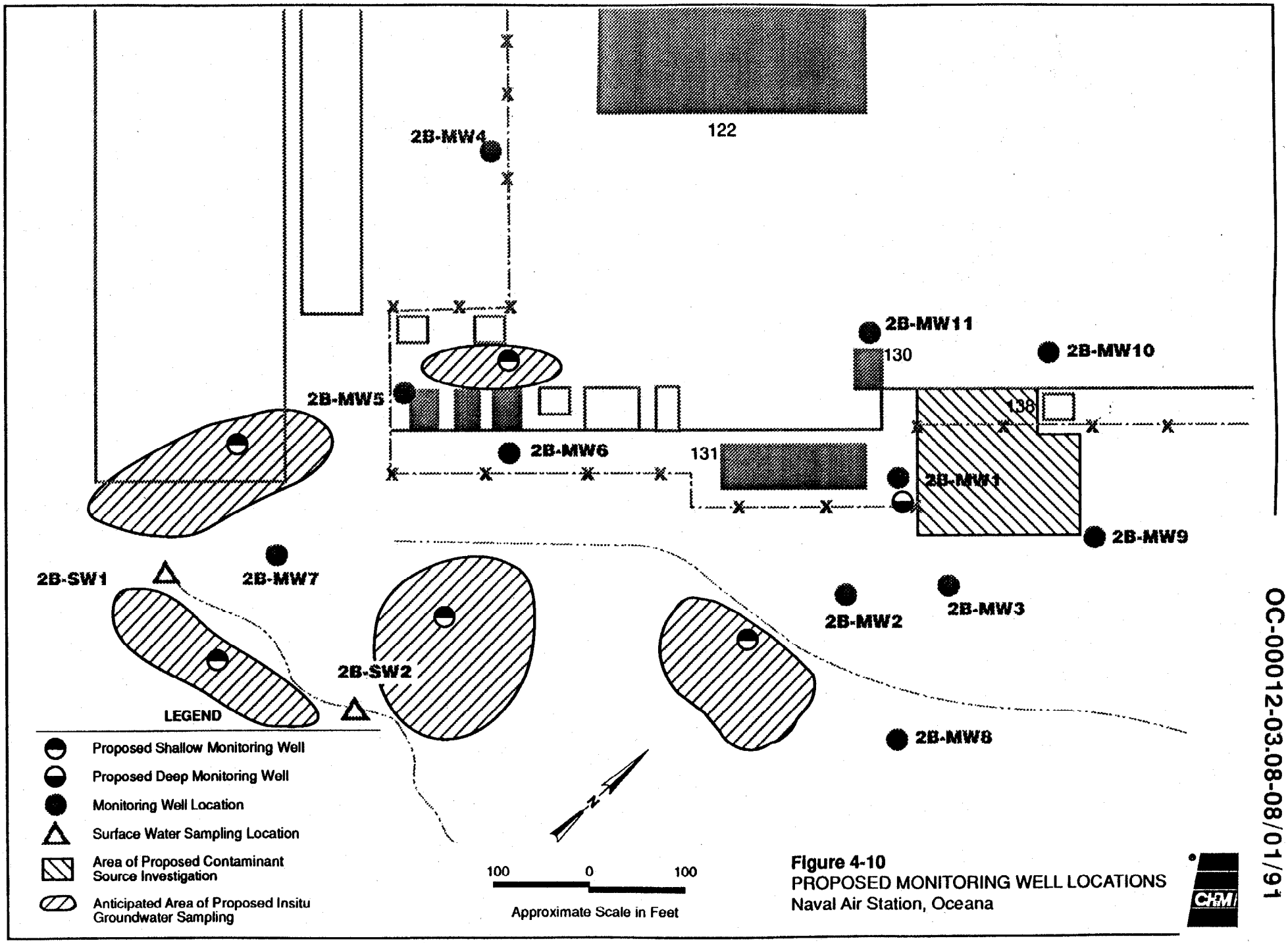

Figure 4-10
PROPOSED MONITORING WELL LOCATIONS
Naval Air Station, Oceana

CH2M

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detected do not currently exceed potentially applicable standards, and a second round of sampling is necessary before further recommendations should be made. All existing wells should be resampled. The chemical analyses conducted on groundwater samples collected in the future should be limited to VOCs.

At Area 2, more groundwater investigation is needed to help define the source and extent of shallow groundwater contamination. Accordingly, the installation of four additional shallow monitoring wells is recommended. The general locations of the proposed wells are shown in Figure 4-10. It is recommended that insitu groundwater samples be collected and analyzed in a mobile lab to determine the best locations for these monitoring wells. It is also recommended that the existing wells be resampled. The chemical analyses performed on all groundwater samples may be limited to VOCs. Lastly, it is recommended that the elevation of the water level in the perennially flowing drainage ditch be surveyed to determine the relationship between the ditch and local groundwater flow.

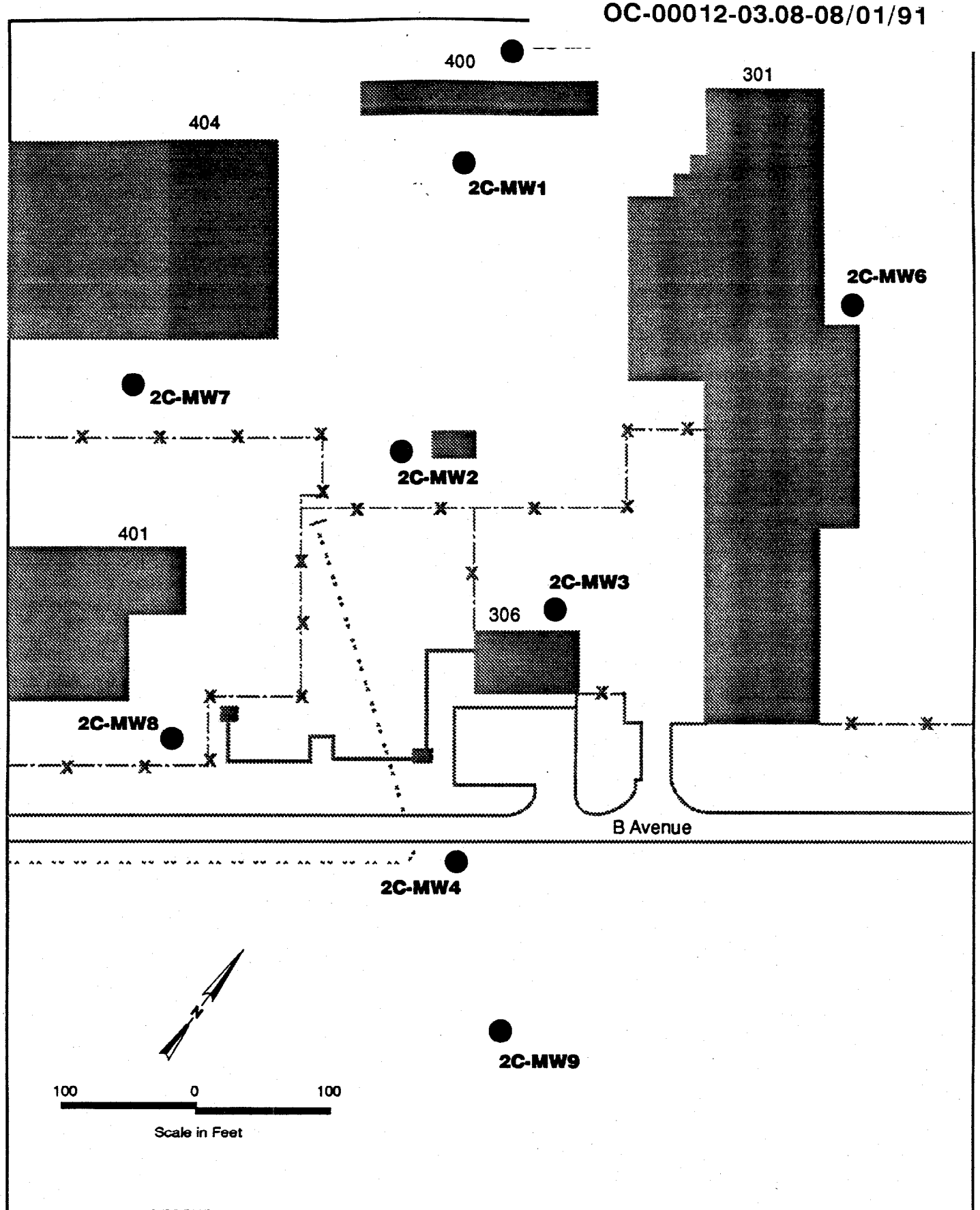
SITE 2C--LINE SHACK 400 DISPOSAL AREA

SITE HISTORY

Site 2C consists of the area adjacent to Line Shack 400, bounded by Buildings 301, 401, and 404 (Figure 4-11). The principal activities at the site have involved aircraft maintenance and cleaning. The IAS reported that from the time that Line Shack 400 was constructed in 1963 until the early 1980s, when the area immediately around the building was covered with concrete, various maintenance and cleaning chemicals were discarded onto the uncovered surface (RGH, 1984).

ENVIRONMENTAL SETTING

Most of the site is on the flight line. As a result, much of the site is flat and covered with either concrete or asphalt. Cores through the concrete reveal that it is approximately 18 inches thick with large aggregate up to 4 inches in diameter. Off the flight line the ground surface is mostly planted with a grass cover. The exception is the fenced area around Building 401, which is covered with asphalt. Currently, the paved portion of the flight line is drained by flush-mounted grates which, during aircraft cleaning activities, direct runoff to an oil-water separator by underground pipes. During storm events the discharge is directed past the oil-water separator. The grassed area of the site drains to an unlined ditch which cuts across the lawn, directing water toward B Avenue before entering a culvert to cross the road. This unlined ditch also receives runoff from storm drains originating from buildings 404 and 400.



LEGEND

● Monitoring Welll Location

** ** Drainage Ditch

Figure 4-11
SITE 2C
GENERAL LOCATION MAP SHOWING MONITORING WELLS
Naval Air Station, Oceana

CH2M HILL

Based on boreholes drilled during this and previous investigations, the shallow subsurface geology at this site consists of two general units. The upper-most unit is a fine-textured layer comprised primarily of silty clay and clayey silt, which is 4 to 11 feet thick. This unit is underlain by a layer of clean and silty sands. All monitoring wells at this site are screened in this lower unit. Locally, the average depth to groundwater ranges from approximately 7 to 9 feet below grade.

INTERIM RFI ACTIVITIES

Field activities at Site 2C during this investigation included the installation and sampling of five shallow monitoring wells (2C-MW5 through 2C-MW9), the sampling of four existing monitoring wells installed during a previous investigation of the site (2C-MW1 through 2C-MW4), and performing in-situ hydraulic conductivity tests in six of the nine wells (2C-MW1 through 2C-MW3, 2C-MW6, 2C-MW7, and 2C-MW9). The details of the monitoring wells located at this site are summarized in Table 4-16. The locations of all of the monitoring wells are shown in Figure 4-11. All water samples were analyzed for VOCs, EDB, and TPH.

INVESTIGATION RESULTS

Water-Level Data

Water-level data for all wells at this site collected in August, 1990, are presented in Table 4-17. The water-level elevations from this table are contoured in Figure 4-12 to create a map of the water-table surface over this site. The 1990 data are consistent with the water-level measurements made in 1988, which indicate that the principal direction of shallow, unconfined, groundwater flow at this site is generally toward the south.

Hydraulic Conductivity Data

In-situ hydraulic tests were performed at six of the nine monitoring wells at site 2C. The results of these tests are presented in Table 4-18. The values calculated at this site range from approximately 1×10^{-3} to 9×10^{-3} cm/s. This range is typical for relatively permeable silty sands (Freeze and Cherry, 1979), and is consistent with the stratigraphy encountered at this site.

A range of average linear groundwater velocities at this site can be calculated based on: The results of the in-situ permeability tests performed at this site (e.g., a geometric mean of hydraulic conductivity values of 4×10^{-3} cm/s), (2) a range of approximated values of the local hydraulic gradient (0.0008 to 0.006) obtained from Figure 4-12, and (3) a range of approximated effective porosity values (0.1 to 0.3). Using these numbers, the resulting range of average linear groundwater velocity at this site is between approximately 11 and 248 feet per year.

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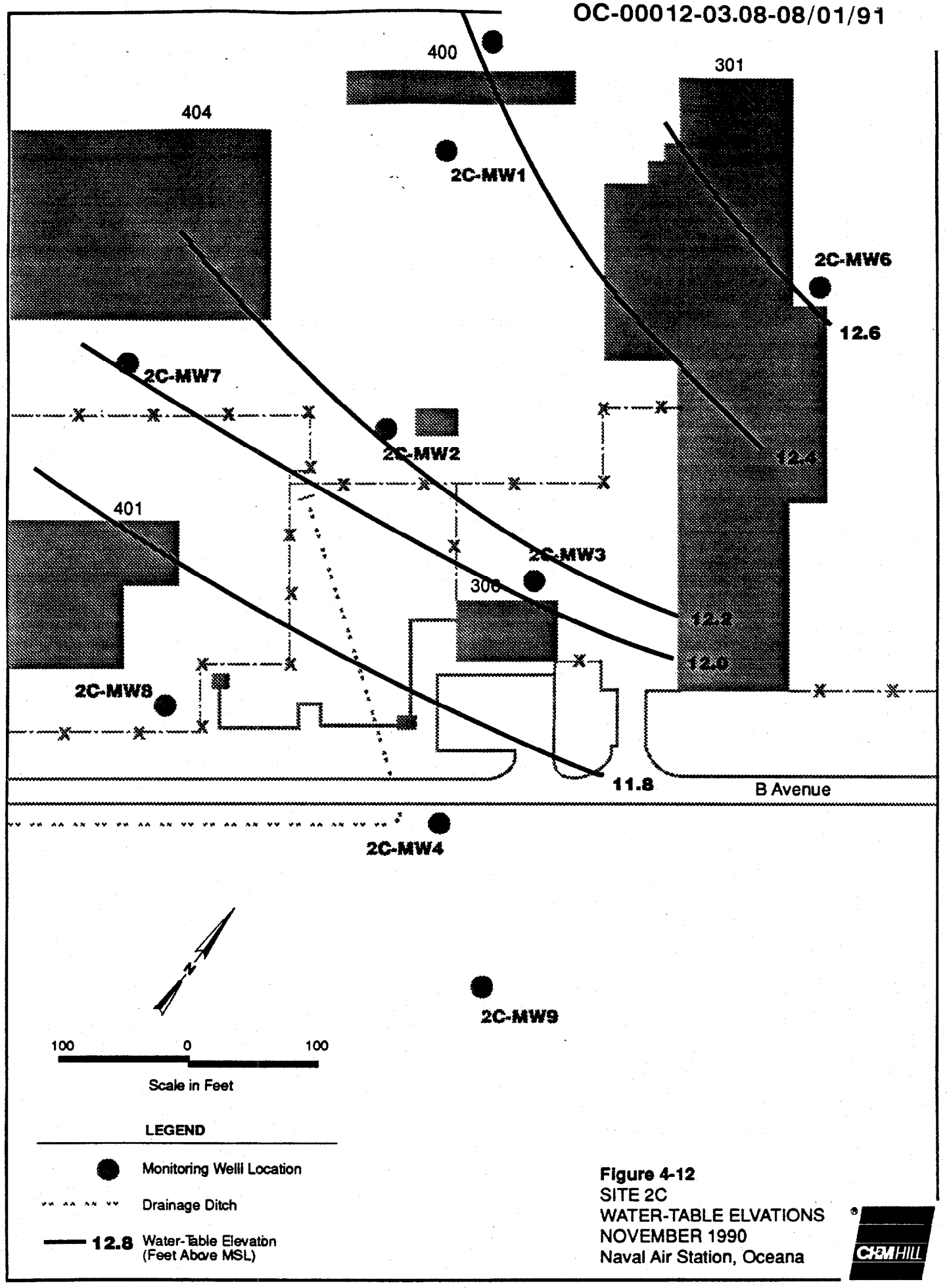

Figure 4-12
SITE 2C
WATER-TABLE ELVATIONS
NOVEMBER 1990
Naval Air Station, Oceana

CH2M HILL

Table 4-16
SITE 2C MONITORING WELL SUMMARY

Well Number	Date Installed	Ground Elevation (feet above MSL)	Total Depth (feet)	Screened Interval (feet below ground surface)
2C-MW1	9/13/88	20.5	20	10-20
2C-MW2	9/9/88	20.8	20	10-20
2C-MW3	9/9/88	20.0	18	8-18
2C-MW4	9/14/88	17.0	18	8-18
2C-MW5	7/12/90	20.4	16	6-16
2C-MW6	6/29/90	20.7	21	11-21
2C-MW7	7/5/90	20.8	19	9-19
2C-MW8	7/3/90	19.0	17	7-17
2C-MW9	7/3/90	17.0	17.5	7.5-17.5

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Table 4-17
SITE 2C WATER-LEVEL DATA
NOVEMBER, 1990

Well	Depth to Water (Feet below Survey Datum)	Water-Level Elevation (Feet Above Mean Sea Level)
2C-MW1	7.77	12.37
2C-MW2	7.98	12.25
2C-MW3	9.25	12.04
2C-MW4	7.81	11.75
2C-MW5	7.90	12.52
2C-MW6	10.57	12.61
2C-MW7	8.80	12.01
2C-MW8	7.29	11.76
2C-MW9	7.72	12.61

WDCR509/043.51

Table 4-18 2C IN-SITU HYDRAULIC CONDUCTIVITY RESULTS	
Well	**Hydraulic Conductivity (cm/sec)**
2C-MW1	1×10^{-3}
2C-MW2	4×10^{-3}
2C-MW3	3×10^{-3}
2C-MW6	5×10^{-3}
2C-MW7	6×10^{-3}
2C-MW9	9×10^{-3}

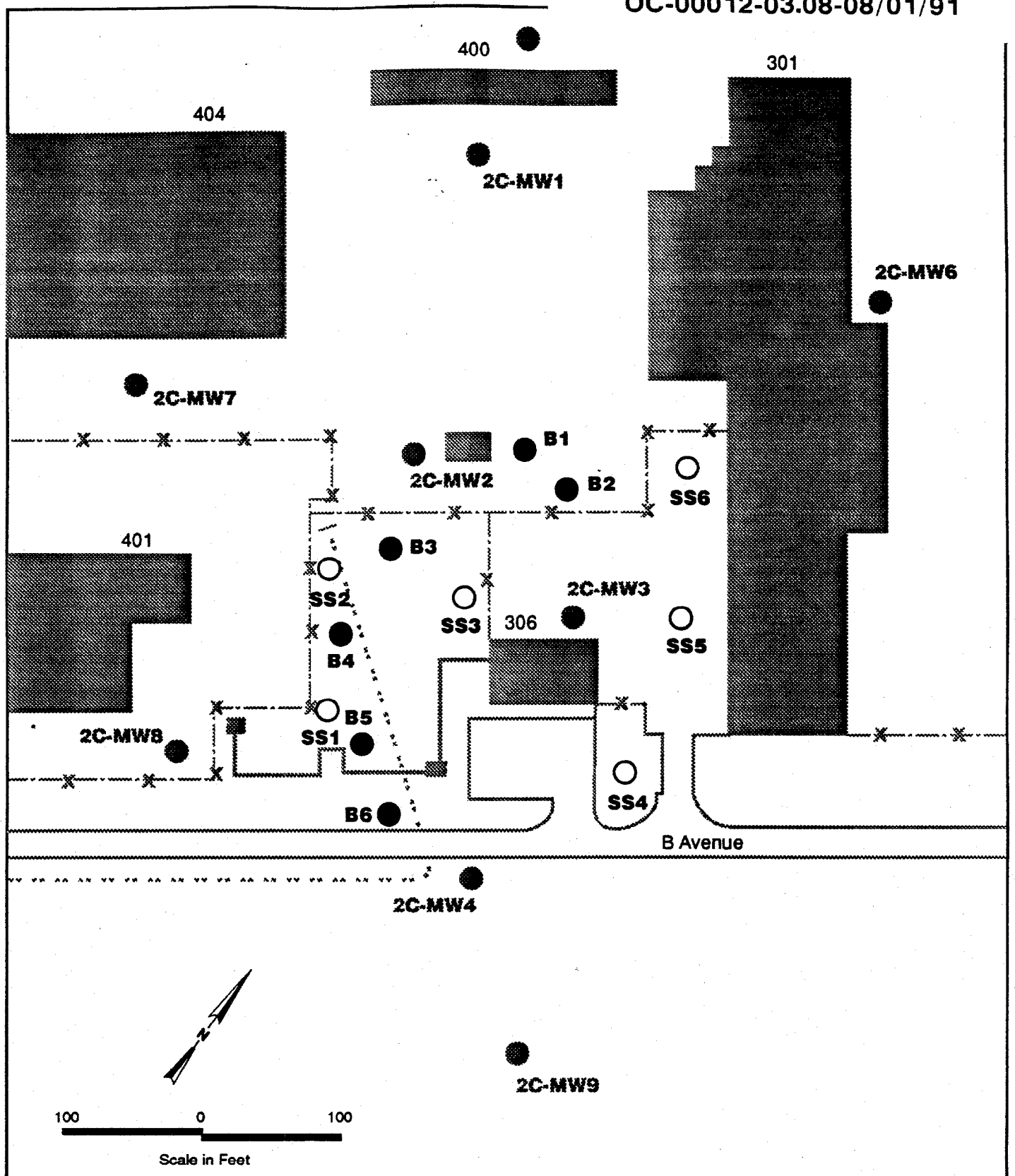
Chemical Data

The organic chemical data obtained to date for all monitoring wells at this site is shown in Table 4-19. Data on dissolved metals concentrations collected in 1988 from the four previously installed wells are summarized from CH2M HILL (1989) in Table 4-20. Also presented are VOC data from CH2M HILL (1989) on soil samples collected from six shallow boreholes in 1988 (Table 4-21). The locations of these boreholes are shown in Figure 4-13.

The chemical data indicate that a variety of VOCs are present in the groundwater at this site. The most prevalent compounds detected include DCE, VC, and TCE. Also detected in groundwater at this site were chloroethane, DCA, and 2-butanone.

Figure 4-14 shows the concentrations of TCE, DCE, and VC in Site 2C monitoring wells as of August, 1990. The spatial distribution of the concentration of these compounds, together with the water-level information presented in Figure 4-12, suggest that there may be more than one source of the groundwater contamination. The data in these two figures also indicate that 2C-MW5 and 2C-MW6 are in upgradient locations which suggest that the contaminant sources are/were primarily within the current bounds of the 2C study area.

The high concentrations of VC and 1,2-DCE in 2C-MW1 and only low concentrations of 1,2-DCE in 2C-MW5 suggest that the source of contamination in 2C-MW1 is likely to be close to this well. The detection of the same contaminants at lower concentrations in 2C-MW7, which is downgradient from 2C-MW1, suggests that the source of contamination in these two wells may be the same.



LEGEND

- Monitoring Welll Location
- Drainage Ditch
- Soil Boring Location (1988)
- Surface Soil Sampling Location (1988)

Figure 4-13
SITE 2C
LOCATIONS OF SOIL BORINGS
DRILLED IN 1988
Naval Air Station, Oceana

CH2M HILL

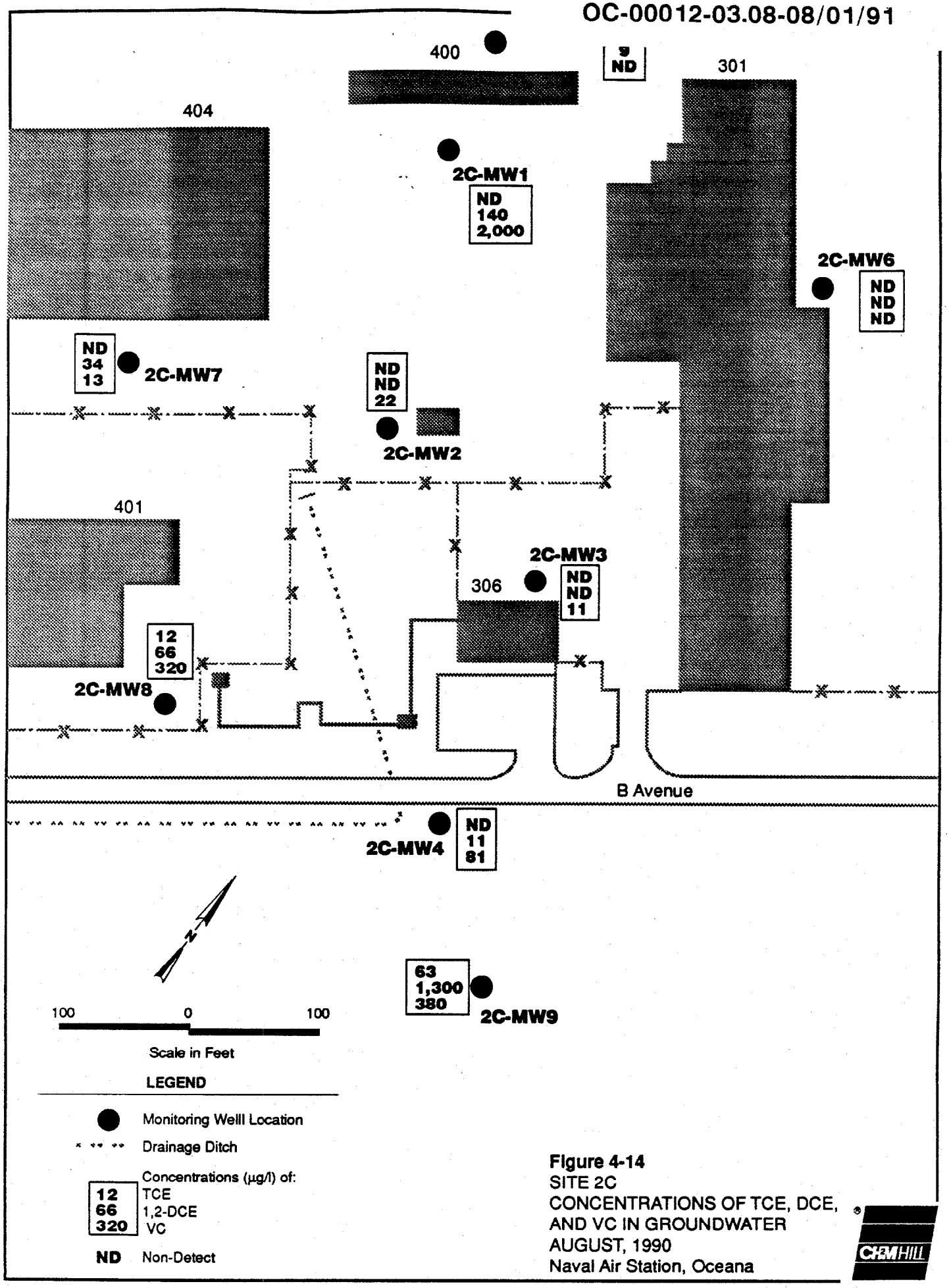


Figure 4-14
SITE 2C
CONCENTRATIONS OF TCE, DCE, AND VC IN GROUNDWATER
AUGUST, 1990
Naval Air Station, Oceana

CH2M HILL

Table 4-19
ORGANIC COMPOUNDS IN GROUNDWATER AT SITE 2C, LINE SHACK 400 DISPOSAL AREA
(Concentrations in µg/l)

Analyte	Detection Limit	2C-MW1			2C-MW2		2C-MW3		2C-MW4		Production Well	2C-MW5	2C-MW6	2C-MW7	2C-MW8	2C-MW9
		Sept. 88	Aug. 90	Duplicate Aug. 90	Sept. 88	Aug. 90	Sept. 88	Aug. 90	Sept. 88	Aug. 90	Sept. 88	Aug. 90	Aug. 90	Aug. 90	Aug. 90	Aug. 90
EDB	0.02	NA	--	--	NA	--	NA	--	NA	--	NA	NA	--	--	--	--
TPH	60	NA	260	360	NA	280	NA	290	NA	380	NA	160	--	140	150	170
Volatile Organic Compounds:																
Acetone	10	13	$7^{b,j}$	210^{b}	30	22^{b}	--	$9^{b,j}$	--	$5^{b,j}$	18	10^{b}	$9^{b,j}$	10^{b}	$8^{b,j}$	$86^{b,j}$
Benzene	5	7	2^{j}	--	--	2^{j}	5	4^{j}	--	1^{j}	--	--	2^{j}	--	3^{j}	--
2-Butanone (MEK)	10	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	5	--	1^{j}	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	10	--	--	--	--	--	--	--	78	31	--	--	--	--	--	
1,1-Dichloroethane	5	--	--	--	--	--	--	3^{j}	25	11	--	--	--	4^{j}	78	
1,2-Dichloroethane	5	--	--	--	--	--	--	--	--	2^{j}	--	--	--	--	--	
1,1-Dichloroethylene	5	--	--	--	--	--	--	--	--	--	--	--	--	--	3^{j}	
1,2-Dichloroethylene (total)	5	2,400	140	130	--	3^{j}	--	--	12	11	--	9	--	34	66	1
Ethylbenzene	5	15	1^{j}	--	--	--	--	1^{j}	--	--	--	--	2^{j}	--	--	
Methylene chloride	5	--	$4^{b,j}$	170^{b}	--	5^{b}	--	$4^{b,j}$	--	6^{b}	--	5^{b}	8^{b}	5^{b}	5^{b}	2
Toluene	5	34	14	20^{j}	--	--	--	--	--	1^{j}	--	--	--	--	--	
Trichloroethylene	5	--	--	--	--	--	--	--	--	2^{j}	--	--	--	--	12	
Vinyl chloride	10	2,500	2,000	1,900	37	22	--	11	210	81	--	--	--	13	320	
Xylenes (total)	5	--	15	$47^{b,j}$	--	$2^{b,j}$	5	$3^{b,j}$	--	2^{j}	--	$2^{b,j}$	5^{b}	$2^{b,j}$	$2^{b,j}$	

Notes:

EDB = Ethylene Dibromide
TPH = Total Petroleum Hydrocarbons
NA = Not analyzed

[b]Compound found in laboratory blank as well as sample; sample concentrations is less than 10 times blank concentration
[j]Estimated value; measured value is less than the accurately quantitative detection limit
(--) Concentration below detection limit

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Table 4-20
RESULTS OF METALS ANALYSIS OF GROUNDWATER SITE 2C, LINE SHACK 400 DISPOSAL AREA
September 1988
(Concentrations in μg/l)

Parameter	2C-MW1	2C-MW2	2C-MW3	2C-MW4	Production Well
Silver	<3	<3	<3	<3	<3
Aluminum	<200	<200	<200	<200	<200
Arsenic	<5	<5	<5	6	<5
Barium	<200	<200	<200	<200	<200
Beryllium	<5	<5	<5	<5	<5
Calcium	60,800	52,300	39,000	33,000	59,200
Cadmium	<3	5	<3	<3	<3
Cobalt	<50	<50	<50	<50	<50
Chromium	<10	<10	<10	<10	<10
Copper	<25	<25	<25	<25	<25
Iron	13,500	8,300	7,100	4,500	3,680
Mercury	<0.2	<0.2	<0.2	<0.2	<0.2
Potassium	40,000	11,500	<5,000	<5,000	<5,000
Magnesium	6,900	8,200	15,900	10,600	14,600
Manganese	610	430	690	350	370
Sodium	37,000	31,000	50,600	44,200	52,700
Nickel	<40	<40	50	<40	<40
Lead	<5	<5	<5	<5	<5
Antimony	<5	<5	<5	<5	<5
Selenium	<5	<5	<5	<5	<5
Thallium	<5	<5	<5	<5	<5
Vanadium	<50	<50	<50	<50	<50
Zinc	170	120	160	120	50

Table 4-21
VOLATILE ORGANIC COMPOUNDS IN SOILS AT SITE 2C LINE SHACK 400 DISPOSAL AREA
September 1988
(Concentrations in μg/kg)

	Acetone	Methylene Chloride	Toluene	Xylenes (Total)	Carbon Disulfide	Vinyl Chloride	1,1-Dichloroethane	Chloroform
Soil Boring No.								
B1--S1	--	170[a]	--	--	--	--	--	6[a]
S2	17[a]	--	--	--	--	--	--	7[a]
B2--S1	--	130[a]	--	--	--	--	--	--
S2	--	--	--	--	--	--	--	--
B3--S1	--	--	--	--	--	--	--	8[a]
S2	--	--	--	--	--	--	--	--
B4--S1	16[a]	29[a]	--	--	--	--	--	8[a]
S2	--	--	--	--	--	--	--	--
B5--S1	--	--	--	--	--	--	--	8[a]
S2	110[a]/62	160[a]/10[a]	--	--	--/45	--	--	--
B6--S1	--	--	--	--	--	--	--	--
S2	--	110[a]	--	--	17	--	--	--
Monitoring Well No.								
MW2--S1	--	36[a]	--	--	--	--	--	--
S2	--	140[b]	--	--	--	--	--	--
S3	--	--	--	--	--	--	--	--
MW3--S1	--	22[a]	--	--	--	--	--	6[a]
S2	--	19[a]	12	--	--	30	--	--
S3	--	83[a]	--	--	--	--	9	--

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Table 4-21
VOLATILE ORGANIC COMPOUNDS IN SOILS AT SITE 2C LINE SHACK 400 DISPOSAL AREA
September 1988
(Concentrations in μg/kg)

	Acetone	Methylene Chloride	Toluene	Xylenes (Total)	Carbon Disulfide	Vinyl Chloride	1,1-Dichloroethane	Chloroform
Surface Soil No.								
SS1	--	52	--	--	--	--	--	--
SS2	--	--	--	--	--	--	--	--
SS3	--	89[a]	--	--	--	--	--	--
SS4	--	--	--	--	--	--	--	--
SS5	58[a]	160[a]	6	16	--	--	--	--
SS6	--	18[a]	--	--	--	--	--	--
SS7	--	68[a]	--	--	--	--	--	--

Notes:

All Values not reported were below detection limits.
(--) Concentration below detection limit

Sample Depths:
S1--3 to 5 feet
S2--8 to 10 feet
S3--14 to 16 feet

[a]Compound found in blank as well as sample. Sample concentration less than 10 times blank concentration.
[b]Compound found in blank as well as sample. Sample concentration greater than 10 times blank concentration.

OC-00012-03.08-08/01/91

The contaminant signature in 2C-MW2 and 2C-MW3 is different from that of 2C-MW1 and 2C-MW7 in that the former wells only contain VC. Moreover, 2C-MW2 and 2C-MW3 are not directly downgradient from 2C-MW1. It should be noted that depending on the degree of anisotrophy (i.e., the directional dependence of hydraulic conductivity) a streamline could flow from 2C-MW1 to either 2C-MW2 or 2C-MW3. However, due to the fairly uniform stratigraphy across this site that possibility is unlikely.

Wells 2C-MW2 and 2C-MW3 themselves are not along a common streamline. Consequently, for these wells to have been contaminated from a common source implies that the source is either of a relatively large lateral extent or occurs as a linear feature parallel to a line connecting the two wells. The fact that the principal contaminant detected in both of these wells is VC raises the possibility that the contaminant source may currently be inactive. This observation is based on the fact that VC, although a commonly used chemical in this form, is also a natural daughter product of TCE and DCE degradation.

Well 2C-MW8 contains significant concentrations of VC, TCE, 1,2-DCE, as well as 1,1-DCA (78 μg/l). This well is hydraulically downgradient from the general area of 2C-MW2 and 2C-MW3, but is more contaminated. The three wells could have been contaminated from the same source following a scenario whereby the source is now inactive and the contaminant plume has generally migrated away from 2C-MW2 and 2C-MW3. Another possibility is that the source of contamination in 2C-MW8 is not related to that for 2C-MW2 and 2C-MW3, and instead is somewhere in-between these two sets of wells such as the unlined drainage ditch.

Given the picture of groundwater flow at this site (Figure 4-12), the contamination detected in 2C-MW4 and 2C-MW9 may well be from yet a fourth, and possibly fifth, different source. It is possible that contamination reaching 2C-MW4 is from the drainage ditch, but it is just as likely that it is coming from somewhere else. The source of contamination to 2C-MW9 may be unrelated to Line Shack 400 activities. This contaminant source may be east side of Building 301 and southeast of 2C-MW6, and out of the current bounds of the 2C study area.

Table 4-22 presents a comparison of the detected values against applicable federal and state standards. As was the case with the data from Site 2B, the contaminants present at Site 2C generally have either an associated MCL, proposed MCL, or MCLG. Inasmuch as the EPA will most likely have these federal criteria take precedent over other standards for contaminants in groundwater (EPA, 1989), only these federal standards and the Virginia groundwater standards are included in Table 4-18.

Table 4-22
CONTAMINANTS PRESENT AT SITE 2C COMPARED AGAINST POTENTIALLY APPLICABLE FEDERAL AND STATE STANDARDS
August 1990
(Concentrations in μg/l)

Chemical	Location Detected	Concentration	MCL	MCLG	Proposed MCL	Virginia Groundwater Standard
Benzene	2C-MW1 2C-MW2 2C-MW3 2C-MW4 2C-MW6 2C-MW8	2[j] 2[j] 4[j] 1[j] 2[j] 3[j]	5	Zero	-	-
1,1-Dichloroethylene	2C-MW8	3[j]	7	7	-	-
1,2-Dichloroethylene (total)	2C-MW1 2C-MW9	140 1,300	--	--	70/100*	-
Trichloroethylene	2C-MW8 2C-MW9	12 63	5	Zero	--	-
1,1-Dichloroethane	2C-MW3 2C-MW4 2C-MW7 2C-MW8	3[j] 11 4[j] 78	-	-	-	-
Vinyl Chloride	2C-MW1 2C-MW2 2C-MW3 2C-MW4 2C-MW7 2C-MW8 2C-MW9	2,000 22 11 81 13 320 380	2	Zero	--	
TPH	2C-MW1 2C-MW2 2C-MW3 2C-MW4 2C-MW5 2C-MW7 2C-MW8 2C-MW9	260 280 290 380 160 140 150 170	-	-	-	1,000

Table 4-22
CONTAMINANTS PRESENT AT SITE 2C COMPARED AGAINST POTENTIALLY APPLICABLE FEDERAL AND STATE STANDARDS
August 1990
(Concentrations in μg/l)

Notes:

Chemicals detected in laboratory blanks are not included.
MCL = Safe Drinking Water Act Maximum Contaminant Level. Standards given are current as of April 1990.
MCLG = Safe Drinking Water Act Maximum Contaminant Level Goal. Standards given are current as of April 1990.
Virginia groundwater standards: Virginia Code, Section 62.1-44.15(3).
(-) Concentration below detection limit

[i]70 μg/l and 100 μg/l are standards for cis- and trans-isomers, respectively. "Total" includes both isomers.
[j]Estimated value. Measured value was less than quantitative detection limit.

The results indicate that the most wide-spread contaminant is VC, which is present above its MCL (2 μg/l) in all but the two most upgradient wells. In 2C-MW1 the level of VC (2,000 μg/l) is 1,000 times greater than the MCL. TCE concentrations were detected above their MCL (5 μg/l) in two wells (2C-MW8, 12 μg/l; and 2C-MW9, 63 μg/l), and 1,2-DCE (total) was detected at levels which exceed its proposed MCL in two other wells (2C-MW1, 140 μg/l; and 2C-MW9, 1,300 μg/l). With 1,2-DCE, the proposed MCL differentiates between the cis and trans isomers of this compound, but the laboratory only reported values which combined all isomers.

The results of the analyses for dissolved metals concentrations performed on groundwater samples from 2C-MW1 through 2C-MW4 in 1988 (Table 4-20) are summarized as follows. Arsenic was detected in 2C-MW4 at 6 μg/l, which is below the MCL (50 μg/l) for this element. Nickle was detected in 2C-MW3 at 50 μg/l, which is below the MCL (100 μg/l) for this element. Zinc was detected at or above the Virginia groundwater standard (50 μg/l) in all four wells sampled at this site in 1988. The concentrations of dissolved zinc, however, were all below the national secondary drinking water standard of 5,000 μg/l set under the federal Safe Drinking Water Act. There was no obvious trend in zinc concentrations between upgradient and downgradient wells, which suggests that the concentrations are independent of past waste disposal activities at the site and may be attributed to natural background conditions.

RECOMMENDATIONS

As discussed above, the pattern of groundwater flow coupled with the resulting spatial distribution of contamination suggests that there are multiple sources and destinations for the chemicals detected in groundwater at this site. In order to determine as accurately as possible where the contamination in a particular well is potentially coming from and where it may be going, a systematic approach to implementing further field work at this site should be followed.

The first step in this approach should be the development of an expanded and more detailed site plan. This would involve developing a map from air photos flown specifically for this purpose, utilizing existing maps based on recent air photos, if appropriate, or surveying the locations of monitoring wells, buildings, and other major permanent features, for horizontal control. Superimposing the available water-level and chemical data on a more accurate and expanded base map will enhance the picture of existing conditions, and, in turn, enable better siting of additional monitoring wells and/or soil sampling points which most likely will be required to define the source(s) and extent of contamination.

The current level of information describing Site 2C conditions, however, does enable the following specific recommendations to be made at this time (but not necessarily in this order). First, the vertical extent of the contamination in the vicinity of 2C-MW1 should be addressed. This would involve the installation of a deep monitoring well

(approximately 60 to 70 feet) adjacent to 2C-MW1. The location of the proposed deep well is shown in Figure 4-15.

Second, insitu groundwater samples should be collected adjacent to and upgradient of 2C-MW1 (Figure 4-15). The area of investigation should be at least 25 by 25 feet, initially, and expanded as necessary to identify properly the upgradient extent and hence the approximate location of the contaminant source. Sample collection will require boring through the thick concrete cover. Shallow soil samples (18-24 inches below the ground surface) should be collected in the immediate vicinity of where the insitu groundwater samples indicate the highest concentrations of the analyzed parameters. The samples should be analyzed in the field using a mobile lab for selected VOCs (e.g., TCE, 1,2-DCE, VC, etc.). In addition to field analysis, a limited number of samples should be shipped to a laboratory for confirmation and more specific VOC analyses.

Third, a minimum of two shallow soil samples should be collected from the bottom of the drainage ditch which flows through the central portion of the site (Figure 4-15). Samples should be collected approximately 18 to 24 inches below the ground surface and analyzed for VOCs.

Fourth, a shallow monitoring well should be installed immediately inside the flight line adjacent to the northeast side of Building 301 (Figure 4-15). The purpose of this well is to determine whether the contamination detected in 2C-MW4 and 2C-MW9 had its origin from offsite in that direction.

Fifth, insitu groundwater sampling should be conducted in the undeveloped area south of 2C-MW4 and 2C-MW9 (Figure 4-15). The purpose of this sampling is to determine the extent of contaminant migration down gradient of these wells. Following the insitu sampling and analysis at least three additional shallow and one additional deep monitoring wells should be installed in this area. Monitoring wells are important for the collection of both water-quality and water-level data.

With the exception of the insitu groundwater sampling and analysis, all of the field activities described in the above recommendations should not be implemented until the expanded and more accurate map of this site has been developed. This will enable any potential recommendations that follow from the development of this map to be implemented simultaneously with those proposed here, and enhance the efficiency of the field investigation at this site.

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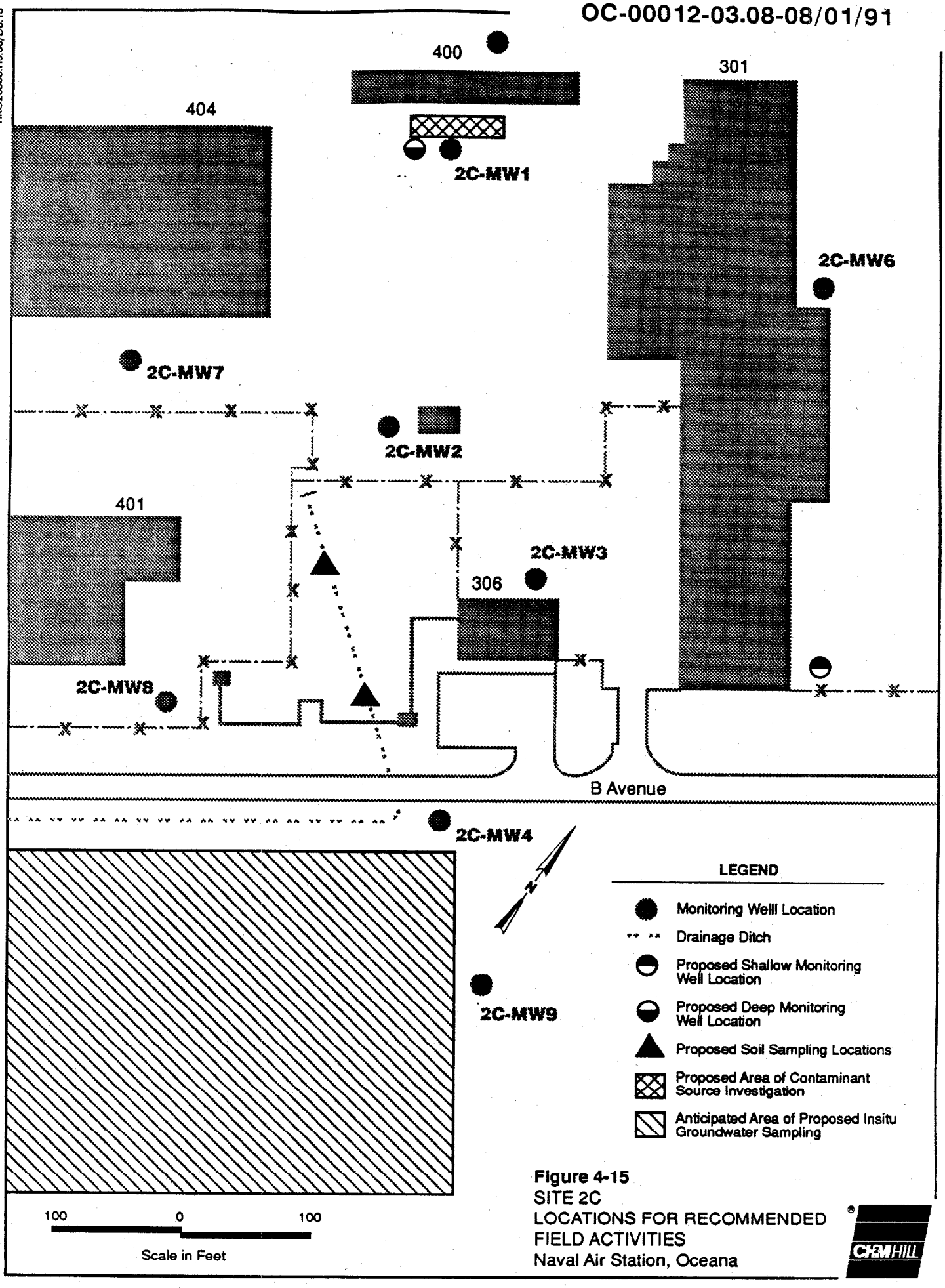

Figure 4-15
SITE 2C
LOCATIONS FOR RECOMMENDED
FIELD ACTIVITIES
Naval Air Station, Oceana

CH2M HILL

SITE 2D--LINE SHACK 125 DISPOSAL AREA

SITE HISTORY

Site 2D consists of the area in the immediate vicinity of Line Shack 125 south of Hangar 111 (Figure 4-16). The IAS reported that soil near Line Shack 125 excavated in the early 1980s was found to be saturated with oily substances down to a depth of approximately 6 feet (RGH, 1984). Like the other line shacks at Oceana, Building 125 was constructed in 1963, and has been a location for aircraft cleaning and maintenance, and equipment and material storage. The IAS identified this area as a place where waste chemicals used for aircraft cleaning and maintenance were discarded onto the ground.

ENVIRONMENTAL SETTING

Most of this site is on the flight line; consequently, most of the site is covered by a generally flat asphalt pavement. Off the flight line, the ground surface slopes down toward a wooded area to the west. Runoff at the site is directed southwest and off the flight line by storm drains.

Shallow boreholes (less than 20 feet deep) drilled for monitoring well installation at this site revealed that the local subsurface sediments consist of clay, sandy silt and silty sand. The clean sand layer present at other Oceana sites was absent. Locally, the depth to groundwater in August, 1990, was approximately 7 feet below grade.

INTERIM RFI ACTIVITIES

Field activities conducted at Site 2D during this investigation consisted of installing and sampling three shallow monitoring wells (2D-MW1 through 2D-MW3). The details of the monitoring wells are summarized in Table 4-23. The locations of these monitoring wells are shown in Figure 4-16. The samples of groundwater were analyzed for VOC, EDB, and TPH concentrations.

Table 4-23
SITE 2D MONITORING WELL SUMMARY

Well Number	Date Installed	Ground Elevation (feet above MSL)	Total Depth (feet)	Screened Interval (feet below ground surface)
2D-MW1	6/28/90	18.9	17	7-17
2D-MW2	7/2/90	22.3	19	9-19
2D-MW3	7/3/90	22.1	19	9-19

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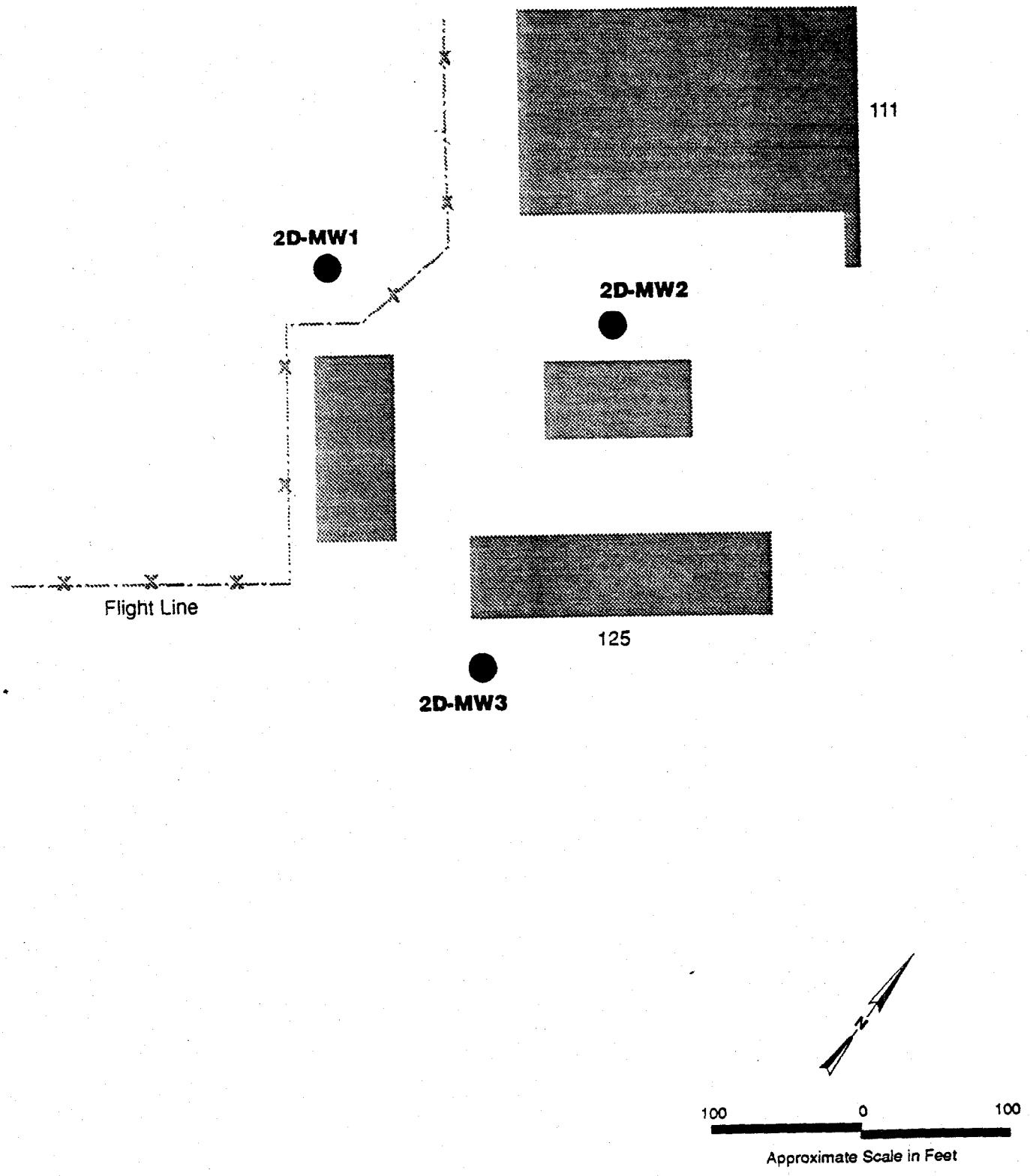

LEGEND

● Monitoring Well Locations

Figure 4-16
SITE 2D
GENERAL LOCATION MAP SHOWING
MONITORING WELLS
Naval Air Station, Oceana

CH2M HILL

INVESTIGATION RESULTS

The results of water-level measurements of all three wells made in August, 1990, are presented in Table 4-24. The water-level elevations from this table are contoured in Figure 4-17 to create a map of the water-table surface over this site. The data suggest that the principal direction of shallow, unconfined, groundwater flow at this site is generally toward the west.

Table 4-24
SITE 2D WATER-LEVEL DATA
AUGUST, 1990

Well	Depth to Water (Feet Below Survey Datum)	Water-Level Elevation (Feet Above Mean Sea Level)
2D-MW1	7.08	14.62
2D-MW2	7.43	14.83
2D-MW3	7.20	14.90

The chemical data from the three wells at this site are presented in Table 4-25. The analytical results indicate that only 2D-MW2 contains detectable concentrations of the parameters analyzed for. Specifically, the compounds detected at accurately quantifiable levels include 1,1-DCA (64 μg/l), 1,1-DCE (9 μg/l) and total xylenes (6 μg/l). Of these compounds, only 1,1-DCE has a relevant federal or state standard to compare the resulting chemical data against. The MCL and MCLG for 1,1-DCE is 7 μg/l; consequently, the concentration of 1,1-DCE in 2D-MW2 (9 μg/l) is above its MCL.

RECOMMENDATIONS

A second round of groundwater samples should be collected from all three wells at this site. The samples should be analyzed for VOCs only. The existing data base is insufficient to support the installation of additional wells or to initiate soil sampling in an effort to identify the source of apparent contamination in 2D-MW2.

SITE 2E--LINE SHACK 109 DISPOSAL AREA

SITE HISTORY

Site 2E is comprised principally of the area behind Line Shack 109 and Hangar 23 (Figure 4-18). Like the other line shacks at Oceana, building 109 was constructed in

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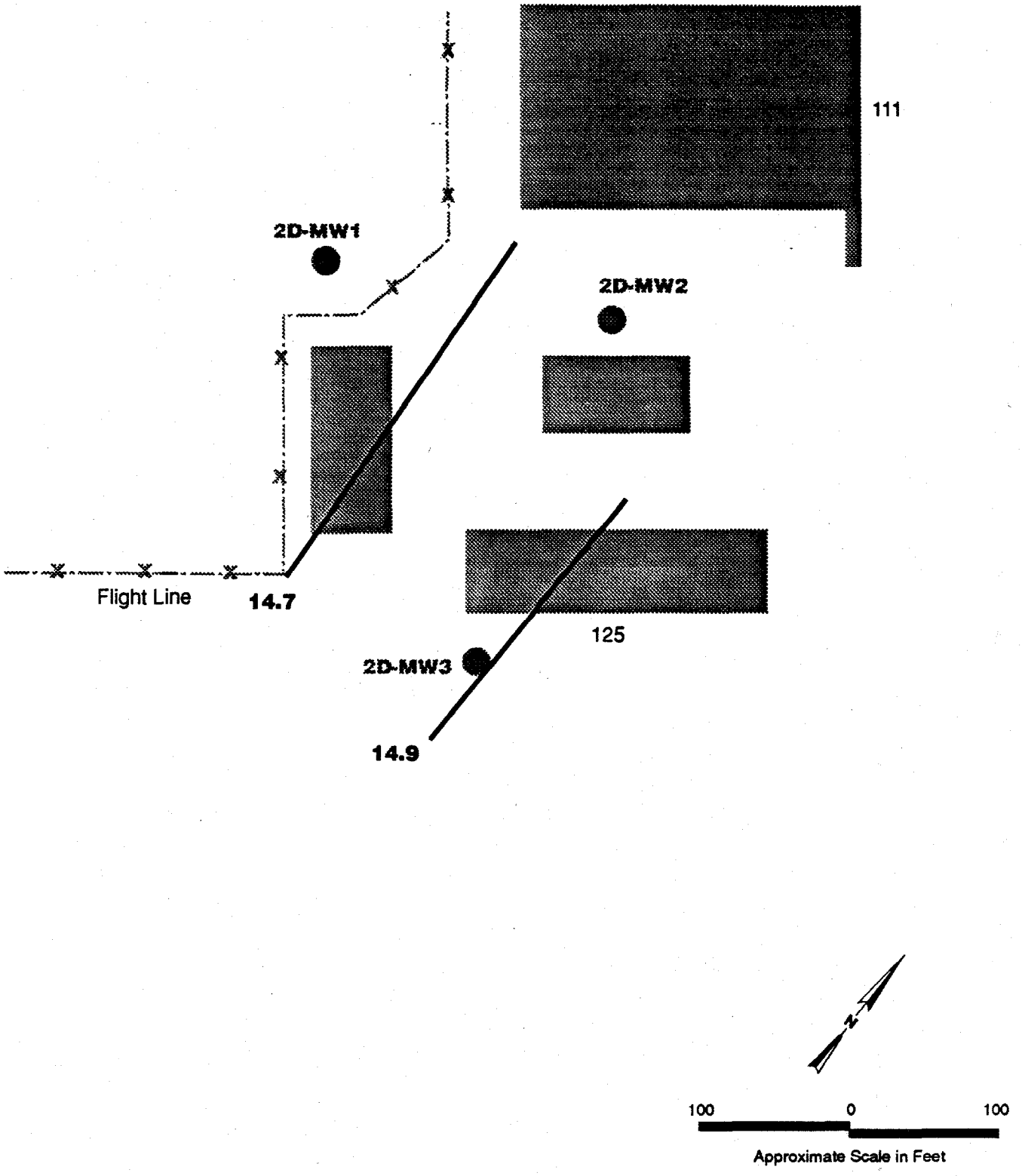


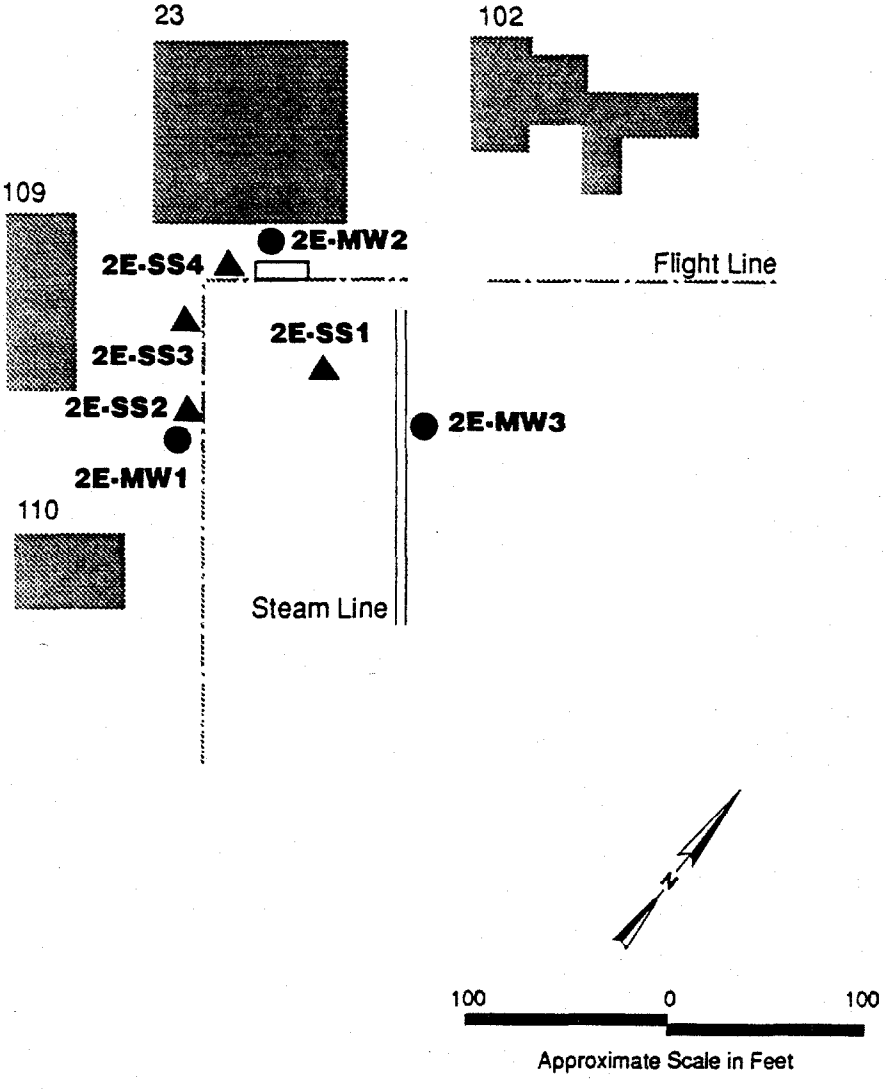
LEGEND

Monitoring Well Locations

14.7 Monitoring Well Locations

Figure 4-17
SITE 2D
WATER-TABLE ELVATIONS
AUGUST, 1990
Naval Air Station, Oceana

CH2M HILL



LEGEND

▲ Soil Sampling Location

● Monitoring Well Location

Figure 4-18
SITE 2E
GENERAL LOCATION MAP SHOWING
MONITORING WELLS AND SOIL
SAMPLING POINTS
Naval Air Station, Oceana

CH2M HILL

Table 4-25
ORGANIC COMPOUNDS IN GROUNDWATER AT SITE 2D, LINE SHACK 125 DISPOSAL AREA
August 1990
(Concentrations in $\mu g/l$)

	Detection Limit	2D-MW1	2D-MW2	2D-MW3
EDB	0.02	--	--	--
TPH	60	360	220	--
Volatile Organic Compounds:				
Acetone	10	5[b,j]	5[b,j]	20[b]
Benzene	5	--	3[j]	-
Carbon disulfide	5	--	--	1[j]
1,1-Dichloroethane	5	--	64	--
1,1-Dichloroethylene	5	--	9	--
1,2-Dichloroethylene (total)	5	--	2[j]	--
Ethylbenzene	5	--	2[j]	--
Methylene chloride	5	4[b,j]	3[b,j]	4[b,j]
Xylenes (total)	5	--	6	--

Notes:
EDB = Ethylene Dibromide
TPH = Total Petroleum Hydrocarbons
(--) = Concentration below detection limit

[b]Compound found in laboratory blank as well as sample; sample concentration is less than 10 times blank concentration.
[j]Estimated value. Measured value is less than the accurately quantitative detection limit.

1963, and has been a location for aircraft cleaning and maintenance, and equipment and material storage. The IAS identified this area as a place where waste chemicals used for aircraft cleaning and maintenance were discarded onto the ground (RGH, 1984).

ENVIRONMENTAL SETTING

Most of the site is on the flight line, and covered with a flat asphalt surface. Off the flight line the site is covered by grass. There is no specifically designed runoff collection or storm drain system at this site. In general, there is a slight slope to the overall topography which directs runoff toward the southeast.

Shallow boreholes (less than 20 feet deep) drilled for monitoring well installation at this site revealed that the subsurface stratigraphy generally consists of two sedimentary units. At the surface is a unit of fine silts and clays that is approximately 7 to 8 feet thick, and beneath this unit is a layer of clean and silty sand that extends to a depth of at least 20 feet. Locally, the depth to groundwater in August, 1990, at this site was approximately 7 feet below grade.

INTERIM RFI ACTIVITIES

Field activities conducted at Site 2E during this investigation consisted of installing and sampling three shallow monitoring wells (2E-MW1 through 2E-MW3), and collecting samples of surface soils at four locations (2E-SS1 through 2E-SS4). The details of the monitoring wells are summarized in Table 4-26, and their locations are shown in Figure 4-18. All of the groundwater samples and three of the soil samples were analyzed for VOC, EDB, and TPH concentrations. The fourth soil sample (2E-SS4) was analyzed for VOCs only.

Table 4-26
SITE 2E MONITORING WELL SUMMARY

Well Number	Date Installed	Ground Elevation (feet above MSL)	Total Depth (feet)	Screened Interval (feet below ground surface)
2E-MW1	6/28/90	20.3	19	9-19
2E-MW2	7/6/90	19.4	18	8-18
2E-MW3	7/2/90	18.9	18	8-18

INVESTIGATION RESULTS

The results of water-level measurements of all three wells made in August, 1990, are presented in Table 4-27. The water-level elevations from this table are contoured in Figure 4-19 to create a map of the water-table surface over this site. The differences in water-level elevations between the three wells are sufficiently low (0.1 foot) to be inconclusive for defining the direction of shallow groundwater flow. However, the data suggest that groundwater locally may be flowing to the south. This flow direction is consistent with nearby Sites 2A and 2C, located to the west of this site.

The chemical data obtained from the three wells at this site are presented in Table 4-28, and the soil analytical data are presented in Table 4-29. The results indicate that the parameters analyzed for in groundwater were either not detected or were detected at levels below the accurately quantifiable level. The same result occurred for the soil analytical data with the exception of TPH, and in one soil sample (2E-SS4), methylene chloride was detected, but at a relatively low level considering it was also detected in the laboratory blank for that sample. TPH was detected in two soil samples (2E-SS2 and 2E-SS3) at concentrations (513 and 242 mg/kg, respectively) that exceed the Virginia standard for TPH in soil (100 mg/kg).

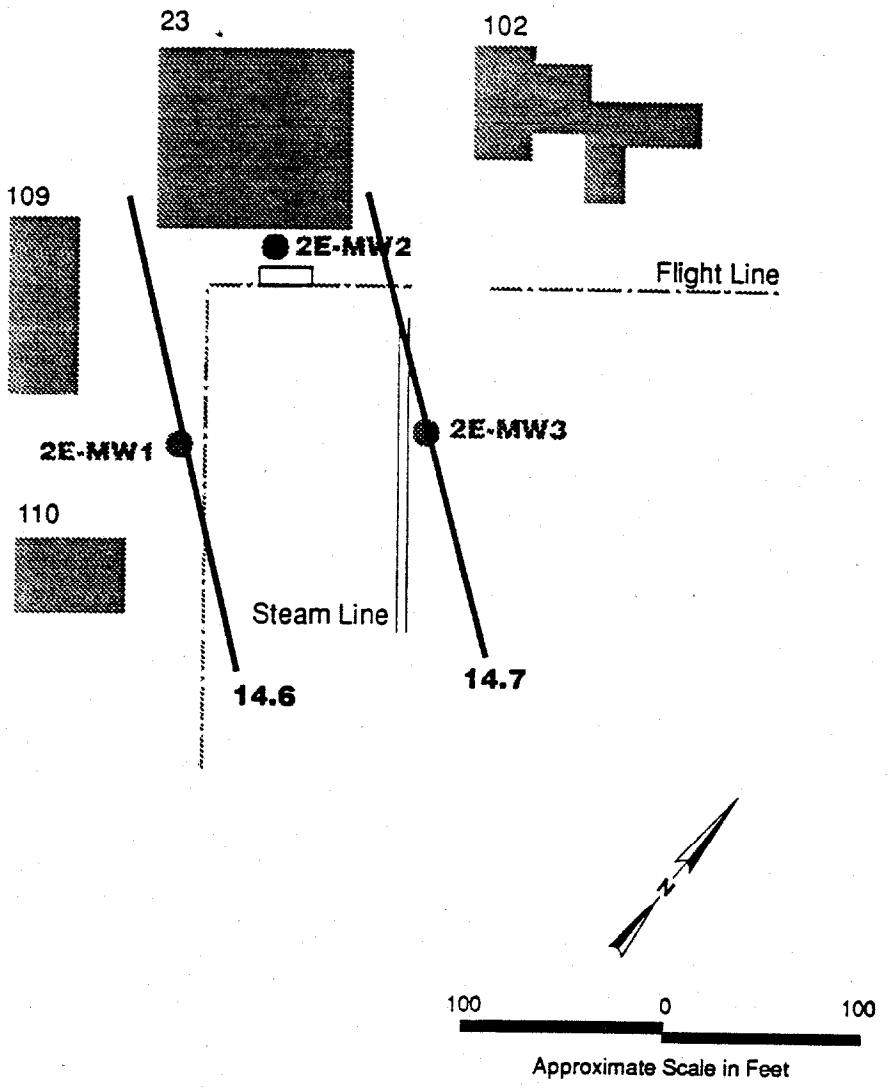
Table 4-27
SITE 2E WATER-LEVEL DATA
AUGUST, 1990

Well	Depth to Water (Feet Below Survey Datum)	Water-Level Elevations (Feet Above Mean Sea Level)
2E-MW1	7.92	14.60
2E-MW2	4.77	14.66
2E-MW3	6.13	14.70

RECOMMENDATIONS

A second round of groundwater samples should be collected from all three wells. The samples should be analyzed for VOCs only. The existing data base is insufficient to support the installation of additional wells at this time.

Following this, a soil sampling program should be initiated in the vicinity of 2E-SS2 and 2E-SS3 to define the extent of TPH contamination in the soil.



LEGEND

● Monitoring Well Location

— **14.6** Water-Table Elevation (Feet Above MSL)

Figure 4-19
SITE 2E
WATER-TABLE ELEVATIONS
AUGUST, 1990
Naval Air Station, Oceana

CH2M HILL

Table 4-28
ORGANIC COMPOUNDS IN GROUNDWATER AT SOTE 2E
LINE SHACK 109 DISPOSAL AREA
(Concentrations in μg/l)

Analyte	Detection Limit	2E-MW1	2E-MW2	2E-MW3
TPH	60	200	--	210
EDB	0.02	--	--	--
Volatile Organic Compounds:				
Acetone	10[b,j]	6[b,j]	6[b,j]	4[b,j]
Benzene	5	2[j]	--	--
Carbon disulfide	5	--	--	2[j]
Ethylbenzene	5	2[j]	--	--
Methylene chloride	5	5[b]	7[b]	5[b]
Xylenes (total)	5	3[j]	--	--

Notes:

EDB = Ethylene Dibromide
TPH = Total Petroleum Hydrocarbons
(--) = Concentration below detection limit

[b]Compound found in laboratory blank as well as in sample. Sample concentration was less than 10 times blank concentration.
[j]Estimated value. Measured value is less than the quantitative detection limit.

Table 4-29
ORGANIC COMPOUNDS IN SOIL AT SITE 2E
LINE SHACK 109 DISPOSAL AREA
(Concentrations in μg/kg)

	Detection Limit	2E-SS1	2E-SS2	2E-SS3	2E-SS4
TPH	1,900-18,900[a]	99,400	513,000	242,000	NA
EDB	0.2	--	--	--	NA
Volatile Organic Compounds:					
Acetone	10	11[b,j]	21[b]	13[b]	14[b]
Methylene chloride	10	24[b]	13[b]	61[b]	120[e]
Toluene	6	--	--	--	2[j]

Notes:

NA = Not analyzed
EDB = Ethylene Dibromide
TPH = Total Petroleum Hydrocarbons
(--) = Concentration below detection limit

[a]Detection limit range in soil for TPH samples particular to this site.
[b]Compound found in laboratory blank as well as sample. Sample concentration is less than 10 times blank concentration.
[e]Compound found in laboratory blank as well as sample. Sample concentration is greater than 10 times blank concentration.
[j]Estimated value. Measured value is less than the quantitative detection limit.

SITE 6--NAVAL EXCHANGE MAINTENANCE BUILDING OIL DISPOSAL AREA

SITE HISTORY

This site consists of a small area outside Building 518, which once was the Naval Exchange Maintenance Building (Figure 4-20). The IAS reported that over a ten-year period, approximately 15 gallons of waste oil were dumped each year onto a small strip of ground, about 25 feet long, outside the building (RGH, 1984). Due to the small volumes of waste involved, the site was not recommended for field investigation by the IAS.

ENVIRONMENTAL SETTING

The area flat, and is currently covered with a grass lawn. No soil borings have been drilled at this site, so little is known about the subsurface geology below the depth of surface soil sampling. The material in the top 12 inches of the soil horizon is a sandy silt.

INTERIM RFI ACTIVITIES

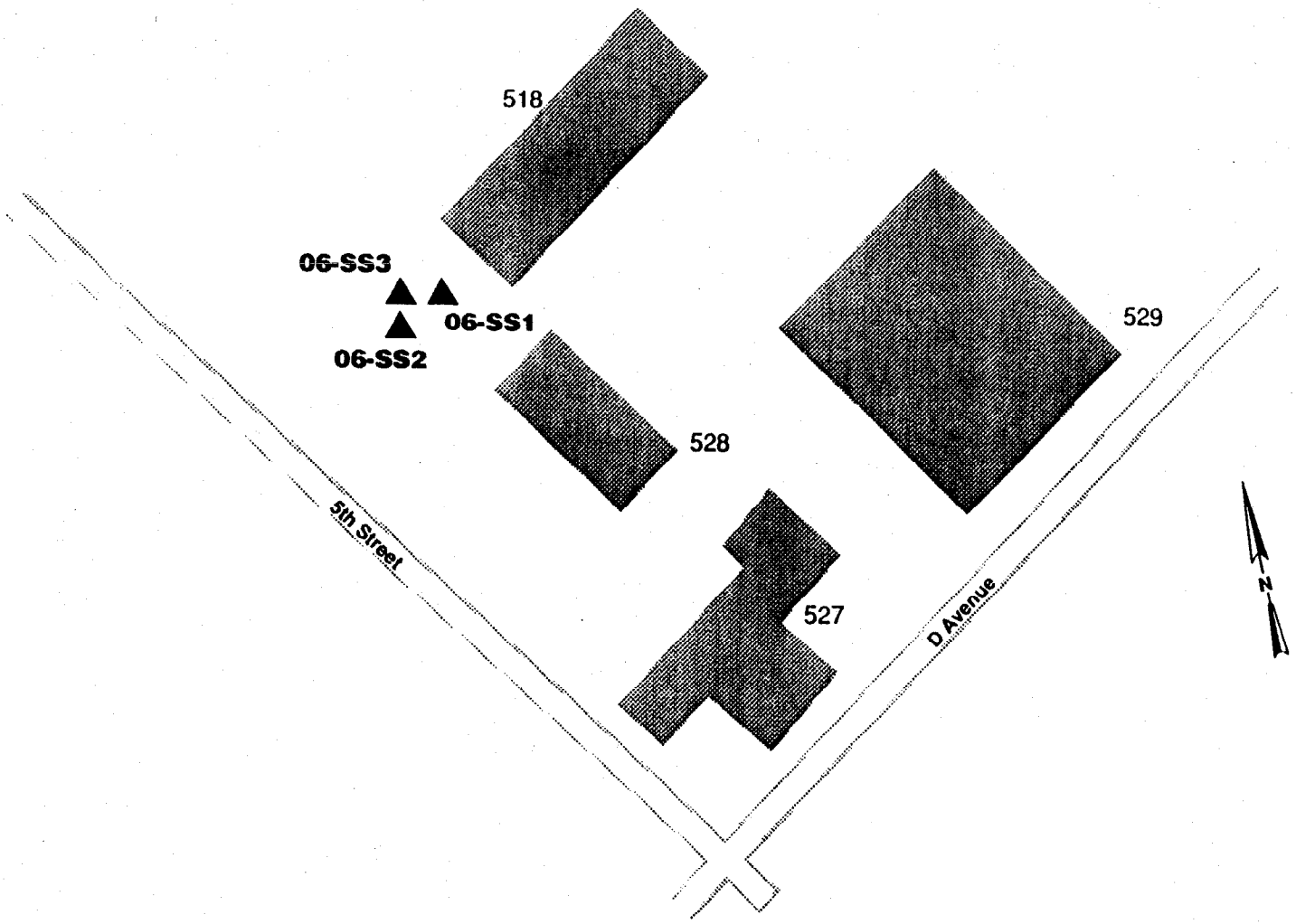
Field activities conducted at Site 6 during this investigation consisted of collecting three samples of near-surface soil from approximately 6 to 12 inches in depth (06-SS1 through 06-SS3). The locations of the sampling points are shown in Figure 4-20. The soil samples were analyzed for concentrations of VOCs, TPH, and lead (Pb).

INVESTIGATION RESULTS

The analytical results of the soil samples are shown in Table 4-30. The chemical data indicate that all of the analyzed parameters are present in low levels. There are no federal standards for the analyzed parameters in soil. The State of Virginia, however, does have an action level for TPH in soil of 100 mg/Kg, which is well above the values detected at this site.

RECOMMENDATIONS

No further action is recommended at this site. Future RFI activities at NAS Oceana should not include this site in the scope of work.



LEGEND

▲ Soil Sampling Locations

Not to Scale

Figure 4-20
SITE 6
GENERAL LOCATION MAP SHOWING
SOIL SAMPLING POINTS
Naval Air Station, Oceana

CH2M

Table 4-30
ORGANIC COMPOUNDS IN SOILS AT SITE 6
NAVAL EXCHANGE MAINTENANCE BUILDING
(Concentrations in μg/kg)

Analyte	06-SS1	06-SS2	06-SS3
TPH	11,100	30,400	10,200
Lead (mg/kg)	42.5	35.9	32.4
Volatile Organic Compounds:			
Acetone	19[b]	20[b]	17[b]
Methylene Chloride	77[e]	76[e]	130[e]

Notes:
TPH = Total petroleum hydrocarbons
[b] = Compound found in laboratory blank as well as sample; sample concentration is less than 10 times blank concentration
[e] = Compound found in laboratory blank as well as sample; sample concentration is greater than 10 times blank concentration

SITE 7--FIFTH GREEN LANDFILL

SITE HISTORY

This site is located near the present 14th green of the NAS Oceana golf course (Figure 4-21). According to the IAS, between 1954 and 1961 this landfill received both solid and liquid wastes which were burned and subsequently covered with soil. The site was covered and graded, and incorporated into the golf course in the early 1960s. The potential wastes disposed of at this site include asbestos, metal debris, solvents, oils, and pesticides and PCBs (RGH, 1984).

ENVIRONMENTAL SETTING

The former landfill site is now overgrown with a thick natural vegetative cover of mature trees and shrubs. The topography is generally flat except where a drainage ditch is incised along the northern edge of the former landfill.

Information on the subsurface comes from several boreholes drilled for monitoring well installation at this site. The near-surface stratigraphy is typically comprised of the following sequence from the surface to approximately 55 feet below grade: 10 feet of sandy silt, 15 feet of clean sand, 15 feet of silty sand with shell fragments, 5 feet of sandy clay, and 5 feet of silty sand. The upper-most 25 feet correspond to Columbia Group sediments. Below that, the stratigraphy is consistent with the Yorktown Formation. The average depth to groundwater at this site ranges from approximately 6 to 9 feet below grade.

INTERIM RFI ACTIVITIES

Field activities conducted at Site 7 during this investigation included the installation and sampling of two shallow (07-MW4 and 07-MW5) and two deep monitoring wells (07-MW3D and 07-MW4D), the sampling of three other existing wells (07-MW1 through 07-MW3), and the sampling of surface water from two locations in the drainage ditch (07-SW1 and 07-SW2). The locations of the sampling points are shown in Figure 4-21. The details of the monitoring wells at this site are summarized in Table 4-31. All water samples were analyzed for target compound list (TCL) organics and metals (see Table 3-3), EDB, total organic carbon (TOC), total organic halogens (TOX), hexavalent chromium (Cr VI), chloride, sulfide and alkalinity.

INVESTIGATION RESULTS

The results of water-level measurements of all three wells made in August, 1990, are presented in Table 4-32. The water-level elevations from this table are contoured in Figure 4-22 to create a map of the water-table surface over this site. The data indicate

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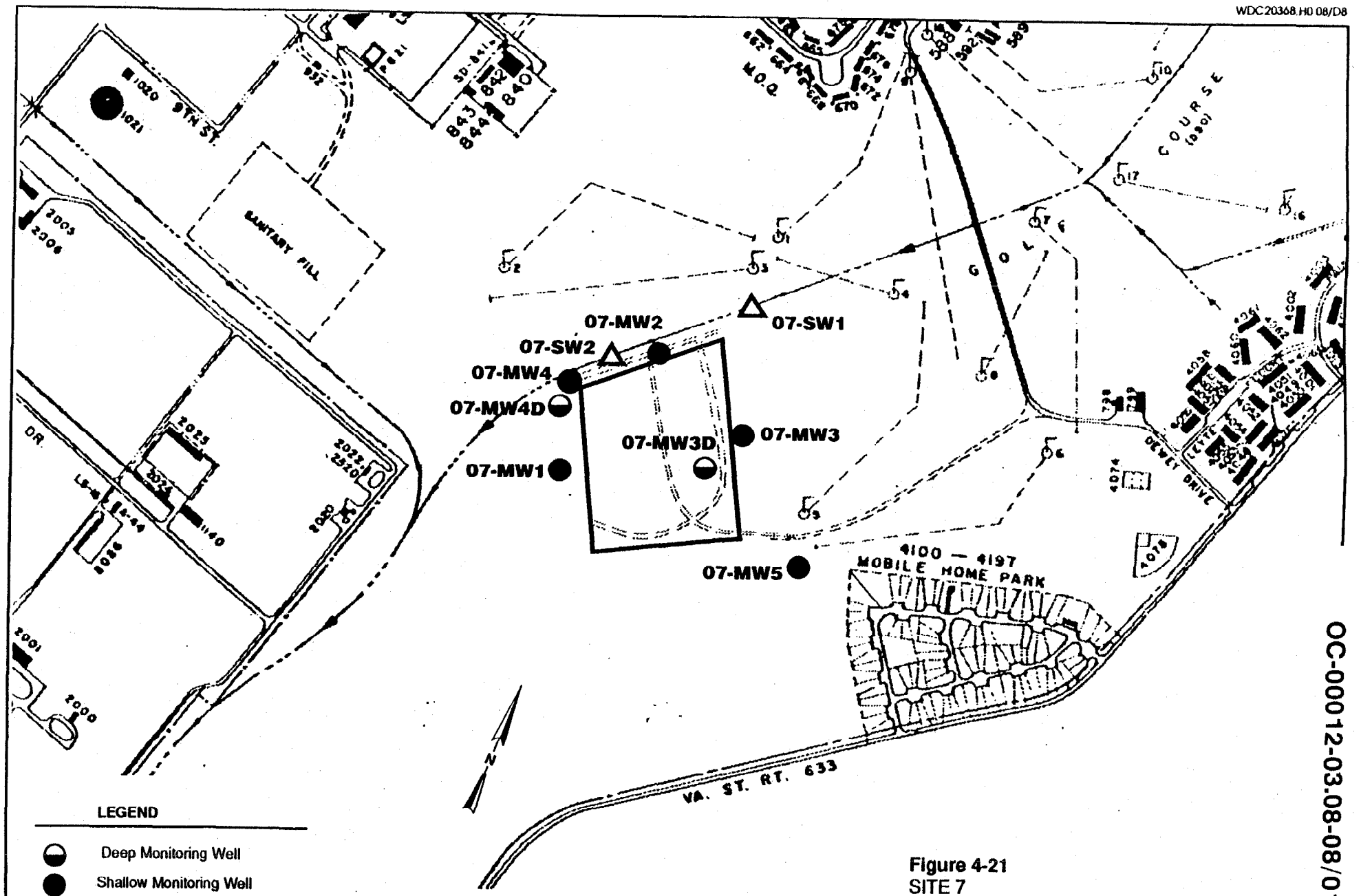

Figure 4-21
SITE 7
GENERAL LOCATION MAP SHOWING MONITORING WELLS AND SURFACE WATER SAMPLING POINTS
Naval Air Station, Oceana

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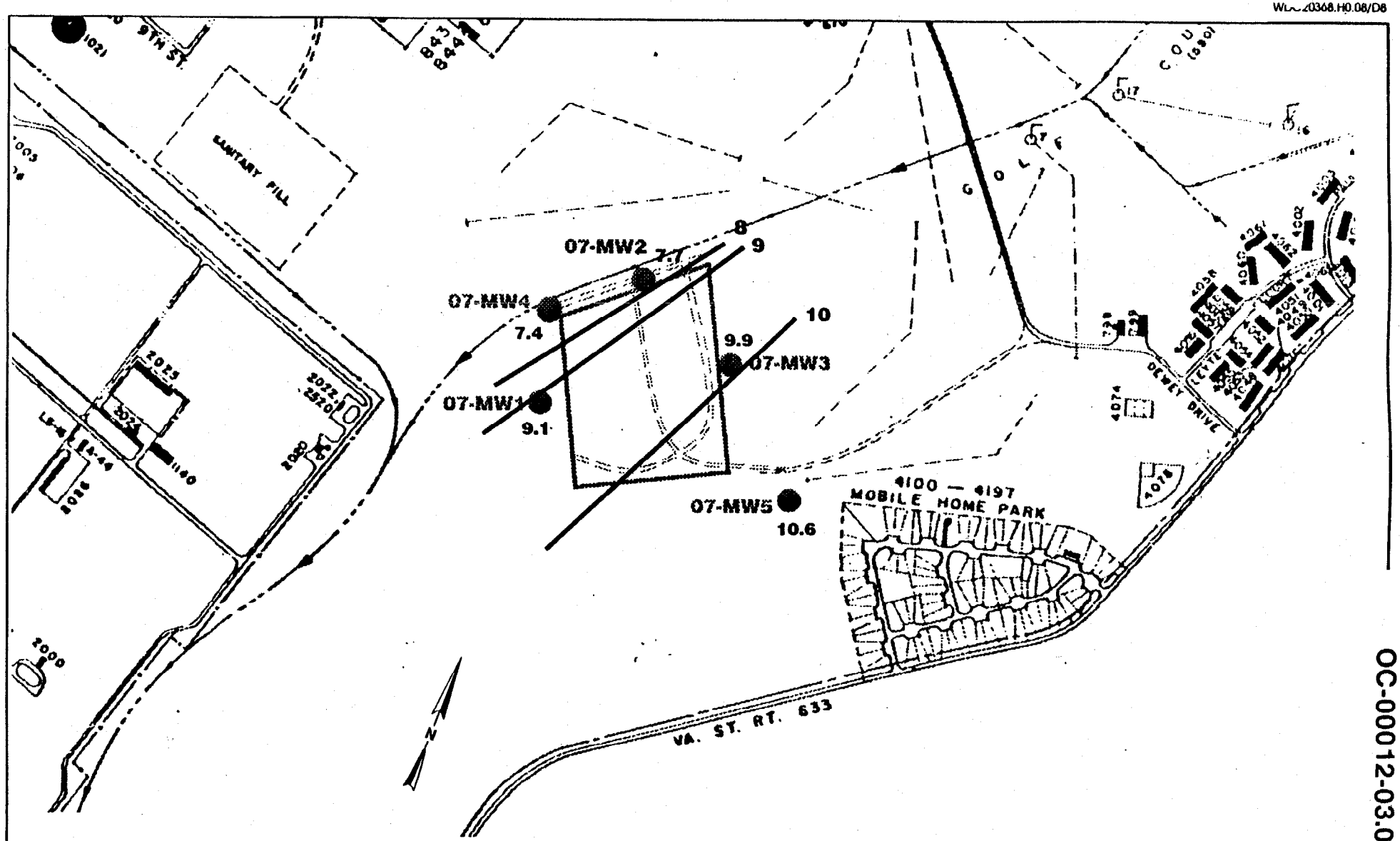

LEGEND

- Shallow Monitoring Well
- Approximate Landfill Boundary
- 10 Water-Table Elevation (Feet Above MSL)

500 0 500

Scale in Feet

Figure 4-22
SITE 7
WATER-TABLE ELEVATIONS
NOVEMBER, 1990
Naval Air Station, Oceana

CH2M

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Table 4-31
SITE 7 MONITORING WELL SUMMARY

Well Number	Date Installed	Ground Elevation (feet above MSL)	Total Depth (feet)	Screened Interval (feet below ground surface)
07-MW1	3/31/86	16.1	18.5	8.5-18.5
07-MW2	3/27/86	15.0	18	8-18
07-MW3	3/26/86	16.9	18.5	8.5-18.5
07-MW3D	7/20/90	17.6	48	38-48
07-MW4	6/29/90	16.1	18	8-18
07-MW4D	7/13/90	16.2	55	45-55
07-MW5	7/2/90	17.8	17.5	7.5-17.5

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Table 4-32
SITE 7 WATER-LEVEL DATA
NOVEMBER, 1990

Well	Depth to Water (Feet Below Survey Datum)	Water-Level Elevations (Feet Above Mean Sea Level)
07-MW1	8.80	9.09
07-MW2	10.29	7.72
07-MW3	8.40	9.91
07-MW3D	11.01	9.33
07-MW4	11.02	7.40
07-MW4D	10.71	8.32
07-MW5	9.67	10.61

that the general direction of shallow, unconfined, groundwater flow is toward the northwest. The water-level data also indicate a significant upward gradient (0.026) between 07-MW4 and 07-MW4D. These wells are adjacent to the perennially flowing drainage ditch; as a result, this upward gradient indicates that shallow groundwater flow locally discharges to the ditch. The water-level elevations in 07-MW3 and 07-MW3D do not support the occurrence of an upward hydraulic gradient in this portion of the site. However, the wells are located too far apart for the data to indicate the presence of a downward gradient.

The results of organic analyses from both groundwater and surface water are presented in Table 4-33. The results of inorganic analyses for the same samples are presented in Table 4-34. The data from both this investigation and the 1986 study (CH2M HILL, 1986) indicate that the concentrations of all of the analyzed parameters were either: (1) not detected, (2) below accurately quantifiable detection limits, (3) detected at levels not significantly different than the laboratory blank, or (4) detected at levels not high enough to support further investigation.

Contaminants detected in groundwater at this site are compared against federal and state water quality standards in Table 4-35. Cadmium was detected in one well (07-MW3D, 4.7 μg/l) and mercury was detected in three wells (07-MW2, 0.08 μg/l; 07-MW3D, 0.16 μg/l; and 07-MW5, 0.08 μg/l) at estimated concentrations which were below their respective MCLs. The MCL for cadmium is 10 μg/l and the proposed MCLG is 5 μg/l. Both the MCL and the proposed MCL for mercury are 2 μg/l. The Virginia groundwater standard for cadmium, however, is 0.04 μg/l and the state groundwater standard for mercury is 0.05 μg/l. All of the detected concentrations for both of these metals exceed this value. Furthermore, these values may have been exceeded in all monitoring wells at this site because the method detection limits followed by the laboratory for cadmium and mercury are 5 μg/l and 0.2 μg/l, respectively. With mercury there is no obvious trend in the dissolved concentration between upgradient and downgradient wells (i.e., 07-MW5 and 07-MW2 have the same concentration). This suggests that the concentrations of mercury are independent of the landfill and may be attributed to natural background conditions. With cadmium, it is not possible to differentiate between upgradient and downgradient wells with respect to the presence of this metal above state standards because of the detection limit.

Zinc was detected in five wells at this site at concentrations that exceed the Virginia groundwater standard of 50 μg/l (07-MW1, 53.1 μg/l; 07-MW3D, 115 μg/l; 07-MW4, 52 μg/l; 07-MW4D, 50.6 μg/l; and 07-MW5, 56.5 μg/l). All of these zinc concentrations, however, were below the national secondary drinking water standard of 5,000 μg/l set under the federal Safe Drinking Water Act. There is no obvious trend in zinc concentrations between upgradient and downgradient wells, which suggests that the concentrations are independent of the landfill and may be attributed to natural background conditions.

Table 4-33
ORGANIC COMPOUNDS IN GROUNDWATER AND SURFACE WATER AT SITE 7
(Concentration in µg/l)

Analyte	Detection Limit (µg/l)	Groundwater											Surface Water			
		07-MW1		07-MW2			07-MW3		07-MW3D	07-MW4	07-MW4D	07-MW5	07-SW1		07-SW2	
		5/86	11/90	5/86	8/90	8/90	5/86	11/90	8/90	8/90	8/90	8/90	5/86	8/90	5/86	8/90
EDB	0.02	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Pesticides/PCBs		--		--	--	--	--	--	--	--	--	--	--	--	--	--
Acid, Base/Neutral Organics																
bis (2-Ethylhexyl) phthalate	10	--	2[j]	--	4[j]	--	--	3[j]	--	--	--	9[j]	--	--	--	--
Volatile Organic Compounds:																
Acetone	5	--	6[b,j]	--	6[b,j]	5[b,j]	--	6[b,j]	8[b,j]	8[b,j]	9[b,j]	5[b,j]	--	8[b,j]	--	8[b,j]
Methylene Chloride	5	--	6[b]	--	4[b,j]	6[b]	--	6[B]	5[b]	6[b]	7[b]	5[b]	--	8[b]	--	
Chloroform	5	--	--	--	--	--	--	--	--	--	2[j]	--	7.1	--	--	
Bromodichloromethane	5	--	--	--	--	--	--	--	--	--	--	--	1.4	--	--	
Total Organic Carbon	1,000	NA	28,000	NA	38,900	25,700	NA	11,000	30,000	25,800	21,900	90,000	NA	40,800	NA	
Total Organic Halogens	10	NA	NA	NA	--	--	NA	NA	10	--	--	60	NA	--	NA	

All compounds not listed were below detection limits in all samples.
EDB = Ethylene dibromide
NA = Not analyzed
[b] = Compound found in laboratory blank as well as sample; sample concentration is less than 10 times blank concentration
[j] = Estimated value; measured value was less than accurately quantitative detection limit
(--) Concentration below detection limit

WDCR01/057.51

OC-00012-03.08-08/01/91

Table 4-34
INORGANIC COMPOUNDS IN GROUNDWATER AND SURFACE WATER AT SITE 7
(Concentrations in $\mu g/l$)

Analyte	Detection Limit	Groundwater											Surface Water (8/90)	
		07-MW1		07-MW2			07-MW3		07-MW3D	07-MW4	07-MW4D	07-MW5	07-SW1	07-SW2
		5/86	11/90	5/86	8/90	8/90 Duplicate	5/86	11/90	8/90	8/90	8/90	8/90	-	-
Silver	10	1.2	-	<0.6	-	-	<0.6	-	-	-	-	-	74.1 J	317
Aluminum	200	NA	48.6 J	NA	83.8 J	72.3 J	NA	99.1 J	984	211	99.8 J	109 J	14,000	16,000
Alkalinity as $CaCO_3$	1000	NA	32,000	NA	182,000	178,000	NA	4,000	210,000	30,000	257,000	14,000	-	-
Arsenic	10	<5	-	<5	-	-	<5	-	-	-	-	2.6 J	33.8 J	41.1 J
Barium	200	NA	-	NA	124	126	NA	-	30.0 J	45.8 J	30.9 J	60.0 J		
Beryllium	5	<3	-	<3	-	-	<3	-	-	-	-	-	-	-
Calcium	5000	NA	9,840	NA	56,000	56,300	NA	7,770	57,300	8590	79,700	6360	8340	13,100
Cadmium	5	<0.5	-	<0.5	-	-	<0.5	-	4.7 J	-	-	-	-	-
Chloride	1000	NA	14,000	NA	12,000	12,000	NA	15,000	14,000	11,000	17,000	14,000	10,000	9,000
Cobalt	50	NA	-	NA	-	-	NA	-	-	-	-	-	-	-
Chromium (total)	10	<5	-	<5	-	-	<5	-	7.2 J	-	-	<10	-	<10
Chromium (Hexavalent)	3	<40	3	<40			<40	-	23	-	-	7	-	7
Copper	25	<30	-	<30	-	-	<30	-	61.6	3.0 J	2.7 J	-	-	-
Iron	100	NA	5,950	NA	9320	10,300	NA	4,060	1010	4040	790	7650	123	424
Mercury	0.2	<0.4	-	<0.4	0.08 J	0.08 J	<0.4	-	0.16 J	-	-	0.08 J	-	-
Potassium	5000	NA	-	NA	4260 J	4380 J	NA	-	2580 J	1340 J	5350	1150 J	1660 J	1670 J
Magnesium	5000	NA	7,930	NA	9440	9530	NA	6,720	7220	7800	8470	7210	3700 J	4150 J
Manganese	15	NA	138	NA	288	313	NA	99	116	121	221	139	63.2	94.3

OC-00012-03.08-08/01/91

Table 4-34
INORGANIC COMPOUNDS IN GROUNDWATER AND SURFACE WATER AT SITE 7
(Concentrations in $\mu g/l$)

Analyte	Detection Limit	Groundwater											Surface Water (8/90)	
		07-MW1		07-MW2			07-MW3		07-MW3D	07-MW4	07-MW4D	07-MW5	07-SW1	07-SW2
		5/86	11/90	5/86	8/90	8/90 Duplicate	5/86	11/90	8/90	8/90	8/90	8/90	-	-
Sodium	5000	NA	11,900	NA	12,300	12,500	NA	10,700	26,600	10,600	20,700	14,100	6840	7500
Nickel	40	<50	-	<50	9.0 J	-	<50	-	31.7 J	-	-	-	-	-
Lead	3	<2	-	<2	-	-	<2	-	2.3 J	1.9 J	-	-	-	-
Antimony	60	<20	-	<20	-	-	<20	-	-	-	-	-	-	-
Selenium	5	<4	-	<4	-	-	<4	-	-	-	-	-	-	-
Sulfate	1000	NA	43,500	NA	16,000	16,700	NA	48,300	4,800	32,500	-	48,200	23,2000	27,500
Thallium	10	<50	-	<50	-	-	<50	-	-	-	-	-	-	-
Vanadium	150	NA	-	NA	3.5 J	3.8 J	NA	-	-	-	-	-	-	-
Zinc	20	70	53.1	90	31.0	46.6	80	45.3	115	52.0	50.6	56.5	64.5	238

J = Estimated value. Measured concentration is less than accurately quantitative detection limit.
NA = Not Analyzed
(-) Concentration below detection limit

WDCR503/030.51

OC-00012-03.08-08/01/91

Table 4-35
CONTAMINANTS DETECTED AT SITE 7 COMPARED AGAINST POTENTIALLY APPLICABLE FEDERAL AND STATE STANDARDS
AUGUST 1990
(concentrations in μg/l)

Chemical	Location Detected	Concentration (μg/l)	MCL	MCLG	Proposed MCLG	Virginia Groundwater Standard
Cadmium	07-MW3D	4.7 J	10	-	5	0.4
Mercury	07-MW2 07-MW3D 07-MW5	0.08 J 0.16 J 0.08 J	2	-	2	0.05
Zinc	07-MW1 07-MW3D 07-MW4 07-MW4D 07-MW5	53.1 115 52 50.6 56.5	-	-	-	50

Notes:
MCL = Safe Drinking Water Act. Maximum Contaminant Level. Maximum permissible level of a contaminant in water which is delivered to any user of a public water system. Standards current as of April 1990.
MCLG = Safe Drinking Water Act. Maximum Contaminant Level Goal. A non enforceable concentration of a drinking water contaminant that is protective of adverse human health effects and allows an adequate margin of safety. Standards current as of April 1990.
Virginia groundwater standards: Virginia Code, Section 62.1-44.15(3).
(-) = Concentration below detection limit.

[j]Estimated value. Measured value was less than accurately quantitative detection limit.

WDCR503/087.51

OC-00012-03.08-08/01/91

RECOMMENDATIONS

The chemical data from both groundwater and surface water sampling at this site suggest that past waste disposal at this landfill has not resulted in hazardous contaminants entering the groundwater at least since 1986. As a result, this site should not be included within the scope of work of future RFI activities at Oceana. In addition, both the Solid Waste and the Superfund Divisions of the Virginia Department of Waste Management have stated that they would not anticipate requesting further action at a site such as this one as long as the U.S. Environmental Protection Agency (EPA) is informed of the current conditions (Green, 1991; Modena, 1991). Meetings of the Technical Review Committee should be a suitable means of notifying the EPA.

However, in the absence of official concurrence by the EPA that no further action is warranted at this site, CH2M HILL recommends that the Navy continue to collect samples from each of the existing monitoring points annually for the next 2 years. Future monitoring would not need to include additional sampling points beyond those already established. If the results from each of the two sampling rounds indicate that the concentrations of detected chemicals have not increased significantly above the current data, then the sampling program should be terminated. The concentration that represents a significant increase should be determined for each constituent independently. If there is a significant increase in concentration of any analyzed constituent, then the continuation of the sampling program should be evaluated.

The Tidewater office of the State Water Control Board has stated that they do not have to be notified of the concentrations of dissolved metals that exceed Virginia groundwater standards because the Department of Waste Management is the State agency with authority at a site such as this (Siduyla, 1991).

SITE 8--NORTH STATION LANDFILL

SITE HISTORY

This landfill is located near the old North Station airfield in the northeast corner of the base (Figure 4-23). According to the IAS, wastes from the North Station area and various construction activities were disposed of at this 4-acre site from 1951 to 1954 (RGH, 1984). The wastes are thought to include solvents, metals, asbestos, pesticides, PCBs, and hospital wastes.

ENVIRONMENTAL SETTING

The site is in an undeveloped portion of the base which is leased to a farmer for growing crops. There is no evidence of past waste disposal. There is a large depression or ditch which is overgrown with vegetation adjacent to the site. Surface water most likely collects in this depression during storms.

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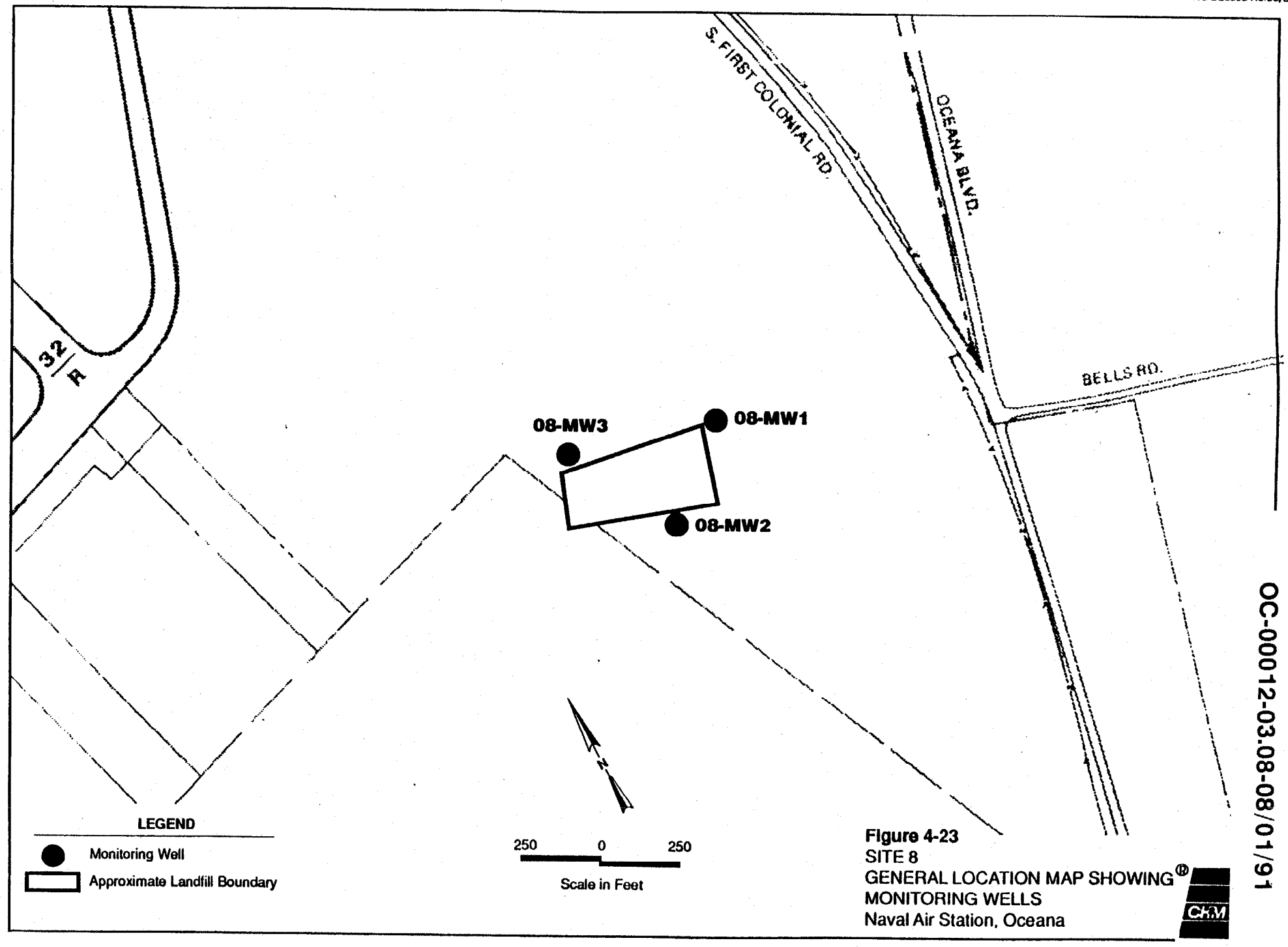

Figure 4-23
SITE 8
GENERAL LOCATION MAP SHOWING®
MONITORING WELLS
Naval Air Station, Oceana

CH2M

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Based on the soil borings drilled for monitoring well installation during a previous investigation (CH2M HILL, 1986), the shallow subsurface stratigraphy generally consists of two units: a top layer of silty, clayey sand, underlain by a layer of medium to coarse sand with gravel. Locally, the depth to groundwater in August, 1990, is approximately 9 feet below grade.

INTERIM RFI ACTIVITIES

Field activities conducted at Site 8 during this investigation consisted of measuring water levels and collecting groundwater sample from the three existing monitoring wells shown in Figure 4-23. The monitoring well details are summarized in Table 4-36. The groundwater samples were analyzed for TCL organics and metals, EDB, TOX, TOC, Cr VI, chloride, sulfide and alkalinity.

Table 4-36
SITE 8 MONITORING WELL SUMMARY

Well Number	Date Installed	Ground Elevation (feet above MSL)	Total Depth (feet)	Screened Interval (feet below ground surface)
08-MW1	4/3/86	24.9	20	10-20
08-MW2	4/7/86	25.1	18	8-18
08-MW3	4/4/86	23.9	20	10-20

INVESTIGATION RESULTS

The results of water-level measurements of all three wells made in August, 1990, are presented in Table 4-37. The water-level elevations from this table are contoured in Figure 4-24 to create a map of the water-table surface over this site. The data indicate that the principal direction of shallow, unconfined, groundwater flow at this site is generally toward the northwest.

Table 4-37
SITE 8 WATER-LEVEL DATA
AUGUST, 1990

Well	Depth to Water (Feet Below Survey Datum)	Water-Level Elevations (Feet Above Mean Sea Level)
08-MW1	9.07	17.80
08-MW2	9.33	17.68
08-MW3	8.93	17.28

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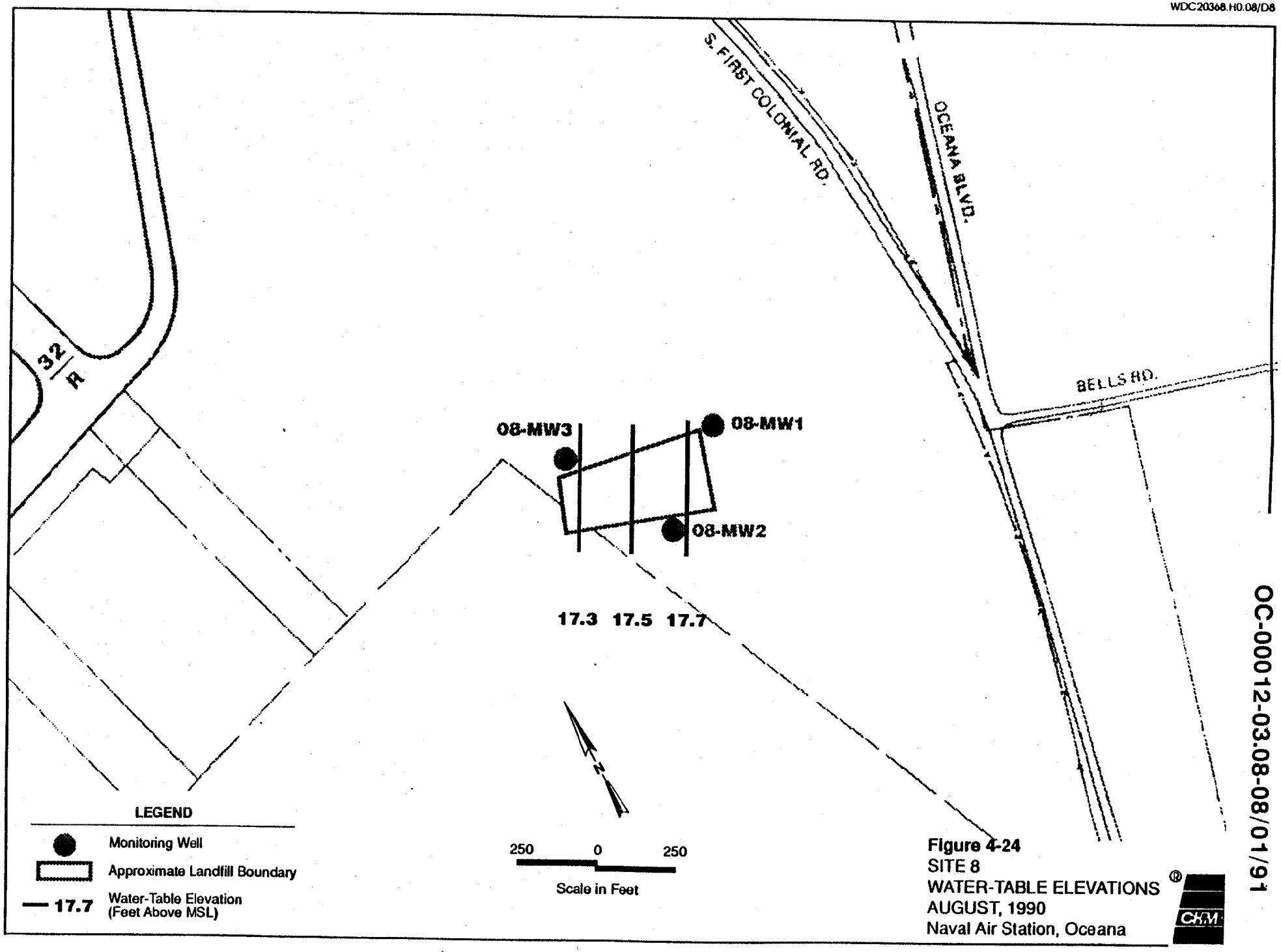

Figure 4-24
SITE 8
WATER-TABLE ELEVATIONS
AUGUST, 1990
Naval Air Station, Oceana

CH2M

OC-00012-03.08-08/01/91

The organic chemical data obtained from the three wells at this site are presented in Table 4-38. The inorganic data are presented in Table 4-39. The analytical data from both tables do not indicate the presence of contamination in the groundwater, and although the two investigations at this site were conducted 4 years apart, the results are consistent between the two sampling events. It is important to note that the dissolved concentrations of zinc in all three wells exceed the Virginia groundwater standard of 50 μg/l. However, all of these zinc concentrations are well below the national secondary drinking water standard of 5,000 μg/l set under the federal Safe Drinking Water Act. There is no obvious trend in zinc concentrations between upgradient and downgradient wells, which suggests that the concentrations are independent of the landfill and may be attributed to natural background conditions.

RECOMMENDATIONS

The chemical data from this site suggest that past waste disposal at this landfill has not resulted in hazardous contaminants entering the groundwater at least since 1986. As a result, this site should not be included within the scope of work of future RFI activities at Oceana. In addition, both the Solid Waste and the Superfund Divisions of the Virginia Department of Waste Management have stated that they would not anticipate requesting further action at a site such as this one as long as the U.S. Environmental Protection Agency (EPA) is informed of the current conditions (Green, 1991; Modena, 1991). Meetings of the Technical Review Committee should be a suitable means of notifying the EPA.

However, in the absence of official concurrence by the EPA that no further action is warranted at this site, CH2M HILL recommends that the Navy continue to collect samples from each of the existing monitoring points annually for the next 2 years. Future monitoring would not need to include additional sampling points beyond those already established. If the results from each of the two sampling rounds indicate that the concentrations of detected chemicals have not increased significantly above the current data, then the sampling program should be terminated. The concentration that represents a significant increase should be determined for each constituent independently. If there is a significant increase in concentration of any analyzed constituent, then the continuation of the sampling program should be evaluated.

The Tidewater office of the State Water Control Board has stated that they do not have to be notified of the concentrations of dissolved metals that exceed Virginia groundwater standards because the Department of Waste Management is the State agency with authority at a site such as this (Siduyla, 1991).

Table 4-38
ORGANIC COMPOUNDS IN GROUNDWATER AT SITE 8, NORTH STATION LANDFILL
(Concentrations in μg/l)

Analyte	Detection Limit (μg/l)	08-MW1		08-MW2		08-MW3	
		5/86	8/90	5/86	8/90	5/86	8/90
EDB	0.02	--	--	--	--	--	--
Acid, Base/Neutral Extractable Organics:							
bis (2-Ethylhexyl) pthalate	10	--	5[b,j]	--	9[b,j]	--	10[b]
Volatile Organic Compounds:							
Acetone	10	--	7[b,j]	--	18[b]	--	10[b]
Methylene Chloride	5	--	6[b]	--	7[b]	--	10[b]
Toluene	5	--	--	--	--	--	1[j]
Total Organic Carbon (TOC)	1,000	NA	8,300	NA	22,300	NA	49,700
Total Organic Halogens as Cl (TOX)	10	NA	--	NA	20	NA	20

[b] = Compound found in laboratory blank as well as sample; sample concentration is less than 10 times blank concentration
[j] = Estimated value; measured value was less than quantitative detection limit
NA = Not analyzed
(--) Concentration below detection limit

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OC-00012-03.08-08/01/91

Table 4-39
INORGANIC COMPOUNDS IN GROUNDWATER AT SITE 8
(Concentrations in $\mu g/l$)

ANALYTE	08-MW1		08-MW2		08-MW3	
	5/86	8/90	5/86	8/90	5/86	8/90
Silver	<1	<10	<0.6	<10	<1	<10
Aluminum	NA	<200	NA	810	NA	<200
Alkalinity as $CaCO^3$	NA	<1000	NA	2,000	NA	42,000
Arsenic	<5	<10	<5	<10	<5	<10
Barium	NA	<200	NA	<200	NA	<200
Beryllium	<3	<5	<3	<5	<3	<5
Calcium	NA	16,300	NA	9,100	NA	28,400
Cadmium	<4	<5	0.8	<5	<4	<5
Chloride	NA	18,000	NA	11,000	NA	28,000
Cobalt	NA	<50	NA	<50	NA	<50
Chromium (total)	<5	<10	<5	<10	<5	<10
Chromium (hexavalent)	<40	<3	<40	<3	<40	<3
Copper	70	<25	<30	<25	60	<25
Iron	NA	<100	NA	<100	NA	270
Mercury	<0.3	<0.2	<0.4	<0.2	<0.3	<0.2
Potassium	NA	<5,000	NA	6,500	NA	9,200
Magnesium	NA	<5,000	NA	<5,000	NA	7,600
Manganese	NA	27	NA	45	NA	140
Sodium	NA	5,500	NA	<5,000	NA	7,300
Nickel	<40	<40	<50	<40	<40	<40

OC-00012-03.08-08/01/91

Table 4-39
INORGANIC COMPOUNDS IN GROUNDWATER AT SITE 8
(Concentrations in μg/l)

ANALYTE	08-MW1		08-MW2		08-MW3	
	5/86	8/90	5/86	8/90	5/86	8/90
Lead	<2	<3	<2	4	<2	<3
Antimony	<20	<60	<20	<60	<20	<60
Selenium	<4	<5	<4	<5	<4	<5
Sulfate	NA	19,600	NA	18,900	NA	25,100
Thallium	<50	<10	<50	<10	<50	<10
Vanadium	NA	<50	NA	<50	NA	<50
Zinc	<20	59	60	82	30	83

Notes:
<5 = Value is less than given detection limit
NA = not analyzed

OC-00012-03.08-08/01/91

SITE 11--FIRE FIGHTING TRAINING AREA

SITE HISTORY

Site 11 constitutes the old fire fighting training ring and its immediate surroundings. It is located on the west side of the base at the intersection of two abandoned runways (Figure 4-25). The IAS reported that the ring was constructed in the early 1960s, and up until the mid-1970s fire fighters were trained by extinguishing 7,500 gallons per year of various flammable liquids which included wastes such as paints, thinners, naphtha, and trichlorotrifluoroethane. In the mid-1970s an earthen berm was constructed, and the volume of liquid wastes burned increased to approximately 50,000 gallons annually (RGH, 1984). In recent years, this practice has been stopped, a new fire pit has been constructed adjacent to the old one, and jet fuel is burned to train personnel.

ENVIRONMENTAL SETTING

The old fire ring is situated directly on abandoned concrete runways. As a result, the site is very flat, with the exception of the 2-foot high earthen berm which outlines the ring. The site is covered with weathered concrete except just east of the fire ring. There, the ground has a grass cover, and it is slightly lower than the ring. The grass area, consequently, appears to collect surface runoff from the immediate area, including the fire ring.

INTERIM RFI ACTIVITIES

Field activities conducted at Site 11 during this investigation consisted of installing and sampling one monitoring well (11-MW1), and collecting four samples of near-surface soil (i.e., from approximately 12 to 18 inches below grade (11-SS1 through 11-SS4). The locations of all sampling points are shown in Figure 4-25. The monitoring well details are summarized in Table 4-40. The groundwater sample was analyzed for VOC, BN, TPH, and Pb. The soil samples were analyzed for these same parameters as well as ignitability.

Table 4-40
SITE 11 MONITORING WELL SUMMARY

Well Number	Date Installed	Ground Elevation (feet above MSL)	Total Depth (feet)	Screened Interval (feet below ground surface)
11-MW1	6/28/90	17.1	18	8-18

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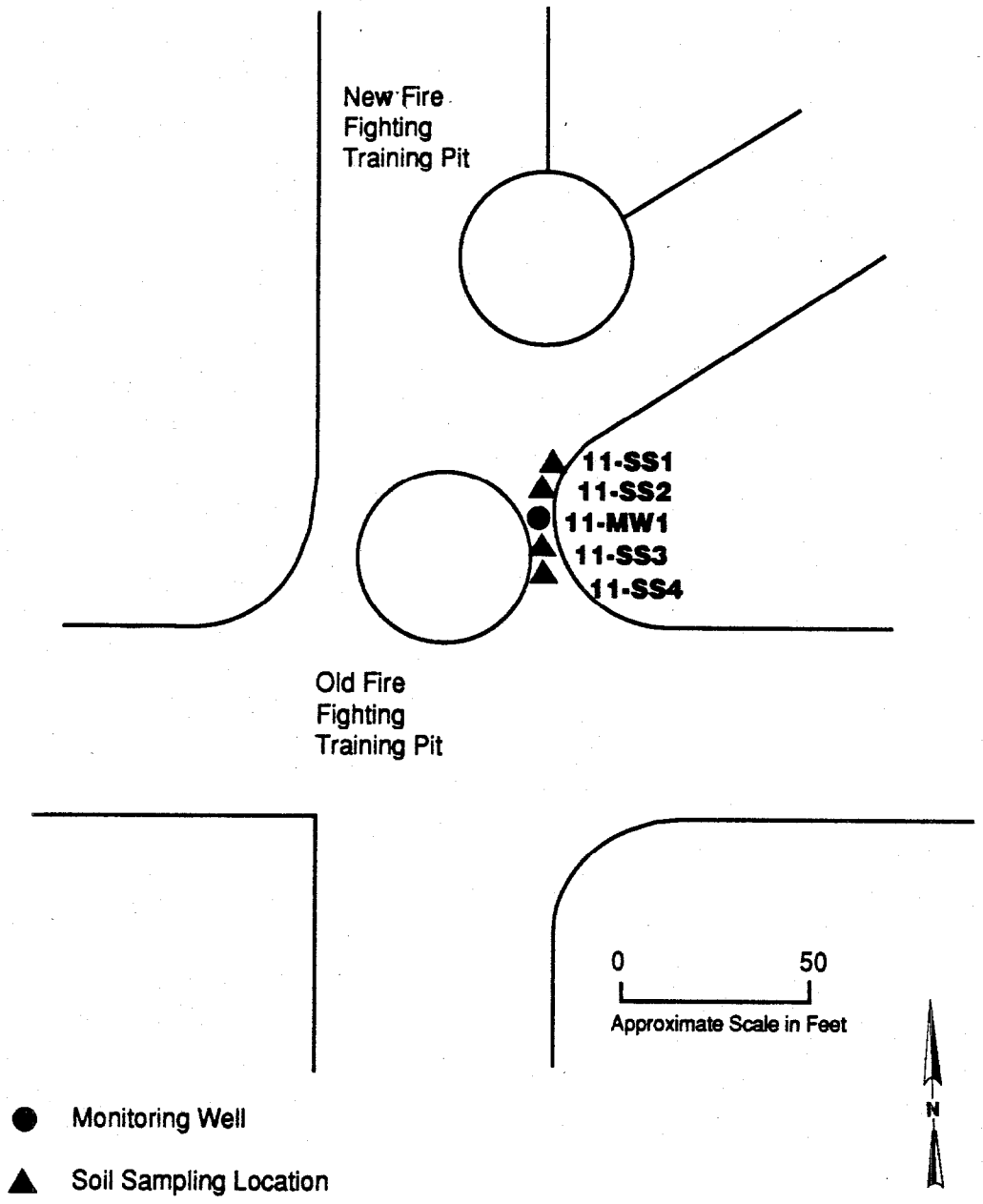

LEGEND

- Fire Fighting Training Pit
- Shallow Monitoring Well
- Soil Sampling Locations

Figure 4-25
SITE 11
GENERAL LOCATION MAP SHOWING
MONITORING WELL AND SOIL SAMPLING POINTS
Naval Air Station, Oceana

CH2M HILL

INVESTIGATION RESULTS

Water-level information obtained from 11-MW1 is summarized in Table 4-41. When combined with the water-level data from Site 1 (Table 4-2), the groundwater elevation in 11-MW1 indicates that it is an upgradient well relative to the old fire training ring. In other words, in August, 1990, the principal direction of shallow groundwater flow at this site was generally to the west.

Table 4-41
SITE 11 WATER-LEVEL DATA
AUGUST, 1990

Well	Depth to Water (Feet Below Survey Datum)	Water-Level Elevations (Feet Above Mean Sea Level)
11-MW1	8.43	10.82

The chemical data obtained from 11-MW1 is presented in Table 4-42, and the soil analytical data are presented in Table 4-43. These results indicate that the parameters analyzed for in groundwater were either not detected at a significant level (e.g., TPH) or were not detected at levels significantly different than the laboratory blank. The same result occurred for the soil analytical data, with the exception of TPH in 11-SS4. The concentration of TPH in that sample (289 mg/kg) exceeds the Virginia standard for TPH in soil by more than two times.

RECOMMENDATIONS

Although 11-MW1 is apparently upgradient, it is close enough to the fire ring to justify resampling of the well to verify that groundwater is not contaminated at that location. A soil sampling program in the immediate vicinity of 11-SS4 is recommended to define the extent of TPH contamination in the soil.

WDCR509/038.51

Table 4-42
ORGANIC COMPOUNDS IN GROUNDWATER AT SITE 11
(Concentrations in μg/l)

Parameter	Detection Limit	11-MW1
Pb	3	--
TPH	60	120
Base Neutral Extractable Organics:		
bis (2-ethylhexyl) phthalate	10	20[b]
Volatile Organic Compounds:		
Acetone	10	5[b,j]
Methylene Chloride	5	4[b,j]

Notes:
(--) Concentration below detection limit
[b]Compound found in laboratory blank as well as sample. Sample concentration is less than 10 times blank concentration.
[j]Estimated value. Measured value is less than the accurately quantitative detection limit.

Table 4-43
ORGANIC COMPOUNDS IN SOIL AT SITE 11
(Concentrations in μg/kg)

Parameter	11-SS1	11-SS1 (Duplicate)	11-SS2	11-SS3	11-SS4
Pb (mg/kg)	9	9.6	11.4	10.9	10.4
TPH (mg/kg)	9.3	6.3	22.9	18.8	289
Ignitability	NI	NI	NI	NI	NI
Base Neutral Extractable Organics:					
bis (2-ethylhexyl) phthalate	640	310[j]	110[j]	98[j]	54[j]
Volatile Organic Compounds:					
Acetone	27[b]	17[b]	60[b]	26[b]	19[b]
Methylene Chloride	57[e]	45[e]	76[e]	65[e]	27[b]

Notes:

[b]Compound found in laboratory blank as well as in sample. Sample concentration is less than 10 times blank concentration.
[e]Compound found in laboratory blank as well as in sample. Sample concentration is greater than 10 times blank concentration.
[j]Estimated value. Measured value is less than the accurately quantitative detection limit.
NI = Non-ignitable

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WDCR04/033.51

Appendix A

SOIL BORING LOGS FOR WELLS INSTALLED DURING THE INTERIM RFI

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 01-MW4 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 1, NORTH OF 01-MW5
ELEVATION: 16.9
DRILLING CONTRACTOR: ATEC
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 6/27/90 FINISH: 6/27/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	16	6-6-7	0-16": SILTY SAND, grayish brown (5YR 3/2), soft, dry, locally clayey, contains metal shards		
	3.5-5	S2	13	3-3-8	0-4": CLAY, lt. olive gray (5 Y 5/2), moist soft; 4-13": SANDY SILT w/ abun. clay, lt. olive gray (5 Y 5/2), moist, soft		
5							
							Water table at 7.5 ft
	8.5-10	S3	15	16-14-14	0-2": SAND, f. to c., light gray (N7), dry v. loose; 2-15": same but wet; both are beach sands		Water has hydrocarbon odor during drilling at 7.5 ft
10							
	13.5-15	S4	23	15-20-24	0-23": SAND, wet, same as S3		HNU = 10-15 ppm in borehole Explo nondetect
15							
							Auger bit comes up w/ piece of old cable from 18 ft
	16.5-18	S5	24	9-5-2	0-24": SAND, f. to c., same as S3		
							WELL SUMMARY
							FINAL DEPTH = 18' 6"
							SCREEN = 8' TO 18'
							SAND = 6' 6" TO 18' 6"
							BENTONITE = 5' TO 6' 6"
20							GROUT = 0' TO 5'

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 01-MW5 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA | LOCATION: SITE 1, SOUTH OF 01-MW4
ELEVATION: 16.7 | DRILLING CONTRACTOR: ATEC
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE: | START: 6/27/90 FINISH: 6/27/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	19	4-4-5-4	0-19": CLAYEY SILT, grayish brown (5 YR 5/2), dry, hard		
	3.5-5	S2	12	3-2-10	0-6": SANDY CLAY, med. gray (N5), moist, soft; 6-11": SILTY SAND, med. lt. gray (N6) moist, soft; 11-12": SAND, lt. gray (N7), dry, loose, hydrocarbon odor		
5							
	8.5-10	S3	15	14-12-15	0-15": SAND, vf. to med., lt. gray (N7), wet, v.loose, hydrocarbon odor		Water table at 8.5 ft
10							
	13.5-15	S4	23	13-17-20	0-23": SAND, same as S3		Cuttings have oily sheen
15							Auger head brings up piece of cable
	15-18	N/A			Logged cuttings: SAND, same as S3, hydrocarbon odor		
20							

WELL SUMMARY

FINAL DEPTH = 18' 6"
SCREEN = 7'10" TO 17'10"
SAND = 5'8" TO 18'6"
BENTONITE 3'10" TO 5'8"
GROUT = 0' TO 3'10"

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2B-MW7 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2B, WELL IN WOODS, CLOSEST TO PARKING LOT
ELEVATION: 18.7
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 6/27/90 FINISH: 8/1/90 LOGGER: DOUG BITTERMAN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	1	4-10-10-8 (18)	0-1": SANDY SILT, sand is v. fine, grayish brown (5 YR 3/2), dry, v.loose, (ML)		NOTE: WELL DRILLED AND INSTALLED 6/27/90 WAS ABANDONED AND REDRILLED WITHOUT SAMPLING ON 8/1/90
							FINAL WELL INSTALLATION IS DESCRIBED BELOW
5	4-6	S2	18	6-10-10-9 (19)	0-8": SANDY SILT with some clay, dark yellowish brown (10 YR 4/2), dry, with some organic matter; 8-14": SAND, sand is fine, pale yellowish brown (10 YR 6/2), wet; 14-24": SAND, same as 8-14" interval but lt bluish gray (5 B 7/1)		
	9-11	S3	20	5-5-8-10 (18)	0-20": SAND, sand is fine, med. gray to med. dk. gray (N4 to N5), wet		
10							
	14-16	S4	18	1-2-2 (4)	0-6": SAND WITH SILT, sand is fine, medium gray to med. dk. gray (N4 to N5), wet; 6-18": SILTY CLAY WITH SAND, sand is very fine, med. gray to med. dk. gray (N4 to N5) wet		WELL SUMMARY (8/1/90)
15							FINAL DEPTH = 14'
							SCREEN = 9' TO 14'
							SAND = 5' TO 14'
							BENTONITE = 3'6" TO 5'
							GROUT = 0' TO 3.5'
20							

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2B-MW8 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2B, IN WOODS
ELEVATION: 18.0
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 6/27/90 FINISH: 6/27/90 LOGGER: DOUG BITTERMAN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	0	7-5-4-2 (6)	NO RECOVERY		
	4-6	S2	2	3-2-3-2 (5)	0-2": SANDY CLAY, sand is very fine, light olive gray (5 Y 6/1), moist		
5							
	9-11	S3	0	1-0-1 (1)	NO RECOVERY		Wetness observed on outside of split spoon
10							First blow drove split spoon 12 inches
	11-13	S4	24	1-2-1 (3)	0-24": SILTY SAND WITH CLAY, sand is fine, medium dark gray (N4), wet		
	14-16	S5	24	1-2-2-5 (7)	0-18": SAND WITH SILT, sand is med.-grained trace clay, med. dk. gray (N4), grades to fine silty sand w/ clay near bottom of interval; 18-24": SAND WITH SILT, sand is med. to coarse, med. dk. gray (N4), wet		
15							WELL SUMMARY FINAL DEPTH = 22'6" SCREEN = 10' TO 20' SAND = 7' TO 20' BENTONITE = 5' TO 7' GROUT = 0' TO 5'
	19-21	S6	-	11-20-20-7 (27)	SAND WITH SILT, sand is medium, med. dark gray (N4), wet, trace shell fragments		
20							

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2B-MW9 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2B, IN FIELD
ELEVATION: 20.5
DRILLING CONTRACTOR: ATEC
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 6/29/90 FINISH: 6/29/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	19	3-6-10-10	0-19": SANDY SILT, brownish gray (5 YR 4/1) dry, very stiff		
	3.5-5	S2	18	7-11-15	0-9": SANDY SILT, same as S1; 9-11": lt. gray (N7), dry, loose; 11-18": SAND, dk. yellowish orange (10 YR 6/6), dry, loose		
5							
	8.5-10	S3	18	7-7-2	0-18": SAND, light gray (N7), wet, loose, runny over entire interval		Water table at approx. 8 ft
10							
	13.5-15	S4	21	2-2-1	0-14": SANDY SILT, v. fine, dark greenish gray (5 GY 4/1), wet, very loose; 14-21": SILTY SAND, dark greenish gray (5 GY 4/1), wet, loose		
15							WELL SUMMARY
							FINAL DEPTH = 20'
	17.5-19	S5	13	3-6-14	0-6": SILTY SAND, same as 14-17" of S4, 6-13": SAND, med. gray (N5), wet, loose		SCREEN = 10' TO 20'
							SAND = 6'4" TO 20'4"
							BENTONITE 4'4" TO 6'4"
							GROUT = 0' TO 4'4"
20							

SBLSYM 06/14/88

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2B-MW10 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2B, FLUSH MOUNT, NEAR BUILDING 138
ELEVATION: 22.1
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 7/11/90 FINISH: 7/11/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	13"-3'	S1	15	16-19-12-8	0-4": road gravel and sand; 4-8": SANDY SILT, sand is v.f. to fine, dk. yellowish brown (10 YR 4/2), dry, hard; 8-12": SILTY SAND, sand is f. to med., dk. yellowish brown (10 YR 4/2), dry, dense; 12-15": SAND medium, dk. yellowish brown, dry, loose		
	4-5.5	S2	11	5-4-5	0-3": SANDY SILT, lt. olive gray (5 Y 5/2), dry, stiff; 3-11": SILTY CLAY, lt. olive gray (5 Y 6/1), moist, soft		
5							
							Water at approx. 8 ft.
	8.5-10	S3	18	8-8-12	0-4": CLAYEY SILT w/ some sand (20%), sand is v. fine, olive gray (5 Y 4/1), moist, soft; 4-18": SAND, med. beach sand, dusky yellow (5 Y 6/4) to yellowish gray (5 Y 7/2), wet, loose		
10							
	13.5-15	S4	18	1-2-3	0-10": SILTY SAND, sand is v. fine, dark greenish gray (5 GY 4/1), wet, v. soft; 10-18": SAND, same color, wet, loose		
15							
	16.5-18	S5	25	1-0-1	0-25": V. SILTY SAND (est. 60 v.f. sand, 40% silt), dk. greenish gray (5 GY 4/1), wet, v. soft		First blow drove spoon 12"
20							

WELL SUMMARY
FINAL DEPTH = 18'
SCREEN = 8' TO 18'
SAND = 5'11" TO 18'
BENTONITE 3'11" TO 5'11"
GROUT = 1' TO 3'11"
FLUSH MOUNT, CONCRETE FILL

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2B-MW11 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2B, FLUSH MOUNT, AT END OF BUILDING 130
ELEVATION: 22.1
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 7/10/90 FINISH: 7/10/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	14"-3	S1	20	8-9-9-10	0-13": V. SILTY SAND, dk. yellowish brown (10 YR 4/2), moist, medium density, hydrocarbon odor; 13-20": SAND, med. to very coarse, dk. yellowish brown (10 YR 4/2), moist, loose, hydrocarbon odor		Note: depths are from top of concrete; Geologic log starts below concrete slab HNU = 5 ppm in borehole, = 0 ppm in breathing zone
	3.5-5	S2	13	2-2-2	0-3": SILTY SAND, same as 0-13" of S1; 3-13": SANDY SILT, sand is v. fine, brownish gray (5 YR 4/1), moist, soft, hydrocarbon odor		
5							
							Water table at approx. 8 ft
	8.5-10	S3	17	12-19-15	0-2": SILTY SAND, dk. yellowish brown (10 YR 4/2), moist, medium density, hydrocarbon odor; 2-6": CLAYEY SILT, dusky brown (5 YR 2/2); 6-11": SAND, med., uniform size, wet, soft, no odor; 11-16": SAND, same as 6-11" but dk. yellowish orange (10 YR 6/6)		
10							
							WELL SUMMARY
							FINAL DEPTH = 18'2"
							SCREEN = 8'2" to 18'2"
	13.5-15	S4	24	4-3-4	0-7": SAND w/ some silt, sand is fine, med. dark gray (N4), wet, loose; 7-24": SAND, same as 0-7" interval but no silt		SAND = 6' to 18'
							BENTONITE 3'8" to 6'
							GROUT = 1' to 3'8"
15							FLUSH MOUNT, COARSE AGGREGATE CONCRETE USED IN INSTALLATION
	16.5-18	S5	18	2-1-0	0-18": SILTY SAND, sand is v.f. to fine, dark greenish gray (5 GY 4/1), wet, loose, runny		Third blow drove spoon 12"
20							

SBLSYM 06/14/88

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2C-MW5 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2C, NEXT TO MAIN F-14 PARKING AREA
ELEVATION: 20.4
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 7/12/90 FINISH: 7/12/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	1-3	S1	17	17-12-11-12	0-4": fill gravel and basal sand; 4-7": SAND moderate yellowish brown (10 YR 5/4), dry, loose; 7-12": SAND, olive gray (5 Y 4/1), dry, loose; 12-17": SAND, dk. yellowish brown (10 YR 4/2), dry, loose		
	3.5-5	S2	16	3-2-3	0-7": SAND, same as 12-17" of S1; 7-16": CLAYEY SILT, dusky brown (5 YR 2/2), moist, soft, hydrocarbon odor		
5							Water table at approx. 5 ft
	8.5-10	S3	18	7-4-4	0-8": SILTY CLAY, like 7-16" of S2 but more clayey; 8-13": SAND, medium-grained, light olive gray (5 Y 5/2), wet, loose		
10							
	13.5-15	S4	18	1-2-3	0-18": SAND, med. beach sand, olive gray (5 Y 3/2), wet, loose		
15							WELL SUMMARY FINAL DEPTH = 16' SCREEN = 6' TO 16' SAND = 3'10" TO 16' BENTONITE 2'6" TO 3'10" GROUT = 1'2" TO 2'6" FLUSH MOUNT, CONCRETE FILL
20							

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2C-MW6 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2C, NEXT TO BUILDING 301
ELEVATION: 20.7
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 6/29/90 FINISH: 6/29/90 LOGGER: DOUG BITTERMAN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	2	10-8-5-7 (12)	0-2": SANDY SILTY ORGANIC SOIL, grayish brown (5 YR 3/2), dry		
	4-6	S2	22	7-6-5-3 (8)	0-4": SANDY SILTY CLAY w/ organic matter, grayish brown (5 YR 3/2), moist; 4-22": SILTY SAND, sand is fine, grayish orange (10 YR 7/4), moist		
5							
	9-11	S3	20	12-9-4 (13)	0-9": SILTY CLAY, greenish gray (5 GY 6/1) moist; 9-20": SAND W/ SILT, sand is fine, med. gray to med. dk. gray (N4 - N5), moist		Water table estimated to be at 10 feet
10							
	14-16	S4	20	4-3-5 (8)	0-20": SAND w/ trace gravel, sand is medium medium dark gray (N4), wet		
15							
	19-21	S5	24	11-12-30-6 (36)	0-7": SILTY SAND, sand is fine to medium, medium gray (N5), wet; 7-24": SILTY SAND, sand is fine, med. lt. gray (N6), wet		
20							

WELL SUMMARY

FINAL DEPTH = 22'
SCREEN = 11' TO 21'
SAND = 7' TO 21'
BENTONITE = 5' TO 7'
GROUT = 0' TO 5'

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2C-MW7 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2C, FLUSH MOUNT WELL, END OF BUILDING 404
ELEVATION: 20.8
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 7/5/90 FINISH: 7/5/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	16	31-13-13-12	0-5": asphalt and basal gravel; 5-16": SILTY SAND, dk. yellowish brown (10 YR 4/2) dry, loose		Logged from top of asphalt
	4-6	S2	24	2-2-2-2	0-6": same as 5-16" of S1; 6-24": CLAYEY SILT, grayish brown (5 YR 3/2), moist, soft, black oily streak at 18"		
5							
	9-10.5	S3	15	7-19-21	0-15": SAND, med. to coarse, lt. gray (N7), wet, loose		
10							
	14-15.5	S4	24	5-4-5	0-24": SAND, same as S3		
15							
	18-19.5	S5	24	4-5-6	0-24": SAND, same as S3		
20							

WELL SUMMARY

FINAL DEPTH = 19'6"
SCREEN = 9' TO 19'
NATURAL SAND
PACK = 14'6"' TO 19'6"
SAND = 6'6" TO 14'6"
BENTONITE 4'6" TO 6'6"
GROUT = 1' TO 4'6"
FLUSH MOUNT

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2C-MW8 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2C, FLUSH MOUNT WELL, NEAR B AVENUE
ELEVATION: 19.0
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 7/3/90 FINISH: 7/3/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	17	19-8-11-13	0-7": asphalt and basal gravel; 7-17": SAND f. to med., lt. olive gray (5 Y 6/1), moist loose, slight hydrocarbon odor		Logged from top of asphalt
							hydrocarbon odor in samples S1 and S2
	3.5-5	S2	18	2-3-3	0-18": SILTY CLAY, olive gray (5 Y 4/1), moist, soft, organic odor		
5							
	8.5-10	S3	22	3-2-3	0-9": SILT, brownish gray (5 YR 4/1), moist soft; 9-22": SAND, f. to med., med. light gray (N6), moist, v. loose		Water table at approx. 9 ft
10							
	13.5-15	S4	23	5-4-5	0-23": SAND, same as 9-22" of S3 but wet		
15							WELL SUMMARY
	16.5-18	S5	23	3-4-10	0-23": SAND, same as S4		FINAL DEPTH = 18' SCREEN = 7'3" TO 17'3" SAND = 5'8" TO 18' BENTONITE 4' TO 5'8" GROUT = 1'4" TO 4'
20							

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2C-MW9 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA | LOCATION: SITE 2C, NEAR PATH IN WOODS

ELEVATION: 17.0 | DRILLING CONTRACTOR: ATEC (NORFOLK)

DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA

WATER LEVEL AND DATE: | START: 7/2/90 | FINISH: 7/3/90 | LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	14	3-4-4-4	0-14": CLAYEY SILT, brownish gray (5YR 4/1) dry, soft, high organic content at surface		
	3.5-5	S2	18	5-5-9	0-6": SILT, brownish gray (5 YR 4/1), dry, soft; 6-11": SAND, dark yellowish orange (10 YR 6/6), moist, loose; 11-18": SAND, lt. olive gray (5 Y 6/1), moist, loose		
5							
							Water table at approx. 7 to 8 ft.
	8.5-10	S3	18	3-2-3	0-18": SAND, f. to med., med. gray (N6), wet, loose		
10							
	13.5-15	S4	18	8-12-9	0-18": SAND, f. to coarse, med. lt. gray (N6), wet, loose		
15							
	16.5-18	S5	18	6-7-6	0-18": SAND, same as S4		WELL SUMMARY FINAL DEPTH = 18' SCREEN = 7'6" TO 17'6" SAND = 4'6" TO 18' BENTONITE 3'6" TO 4'6" GROUT = 0' TO 3'6"
20							

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2D-MW1 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2D, AT EDGE OF TREE LINE, OUTSIDE FENCE
ELEVATION: 18.9
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 6/28/90 FINISH: 6/28/90 LOGGER: DOUG BITTERMAN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	16	5-5-4-5 (9)	0-3": SANDY SILT, brownish gray (5 YR 3/1), dry, organic, contains some roots; 3-7": SAND, fine to medium grained, moderate yellowish brown (10 YR 5/4), dry; 7-16": SILTY CLAY, olive gray (5 Y 4/1), slightly moist		
	4-6	S2	20	7-7-10-10 (20)	0-7": SILTY CLAY, brownish gray (5 YR 4/1) at top to med. gray (N5) at bottom, wet; 7-20": SAND, fine grained, trace silt, med. lt. gray to lt. gray (N6-N7), wet		
5							
	9-11	S3	24	3-1-1 (2)	0-5": SILTY SANDY CLAY, dk. yellowish brown (10 YR 4/2), wet; 5-24": SILTY SAND, sand is fine, dk. greenish gray (5 GY 4/1), wet		
10							
	14-16	S4	24	12-3-3 (6)	0-9": SILTY SAND, sand is fine, med. dark gray (N4), wet; 9-24": SAND, fine to medium grained, trace silt, med. gray (N5), wet		
15							
20							

WELL SUMMARY

FINAL DEPTH = 17'
SCREEN = 7' TO 17'
SAND = 4' TO 17'
BENTONITE = 3' TO 4'
GROUT = 0' TO 3'

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2D-MW2 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2D, NEAR BUILDING 111
ELEVATION: 22.3
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 7/2/90 FINISH: 7/2/90 LOGGER: FRANK LEWIS

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	11	19-9-11-7 (18)	0-11": SANDY SILT, sand is fine, trace gravel, grayish olive (10 Y 4/2), dry, clay appears to be fill material		
	4-6	S2	19	5-1-1-3 (18)	0-9": CLAY with trace silt, olive gray (5 Y 4/1), moist; 9-19": SILTY SAND, sand is fine, olive gray (5 Y 4/1), wet		
5							
	9-11	S3	18	8-7-8-9 (17)	0-18": SILTY SAND, sand is fine, lt. olive gray (5 Y 6/1), saturated		
10							
	14-16	S4	20	3-1-1-1 (2)	0-12": SANDY SILT W/ CLAY, sand is fine; 12-20": fine SANDY SILT at top grading to SILTY CLAY w/ trace sand at bottom, dark gray (N3), saturated		
15							
	18-20	S5	24	8-6-10-8 (18)	0-24": SAND W/SILT, sand is coarse, medium gray (N5), saturated		
20							

WELL SUMMARY

FINAL DEPTH = 19'
SCREEN = 9' TO 19'
SAND = 7' TO 19'
BENTONITE = 5' TO 7'
GROUT = 1' TO 5'
FLUSH MOUNT

CH2M HILL

PROJECT NUMBER: WDC20368.H0 | BORING NO.: 2D-MW3 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2D, NEXT TO LINE SHACK 125
ELEVATION: 22.1
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 7/3/90 FINISH: 7/3/90 LOGGER: F. LEWIS

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	12	2-3-4-3 (7)	0-3": SANDY GRAVEL, light greenish gray (5 GY 8/1), dry, crumbly fill material; 3-12": SILTY CLAY, greenish black (5 GY 2/1), slightly moist, dense, oily odor		Explosimeter reads 5% LEL
	4-6	S2	19	2-2-2-3 (5)	0-19": CLAY WITH SILT, grades from greenish black at top 8" to med. gray (N5) at bottom moist, dense		
5							
	9-11	S3	13	18-17-14-11 (25)	0-8": SILTY SAND, sand is fine, med. light gray (N6), saturated; 8-13": SANDY SILT, sand is fine, med. dk. gray (N4), saturated		
10							
	14-16	S4	18	2-1-1-1 (2)	0-18": SANDY SILT WITH LENSES OF SILTY CLAY sand is fine, lenses are 2" thick, greenish black (5 GY 2/1), saturated		
15							
	19-21	S5	24	13-8-13-8 (21)	0-24": SAND WITH SILT, sand is fine to med. medium gray (N5), saturated		
20							

WELL SUMMARY

FINAL DEPTH = 19'
SCREEN = 9' TO 19'
SAND = 7'6" TO 19'
BENTONITE = 5'6" TO 7'6"
GROUT = 10" TO 5'6"
FLUSH MOUNT

SBLSYM 06/14/88

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2E-MW1 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2E, INSIDE FENCE, NEAR BUILDING 109
ELEVATION: 20.3
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 6/28/90 FINISH: 6/28/90 LOGGER: DOUG BITTERMAN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	10	7-4-4-6 (10)	0-10": SILTY SAND, sand is fine, dark yellowish orange (10 YR 6/6), moist		First borehole redrilled after striking hard object at 4 feet, possible pipe
5	4-6 (second boring)	S2	21	2-2-2-3 (5)	0-21": CLAY WITH SOME SILT, dark yellowish brown (10 YR 4/2), moist, petroleum odor		HNU detects 5-7 ppm when held close to sample
10	9-11	S3	24	6-4-7 (11)	0-24": SILTY SAND, sand is med., trace clay med. gray to dark gray (N4 - N5), wet		
15	14-16	S4	23	4-4-7 (11)	0-8": SILTY CLAY w/ abun. fine sand, medium gray to dark gray (N4 - N5), wet; 8-23": SILTY SAND w/ trace gravel, medium gray to med. dark gray (N4 - N5), wet		WELL SUMMARY FINAL DEPTH = 19' SCREEN = 9' TO 19' SAND = 4'6" TO 19 BENTONITE = 3'6"' TO 4'6" GROUT = 2' TO 3'6"
20	19-21	S5	24	15-12-12 (24)	0-24": SAND W/SILT, sand is coarse, trace gravel, med. gray to med. dark gray (N4 - N5), wet		HNU detects 2 ppm in borehole, 0 in breathing zone

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2E-MW2 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2E, NEXT TO HAZ. WASTE STORAGE AREA
ELEVATION: 19.4
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 7/6/90 FINISH: 7/6/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	15	5-7-8-7	0-2": road gravel; 2-15": SANDY SILT, v.f. to fine, dk. yellowish brown (10 YR 4/2), dry, soft		
	4-6	S2	16	2-1-2-7	0-13": SILTY CLAY, brownish gray (5 YR 4/1) moist, soft; 13-16": SANDY SILT, olive gray (5 Y 4/1), moist, soft, sand is very fine to fine		
5							
							Water table at approx. 8 ft
	9-10.5	S3	11	6-5-4	0-11": SAND, fine to med., med. gray (N5), wet, loose		
10							
	13.5-15	S4	20	3-2-5	0-20": SAND w/ well-rounded 4 mm pebbles, med. gray (N5), wet, loose, pbls are white, gray, yellow		
15							
	16.5-18	S5	23	4-3-9	0-23": SAND, same as S3		
20							

WELL SUMMARY
FINAL DEPTH = 18'6"
SCREEN = 8' TO 18'
SAND = 5'7" TO 18'6"
BENTONITE 3'6" TO 5'7"
GROUT = 1' TO 3'6"
FLUSH MOUNTED

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 2E-MW3 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 2E, OUTSIDE FENCE, NEXT TO STEAM LINE
ELEVATION: 18.9
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 7/2/90 FINISH: 7/2/90 LOGGER: FRANK LEWIS

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	17	5-8-6-7 (13)	0-17": SANDY SILT W/ TRACE CLAY, sand is fine, olive gray (5 Y 4/1), very dry		
	4-6	S2	15	2-4-11-11 (22)	0-10": CLAY W/ SILT, dark greenish gray (5 GY 4/1), moist, stiff; 10-15": SAND W/ SILT, sand is fine to med., grayish orange (10 YR 7/4), wet		
5							
	9-11	S3	15	5-4-2-2 (4)	0-15": SILTY SAND, sand is fine, med. dark gray (N4), saturated		
10							
	14-16	S4	24	6-9-8-7 (15)	0-24": SILTY SAND, sand is med. to coarse, trace clay, med. dark gray (N4), saturated		
15							WELL SUMMARY FINAL DEPTH = 18' SCREEN = 8' TO 18' SAND = 5' TO 18' BENTONITE = 3'6" TO 5' GROUT = 0' TO 3'6" ABOVE GRADE
	19-21	S5	22	10-14-21-10 (31)	0-22": SILTY SAND, sand is coarse, trace gravel, medium gray (N5), saturated		
20							

CH2M HILL

PROJECT NUMBER: WDC20368.H0 | BORING NO.: 07-MW3D | SHEET: 1 OF 2

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: FIFTH GREEN LANDFILL, DEEP WELL ALONG CENTRAL ROAD
ELEVATION: 17.6
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 6 1/4-INCH HSA AND MUD ROTARY WITH 5 7/8 TRICONE BIT
WATER LEVEL AND DATE:
START: 7/16/90 FINISH: 7/20/90 LOGGER: JIM FORD

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	20-22	S1	24	4-3-4 (7)	0-12": SAND, sand is medium size and well sorted, med. gray (N5), wet, unconsolidated 12-24": SAND WITH SILT, sand is fine, med. gray (N5), wet, semi-consolidated		NOTE: lithologies from 0-20 feet were sampled at well 07-MW3S, located approx. 200 feet east of 07-MW3D
25	25-27	S2	20	10-8-9 (17)	0-6": SAND, sand is medium size, medium gray (N5), wet, unconsolidated; 6-20": SANDY SILT, 10% fine sand, medium gray (N5), wet, consolidated		No shells
30	30-32	S3	16	6-6-5 (11)	0-16": SILT WITH FINE SAND, medium gray (N5), wet, contains shell fragments		Shells
35	35-37	S4	19	35-21-33 (54)	0-19": SILTY SAND, sand is fine, medium gray (N5), contains high % of shell fragments, some of which are large		
40							

CH2M HILL

PROJECT NUMBER: WDC20368.H0 | BORING NO.: 07-MW3D | SHEET: 2 OF 2

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: FIFTH GREEN LANDFILL, DEEP WELL ALONG CENTRAL ROAD
ELEVATION: 17.6
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 6 1/4-INCH HSA AND MUD ROTARY WITH 5 7/8-INCH TRICONE BIT
WATER LEVEL AND DATE:
START: 7/16/90 FINISH: 7/20/90 LOGGER: JIM FORD

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	40-42	S5	17	13-12-18 (30)	0-17": SILTY SAND, sand is fine, medium gray (N5), contains high % of shell fragments, some of which are large gray (N5), wet, semi-consolidated same as S4		
45	45-47	S6	4	14-17-15 (22)	0-4": SILTY SAND, same as S5		
50	50-52	S7	12	16-16-18 (34)	0-12": SILTY SAND, same as S5		
55							WELL SUMMARY FINAL DEPTH = 50' SCREEN = 38' TO 48' SAND = 36' TO 50' BENTONITE = 34' TO 36' CAVE-IN = 20' TO 34' GROUT = 0' TO 20'
60							

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 07-MW4 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: FIFTH GREEN LANDFILL, WELL 4 SHALLOW
ELEVATION: 16.1
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 6/29/90 FINISH: 6/29/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	15	4-6-6-7	0-15": SANDY SILT, grayish brown (5 YR 3/2) dry, stiff		
	3.5-5	S2	20	6-10-12	0-2": SANDY SILT, same as S1; 2-10": CLAY, grayish yellow green (5 GY 7/2) w/ orange streaks, moist, soft; 10-20": SAND, v.f. to med., pinkish gray (5 YR 8/1), dry, loose		
5							
							Water table at approx. 8 ft
	8.5-10	S3	14	7-10-12	0-14": SAND, v.f. to med., lt. gray (N6), wet, loose		
10							
	13.5-15	S4	24	8-12-15	0-24": SAND, v.f. to med., med. gray (N5), wet, v. loose		
15							
	16.5-18	S5	22	5-8-6	0-22": SAND, same as S4		WELL SUMMARY FINAL DEPTH = 18'6" SCREEN = 8'1" TO 18'1" SAND = 6'2" TO 18'6" BENTONITE 4'6" TO 6'2" GROUT = 0' TO 4'6"
20							

CH2M HILL

PROJECT NUMBER: WDC20368.H0 | BORING NO.: 07-MW4D | SHEET: 1 OF 2

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: FIFTH GREEN LANDFILL, NORTHWEST WELL PAIR, DEEP WELL
ELEVATION: 16.2
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH AND 6 1/4-INCH HSA AND MUD ROTARY WITH 5 7/8-INCH TRICONE BIT
WATER LEVEL AND DATE:
START: 7/9/90 FINISH: 7/13/90 LOGGER: JIM FORD

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					NOTE: Refer to 07-MW4S log for shallow lithologies at this well pair site		
25	25-27	S1	22	3-2-2 (4)	0-22": SAND W/ SOME SILT, sand is fine to coarse, olive gray (5 Y 4/1), wet, unconsolidated		
30	30-32	S2	24	7-13-16 (29)	0-24": SAND W/ SOME SILT, same as S1		No shells
							Shells
35	35-37	S3	24	20-24-27 (51)	0-24": SILTY SAND, sand is fine to coarse, med. gray (N5), wet, semi-consolidated, numerous shell fragments		
40							

CH2M HILL

PROJECT NUMBER: WDC20368.H0 | BORING NO.: 07-MW4D | SHEET: 2 OF 2

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: FIFTH GREEN LANDFILL, NORTHWEST WELL PAIR, DEEP WELL
ELEVATION: 16.2
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-57 RIG WITH 6 1/4-INCH HSA AND MUD ROTARY WITH 5 7/8-INCH TRICONE BIT
WATER LEVEL AND DATE:
START: 7/9/90 FINISH: 7/13/90 LOGGER: JIM FORD

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	40-42	S4	22	3-3-2 (5)	0-16": SANDY CLAY, sand is fine, med. dark gray (N4), wet, consolidated; 16-24": CLAY, med. dark gray (N4), wet, very plastic		
45	45-47	S5	24	4-2-4 (6)	0-24": SILT AND CLAY W/ SOME SAND, sand is fine, med. dark gray (N5), wet, medium plasticity, contains shell fragments		
50	50-52	S6	24	3-3-3 (6)	0-24": SILTY SAND, sand is fine, silt is <20%, med. dark gray (N5), wet, unconsolidated, contains some shell fragments		
55	55-57	S7	24	2-3-3 (6)	0-24": SILT AND CLAY, same as S5		WELL SUMMARY FINAL DEPTH = 55' SCREEN = 45' TO 55' SAND = 42' TO 55' BENTONITE = 40' TO 45' GROUT = 0' TO 40'
60							

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 07-MW5 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: FIFTH GREEN LANDFILL, NEAR TRAILER PARK
ELEVATION: 17.8
DRILLING CONTRACTOR: ATEC (NORFOLK)
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 7/2/90 FINISH: 7/2/90 LOGGER: STEVEN BROWN

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	19	13-15-14-12	0-19": SANDY SILT, v. fine, brownish gray (5 YR 4/1), dry, very stiff		
	3.5-5	S2	15	3-3-3	0-5": SANDY SILT, same as S1; 5-10": SILTY CLAY, brownish gray (5YR 4/1), moist, soft; 10-12": SILTY SAND, brownish gray (5YR 4/1) moist, soft; 12-15": SILTY SAND, same as 10-12" but wet		
5							Water table at approx. 5 ft
	8.5-10	S3	16	7-7-8	0-4": SILTY SAND, v.f. to med., medium yellowish brown (10 YR 5/2), wet, soft; 4-16": SAND, v.f. to coarse, med. gray (N5) wet, loose		
10							
	13.5-15	S4	18	3-3-5	0-9": SAND, same as 4-16" of S3; 9-15": SILTY SAND, med. yellowish brown (10 YR 5/2), wet, soft; 15-18": SAND, same as 0-9"		
15							
	15-18	N/A			15 TO 18 ft. logged from cuttings: SAND, same as 15-18" interval of S4		
20							

WELL SUMMARY

FINAL DEPTH =	18'
SCREEN =	7'6" TO 17'6"
SAND =	5'7" TO 18'
BENTONITE	4' TO 5'7"
GROUT =	0' TO 4.0'

CH2M HILL

PROJECT NUMBER: WDC 20368.H0.03 | BORING NO.: 11-MW1 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: LANTDIV-OCEANA
LOCATION: SITE 11, FIRE FIGHTING TRAINING PIT
ELEVATION: 17.1
DRILLING CONTRACTOR: ATEC
DRILLING METHOD AND EQUIPMENT: MOBILE B-53 RIG WITH 4 1/4 AND 6 1/4-INCH HSA
WATER LEVEL AND DATE:
START: 6/28/90 FINISH: 6/28/90 LOGGER: STEVEN BROWN

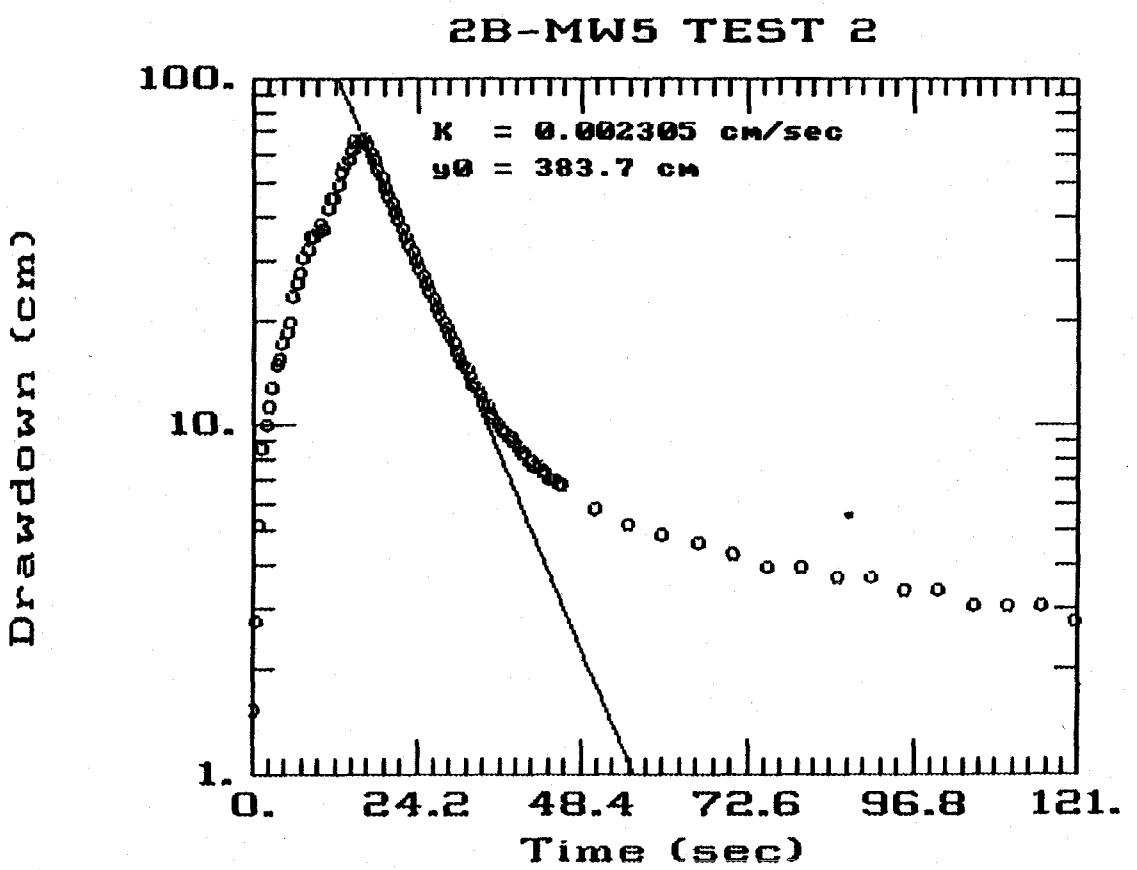
DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
	0-2	S1	20	3-3-3-3	0-20": SANDY CLAY, grayish brown (5 YR 3/2) moist, soft		
	3.5-5	S2	18	4-3-4	0-11": SILTY CLAY, grayish brown (5 YR 3/2) moist, soft; 11-18": CLAY, greenish gray w/ orange staining (5 GY 6/1), moist, soft		
5							
							Water table at 8 ft.
	8.5-10	S3	19	10-10-13	0-5": CLAYEY SILT, grayish brown (5 YR 3/2) moist, soft; 5-17": SAND, f. to c., dk. yellowish orange (10 YR 6/6), wet, loose; 17-19": SAND, med.lt. gray (N6), wet, loose		
10							
	13.5-15	S4	22	12-23-28	0-22": SAND, same as S3, 17-19"		
15							
	16.5-18	S5	23	7-10-10	0-23": SAND, same as S4		
20							

WELL SUMMARY

FINAL DEPTH = 18'6"
SCREEN = 8'2" TO 18'2"
SAND = 5'11" TO 18'6"
BENTONITE 4' TO 5'11"
GROUT = 0' TO 4'

Appendix B

IN-SITU HYDRAULIC CONDUCTIVITY DATA ANALYSIS



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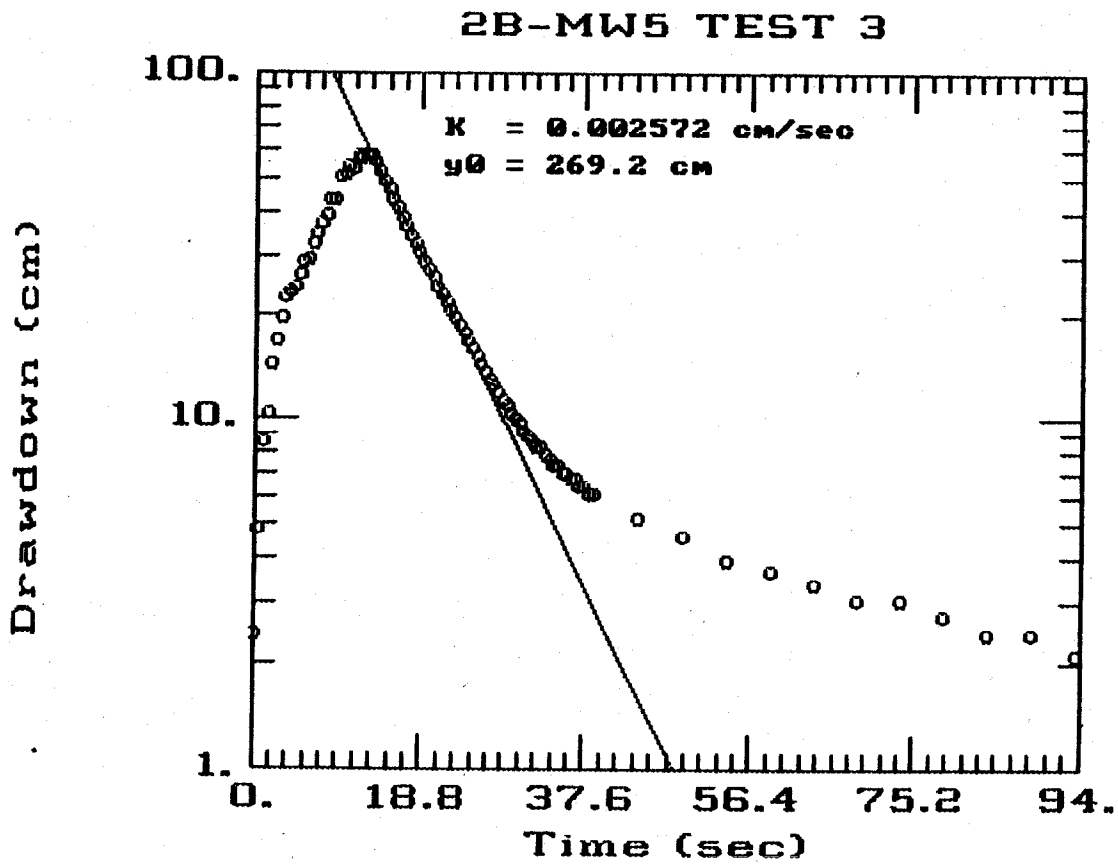

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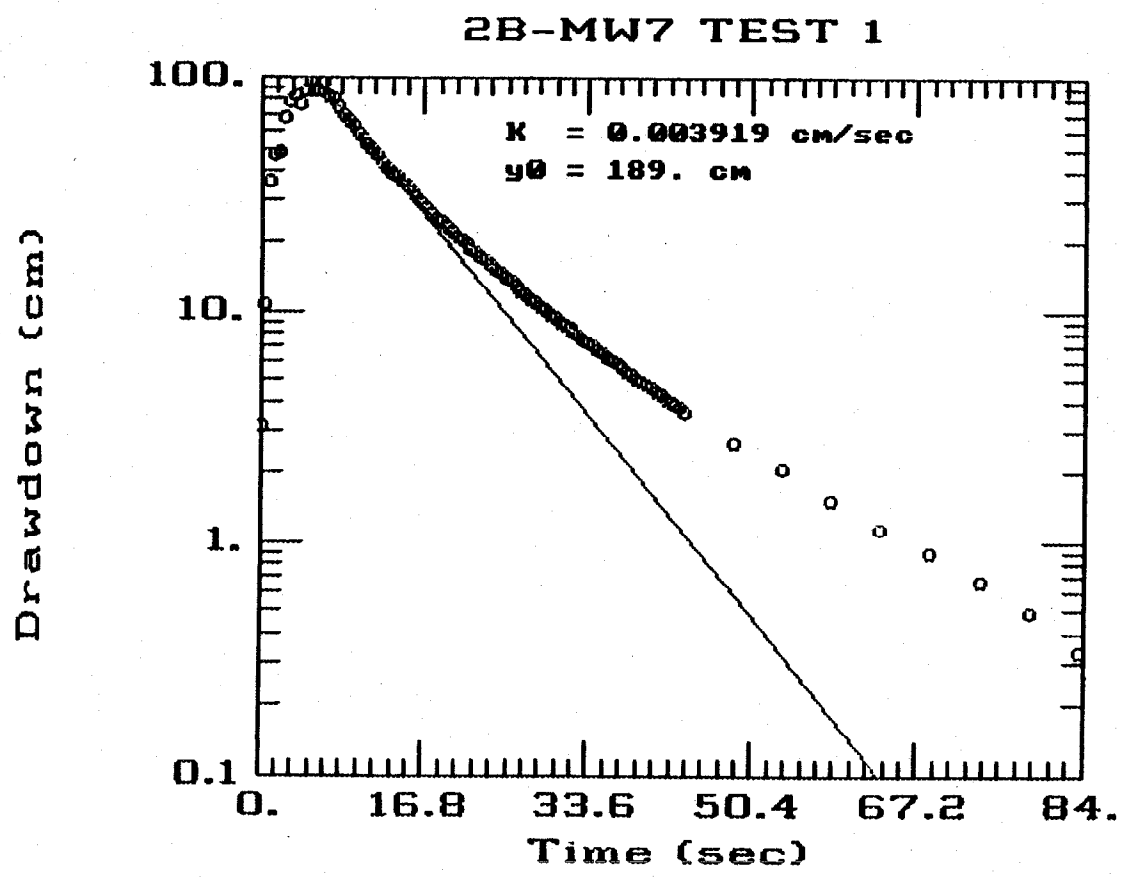

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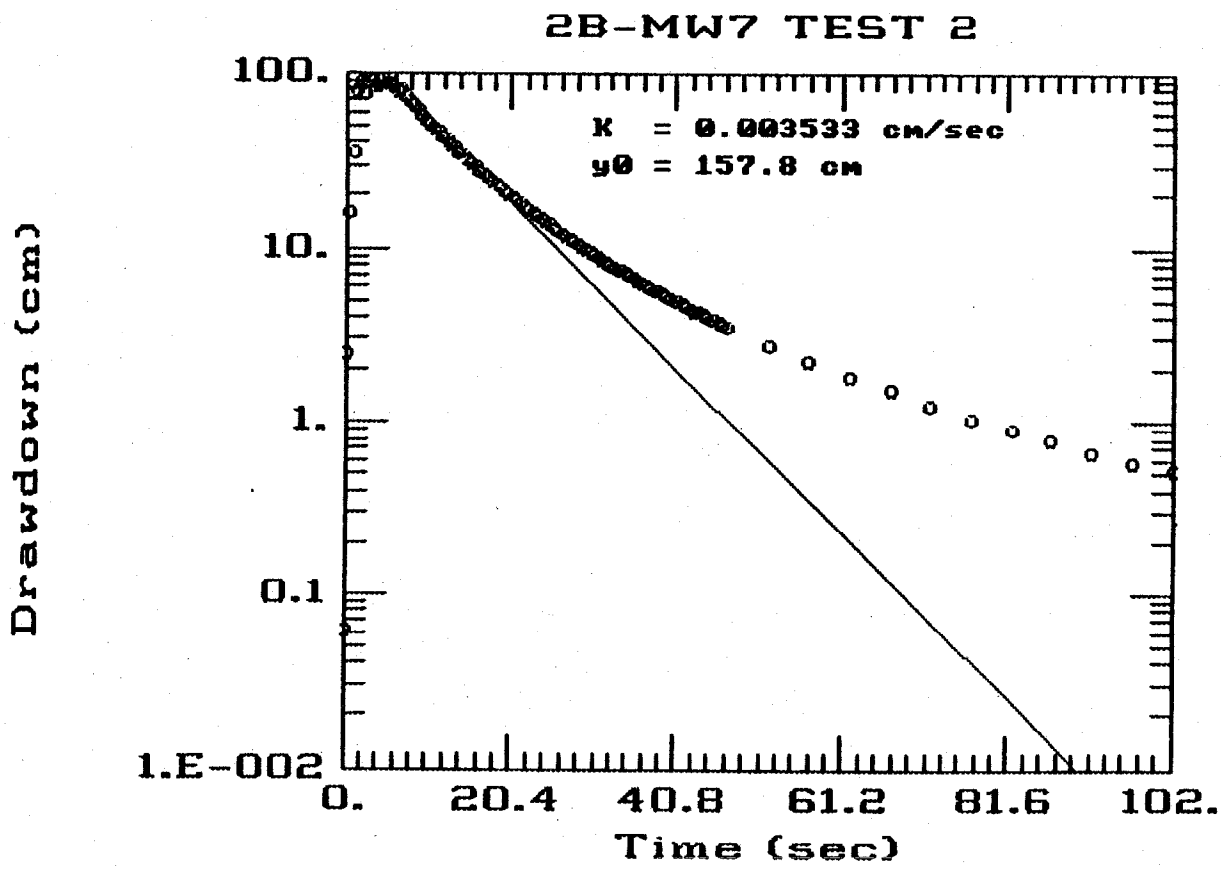

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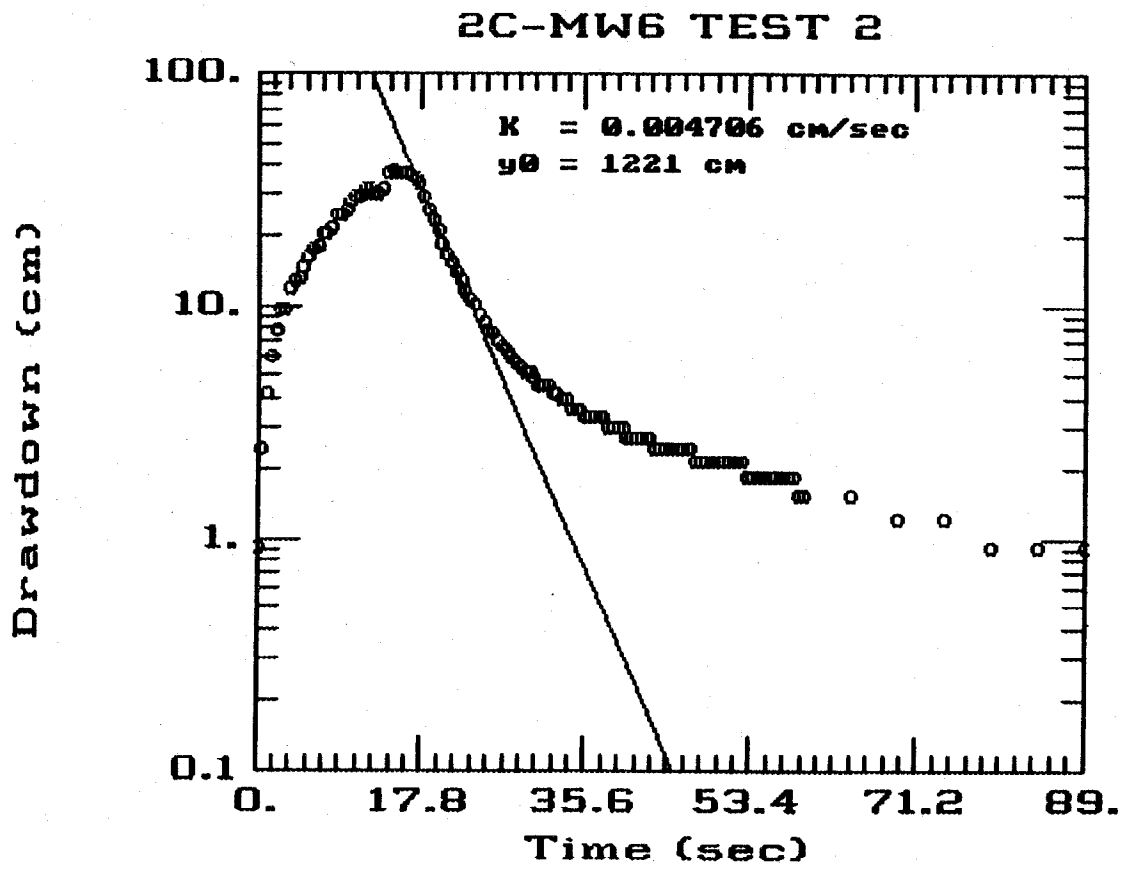

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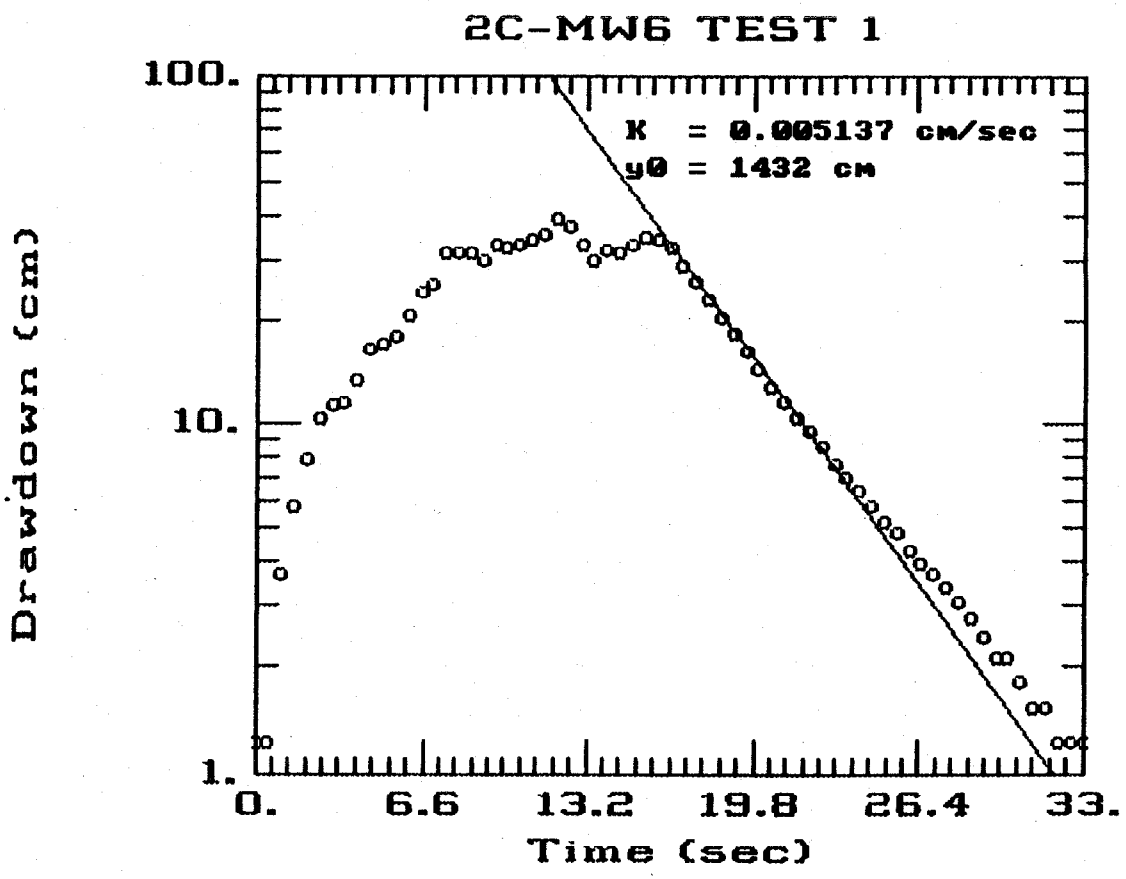

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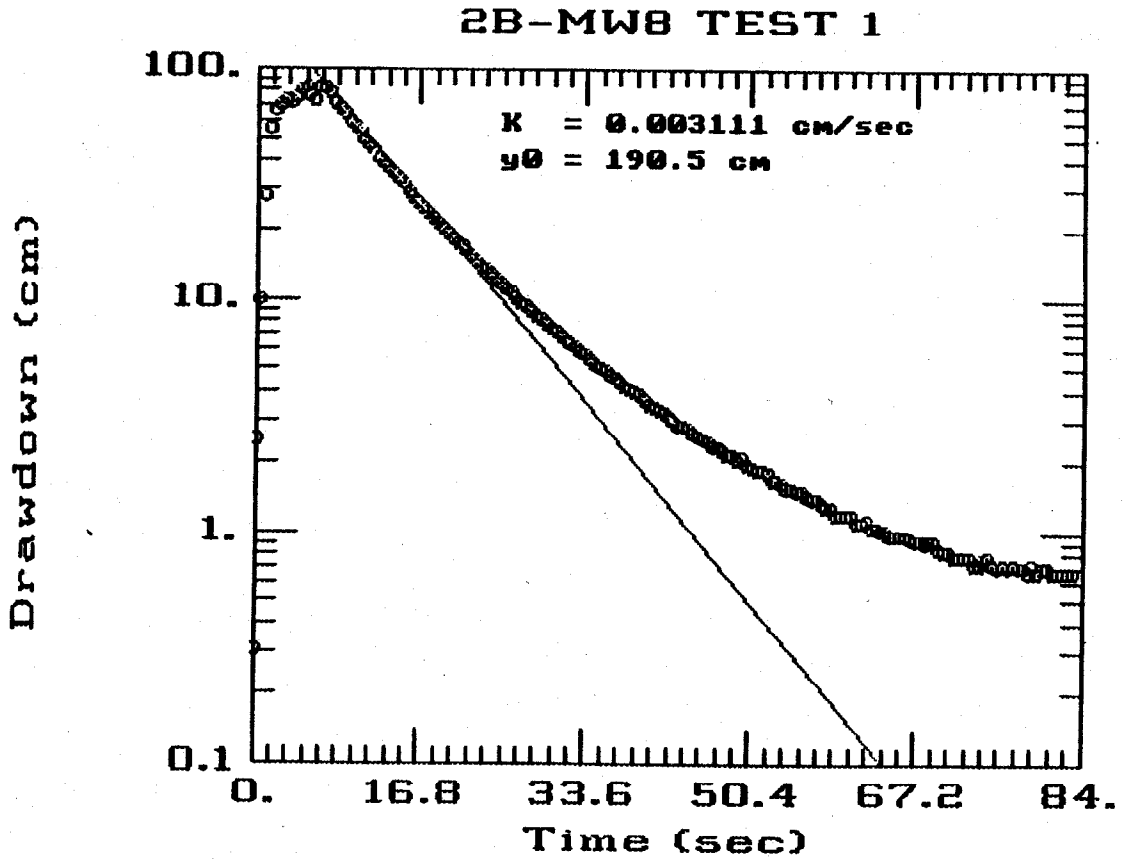

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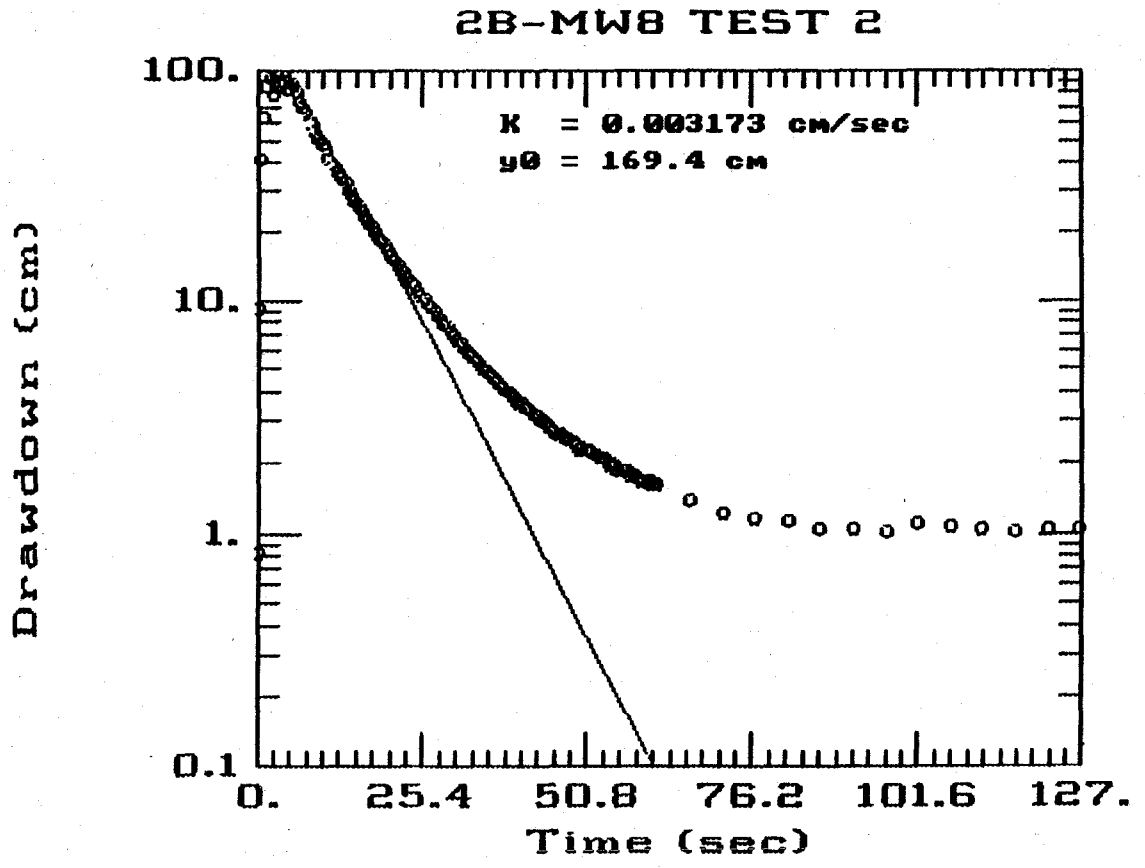

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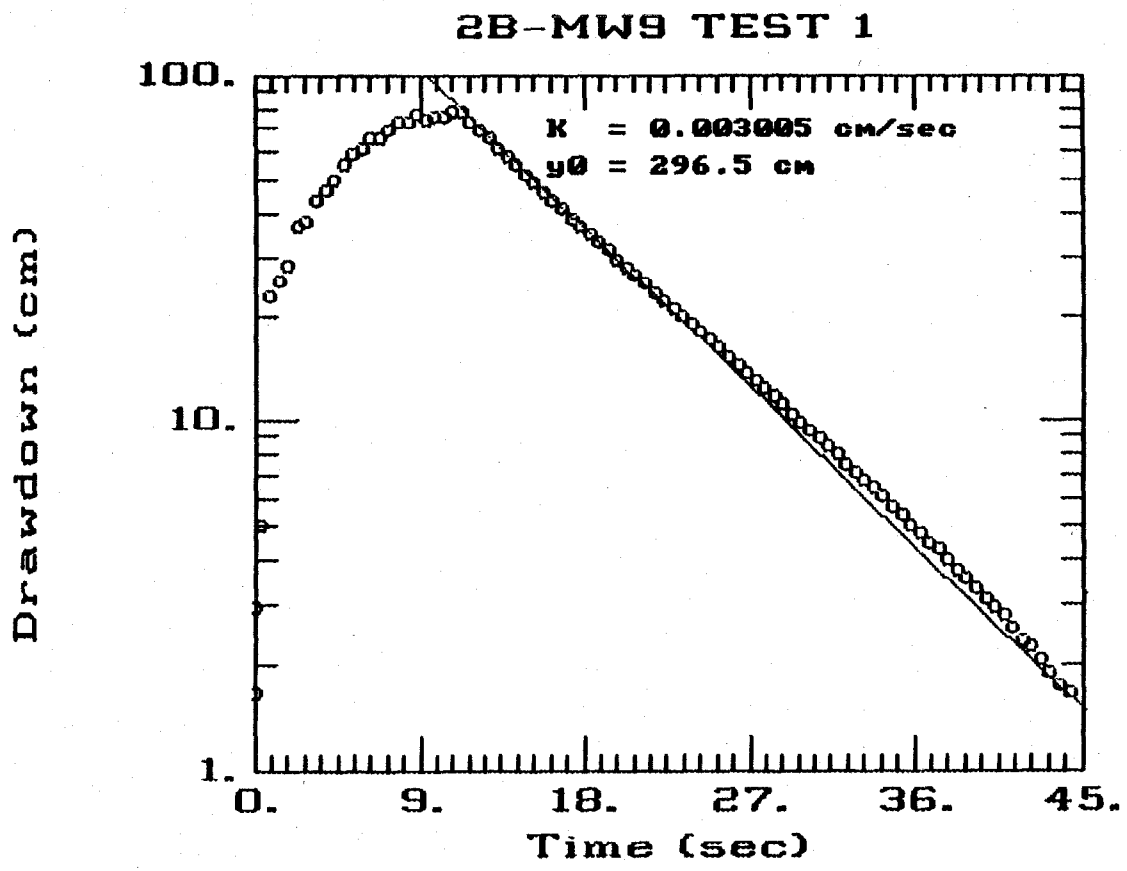

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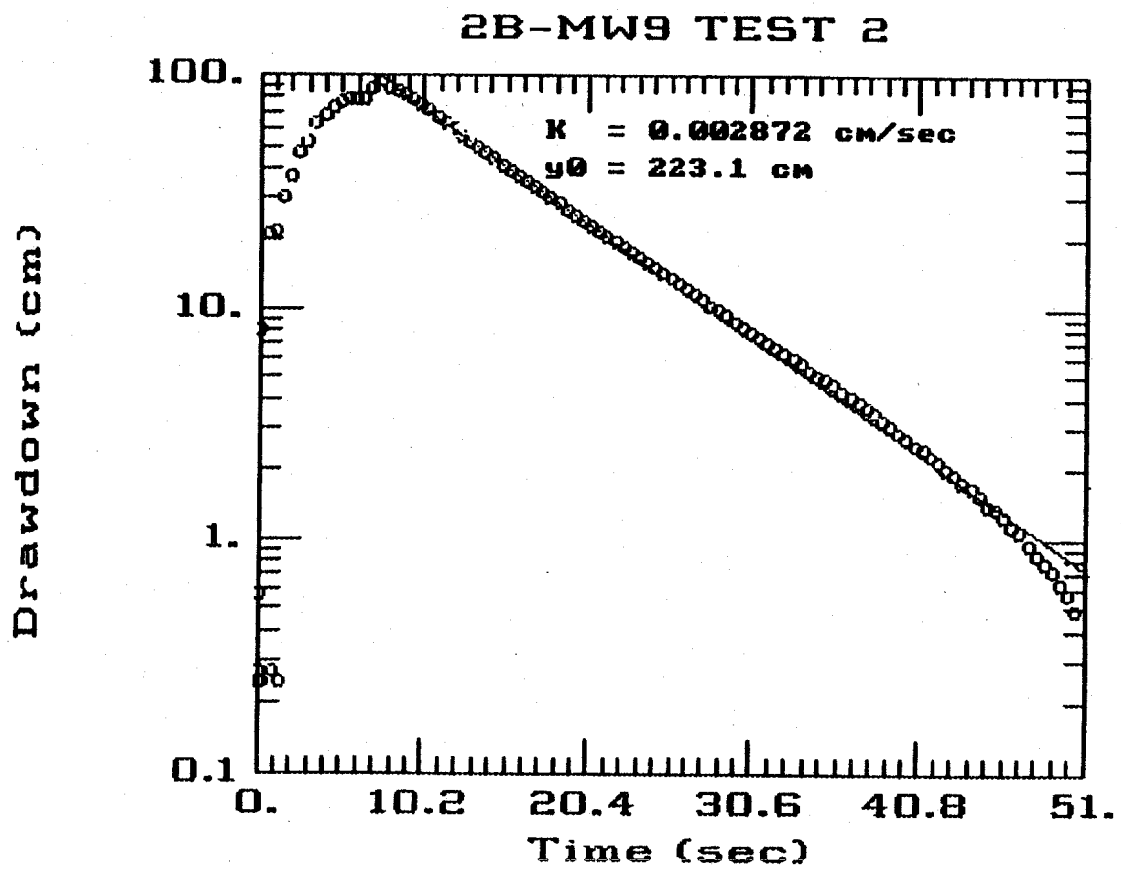

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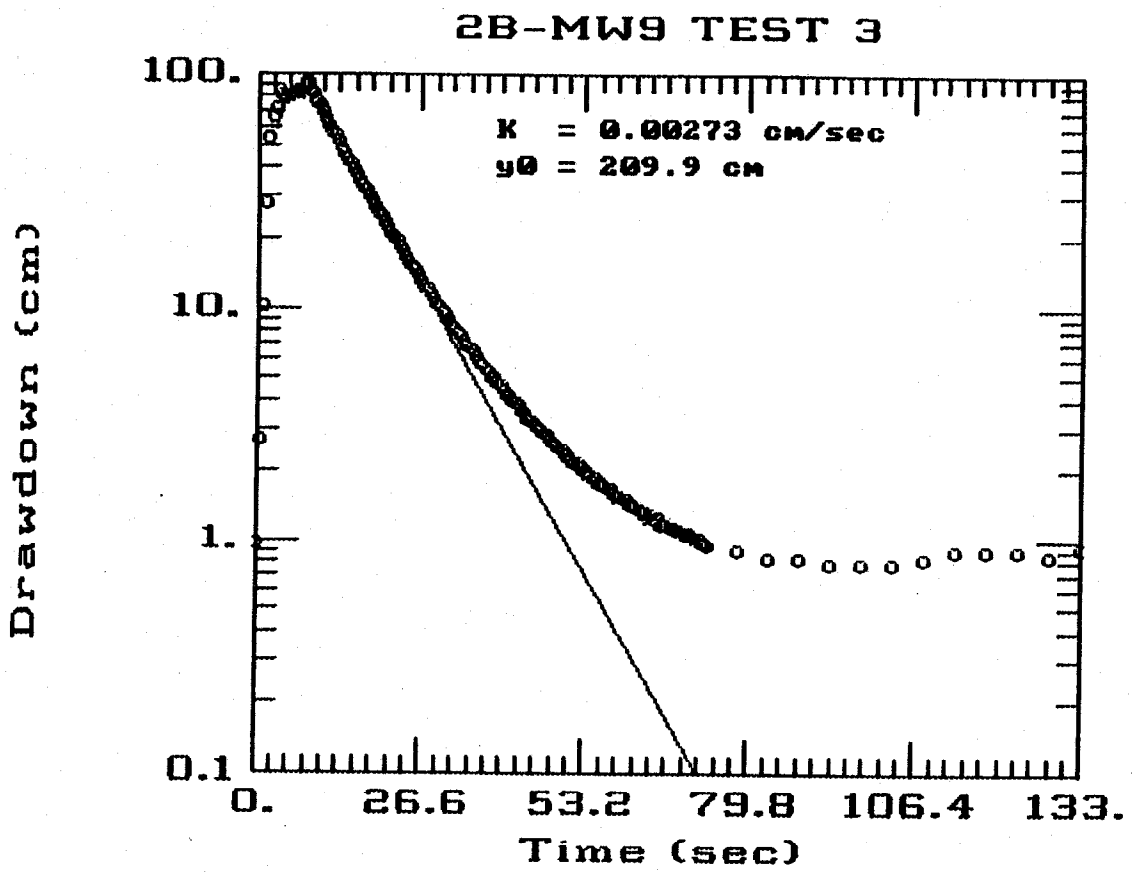

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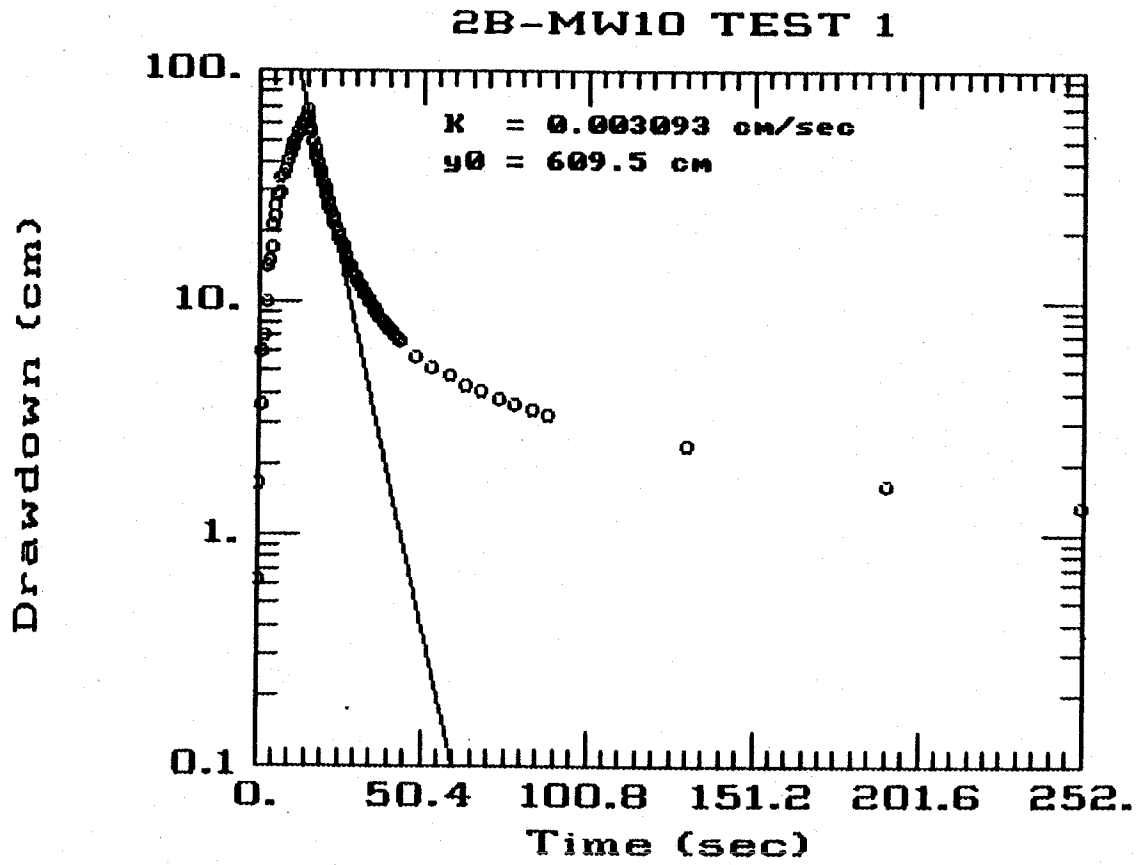

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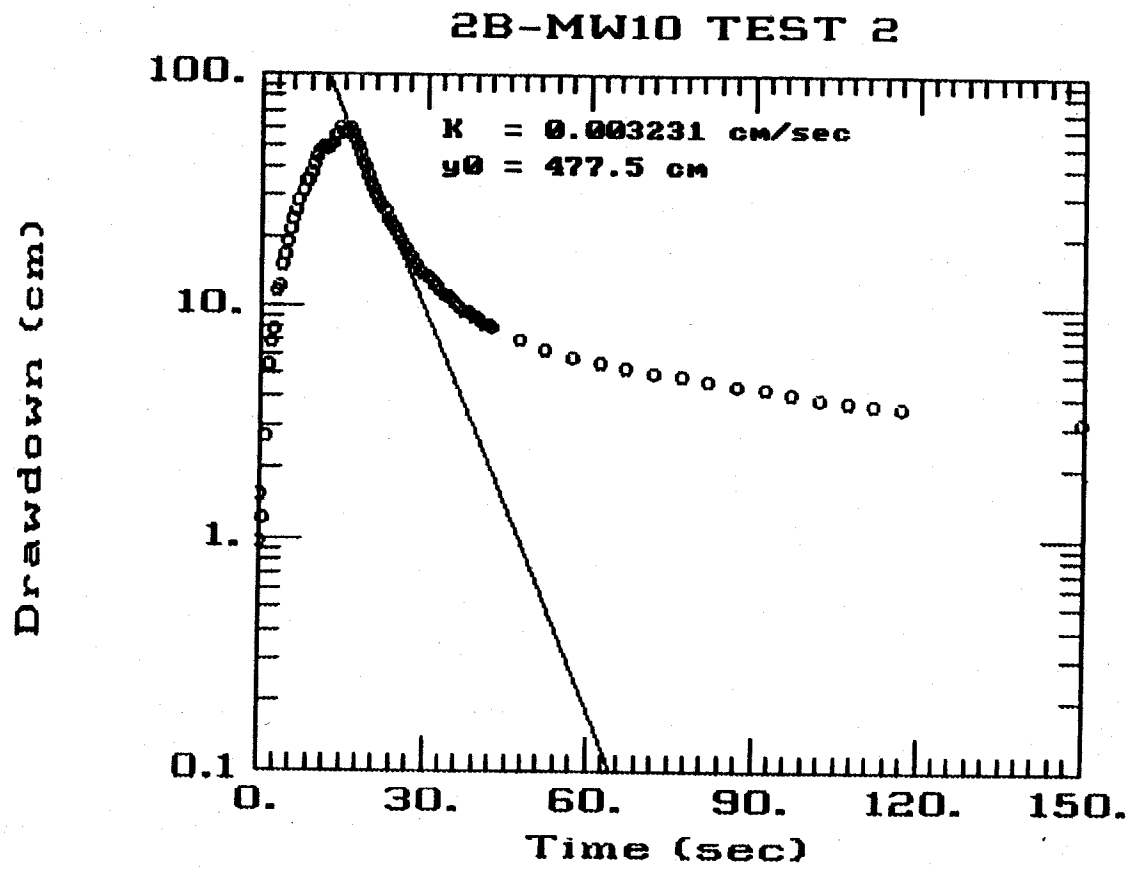

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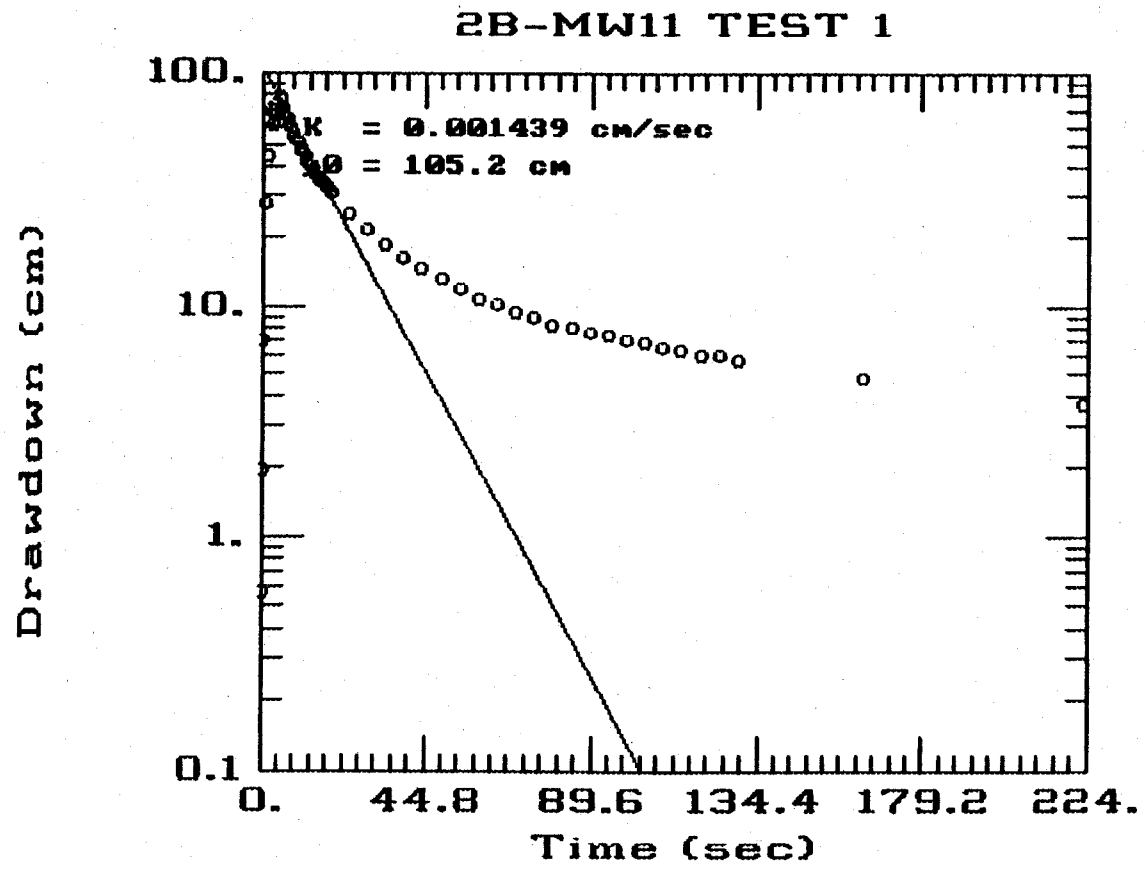

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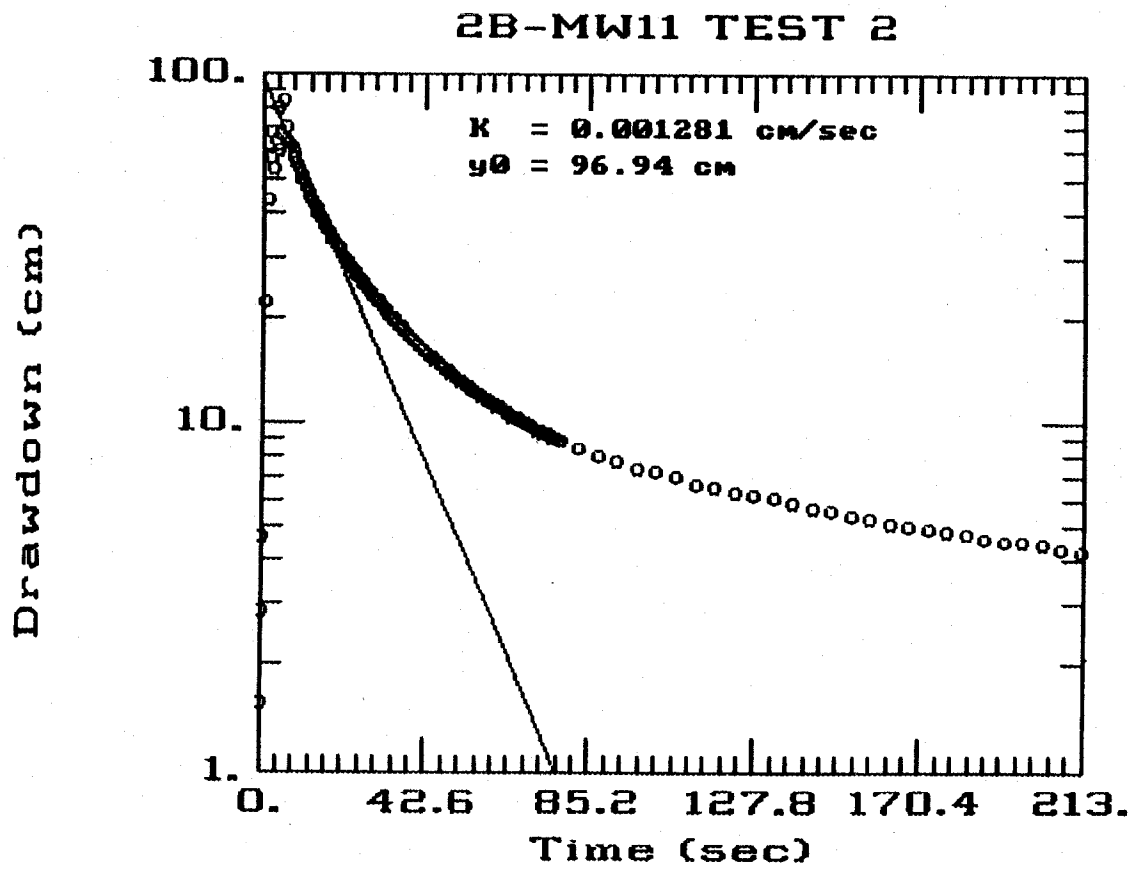

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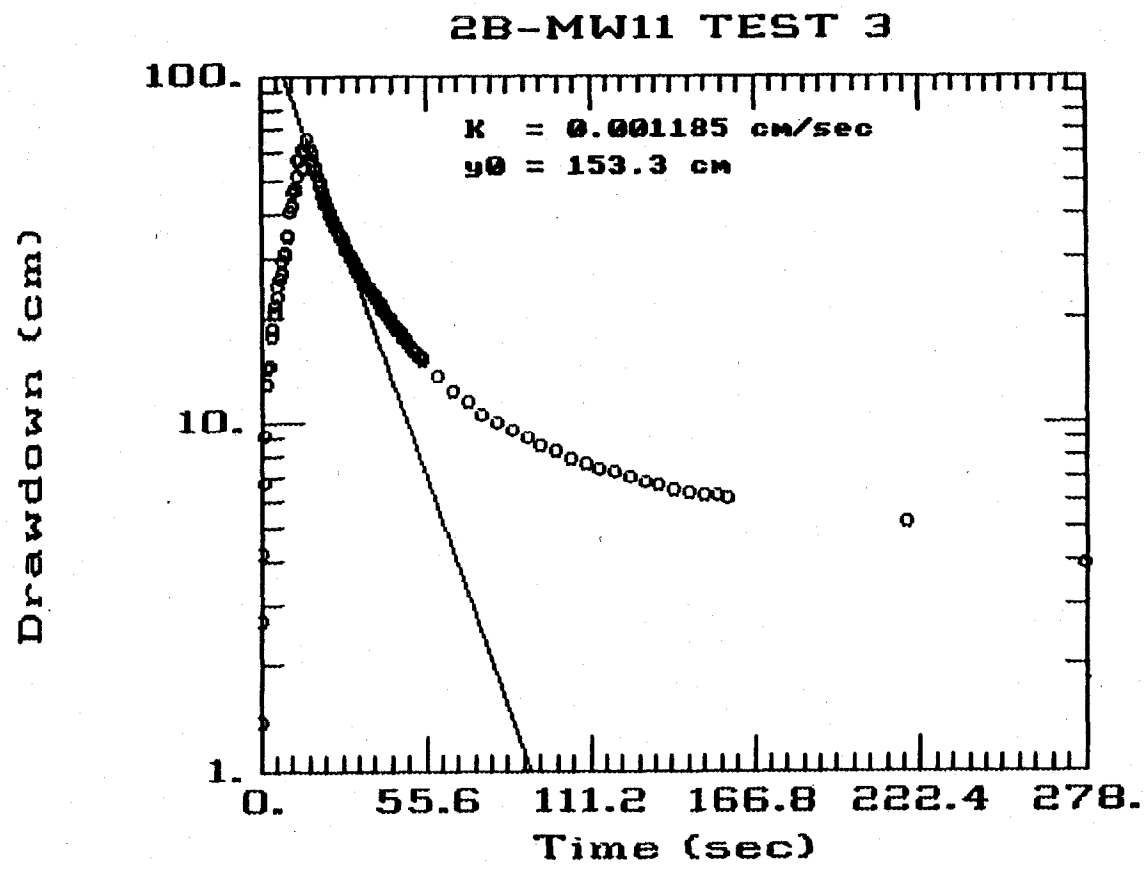

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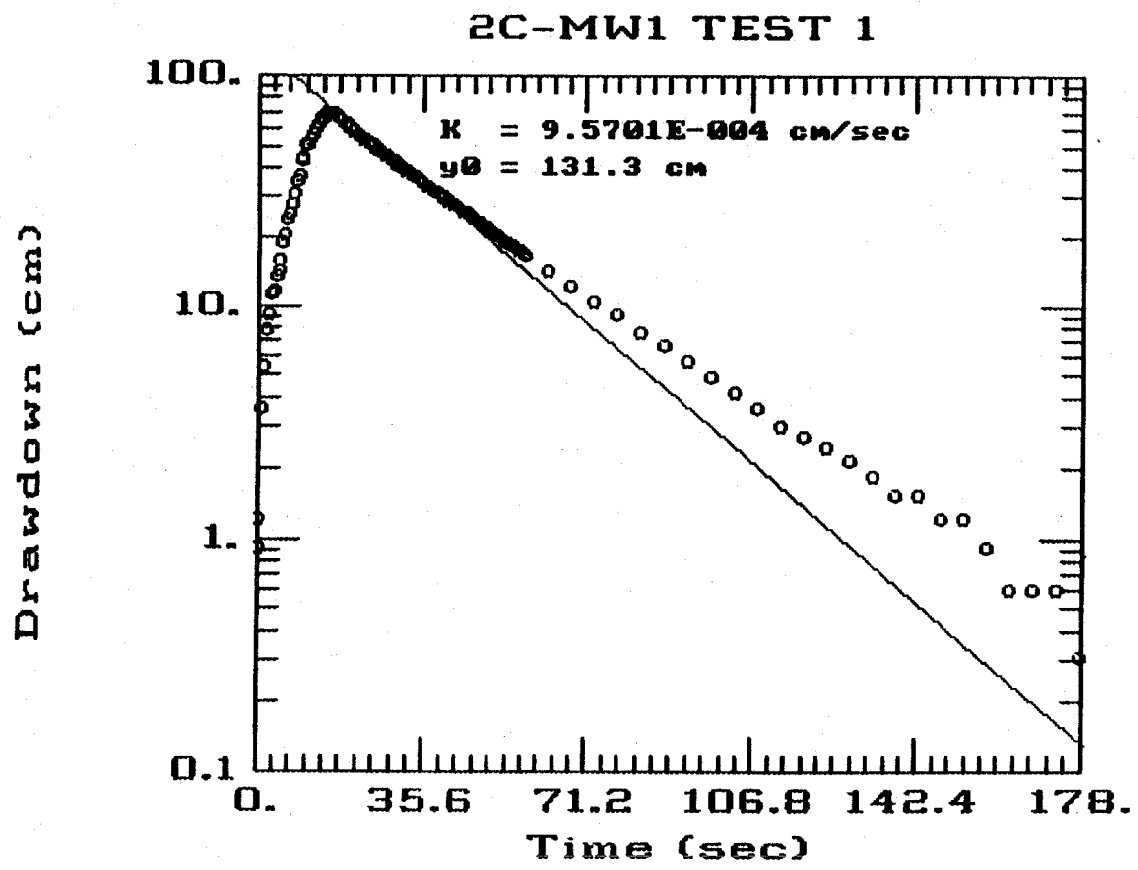

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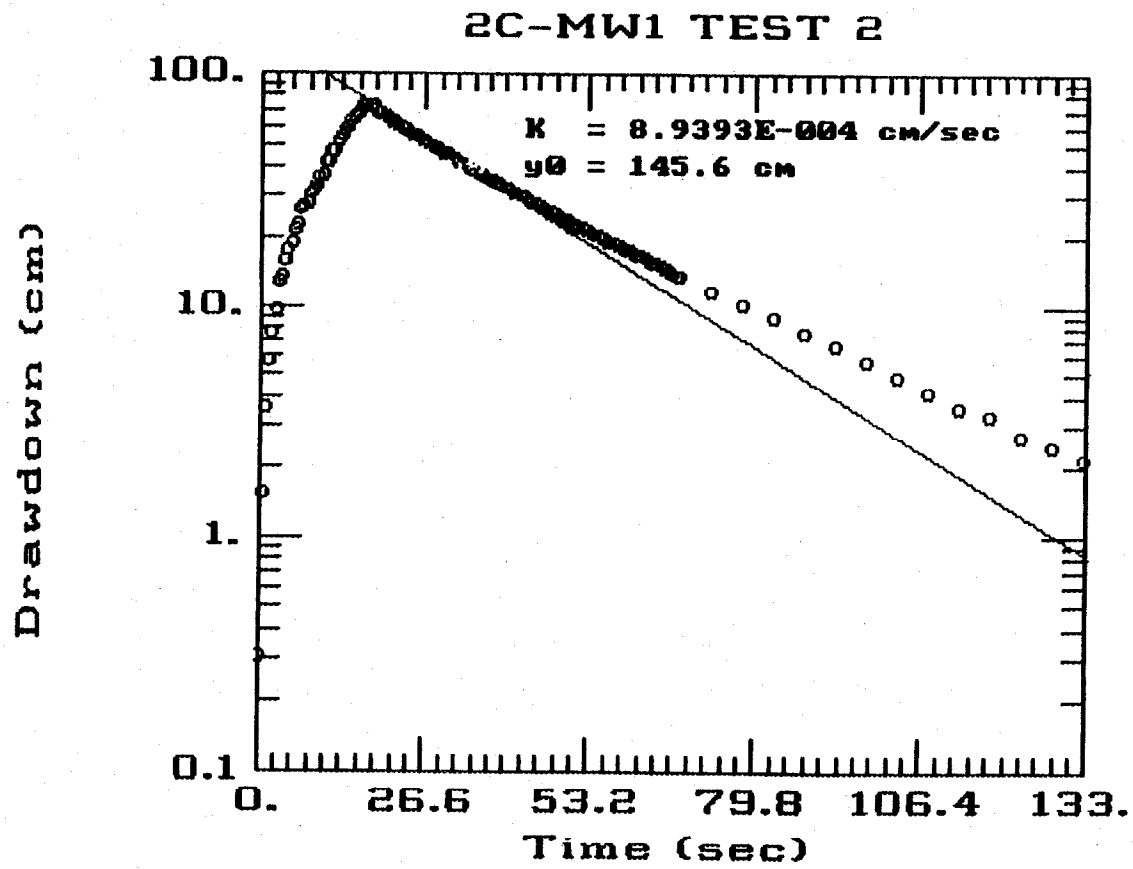

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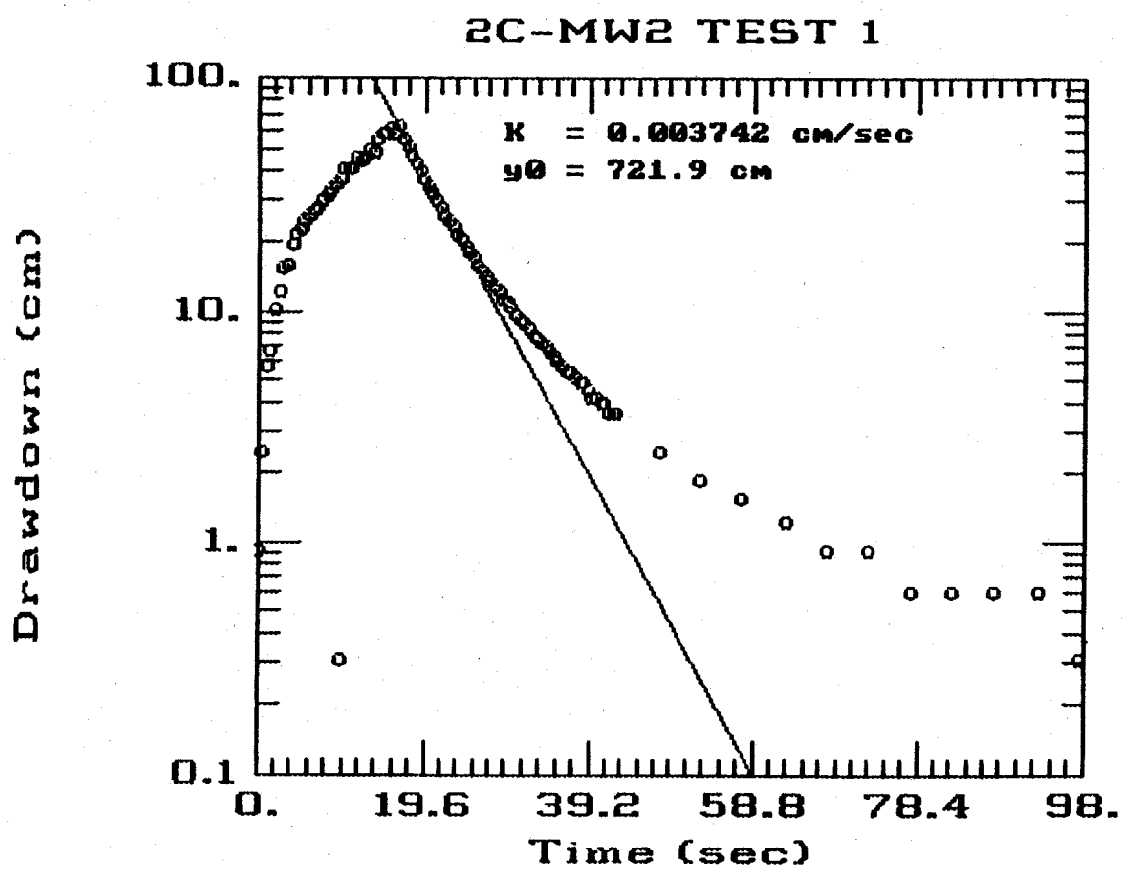

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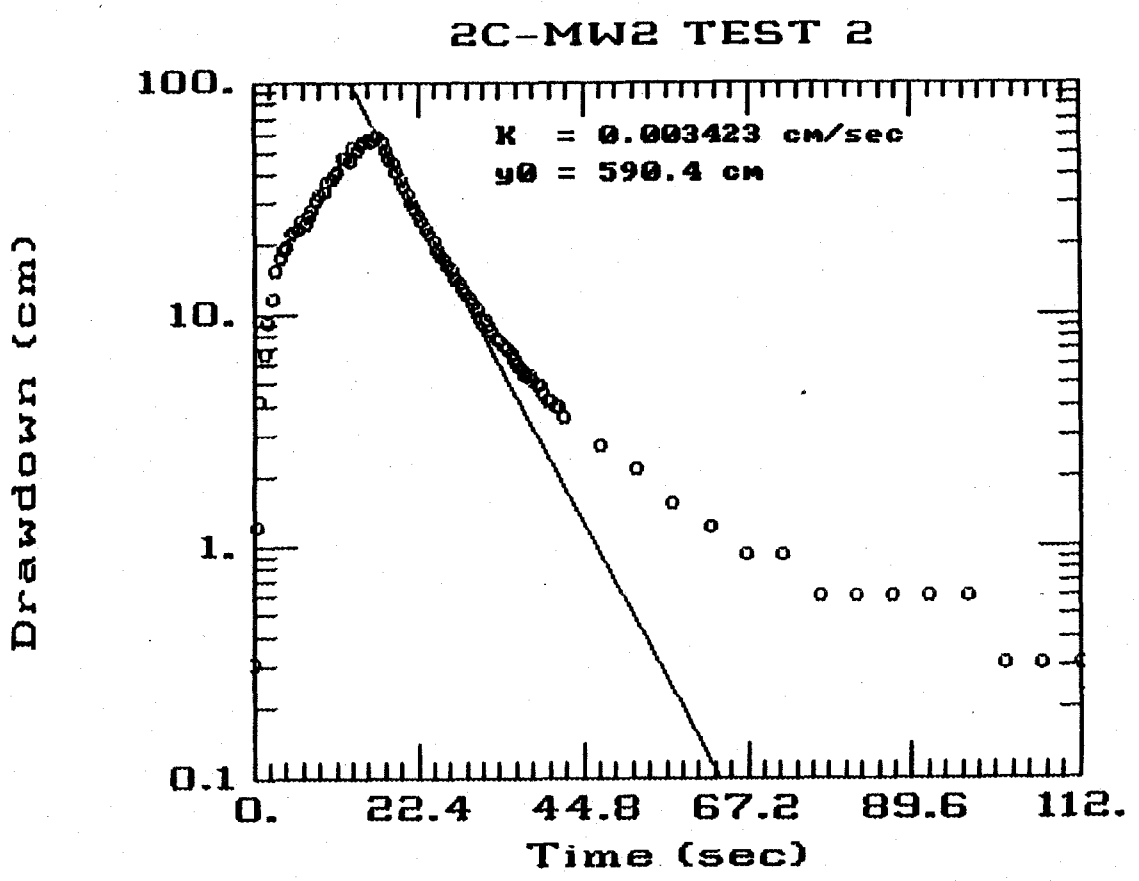

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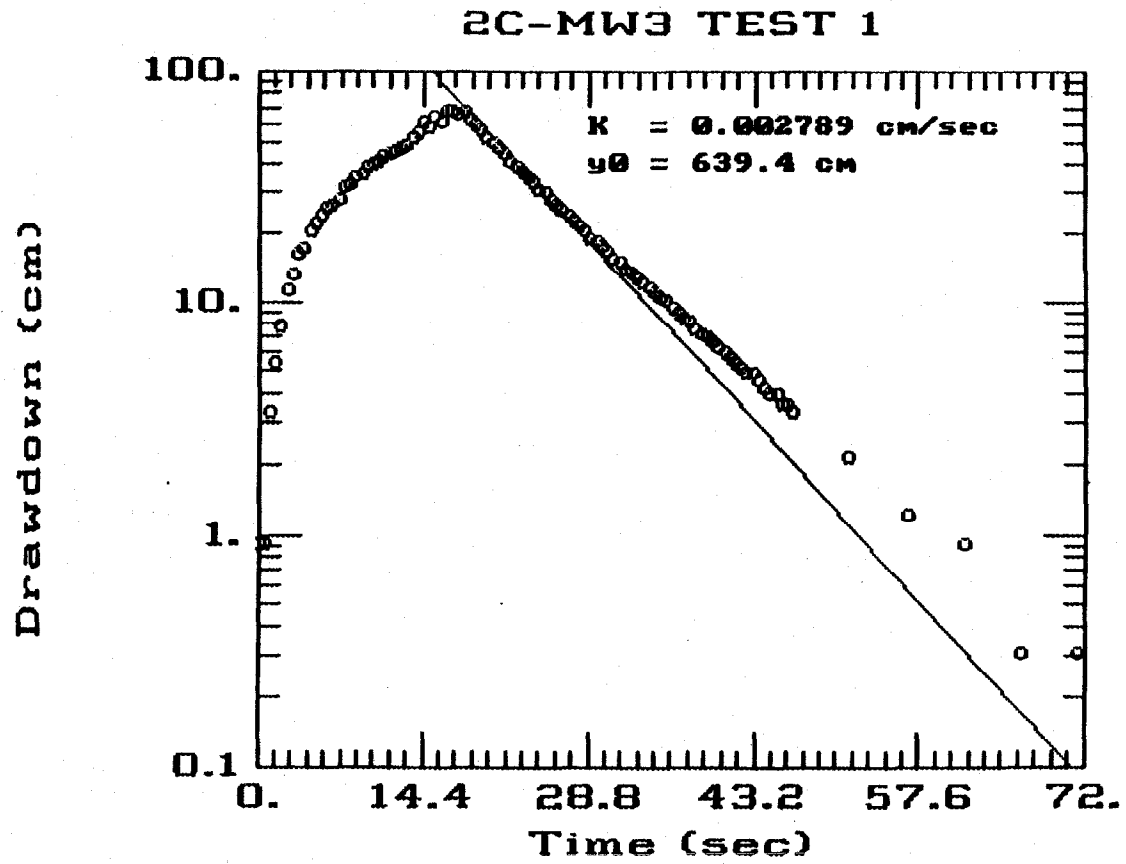

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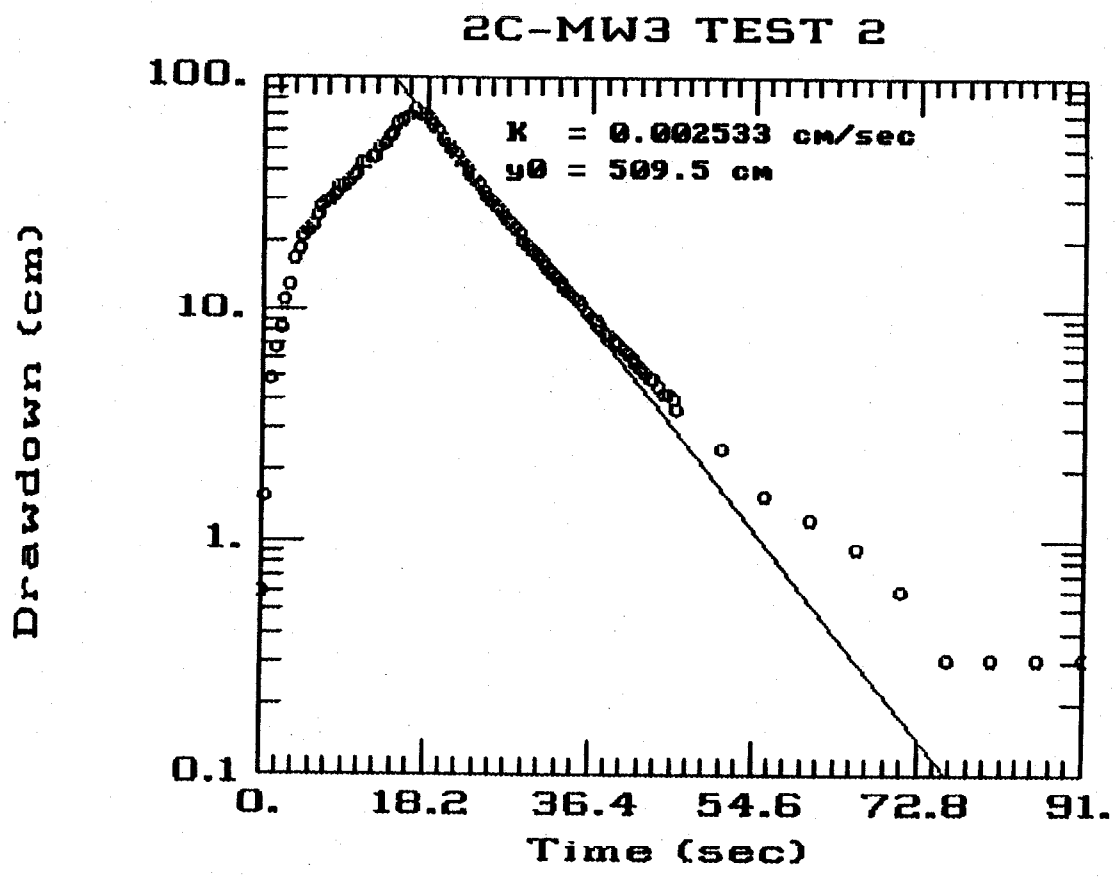

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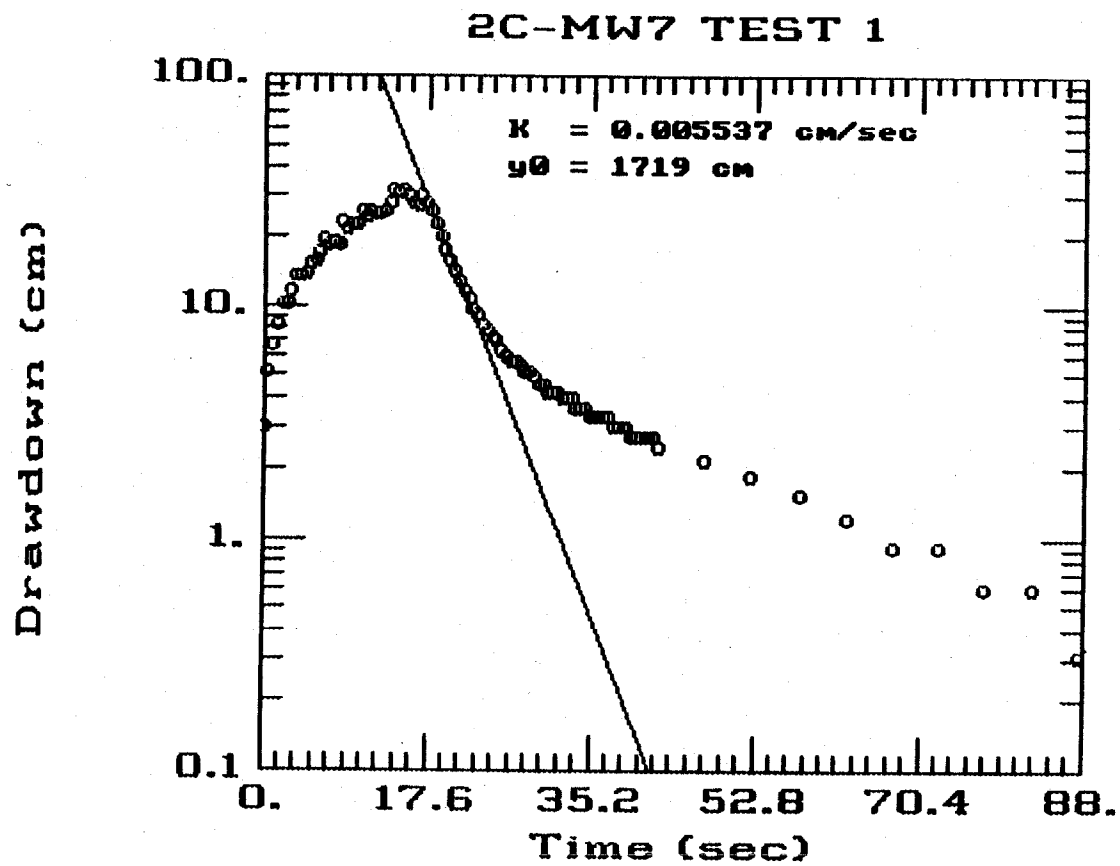

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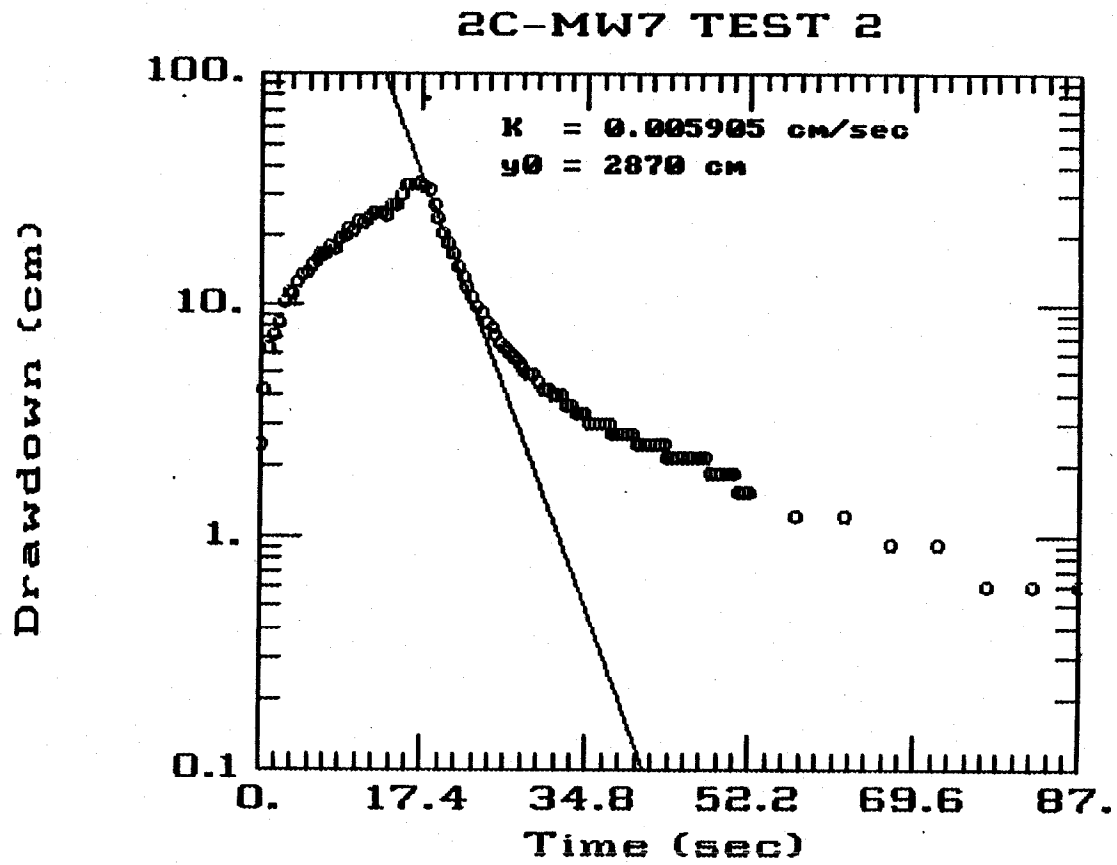

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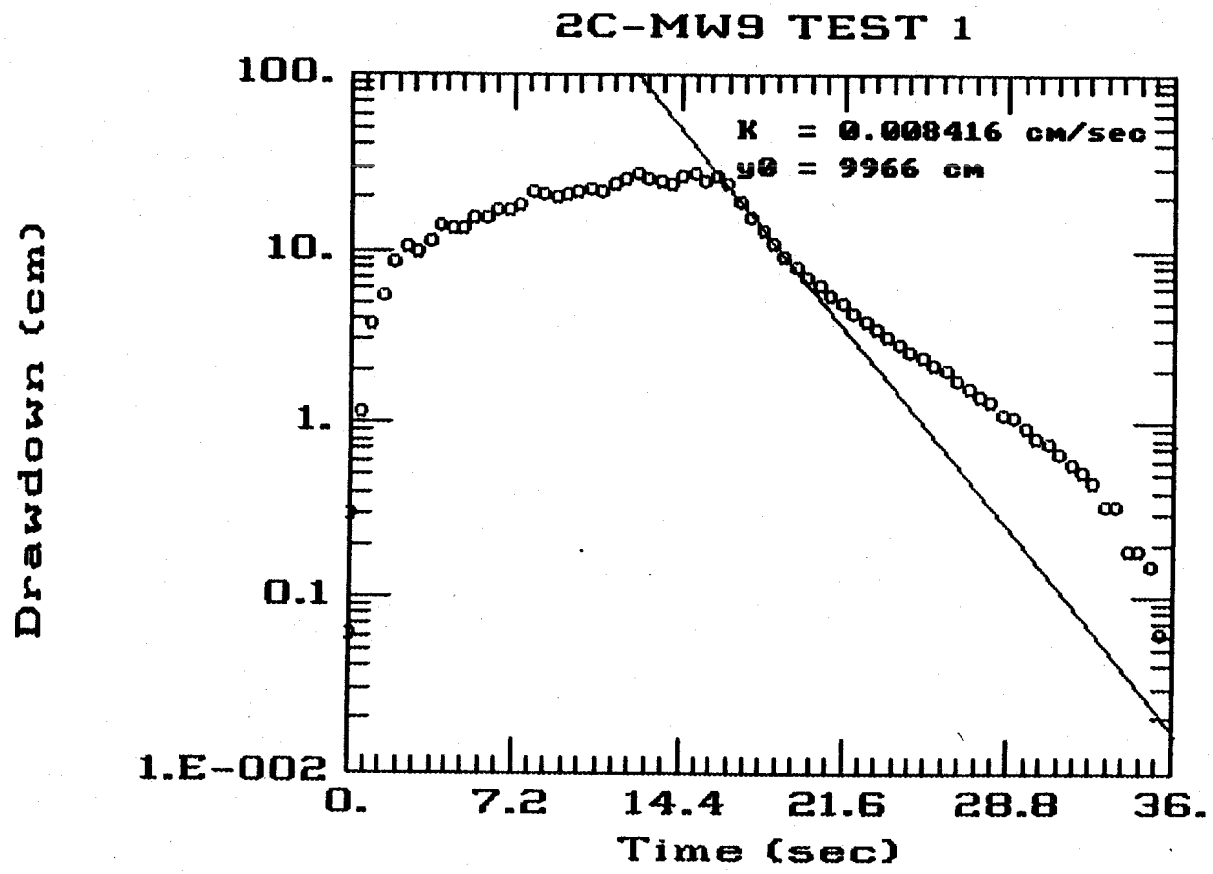

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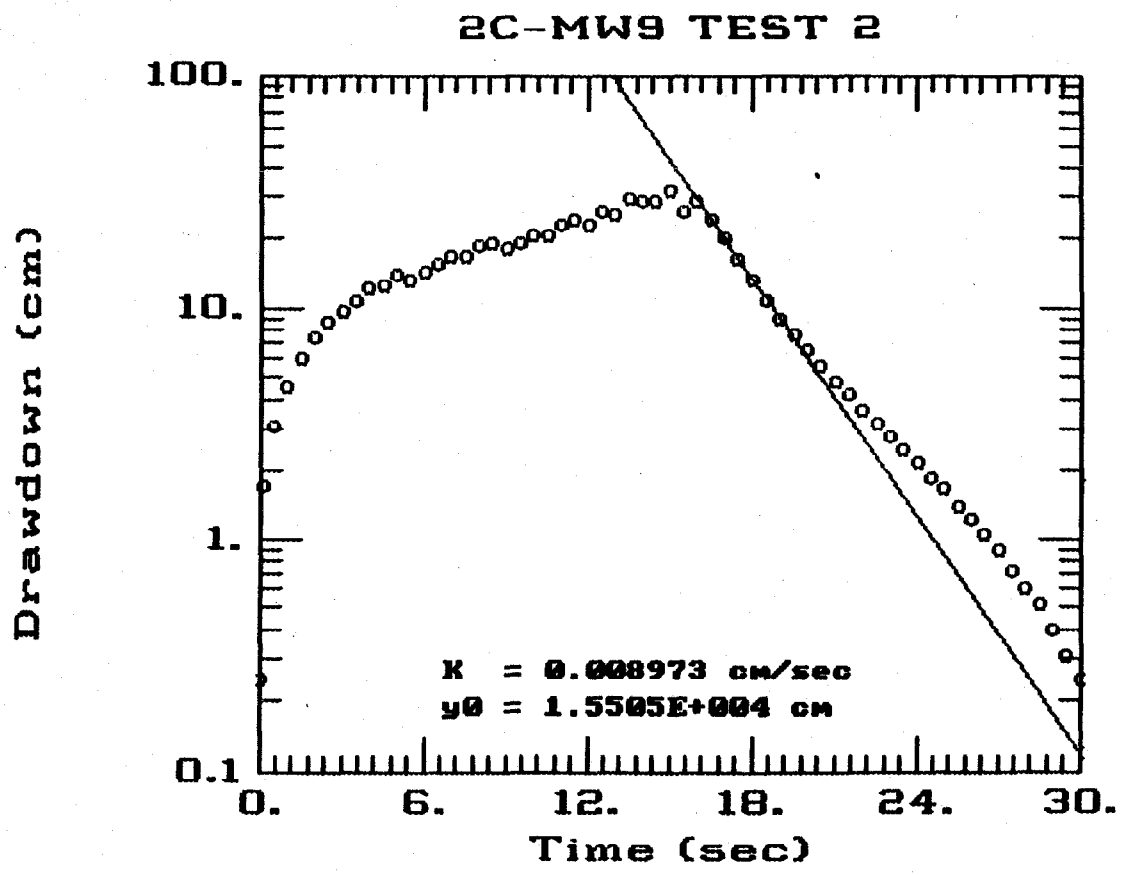

OC-00012-03.08-08/01/91

Appendix C

FIELD PARAMETER MEASUREMENTS IN GROUNDWATER AT NAS OCEANA, 1990

Table C-1
FIELD PARAMETER MEASUREMENTS IN GROUNDWATER
NAS OCEANA
1990

Sample	Date	Time	pH	Conductivity (μmho/cm)	Temperature (°C)
01-MW1	08/06/90	17:05	6.88	227	19.5
01-MW2	08/07/90	9:50	-	185	17.8
01-MW3	08/07/90	8:10	7.75	170	18.0
01-MW4	08/06/90	14:50	6.50	275	18.0
01-MW5	08/06/90	12:00	6.76	278	19.1
2A-MW1	08/09/90	16:50	-	379	22.5
2A-MW2	08/10/90	11:40	-	480	22.2
2A-MW3	08/16/90	14:40	-	610	22.0
2B-MW1	08/08/90	8:45	5.92	420	16.2
2B-MW2	08/07/90	12:10	6.90	327	19.0
2B-MW3	08/07/90	10:15	6.75	650	20.8
2B-MW4	08/07/90	17:30	6.08	500	22.0
2B-MW5	08/08/90	13:55	-	530	21.8
2B-MW6	08/08/90	15:25	-	328	23.9
2B-MW7	08/07/90	16:10	6.09	300	21.3
2B-MW8	08/07/90	15:00	7.19	350	18.3
2B-MW9	08/07/90	8:15	6.87	270	17.2
2B-MW10	08/08/90	11:35	-	705	22.8
2B-MW11	08/08/90	10:20	-	508	23.0
2C-MW1	08/09/90	10:05	-	800	24.0
2C-MW2	08/09/90	14:10	-	650	22.5
2C-MW3	08/10/90	7:50	-	500	20.8
2C-MW4	08/10/90	9:05	-	400	21.2
2C-MW5	08/09/90	11:50	-	500	27.2
2C-MW6	08/09/90	8:45	-	410	22.0
2C-MW7	08/09/90	15:40	-	700	24.0
2C-MW8	08/09/90	17:10	-	440	27.0
2C-MW9	08/09/90	16:55	-	458	20.5
2D-MW1	08/09/90	11:25	-	241	21.0
2D-MW2	08/07/90	17:00	7.03	525	23.0
2D-MW3	08/07/90	16:05	6.64	180	30.0
2E-MW1	08/09/90	14:45	-	355	23.0
2E-MW2	08/09/90	13:40	-	289	21.8
2E-MW3	08/09/90	15:45	-	158	22.1

Table C-1
FIELD PARAMETER MEASUREMENTS IN GROUNDWATER
NAS OCEANA
1990

Sample	Date	Time	pH	Conductivity (μmho/cm)	Temperature (°C)
07-MW1	11/09/90	10:35	5.56	152	16.9
07-MW2	08/15/90	13:45	-	363	20.0
07-MW3S	11/08/90	17/27	5.47	131	15.9
07-MW3D	08/16/90	8:00	-	358	15.3
07-MW4S	08/14/90	17:35	-	-	17.0
07-MW4D	08/14/90	11:15	-	-	16.3
07-MW5	08/15/90	16:45	-	188	18.1
08-MW1	08/06/90	17:25	5.46	168	20.7
08-MW2	08/06/90	14:20	4.20	125	21.2
08-MW3	08/06/90	16:05	5.96	140	20.0
11-MW1	08/07/90	11:30	6.72	122	21.0

INTERIM RCRA FACILITY INVESTIGATION
NAVAL AIR STATION, OCEANA

APPENDIX D: LABORATORY DATA

Prepared for:

ATLANTIC DIVISION NAVAL FACILITIES
ENGINEERING COMMAND,

Norfolk, Virginia

Contract N62470-90-R-7638

CH2M HILL, Inc.

August, 1991

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-MW1

) Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517004

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2VO006496

Level: (low/med) LOW Date Received: 08/07/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	3	BJ
67-64-1	Acetone	6	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

Engineers
Planners
CH2M HILL Economists
Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	04/16/90
Lab Sample ID:	16517004	Sample Matrix:	WATER	Date Analyzed:	05/01/90
Client Sample ID:	01-MW1	Percent Moisture:		Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		

2,4,6-Tribromobiphenyl - SS 84

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 01-MW1 GROUND WATER 1720 GRAB
Laboratory Sample Number: 16517004 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/13/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	108	%rec	08/13/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: BK

INRPRPT(v900202)

000168

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/6/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83258E	Date Received:	8/8/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/13/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 01-MW1 (LM #16517-4)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		108	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/14/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Sample Description: 01-MW1 GROUND WATER 1720 GRAB
Laboratory Sample Number: 16517004 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	<0.06	mg/L	09/03/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.
COMMENT: ND = NOT DETERMINABLE.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-MW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006471

Level: (low/med) LOW Date Received: 08/07/90

% Moisture: not dec. ____ Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	8	B
67-64-1	Acetone	24	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/08/90
Lab Sample ID:	16526002	Sample Matrix:	WATER	Date Analyzed:	09/05/90
Client Sample ID:	01-MW2	Percent Moisture:		Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		

2,4,6-Tribromobiphenyl - SS 94

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

JMS

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 01-MW2 GROUND H2O 0950 GRAB
Laboratory Sample Number: 16526002 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/13/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	101	%rec	08/13/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HR

INRPRPT(v900202)

000218

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/7/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83288E	Date Received:	8/9/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/13/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 01-MW2 (LM #16526-2)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		101	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Garman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 2 of 23

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 01-MW2 GROUND H2O 0950 GRAB
Laboratory Sample Number: 16526002 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.07	0.14	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

000027

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-MW3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006489

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	6	B
67-64-1	Acetone	6	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 1 of 23

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 01-MW3 GROUND H2O 0815 GRAB
Laboratory Sample Number: 16526001 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.14	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

000026

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/08/90
Lab Sample ID:	16526001	Sample Matrix:	WATER	Date Analyzed:	09/05/90
Client Sample ID:	01-MW3	Percent Moisture:		Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		

2,4,6-Tribromobiphenyl - SS 87

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 1 of 12

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 01-MW3 GROUND H2O 0815 GRAB
Laboratory Sample Number: 16526001 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/13/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	100	%rec	08/13/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

000217

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/7/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83287E	Date Received:	8/9/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/13/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 01-MW3 (LM #16526-1)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		100	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-MW4

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: C1VO010872

Level: (low/med) LOW Date Received: 08/07/90

% Moisture: not dec. ____ Date Analyzed: 08/16/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	25	B
67-64-1	Acetone	16	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	4	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	9	
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	26	

HK

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/6/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83256E	Date Received:	8/8/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/13/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 01-MW4 (LM #16517-2)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		121	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

Engineers
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REPORT OF ANALYTICAL RESULTS

Date: 09/14/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Sample Description: 01-MW4 GROUND WATER 1500 GRAB
Laboratory Sample Number: 16517002 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	7.70	254	mg/L	09/03/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.
COMMENT: ND = NOT DETERMINABLE.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/08/90
Lab Sample ID:	16517002	Sample Matrix:	WATER	Date Analyzed:	09/05/90
Client Sample ID:	01-MW4	Percent Moisture:		Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.4			
11096-82-5	Aroclor-1260	0.2			

2,4,6-Tribromobiphenyl - SS 99

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

000126

Engineers
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REPORT OF ANALYTICAL RESULTS

Date: 09/13/90
Page: 2 of 10

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 01-MW4 GROUND WATER 1500 GRAB
Laboratory Sample Number: 16517002 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/13/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	121	%rec	08/13/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

000166

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-MW4_DUP

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517003

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: C1VO010873

Level: (low/med) LOW Date Received: 08/07/90

% Moisture: not dec. ____ Date Analyzed: 08/16/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	15	B
75-15-0	Carbon disulfide	7	
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	42	
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	120	

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/08/90
Lab Sample ID:	16517003	Sample Matrix:	WATER	Date Analyzed:	09/05/90
Client Sample ID:	01-MW4 DUP	Percent Moisture:		Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.3			
11096-82-5	Aroclor-1260	0.2	U		

2,4,6-Tribromobiphenyl - SS 96

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

JWS

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

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REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 01-MW4 DUP GROUND WATER 1535 GRAB
Laboratory Sample Number: 16517003 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/13/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	95	%rec	08/13/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: NK

INRPRPT(v900202)

000167

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/6/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83257E	Date Received:	8/8/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/13/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 01-MW4 DUP (LM #16517-3)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		95	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/14/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 01-MW4 DUP GROUND WATER 1535 GRAB
Laboratory Sample Number: 16517003 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	8.06	307	mg/L	09/03/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.
COMMENT: ND = NOT DETERMINABLE.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

01-MW5

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006492

Level: (low/med) LOW Date Received: 08/07/90

% Moisture: not dec. ____ Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	3	BJ
67-64-1	Acetone	55	B
75-15-0	Carbon disulfide	1	J
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	1	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	3	J
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	3	J
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	14	

HK

FORM I VOA 1/87 Rev.

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/08/90
Lab Sample ID:	16517001	Sample Matrix:	WATER	Date Analyzed:	09/05/90
Client Sample ID:	01-MW5	Percent Moisture:		Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		

2,4,6-Tribromobiphenyl - SS 116

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL
Montgomery Environmental Laboratory
2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116
205.271.1444

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REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 01-MW5 GROUND WATER 1200 GRAB
Laboratory Sample Number: 16517001 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/13/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	108	%rec	08/13/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: AK

INRPRPT(v900202)

000165

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/6/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83255E	Date Received:	8/8/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/13/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 01-MW5 (LM #16517-1)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		108	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/14/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Sample Description: 01-MW5 GROUND WATER 1200 GRAB
Laboratory Sample Number: 16517001 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.29	6.77	mg/L	09/03/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.
COMMENT: ND = NOT DETERMINABLE.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: 01-SW1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 17213 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 17213007

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: C1VO011974

Level: (low/med) LOW Date Received: 11/09/90

% Moisture: not dec. ____ Date Analyzed: 11/15/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	9	B
67-64-1	Acetone	9	BJ
75-15-0	Carbon Disulfide	3	J
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (total)	2	J

MSC

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 12/07/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 17213
Date Received: 11/09/90

Sample Description: 01-SW1 SURFACE WATER 1410 GRAB
Laboratory Sample Number: 17213007 Date Collected: 11/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.05	0.54	mg/L	11/26/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: JB

INRPRPT(v900202)

CH2M HILL Quality Analytical Laboratories 7201 N.W. 11th Place, Gainesville, Florida 32605 904.331.2442 FAX 904.331.5320

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	11/14/90
Lab Sample ID:	17213007	Sample Matrix:	WATER	Date Analyzed:	11/27/90
Client Sample ID:	01-SW1	Percent Moisture:		Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	4-Bromobiphenyl - SS	98			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

JWS

000175

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-SW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 17213 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 17213008

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: C1VO011975

Level: (low/med) LOW Date Received: 11/09/90

Moisture: not dec. ____ Date Analyzed: 11/15/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	B
67-64-1	Acetone	7	BJ
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	4	J
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (total)	5	U

Engineers
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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 12/07/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 17213
Date Received: 11/09/90

Atten: MR. FRANK LEWIS

Sample Description: 01-SW2 SURFACE WATER 1440 GRAB
Laboratory Sample Number: 17213008 Date Collected: 11/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.05	<0.05	mg/L	11/26/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: JB

INRPRPT(v900202)

000076

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	11/14/90
Lab Sample ID:	17213008	Sample Matrix:	WATER	Date Analyzed:	11/27/90
Client Sample ID:	01-SW2	Percent Moisture:		Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	4-Bromobiphenyl - SS	83			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

000178

OC-00012-03.08-08/01/91

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-SW3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 17213 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 17213009

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: C1VO011976

Level: (low/med) LOW Date Received: 11/09/90

Moisture: not dec. ____ Date Analyzed: 11/15/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	11	B
67-64-1	Acetone	10	B
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	8	
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	1	J
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (total)	5	U

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 12/07/90
Page: 8 of 19

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 17213
Date Received: 11/09/90

Atten: MR. FRANK LEWIS

Sample Description: 01-SW3 SURFACE WATER 1510 GRAB
Laboratory Sample Number: 17213009 Date Collected: 11/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.05	<0.05	mg/L	11/26/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: JB

INRPRPT(v900202)

CH2M HILL Quality Analytical Laboratories 7201 N.W. 11th Place, Gainesville, Florida 32605 904.331.2442 FAX 904.331.5320

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	11/14/90
Lab Sample ID:	17213009	Sample Matrix:	WATER	Date Analyzed:	11/27/90
Client Sample ID:	01-SW3	Percent Moisture:		Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	4-Bromobiphenyl - SS	94			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL Quality Analytical Laboratories 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	11/14/90
Lab Sample ID:	17213013	Sample Matrix:	WATER	Date Analyzed:	11/27/90
Client Sample ID:	01-SW3 DUP	Percent Moisture:		Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	4-Bromobiphenyl - SS	102			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

JWS

CH2M HILL Quality Analytical Laboratories 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 12/07/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 17213
Date Received: 11/09/90

Sample Description: 01-SW3 DUP DUPLICATE
Laboratory Sample Number: 17213P13 Date Collected: 11/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	----	0.0	RPD	11/26/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: JB

INRPRPT(v900202)

000086

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

01-SD1

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 17213 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 17213002

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO011992

Level: (low/med) LOW Date Received: 11/09/90

Moisture: not dec. 68 Date Analyzed: 11/16/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	31	U
74-83-9	Bromomethane	31	U
75-01-4	Vinyl Chloride	31	U
75-00-3	Chloroethane	31	U
75-09-2	Methylene Chloride	110	B
67-64-1	Acetone	140	B
75-15-0	Carbon Disulfide	16	U
75-35-4	1,1-Dichloroethene	16	U
75-34-3	1,1-Dichloroethane	16	U
540-59-0	1,2-Dichloroethene (total)	16	U
67-66-3	Chloroform	16	U
107-06-2	1,2-Dichloroethane	16	U
78-93-3	2-Butanone	44	
71-55-6	1,1,1-Trichloroethane	16	U
56-23-5	Carbon Tetrachloride	16	U
108-05-4	Vinyl Acetate	31	U
75-27-4	Bromodichloromethane	16	U
78-87-5	1,2-Dichloropropane	16	U
10061-01-5	cis-1,3-Dichloropropene	16	U
79-01-6	Trichloroethene	16	U
124-48-1	Dibromochloromethane	16	U
79-00-5	1,1,2-Trichloroethane	16	U
71-43-2	Benzene	14	J
10061-02-6	trans-1,3-Dichloropropene	16	U
75-25-2	Bromoform	16	U
591-78-6	2-Hexanone	31	U
108-10-1	4-Methyl-2-Pentanone	31	U
127-18-4	Tetrachloroethene	16	U
79-34-5	1,1,2,2-Tetrachloroethane	31	U
108-88-3	Toluene	16	U
108-90-7	Chlorobenzene	16	U
100-41-4	Ethylbenzene	95	
100-42-5	Styrene	16	U
1330-20-7	Xylenes (total)	110	

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 12/07/90
Page: 1 of 19

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 17213
Date Received: 11/09/90

Atten: MR. FRANK LEWIS

Sample Description: 01-SD1 SEDIMENT 1415 GRAB
Laboratory Sample Number: 17213002 Date Collected: 11/08/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	44.1	1260	mg/Kg	11/18/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: JB

INRPRPT(v900202)

CH2M HILL Quality Analytical Laboratories 7201 N.W. 11th Place, Gainesville, Florida 32605 904.331.2442 FAX 904.331.5320

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM
Lab Sample ID: 17213002
Client Sample ID: 01-SD1

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 67

Date Extracted: 11/12/90
Date Analyzed: 11/27/90
Dilution Factor: 1.0

PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number	ug/Kg
12674-11-2	Aroclor-1016	97	U		
11104-28-2	Aroclor-1221	240	U		
11141-16-5	Aroclor-1232	240	U		
53469-21-9	Aroclor-1242	97	U		
12672-29-6	Aroclor-1248	48	U		
11097-69-1	Aroclor-1254	24	U		
11096-82-5	Aroclor-1260	24	U		
	4-Bromobiphenyl - SS	81			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-SD2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 17213 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 17213010

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO011990

Level: (low/med) LOW Date Received: 11/09/90

Moisture: not dec. 64 Date Analyzed: 11/16/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	28	U
74-83-9	Bromomethane	28	U
75-01-4	Vinyl Chloride	28	U
75-00-3	Chloroethane	28	U
75-09-2	Methylene Chloride	24	B
67-64-1	Acetone	410	B
75-15-0	Carbon Disulfide	14	U
75-35-4	1,1-Dichloroethene	14	U
75-34-3	1,1-Dichloroethane	14	U
540-59-0	1,2-Dichloroethene (total)	14	U
67-66-3	Chloroform	14	U
107-06-2	1,2-Dichloroethane	14	U
78-93-3	2-Butanone	110	
71-55-6	1,1,1-Trichloroethane	14	U
56-23-5	Carbon Tetrachloride	14	U
108-05-4	Vinyl Acetate	28	U
75-27-4	Bromodichloromethane	14	U
78-87-5	1,2-Dichloropropane	14	U
10061-01-5	cis-1,3-Dichloropropene	14	U
79-01-6	Trichloroethene	14	U
124-48-1	Dibromochloromethane	14	U
79-00-5	1,1,2-Trichloroethane	14	U
71-43-2	Benzene	14	U
10061-02-6	trans-1,3-Dichloropropene	14	U
75-25-2	Bromoform	14	U
591-78-6	2-Hexanone	28	U
108-10-1	4-Methyl-2-Pentanone	28	U
127-18-4	Tetrachloroethene	14	U
79-34-5	1,1,2,2-Tetrachloroethane	28	U
108-88-3	Toluene	14	U
108-90-7	Chlorobenzene	14	U
100-41-4	Ethylbenzene	14	U
100-42-5	Styrene	14	U
1330-20-7	Xylenes (total)	14	U

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Engineers
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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 12/07/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 17213
Date Received: 11/09/90

Sample Description: 01-SD2 SEDIMENT 1445 GRAB
Laboratory Sample Number: 17213010 Date Collected: 11/08/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	39.7	1180	mg/Kg	11/18/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: JB

INRPRPT(v900202)

CH2M HILL
Quality Analytical Laboratories
7201 N.W. 11th Place, Gainesville, Florida 32605
904.331.2442
FAX 904.331.5320

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	11/12/90
Lab Sample ID:	17213010	Sample Matrix:	SOIL	Date Analyzed:	11/27/90
Client Sample ID:	01-SD2	Percent Moisture:	61	Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number	ug/Kg
12674-11-2	Aroclor-1016	82	U		
11104-28-2	Aroclor-1221	210	U		
11141-16-5	Aroclor-1232	210	U		
53469-21-9	Aroclor-1242	82	U		
12672-29-6	Aroclor-1248	41	U		
11097-69-1	Aroclor-1254	21	U		
11096-82-5	Aroclor-1260	21	U		
	4-Bromobiphenyl - SS	105			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL Quality Analytical Laboratories 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-SD3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 17213 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 17213011

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C2VO012014

Level: (low/med) LOW Date Received: 11/09/90

% Moisture: not dec. 35 Date Analyzed: 11/19/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	15	U
74-83-9	Bromomethane	15	U
75-01-4	Vinyl Chloride	15	U
75-00-3	Chloroethane	15	U
75-09-2	Methylene Chloride	90	B
67-64-1	Acetone	31	B
75-15-0	Carbon Disulfide	8	U
75-35-4	1,1-Dichloroethene	8	U
75-34-3	1,1-Dichloroethane	8	U
540-59-0	1,2-Dichloroethene (total)	8	U
67-66-3	Chloroform	8	U
107-06-2	1,2-Dichloroethane	8	U
78-93-3	2-Butanone	14	J
71-55-6	1,1,1-Trichloroethane	8	U
56-23-5	Carbon Tetrachloride	8	U
108-05-4	Vinyl Acetate	15	U
75-27-4	Bromodichloromethane	8	U
78-87-5	1,2-Dichloropropane	8	U
10061-01-5	cis-1,3-Dichloropropene	8	U
79-01-6	Trichloroethene	8	U
124-48-1	Dibromochloromethane	8	U
79-00-5	1,1,2-Trichloroethane	8	U
71-43-2	Benzene	8	U
10061-02-6	trans-1,3-Dichloropropene	8	U
75-25-2	Bromoform	8	U
591-78-6	2-Hexanone	15	U
108-10-1	4-Methyl-2-Pentanone	15	U
127-18-4	Tetrachloroethene	8	U
79-34-5	1,1,2,2-Tetrachloroethane	15	U
108-88-3	Toluene	23	
108-90-7	Chlorobenzene	8	U
100-41-4	Ethylbenzene	8	U
100-42-5	Styrene	8	U
1330-20-7	Xylenes (total)	8	U

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	11/12/90
Lab Sample ID:	17213011	Sample Matrix:	SOIL	Date Analyzed:	11/27/90
Client Sample ID:	01-SD3	Percent Moisture:	25	Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number	ug/Kg
12674-11-2	Aroclor-1016	43	U		
11104-28-2	Aroclor-1221	110	U		
11141-16-5	Aroclor-1232	110	U		
53469-21-9	Aroclor-1242	43	U		
12672-29-6	Aroclor-1248	21	U		
11097-69-1	Aroclor-1254	11	U		
11096-82-5	Aroclor-1260	11	U		
	4-Bromobiphenyl - SS	98			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL
Quality Analytical Laboratories
2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116
205.271.1444

Engineers
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REPORT OF ANALYTICAL RESULTS

Date: 12/07/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 17213
Date Received: 11/09/90

Sample Description: 01-SD3 SEDIMENT 1520 GRAB
Laboratory Sample Number: 17213011 Date Collected: 11/08/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	12.9	153	mg/Kg	11/18/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: JB

INRPRPT(v900202)

CH2M HILL
Quality Analytical Laboratories
7201 N.W. 11th Place, Gainesville, Florida 32605
904.331.2442
FAX 904.331.5320

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-SD3_DUP

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 17213 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 17213012

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO011987

Level: (low/med) LOW Date Received: 11/09/90

% Moisture: not dec. 24 Date Analyzed: 11/16/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl Chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene Chloride	330	BE
67-64-1	Acetone	24	B
75-15-0	Carbon Disulfide	7	U
75-35-4	1,1-Dichloroethene	7	U
75-34-3	1,1-Dichloroethane	7	U
540-59-0	1,2-Dichloroethene (total)	7	U
67-66-3	Chloroform	7	U
107-06-2	1,2-Dichloroethane	7	U
78-93-3	2-Butanone	13	U
71-55-6	1,1,1-Trichloroethane	7	U
56-23-5	Carbon Tetrachloride	7	U
108-05-4	Vinyl Acetate	13	U
75-27-4	Bromodichloromethane	7	U
78-87-5	1,2-Dichloropropane	7	U
10061-01-5	cis-1,3-Dichloropropene	7	U
79-01-6	Trichloroethene	7	U
124-48-1	Dibromochloromethane	7	U
79-00-5	1,1,2-Trichloroethane	7	U
71-43-2	Benzene	7	U
10061-02-6	trans-1,3-Dichloropropene	7	U
75-25-2	Bromoform	7	U
591-78-6	2-Hexanone	13	U
108-10-1	4-Methyl-2-Pentanone	13	U
127-18-4	Tetrachloroethene	7	U
79-34-5	1,1,2,2-Tetrachloroethane	13	U
108-88-3	Toluene	7	U
108-90-7	Chlorobenzene	7	U
100-41-4	Ethylbenzene	7	U
100-42-5	Styrene	7	U
1330-20-7	Xylenes (total)	7	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

01-SD3_DUP_R

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 17213 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 17213012R

Sample wt/vol: 2.5 (g/mL) G Lab File ID: C2VO012015

Level: (low/med) LOW Date Received: 11/09/90

% Moisture: not dec. 24 Date Analyzed: 11/19/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	26	U
74-83-9	Bromomethane	26	U
75-01-4	Vinyl Chloride	26	U
75-00-3	Chloroethane	26	U
75-09-2	Methylene Chloride	470	B
67-64-1	Acetone	40	B
75-15-0	Carbon Disulfide	13	U
75-35-4	1,1-Dichloroethene	13	U
75-34-3	1,1-Dichloroethane	13	U
540-59-0	1,2-Dichloroethene (total)	13	U
67-66-3	Chloroform	13	U
107-06-2	1,2-Dichloroethane	13	U
78-93-3	2-Butanone	26	U
71-55-6	1,1,1-Trichloroethane	13	U
56-23-5	Carbon Tetrachloride	13	U
108-05-4	Vinyl Acetate	26	U
75-27-4	Bromodichloromethane	13	U
78-87-5	1,2-Dichloropropane	13	U
10061-01-5	cis-1,3-Dichloropropene	13	U
79-01-6	Trichloroethene	13	U
124-48-1	Dibromochloromethane	13	U
79-00-5	1,1,2-Trichloroethane	13	U
71-43-2	Benzene	13	U
10061-02-6	trans-1,3-Dichloropropene	13	U
75-25-2	Bromoform	13	U
591-78-6	2-Hexanone	26	U
108-10-1	4-Methyl-2-Pentanone	26	U
127-18-4	Tetrachloroethene	13	U
79-34-5	1,1,2,2-Tetrachloroethane	26	U
108-88-3	Toluene	13	U
108-90-7	Chlorobenzene	13	U
100-41-4	Ethylbenzene	13	U
100-42-5	Styrene	13	U
1330-20-7	Xylenes (total)	13	U

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	11/12/90
Lab Sample ID:	17213012	Sample Matrix:	SOIL	Date Analyzed:	11/27/90
Client Sample ID:	01-SD3 DUP	Percent Moisture:	25	Dilution Factor:	1.0

PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number	ug/Kg
12674-11-2	Aroclor-1016	43	U		
11104-28-2	Aroclor-1221	110	U		
11141-16-5	Aroclor-1232	110	U		
53469-21-9	Aroclor-1242	43	U		
12672-29-6	Aroclor-1248	21	U		
11097-69-1	Aroclor-1254	11	U		
11096-82-5	Aroclor-1260	11	U		
	4-Bromobiphenyl - SS	104			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

000190

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 12/07/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 17213
Date Received: 11/09/90

Atten: MR. FRANK LEWIS

Sample Description: 01-SD3 DUP SEDIMENT 1525 GRAB
Laboratory Sample Number: 17213012 Date Collected: 11/08/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	12.2	85.3	mg/Kg	11/18/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: JB

INRPRPT(v900202)

000030

CH2M HILL Quality Analytical Laboratories 7201 N.W. 11th Place, Gainesville, Florida 32605 904.331.2442 FAX 904.331.5320

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2AMW1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556005

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006528

Level: (low/med) LOW Date Received: 08/10/90

Moisture: not dec. ____ Date Analyzed: 08/21/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	10	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	2	J

HL

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2AMW1 GROUND H2O 1650 GRAB
Laboratory Sample Number: 16556005 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	98	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HR

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83397E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2A-MW1 (LM #16556-5)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		98	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 5 of 20

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2AMW1 GROUND H2O 1650 GRAB
Laboratory Sample Number: 16556005 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.07	0.24	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2A-MW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16562 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16562003

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2VO006560

Level: (low/med) LOW Date Received: 08/11/90

Moisture: not dec. ____ Date Analyzed: 08/23/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	7	B
67-64-1	Acetone	7	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

MK

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REPORT OF ANALYTICAL RESULTS

Date: 09/14/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16562
Date Received: 08/11/90

Sample Description: 2A-MW2 GROUND WATER 1145 GRAB
Laboratory Sample Number: 16562003 Date Collected: 08/10/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.09	mg/L	09/07/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

000022

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90
Page: 3 of 4

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16562
Date Received: 08/11/90

Atten: MR. FRANK LEWIS

Sample Description: 2A-MW2 GROUND WATER 1145 GRAB
Laboratory Sample Number: 16562003 Date Collected: 08/10/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/14/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	103	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

000160

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/10/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83456E	Date Received:	8/14/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/14/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	D. BITTEMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2A-MW2 (LM #16562-3)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	103	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Garman 9/11/90

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2AMW1_DUP

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556006

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006531

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/21/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	6	B
67-64-1	Acetone	12	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	2	J

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2AMW1 DUP GROUND H2O 1655 GRAB
Laboratory Sample Number: 16556006 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	97	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

000164

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83398E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2A-MW1 DUP (LM #16556-6)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	97	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2AMW1 DUP GROUND H2O 1655 GRAB
Laboratory Sample Number: 16556006 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.07	<0.07	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2AMW3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16597 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16597002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006597

Level: (low/med) LOW Date Received: 08/17/90

% Moisture: not dec. ____ Date Analyzed: 08/25/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	6	B
67-64-1	Acetone	8	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16597
Date Received: 08/17/90

Atten: MR. FRANK LEWIS

Sample Description: 2AMW3 GROUND H2O 1445 GRAB
Laboratory Sample Number: 16597002 Date Collected: 08/16/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/20/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/22/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	110	%rec	08/22/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/16/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83692E	Date Received:	8/20/90
Proj No:	WDC20368.HO.07	% Moisture	0.00	Date Extracted:	8/20/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/22/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/28/90

Client Sample ID/Description: 2AMW-3 (LM #16597-2)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	110	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

Engineers
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REPORT OF ANALYTICAL RESULTS

Date: 09/17/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16597
Date Received: 08/17/90

Atten: MR. FRANK LEWIS

Sample Description: 2AMW3 GROUND H2O 1445 GRAB
Laboratory Sample Number: 16597002 Date Collected: 08/16/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.33	mg/L	09/07/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: JB

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16543 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16543001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006491

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 3.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	30	U
74-83-9	Bromomethane	30	U
75-01-4	Vinyl chloride	30	
75-00-3	Chloroethane	30	U
75-09-2	Methylene chloride	6	BJ
67-64-1	Acetone	22	BJ
75-15-0	Carbon disulfide	15	U
75-35-4	1,1-Dichloroethene	10	J
75-34-3	1,1-Dichloroethane	50	
540-59-0	1,2-Dichloroethene (Total)	400	
67-66-3	Chloroform	15	U
107-06-2	1,2-Dichloroethane	15	U
78-93-3	2-Butanone (MEK)	30	U
71-55-6	1,1,1-Trichloroethane	15	U
56-23-5	Carbon tetrachloride	15	U
108-05-4	Vinyl acetate	30	U
75-27-4	Bromodichloromethane	15	U
78-87-5	1,2-Dichloropropane	15	U
10061-01-5	cis-1,3-Dichloropropene	15	U
79-01-6	Trichloroethene	230	
124-48-1	Dibromochloromethane	15	U
79-00-5	1,1,2-Trichloroethane	15	U
71-43-2	Benzene	15	U
10061-02-6	trans-1,3-Dichloropropene	15	U
75-25-2	Bromoform	15	U
591-78-6	2-Hexanone	30	U
108-10-1	4-Methyl-2-pentanone	30	U
127-18-4	Tetrachloroethene	15	U
79-34-5	1,1,2,2-Tetrachloroethane	15	U
108-88-3	Toluene	15	U
108-90-7	Chlorobenzene	15	U
100-41-4	Ethylbenzene	15	U
100-42-5	Styrene	15	U
1330-20-7	Xylenes (Total)	15	U

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW1 GROUND H2O 0800 GRAB
Laboratory Sample Number: 16543001 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	91	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/8/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83337E	Date Received:	8/10/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	DOUG BITTERMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW1 (LM# 16543-1)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		91	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 8 of 11

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Sample Description: 2B-EQ1 GROUND H2O 0800 GRAB
Laboratory Sample Number: 16543008 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	98	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HM

INRPRPT(v900202)

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW1 GROUND H2O 0800 GRAB
Laboratory Sample Number: 16543001 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.22	mg/L	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW1_DUP

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16543 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16543007

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006502

Level: (low/med) LOW Date Received: 08/09/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 3.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	30	U
74-83-9	Bromomethane	30	U
75-01-4	Vinyl chloride	37	
75-00-3	Chloroethane	30	U
75-09-2	Methylene chloride	7	BJ
67-64-1	Acetone	24	BJ
75-15-0	Carbon disulfide	15	U
75-35-4	1,1-Dichloroethene	11	J
75-34-3	1,1-Dichloroethane	49	
540-59-0	1,2-Dichloroethene (Total)	400	
67-66-3	Chloroform	15	U
107-06-2	1,2-Dichloroethane	15	U
78-93-3	2-Butanone (MEK)	30	U
71-55-6	1,1,1-Trichloroethane	15	U
56-23-5	Carbon tetrachloride	15	U
108-05-4	Vinyl acetate	30	U
75-27-4	Bromodichloromethane	15	U
78-87-5	1,2-Dichloropropane	15	U
10061-01-5	cis-1,3-Dichloropropene	15	U
79-01-6	Trichloroethene	280	
124-48-1	Dibromochloromethane	15	U
79-00-5	1,1,2-Trichloroethane	15	U
71-43-2	Benzene	15	U
10061-02-6	trans-1,3-Dichloropropene	15	U
75-25-2	Bromoform	15	U
591-78-6	2-Hexanone	30	U
108-10-1	4-Methyl-2-pentanone	30	U
127-18-4	Tetrachloroethene	15	U
79-34-5	1,1,2,2-Tetrachloroethane	15	U
108-88-3	Toluene	15	U
108-90-7	Chlorobenzene	15	U
100-41-4	Ethylbenzene	15	U
100-42-5	Styrene	15	U
1330-20-7	Xylenes (Total)	15	U

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW1 DUP GROUND H2O 0800 GRAB
Laboratory Sample Number: 16543007 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	107	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/8/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83343E	Date Received:	8/10/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	DOUG BITTERMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW1 DUP (LM #16543-7)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	107	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 7 of 10

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Sample Description: 2B-MW1 DUP GROUND H2O 0800 GRAB
Laboratory Sample Number: 16543007 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.21	mg/L	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW2

) Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526011

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006483

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	5	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	7	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

Engineers
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CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW2 GROUND H2O 1030 GRAB
Laboratory Sample Number: 16526011 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	100	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/7/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83296E	Date Received:	8/9/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW2 (LM #16526-11)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		100	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

Engineers
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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW2 GROUND H2O 1030 GRAB
Laboratory Sample Number: 16526011 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.11	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526008

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006474

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. _____ Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	20	U
74-83-9	Bromomethane	20	U
75-01-4	Vinyl chloride	20	U
75-00-3	Chloroethane	20	U
75-09-2	Methylene chloride	10	B
67-64-1	Acetone	35	B
75-15-0	Carbon disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	18	
540-59-0	1,2-Dichloroethene (Total)	140	
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone (MEK)	20	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon tetrachloride	10	U
108-05-4	Vinyl acetate	20	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	230	
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
591-78-6	2-Hexanone	20	U
108-10-1	4-Methyl-2-pentanone	20	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylenes (Total)	10	U

HK

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 7 of 12

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW3 GROUND H2O 0930 GRAB
Laboratory Sample Number: 16526008 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	90	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/7/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83293E	Date Received:	8/9/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW3 (LM #16526-8)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		90	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 7 of 23

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Sample Description: 2B-MW3 GROUND H2O 0930 GRAB
Laboratory Sample Number: 16526008 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.07	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

000032

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW4

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526013

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006485

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	6	BJ
75-15-0	Carbon disulfide	3	J
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW4 GROUND H2O 1730 GRAB
Laboratory Sample Number: 16526013 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	103	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HL

INRPRPT(v900202)

000228

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/7/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83298E	Date Received:	8/9/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW4 (LM #15626-13)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		103	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Sample Description: 2B-MW4 GROUND H2O 1730 GRAB
Laboratory Sample Number: 16526013 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.39	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by:

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW5

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16543 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16543004

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006503

Level: (low/med) LOW Date Received: 08/09/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	6	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	4	J
75-34-3	1,1-Dichloroethane	12	
540-59-0	1,2-Dichloroethene (Total)	6	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	3	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	1	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Sample Description: 2B-MW5 GROUND H2O 1340 GRAB
Laboratory Sample Number: 16543004 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	102	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/8/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83340E	Date Received:	8/10/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	DOUG BITTERMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW5 (LM #16543-4)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		102	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 4 of 10

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Sample Description: 2B-MW5 GROUND H2O 1340 GRAB
Laboratory Sample Number: 16543004 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.20	mg/L	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW6

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16543 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16543005

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006504

Level: (low/med) LOW Date Received: 08/09/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	22	
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	8	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	3	J
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW6 GROUND H2O 1510 GRAB
Laboratory Sample Number: 16543005 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	106	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/8/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83341E	Date Received:	8/10/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	DOUG BITTERMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW6 (LM# 16543-5)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	106	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Garman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 5 of 10

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Sample Description: 2B-MW6 GROUND H2O 1510 GRAB
Laboratory Sample Number: 16543005 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.29	mg/L	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW7

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526010

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006478

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. _____ Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	58	
75-00-3	Chloroethane	4	J
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	14	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	4	J
75-34-3	1,1-Dichloroethane	110	
540-59-0	1,2-Dichloroethene (Total)	40	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	3	J
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	18	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	2	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	27	
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW7 GROUND H2O 1600 GRAB
Laboratory Sample Number: 16526010 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	95	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HL

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/7/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83295E	Date Received:	8/9/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW7 (LM #16526-10)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		95	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 9 of 23

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW7 GROUND H2O 1600 GRAB
Laboratory Sample Number: 16526010 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.05	<0.05	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

000034

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW8

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526009

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006475

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	20	U
74-83-9	Bromomethane	20	U
75-01-4	Vinyl chloride	20	U
75-00-3	Chloroethane	20	U
75-09-2	Methylene chloride	8	BJ
67-64-1	Acetone	26	B
75-15-0	Carbon disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone (MEK)	20	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon tetrachloride	10	U
108-05-4	Vinyl acetate	20	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
591-78-6	2-Hexanone	20	U
108-10-1	4-Methyl-2-pentanone	20	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylenes (Total)	10	U

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 8 of 12

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Sample Description: 2B-MW8 GROUND H2O 1445 GRAB
Laboratory Sample Number: 16526009 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	103	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

000224

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/7/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83294E	Date Received:	8/9/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW8 (LM #16526-9)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		103	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 8 of 23

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW8 GROUND H2O 1445 GRAB
Laboratory Sample Number: 16526009 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.13	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW9

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526012

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006484

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	5	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

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CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 11 of 12

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 2B-MW9 GROUND H2O 0815 GRAB
Laboratory Sample Number: 16526012 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	90	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: FK

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/7/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83297E	Date Received:	8/9/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW9 (LM #16526-12)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		90	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Garman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Sample Description: 2B-MW9 GROUND H2O 0815 GRAB
Laboratory Sample Number: 16526012 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.30	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW10

b Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16543 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16543003

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006499

Level: (low/med) LOW Date Received: 08/09/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	3	BJ
67-64-1	Acetone	5	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	2	J
75-34-3	1,1-Dichloroethane	16	
540-59-0	1,2-Dichloroethene (Total)	24	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	1	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 3 of 11

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Sample Description: 2B-MW10 GROUND H2O 1140 GRAB
Laboratory Sample Number: 16543003 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	99	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/8/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83339E	Date Received:	8/10/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	DOUG BITTERMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW10 (LM# 16543-3)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	99	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

Engineers
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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 3 of 10

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Sample Description: 2B-MW10 GROUND H2O 1140 GRAB
Laboratory Sample Number: 16543003 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.14	mg/L	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by:

INRPRPT(v900202)

000005

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-MW11

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16543 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16543002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006490

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	6	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Sample Description: 2B-MW11 GROUND H2O 1015 GRAB
Laboratory Sample Number: 16543002 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	100	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/8/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83338E	Date Received:	8/10/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	DOUG BITTERMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-MW11 (LM#16543-2)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	100	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Sample Description: 2B-MW11 GROUND H2O 1015 GRAB
Laboratory Sample Number: 16543002 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.24	mg/L	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: AV

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2B-EQ1

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16543 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16543008

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006500

Level: (low/med) LOW Date Received: 08/09/90

% Moisture: not dec. _____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	6	B
67-64-1	Acetone	26	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HR

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/8/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83344E	Date Received:	8/10/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	DOUG BITTERMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-EQ1 (LM #16543-8)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	98	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jasman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 8 of 10

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Sample Description: 2B-EQ1 GROUND H2O 0800 GRAB
Laboratory Sample Number: 16543008 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.10	mg/L	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2BSW1

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556007

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006541

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	19	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	1	J
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	2	BJ

Engineers
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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 7 of 20

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2BSW1 SURFACE WATER 1730 GRAB
Laboratory Sample Number: 16556007 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.05	1.77	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

Engineers
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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2BSW1 SURFACE WATER 1730 GRAB
Laboratory Sample Number: 16556007 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	97	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

000165

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83399E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-SW1 (LM #16556-7)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		97	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2BSW2

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556008

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006533

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/21/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	12	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83400E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2B-SW2 (LM #16556-8)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	101	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

Engineers
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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 8 of 20

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2BSW2 SURFACE WATER 1735 GRAB
Laboratory Sample Number: 16556008 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	2.61	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

000010

Engineers
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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 8 of 19

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2BSW2 SURFACE WATER 1735 GRAB
Laboratory Sample Number: 16556008 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	101	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

000166

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2CMW1

b Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556009

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006534

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/21/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	2100	E
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	7	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	140	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	2	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	14	
108-90-7	Chlorobenzene	1	J
100-41-4	Ethylbenzene	1	J
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	15	

HL

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2CMW1_DL

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556009DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2V0006549

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 17

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	170	U
74-83-9	Bromomethane	170	U
75-01-4	Vinyl chloride	2000	D
75-00-3	Chloroethane	170	U
75-09-2	Methylene chloride	53	BDJ
67-64-1	Acetone	200	BD
75-15-0	Carbon disulfide	83	U
75-35-4	1,1-Dichloroethene	83	U
75-34-3	1,1-Dichloroethane	83	U
540-59-0	1,2-Dichloroethene (Total)	130	D
67-66-3	Chloroform	83	U
107-06-2	1,2-Dichloroethane	83	U
78-93-3	2-Butanone (MEK)	170	U
71-55-6	1,1,1-Trichloroethane	83	U
56-23-5	Carbon tetrachloride	83	U
108-05-4	Vinyl acetate	170	U
75-27-4	Bromodichloromethane	83	U
78-87-5	1,2-Dichloropropane	83	U
10061-01-5	cis-1,3-Dichloropropene	83	U
79-01-6	Trichloroethene	83	U
124-48-1	Dibromochloromethane	83	U
79-00-5	1,1,2-Trichloroethane	83	U
71-43-2	Benzene	83	U
10061-02-6	trans-1,3-Dichloropropene	83	U
75-25-2	Bromoform	83	U
591-78-6	2-Hexanone	170	U
108-10-1	4-Methyl-2-pentanone	170	U
127-18-4	Tetrachloroethene	83	U
79-34-5	1,1,2,2-Tetrachloroethane	83	U
108-88-3	Toluene	19	DJ
108-90-7	Chlorobenzene	83	U
100-41-4	Ethylbenzene	83	U
100-42-5	Styrene	83	U
1330-20-7	Xylenes (Total)	47	BDJ

HK

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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 9 of 20

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2CMW1 GROUND H2O 1000 GRAB
Laboratory Sample Number: 16556009 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.26	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83401E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-MW1 (LM #16556-9)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	104	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2CMW1_DUP

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556011

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006550

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 17

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	170	U
74-83-9	Bromomethane	170	U
75-01-4	Vinyl chloride	1900	
75-00-3	Chloroethane	170	U
75-09-2	Methylene chloride	170	B
67-64-1	Acetone	210	B
75-15-0	Carbon disulfide	85	U
75-35-4	1,1-Dichloroethene	85	U
75-34-3	1,1-Dichloroethane	85	U
540-59-0	1,2-Dichloroethene (Total)	130	
67-66-3	Chloroform	85	U
107-06-2	1,2-Dichloroethane	85	U
78-93-3	2-Butanone (MEK)	170	U
71-55-6	1,1,1-Trichloroethane	85	U
56-23-5	Carbon tetrachloride	85	U
108-05-4	Vinyl acetate	170	U
75-27-4	Bromodichloromethane	85	U
78-87-5	1,2-Dichloropropane	85	U
10061-01-5	cis-1,3-Dichloropropene	85	U
79-01-6	Trichloroethene	85	U
124-48-1	Dibromochloromethane	85	U
79-00-5	1,1,2-Trichloroethane	85	U
71-43-2	Benzene	85	U
10061-02-6	trans-1,3-Dichloropropene	85	U
75-25-2	Bromoform	85	U
591-78-6	2-Hexanone	170	U
108-10-1	4-Methyl-2-pentanone	170	U
127-18-4	Tetrachloroethene	85	U
79-34-5	1,1,2,2-Tetrachloroethane	85	U
108-88-3	Toluene	20	J
108-90-7	Chlorobenzene	85	U
100-41-4	Ethylbenzene	85	U
100-42-5	Styrene	85	U
1330-20-7	Xylenes (Total)	47	BJ

HL

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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 11 of 19

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2CMW1 DUP GROUND H2O 1005 GRAB
Laboratory Sample Number: 16556011 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	108	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83403E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-MW1 DUP (LM #16556-11)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	108	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

Engineers
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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 10 of 20

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2CMW1 DUP GROUND H2O 1005 GRAB
Laboratory Sample Number: 16556011 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.36	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2CMW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556012

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006542

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	22	
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	22	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	3	J
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	13	
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	2	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	2	BJ

HK

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2CMW1 GROUND H2O 1000 GRAB
Laboratory Sample Number: 16556009 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	104	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

000167

Engineers
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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2CMW2 GROUND H2O 1410 GRAB
Laboratory Sample Number: 16556012 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	99	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

000170

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83404E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-MW2 (LM #16556-12)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		99	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2CMW2 GROUND H2O 1410 GRAB
Laboratory Sample Number: 16556012 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.28	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2C-MW3

b Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16562 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16562001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006552

Level: (low/med) LOW Date Received: 08/11/90

% Moisture: not dec. ____ Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	11	
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	9	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	3	J
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	4	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	1	J
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	3	BJ

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REPORT OF ANALYTICAL RESULTS

Date: 09/13/90
Page: 1 of 4

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16562
Date Received: 08/11/90

Atten: MR. FRANK LEWIS

Sample Description: 2C-MW3 GROUND WATER 0750 GRAB
Laboratory Sample Number: 16562001 Date Collected: 08/10/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/14/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	101	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

000158

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/10/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83454E	Date Received:	8/14/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/14/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	D. BITTEMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-MW3 (LM #16562-1)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		101	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/14/90
Page: 1 of 13

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16562
Date Received: 08/11/90

Sample Description: 2C-MW3 GROUND WATER 0750 GRAB
Laboratory Sample Number: 16562001 Date Collected: 08/10/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.29	mg/L	09/07/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2C-MW4

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16562 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16562002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2V0006559

Level: (low/med) LOW Date Received: 08/11/90

% Moisture: not dec. ____ Date Analyzed: 08/23/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	81	
75-00-3	Chloroethane	31	
75-09-2	Methylene chloride	6	B
67-64-1	Acetone	5	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	11	
540-59-0	1,2-Dichloroethene (Total)	11	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	2	J
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	1	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	2	J

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REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16562
Date Received: 08/11/90

Sample Description: 2C-MW4 GROUND WATER 0915 GRAB
Laboratory Sample Number: 16562002 Date Collected: 08/10/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/14/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	101	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

000159

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/10/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83455E	Date Received:	8/14/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/14/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	D. BITTEMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-MW4 (LM #16562-2)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	101	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/14/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16562
Date Received: 08/11/90

Atten: MR. FRANK LEWIS

Sample Description: 2C-MW4 GROUND WATER 0915 GRAB
Laboratory Sample Number: 16562002 Date Collected: 08/10/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.38	mg/L	09/07/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2CMW5

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556013

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006543

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	10	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	9	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	2	BJ

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2CMW5 GROUND H2O 1155 GRAB
Laboratory Sample Number: 16556013 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	102	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

000171

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83405E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-MW5 (LM #16556-13)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		102	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2CMW5 GROUND H2O 1155 GRAB
Laboratory Sample Number: 16556013 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.16	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2CMW6

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556014

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006544

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	8	B
67-64-1	Acetone	9	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	2	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	2	J
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	B

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2CMW6 GROUND H2O 0830 GRAB
Laboratory Sample Number: 16556014 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	96	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

000172

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83406E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-MW6 (LM #16556-14)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		96	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
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Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2CMW6 GROUND H2O 0830 GRAB
Laboratory Sample Number: 16556014 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	<0.06	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by:

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2CMW7

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556015

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006545

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	13	
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	10	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	4	J
540-59-0	1,2-Dichloroethene (Total)	34	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	2	BJ

HK

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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 15 of 19

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2CMW7 GROUND H2O 1545 GRAB
Laboratory Sample Number: 16556015 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	94	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

000173

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83407E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-MW7 (LM #16556-15)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		94	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

Engineers
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CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2CMW7 GROUND H2O 1545 GRAB
Laboratory Sample Number: 16556015 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.14	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2CMW8

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556016

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006546

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. _____ Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	450	E
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	8	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	3	J
75-34-3	1,1-Dichloroethane	78	
540-59-0	1,2-Dichloroethene (Total)	66	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	12	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	3	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	2	BJ

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2CMW~~1~~8_DL

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556016DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2V0006558

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/23/90

Column: (pack/cap) CAP Dilution Factor: 4.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	40	U
74-83-9	Bromomethane	40	U
75-01-4	Vinyl chloride	320	D
75-00-3	Chloroethane	40	U
75-09-2	Methylene chloride	9	BDJ
67-64-1	Acetone	29	BDJ
75-15-0	Carbon disulfide	20	U
75-35-4	1,1-Dichloroethene	20	U
75-34-3	1,1-Dichloroethane	65	D
540-59-0	1,2-Dichloroethene (Total)	61	D
67-66-3	Chloroform	20	U
107-06-2	1,2-Dichloroethane	20	U
78-93-3	2-Butanone (MEK)	40	U
71-55-6	1,1,1-Trichloroethane	20	U
56-23-5	Carbon tetrachloride	20	U
108-05-4	Vinyl acetate	40	U
75-27-4	Bromodichloromethane	20	U
78-87-5	1,2-Dichloropropane	20	U
10061-01-5	cis-1,3-Dichloropropene	20	U
79-01-6	Trichloroethene	12	DJ
124-48-1	Dibromochloromethane	20	U
79-00-5	1,1,2-Trichloroethane	20	U
71-43-2	Benzene	20	U
10061-02-6	trans-1,3-Dichloropropene	20	U
75-25-2	Bromoform	20	U
591-78-6	2-Hexanone	40	U
108-10-1	4-Methyl-2-pentanone	40	U
127-18-4	Tetrachloroethene	20	U
79-34-5	1,1,2,2-Tetrachloroethane	20	U
108-88-3	Toluene	20	U
108-90-7	Chlorobenzene	20	U
100-41-4	Ethylbenzene	20	U
100-42-5	Styrene	20	U
1330-20-7	Xylenes (Total)	20	U

HK

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2CMW8 GROUND H2O 1715 GRAB
Laboratory Sample Number: 16556016 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	101	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83408E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-MW8 (LM #16656-16)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	101	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 15 of 20

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2CMW8 GROUND H2O 1715 GRAB
Laboratory Sample Number: 16556016 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.05	0.15	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by:

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2C-MW9

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16543 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16543006

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006501

Level: (low/med) LOW Date Received: 08/09/90

% Moisture: not dec. _____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	100	U
74-83-9	Bromomethane	100	U
75-01-4	Vinyl chloride	380	
75-00-3	Chloroethane	100	U
75-09-2	Methylene chloride	21	BJ
67-64-1	Acetone	86	BJ
75-15-0	Carbon disulfide	50	U
75-35-4	1,1-Dichloroethene	50	U
75-34-3	1,1-Dichloroethane	50	U
540-59-0	1,2-Dichloroethene (Total)	1300	
67-66-3	Chloroform	50	U
107-06-2	1,2-Dichloroethane	50	U
78-93-3	2-Butanone (MEK)	100	U
71-55-6	1,1,1-Trichloroethane	50	U
56-23-5	Carbon tetrachloride	50	U
108-05-4	Vinyl acetate	100	U
75-27-4	Bromodichloromethane	50	U
78-87-5	1,2-Dichloropropane	50	U
10061-01-5	cis-1,3-Dichloropropene	50	U
79-01-6	Trichloroethene	63	
124-48-1	Dibromochloromethane	50	U
79-00-5	1,1,2-Trichloroethane	50	U
71-43-2	Benzene	50	U
10061-02-6	trans-1,3-Dichloropropene	50	U
75-25-2	Bromoform	50	U
591-78-6	2-Hexanone	100	U
108-10-1	4-Methyl-2-pentanone	100	U
127-18-4	Tetrachloroethene	50	U
79-34-5	1,1,2,2-Tetrachloroethane	50	U
108-88-3	Toluene	50	U
108-90-7	Chlorobenzene	50	U
100-41-4	Ethylbenzene	50	U
100-42-5	Styrene	50	U
1330-20-7	Xylenes (Total)	50	U

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 6 of 11

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Atten: MR. FRANK LEWIS

Sample Description: 2C-MW9 GROUND H2O 1645 GRAB
Laboratory Sample Number: 16543006 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	104	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/8/90
Project:	LANTDIV-NAS OCEANA	Lab Sample Id:	83342E	Date Received:	8/10/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	DOUG BITTERMAN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-MW9 (LM #16543-6)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		104	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16543
Date Received: 08/09/90

Atten: MR. FRANK LEWIS

Sample Description: 2C-MW9 GROUND H2O 1645 GRAB
Laboratory Sample Number: 16543006 Date Collected: 08/08/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.17	mg/L	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2C-EQ1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556017

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006547

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	10	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	4	BJ

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Engineers
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CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2C-EQ1 EQUIPMENT BLANK 1000 GRAB
Laboratory Sample Number: 16556017 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/15/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	98	%rec	08/15/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83409E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/15/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2C-EQ1 (LM #16556-17)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	98	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2C-EQ1 EQUIPMENT BLANK 1000 GRAB
Laboratory Sample Number: 16556017 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.21	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2DMW1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006517

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/20/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	5	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2DMW1 GROUND H2O 1130 GRAB
Laboratory Sample Number: 16556001 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	109	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HM

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83393E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2D-MW1 (LM #16556-1)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		109	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 1 of 20

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2DMW1 GROUND H2O 1130 GRAB
Laboratory Sample Number: 16556001 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.36	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2D-MW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526005

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006486

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	3	BJ
67-64-1	Acetone	5	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	9	
75-34-3	1,1-Dichloroethane	64	
540-59-0	1,2-Dichloroethene (Total)	2	J
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	3	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	2	J
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	6	

HK

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 4 of 12

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Sample Description: 2D-MW2 GROUND H2O 1705 GRAB
Laboratory Sample Number: 16526005 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	102	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/7/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83290E	Date Received:	8/9/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2D-MW2 (LM #16526-5)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	102	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

Engineers
Planners
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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 5 of 23

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 2D-MW2 GROUND H2O 1705 GRAB
Laboratory Sample Number: 16526005 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.22	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

000030

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2D-MW3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526004

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006473

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	20	B
75-15-0	Carbon disulfide	1	J
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

FORM I VOA

1/87 Rev.

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Sample Description: 2D-MW3 GROUND H2O 1610 GRAB
Laboratory Sample Number: 16526004 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/13/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	105	%rec	08/13/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

000219

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/7/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83289E	Date Received:	8/9/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/13/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2D-MW3 (LM #16526-4)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		105	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 4 of 23

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Sample Description: 2D-MW3 GROUND H2O 1610 GRAB
Laboratory Sample Number: 16526004 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.05	<0.05	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by:

INRPRPT(v900202)

000029

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2EMW1

b Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1V0006518

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/20/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	6	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	2	J
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	2	J
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	3	J

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 2 of 19

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2EMW1 GROUND H2O 1450 GRAB
Laboratory Sample Number: 16556002 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	102	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

000160

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83394E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2E-MW1 (LM #16556-2)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		102	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Garman 9/10/90

Engineers
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Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 2 of 20

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2EMW1 GROUND H2O 1450 GRAB
Laboratory Sample Number: 16556002 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.20	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2EMW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556003

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006526

Level: (low/med) LOW Date Received: 08/10/90

Moisture: not dec. ____ Date Analyzed: 08/21/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	7	B
67-64-1	Acetone	6	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

Engineers
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CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2EMW2 GROUND H2O 1340 GRAB
Laboratory Sample Number: 16556003 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	97	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HR

INRPRPT(v900202)

000161

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83395E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2E-MW2 (LM #16556-3)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	97	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2EMW2 GROUND H2O 1340 GRAB
Laboratory Sample Number: 16556003 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	<0.06	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2EMW3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16556 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16556004

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006527

Level: (low/med) LOW Date Received: 08/10/90

% Moisture: not dec. ____ Date Analyzed: 08/21/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	4	BJ
75-15-0	Carbon disulfide	2	J
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

Engineers
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REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 4 of 20

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Sample Description: 2EMW3 GROUND H2O 1550 GRAB
Laboratory Sample Number: 16556004 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.21	mg/L	09/06/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90
Page: 4 of 19

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16556
Date Received: 08/10/90

Atten: MR. FRANK LEWIS

Sample Description: 2EMW3 GROUND H2O 1550 GRAB
Laboratory Sample Number: 16556004 Date Collected: 08/09/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/13/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/14/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	106	%rec	08/14/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

000162

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/9/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83396E	Date Received:	8/13/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/13/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/14/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 2E-MW3 (LM #16556-4)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	106	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/10/90

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2ESS1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16539 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16539004

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO010891

Level: (low/med) LOW Date Received: 08/09/90

Moisture: not dec. 12 Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	24	B
67-64-1	Acetone	11	BJ
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (Total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone (MEK)	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	11	U
108-10-1	4-Methyl-2-pentanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylenes (Total)	6	U

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	
ab Sample ID:	16539004RE	Sample Matrix:	SOIL	Date Analyzed:	08/22/90
⌄lient Sample ID:	2ESS1 RE	Percent Moisture:	12.0	Dilution Factor:	1.0

1,2- DIBROMOETHANE (EDB)

CAS Number		ug/Kg	CAS Number	ug/Kg
74-95-3	1,2-Dibromoethane (EDB) .	0.2U		
	Fluorobenzene - SS	121		
	1,4-Dichlorobenzene-d4 - SS	131		

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	
ab Sample ID:	16539004	Sample Matrix:	SOIL	Date Analyzed:	08/21/90
~lient Sample ID:	2ESS1	Percent Moisture:	12.0	Dilution Factor:	1.0

1,2- DIBROMOETHANE (EDB)

CAS Number		ug/Kg	CAS Number	ug/Kg
74-95-3	1,2-Dibromoethane (EDB) .	0.2U		
	Fluorobenzene - SS	122		
	1,4-Dichlorobenzene-d4 - SS	120		

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
SS - Surrogate Standard reported as percent recovery.

Form I

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REPORT OF ANALYTICAL RESULTS

Date: 09/07/90
Page: 3 of 15

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16539
Date Received: 08/09/90

Atten: MR. FRANK LEWIS

Sample Description: 2ESS1 0930 SOIL
Laboratory Sample Number: 16539004 Date Collected: 08/08/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	1.9	99.4	mg/Kg	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2ESS2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16539 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16539003

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO010890

Level: (low/med) LOW Date Received: 08/09/90

Moisture: not dec. 17 Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene chloride	13	B
67-64-1	Acetone	21	B
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (Total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone (MEK)	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	12	U
108-10-1	4-Methyl-2-pentanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylenes (Total)	6	U

AK

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	
ab Sample ID:	16539003RE	Sample Matrix:	SOIL	Date Analyzed:	08/21/90
-lient Sample ID:	2ESS2 RE	Percent Moisture:	17.0	Dilution Factor:	1.0

1,2- DIBROMOETHANE (EDB)

CAS Number		ug/Kg	CAS Number	ug/Kg
74-95-3	1,2-Dibromoethane (EDB) .	0.2U		
	Fluorobenzene - SS	114		
	1,4-Dichlorobenzene-d4 - SS	67		

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
SS - Surrogate Standard reported as percent recovery.

Form I

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	
ab Sample ID:	16539003	Sample Matrix:	SOIL	Date Analyzed:	08/21/90
-lient Sample ID:	2ESS2	Percent Moisture:	17.0	Dilution Factor:	1.0

1,2- DIBROMOETHANE (EDB)

CAS Number		ug/Kg	CAS Number	ug/Kg
74-95-3	1,2-Dibromoethane (EDB) .	0.2U		
	Fluorobenzene - SS	99		
	1,4-Dichlorobenzene-d4 - SS	64		

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/07/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16539
Date Received: 08/09/90

Sample Description: 2ESS2 0915 SOIL
Laboratory Sample Number: 16539003 Date Collected: 08/08/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	18.9	513	mg/Kg	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2ESS3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16539 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16539002

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C2VO010946

Level: (low/med) LOW Date Received: 08/09/90

Moisture: not dec. 11 Date Analyzed: 08/22/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	61	B
67-64-1	Acetone	13	B
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (Total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone (MEK)	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	11	U
108-10-1	4-Methyl-2-pentanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylenes (Total)	6	U

HL

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	
ab Sample ID:	16539002	Sample Matrix:	SOIL	Date Analyzed:	08/21/90
_lient Sample ID:	2ESS3	Percent Moisture:	11.0	Dilution Factor:	1.0

1,2- DIBROMOETHANE (EDB)

CAS Number		ug/Kg	CAS Number	ug/Kg
74-95-3	1,2-Dibromoethane (EDB) .	0.2U		
	Fluorobenzene - SS	100		
	1,4-Dichlorobenzene-d4 - SS	86		

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
SS - Surrogate Standard reported as percent recovery.

Form I

HK

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/07/90
Page: 1 of 15

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16539
Date Received: 08/09/90

Atten: MR. FRANK LEWIS

Sample Description: 2ESS3 0905 SOIL
Laboratory Sample Number: 16539002 Date Collected: 08/08/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	9.0	242	mg/Kg	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2ESS4

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16539 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16539001

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C2VO010896

Level: (low/med) LOW Date Received: 08/09/90

Moisture: not dec. 14 Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene chloride	120	B
67-64-1	Acetone	14	B
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (Total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone (MEK)	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	12	U
108-10-1	4-Methyl-2-pentanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	2	J
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylenes (Total)	6	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

6SS3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16539 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16539007

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO010899

Level: (low/med) LOW Date Received: 08/09/90

Moisture: not dec. 22 Date Analyzed: 08/18/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene chloride	130	B
67-64-1	Acetone	17	B
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (Total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone (MEK)	13	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	13	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	13	U
108-10-1	4-Methyl-2-pentanone	13	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylenes (Total)	6	U

HK

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/07/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16539
Date Received: 08/09/90

Atten: MR. FRANK LEWIS

Sample Description: 6SS3 1020 SOIL
Laboratory Sample Number: 16539007 Date Collected: 08/08/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	1.9	10.2	mg/Kg	09/05/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

6SS3

Lab Name: CH2M_HILL_MGM Contract: 16539

Lab Code: NA Case No.: 16539 SAS No.: 16539 SDG No.: 16539

Matrix (soil/water): SOIL Lab Sample ID: 16539007

Level (low/med): LOW Date Received: 08/09/90

% Solids: 86.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	32.4		N	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: BROWN Clarity Before: N/A Texture: LOAM

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW3D

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16597 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16597001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004338

Level: (low/med) LOW Date Received: 08/17/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/22/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 08/28/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW3D

) Name: CH2M HILL/MGM Contract: _____

ab Code: _____ Case No.: 16597 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16597001

ample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004338

Level: (low/med) LOW Date Received: 08/17/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/22/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 08/28/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW4S

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16582 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16582002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006578

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ Date Analyzed: 08/24/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	6	B
67-64-1	Acetone	8	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW4S

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16582 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16582002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004265

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/16/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/22/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW4S

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16582 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16582002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004265

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/16/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/22/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/21/90
Lab Sample ID:	16582002	Sample Matrix:	WATER	Date Analyzed:	09/06/90
Client Sample ID:	07MW4S	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
319-84-6	alpha-BHC	0.01	U		
319-85-7	beta-BHC	0.02	U		
319-86-8	delta-BHC	0.01	U		
58-89-9	gamma-BHC (Lindane)	0.01	U		
76-44-8	Heptachlor	0.01	U		
309-00-2	Aldrin	0.01	U		
1024-57-3	Heptachlor Epoxide	0.01	U		
959-98-8	Endosulfan I	0.02	U		
60-57-1	Dieldrin	0.02	U		
72-55-9	4,4'-DDE	0.02	U		
72-20-8	Endrin	0.02	U		
33213-65-9	Endosulfan II	0.02	U		
72-54-8	4,4'-DDD	0.02	U		
1031-07-8	Endosulfan Sulfate	0.02	U		
50-29-3	4,4'-DDT	0.02	U		
72-43-5	Methoxychlor	0.04	U		
7421-93-4	Endrin Aldehyde	0.02	U		
789-03-6	Chlordane	0.1	U		
001-35-2	Toxaphene	0.5	U		
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	Dibutylchlorendate - SS	84			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

JWS

000062

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16582
Date Received: 08/15/90

Atten: MR. FRANK LEWIS

Sample Description: 07MW4S GROUND H2O 1730 GRAB
Laboratory Sample Number: 16582002 Date Collected: 08/14/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/20/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/21/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	106	%rec	08/21/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-OCEANA	Laboratory:	GAINESVILLE	Date Sampled:	8/14/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83544E	Date Received:	8/16/90
Proj No:	WDC20368.HO.07	% Moisture	0.00	Date Extracted:	8/20/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/21/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/23/90

Client Sample ID/Description: 07MW4S (LM #16582-2)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		106	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/14/90
Page: 1 of 5

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16582
Date Received: 08/15/90

Atten: MR. FRANK LEWIS

Sample Description: 07MW4S GROUND H2O 1730 GRAB
Laboratory Sample Number: 16582002 Date Collected: 08/14/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Alkalinity as CaCO3	EPA310.1	1	30	mg/L	08/21/90
Chloride	EPA325.3	1	11	mg/L	08/20/90
Sulfate	EPA375.4	2.0	32.5	mg/L	08/16/90
Total Organic Carbon	EPA415.2	1.0	25.8	mg/L	08/30/90
Total Organic Halogen as CL-	SW9020	0.01	<0.01	mg/L	08/20/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

07MW4S

Lab Name: CH2M_HILL_MGM Contract: 16582

Lab Code: NA Case No.: 16582 SAS No.: 16582 SDG No.: 16582

Matrix (soil/water): WATER Lab Sample ID: 16582002

Level (low/med): LOW Date Received: 08/14/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	211			P
7440-36-0	Antimony	54.2	U		P
7440-38-2	Arsenic	2.1	U		F
7440-39-3	Barium	45.8	B		P
7440-41-7	Beryllium	0.36	U		P
7440-43-9	Cadmium	3.7	U		P
7440-70-2	Calcium	8590			P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	5.4	U		P
7440-50-8	Copper	3.0	B		P
7439-89-6	Iron	4040			P
7439-92-1	Lead	1.9	B		F
7439-95-4	Magnesium	7800			P
7439-96-5	Manganese	121			P
7439-97-6	Mercury	0.080	U		CV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	1340	B		P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	6.2	U		P
7440-23-5	Sodium	10600			P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	2.9	U		P
7440-66-6	Zinc	52.0			P
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW4D

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16582 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16582003

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1V0006579

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ Date Analyzed: 08/24/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	7	B
67-64-1	Acetone	9	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	2	J
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW4D

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16582 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16582003

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004266

Level: (low/med) LOW Date Received: 08/16/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/16/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/22/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

HK

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW4D

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16582 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16582003

ample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004266

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/16/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/22/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/21/90
Lab Sample ID:	16582003	Sample Matrix:	WATER	Date Analyzed:	09/06/90
Client Sample ID:	07MW4D	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
319-84-6	alpha-BHC	0.01	U		
319-85-7	beta-BHC	0.02	U		
319-86-8	delta-BHC	0.01	U		
58-89-9	gamma-BHC (Lindane)	0.01	U		
76-44-8	Heptachlor	0.01	U		
309-00-2	Aldrin	0.01	U		
1024-57-3	Heptachlor Epoxide	0.01	U		
959-98-8	Endosulfan I	0.02	U		
60-57-1	Dieldrin	0.02	U		
72-55-9	4,4'-DDE	0.02	U		
72-20-8	Endrin	0.02	U		
33213-65-9	Endosulfan II	0.02	U		
72-54-8	4,4'-DDD	0.02	U		
1031-07-8	Endosulfan Sulfate	0.02	U		
50-29-3	4,4'-DDT	0.02	U		
72-43-5	Methoxychlor	0.04	U		
7421-93-4	Endrin Aldehyde	0.02	U		
89-03-6	Chlordane	0.1	U		
8001-35-2	Toxaphene	0.5	U		
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	Dibutylchlorendate - SS	58			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

000065

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16582
Date Received: 08/15/90

Atten: MR. FRANK LEWIS

Sample Description: 07MW4D GROUND H2O 1240 GRAB
Laboratory Sample Number: 16582003 Date Collected: 08/14/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/20/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/21/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	104	%rec	08/21/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-OCEANA	Laboratory:	GAINESVILLE	Date Sampled:	8/14/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83545E	Date Received:	8/16/90
Proj No:	WDC20368.HO.07	% Moisture	0.00	Date Extracted:	8/20/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/21/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/23/90

Client Sample ID/Description: 07MW4D (LM #16582-3)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L

79-34-5	1,1,2,2-Tetrachloroethane-SS	104	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/14/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16582
Date Received: 08/15/90

Atten: MR. FRANK LEWIS

Sample Description: 07MW4D GROUND H2O 1240 GRAB
Laboratory Sample Number: 16582003 Date Collected: 08/14/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Alkalinity as CaCO3	EPA310.1	1	257	mg/L	08/21/90
Chloride	EPA325.3	1	17	mg/L	08/20/90
Sulfate	EPA375.4	1.0	<1.0	mg/L	08/16/90
Total Organic Carbon	EPA415.2	1.0	21.9	mg/L	08/30/90
Total Organic Halogen as CL-	SW9020	0.01	<0.01	mg/L	08/21/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

07MW4D

Lab Name: CH2M_HILL_MGM Contract: 16582

Lab Code: NA Case No.: 16582 SAS No.: 16582 SDG No.: 16582

Matrix (soil/water): WATER Lab Sample ID: 16582003

Level (low/med): LOW Date Received: 08/14/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	99.8	B		P
7440-36-0	Antimony	54.2	U		P
7440-38-2	Arsenic	2.1	U		F
7440-39-3	Barium	30.9	B		P
7440-41-7	Beryllium	0.36	U		P
7440-43-9	Cadmium	3.7	U		P
7440-70-2	Calcium	79700			P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	5.4	U		P
7440-50-8	Copper	2.7	B		P
7439-89-6	Iron	790			P
7439-92-1	Lead	1.3	U		F
7439-95-4	Magnesium	8470			P
7439-96-5	Manganese	221			P
7439-97-6	Mercury	0.080	U		CV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	5350			P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	6.2	U		P
7440-23-5	Sodium	20700			P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	2.9	U		P
7440-66-6	Zinc	50.6			P
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW5

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590005

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006595

Level: (low/med) LOW Date Received: 08/16/90

% Moisture: not dec. ____ Date Analyzed: 08/25/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	5	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW5

Name: CH2M HILL/MGM Contract: _____

ab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590005

ample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004321

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/17/90

xtraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/27/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	9	J
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

HK

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07MW5

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590005

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004321

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/27/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

HK

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/21/90
Lab Sample ID:	16590005	Sample Matrix:	WATER	Date Analyzed:	09/06/90
Client Sample ID:	07MW5	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
319-84-6	alpha-BHC	0.01	U		
319-85-7	beta-BHC	0.02	U		
319-86-8	delta-BHC	0.01	U		
58-89-9	gamma-BHC (Lindane)	0.01	U		
76-44-8	Heptachlor	0.01	U		
309-00-2	Aldrin	0.01	U		
1024-57-3	Heptachlor Epoxide	0.01	U		
959-98-8	Endosulfan I	0.02	U		
60-57-1	Dieldrin	0.02	U		
72-55-9	4,4'-DDE	0.02	U		
72-20-8	Endrin	0.02	U		
33213-65-9	Endosulfan II	0.02	U		
72-54-8	4,4'-DDD	0.02	U		
1031-07-8	Endosulfan Sulfate	0.02	U		
50-29-3	4,4'-DDT	0.02	U		
72-43-5	Methoxychlor	0.04	U		
7421-93-4	Endrin Aldehyde	0.02	U		
89-03-6	Chlordane	0.1	U		
01-35-2	Toxaphene	0.5	U		
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	Dibutylchlorendate - SS	95			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90
Page: 5 of 8

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16590
Date Received: 08/16/90

Atten: MR. FRANK LEWIS

Sample Description: 07MW5 GROUND H2O 1700 GRAB
Laboratory Sample Number: 16590005 Date Collected: 08/15/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/20/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/21/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	105	%rec	08/21/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

000162

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

07MW5

Lab Name: CH2M_HILL_MGM Contract: 16590

Lab Code: NA Case No.: 16590 SAS No.: 16590 SDG No.: 16590

Matrix (soil/water): WATER Lab Sample ID: 16590005

Level (low/med): LOW Date Received: 08/16/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	109	B		P
7440-36-0	Antimony	54.2	U		P
7440-38-2	Arsenic	2.6	B		F
7440-39-3	Barium	60.0	B		P
7440-41-7	Beryllium	0.36	U		P
7440-43-9	Cadmium	3.7	U		P
7440-70-2	Calcium	6360			P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	5.4	U		P
7440-50-8	Copper	2.7	U		P
7439-89-6	Iron	7650			P
7439-92-1	Lead	1.3	U		F
7439-95-4	Magnesium	7210			P
7439-96-5	Manganese	139			P
7439-97-6	Mercury	0.080	B		CV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	1150	B		P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	6.2	U		P
7440-23-5	Sodium	14100			P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	2.9	U		P
7440-66-6	Zinc	56.5			P
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/15/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83609E	Date Received:	8/17/90
Proj No:	WDC20368.HO.07	% Moisture	0.00	Date Extracted:	8/20/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/21/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/22/90

Client Sample ID/Description: 07MW5 (LM #16590-5)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		105	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

Engineers
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REPORT OF ANALYTICAL RESULTS

Date: 09/14/90
Page: 5 of 12

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16590
Date Received: 08/16/90

Sample Description: 07MW5 GROUND H2O 1700 GRAB
Laboratory Sample Number: 16590005 Date Collected: 08/15/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Alkalinity as CaCO3	EPA310.1	1	14	mg/L	08/21/90
Chloride	EPA325.3	1	14	mg/L	08/20/90
Sulfate	EPA375.4	1.0	48.2	mg/L	08/16/90
Total Organic Carbon	EPA415.2	1.0	90.0	mg/L	09/07/90
Total Organic Halogen as CL-	SW9020	0.01	0.06	mg/L	08/24/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

COMPUCHEM LABORATORIES, INC.

TOTAL ORGANIC HALIDE
SUMMARY REPORT

TOTAL ORGANIC HALIDE

ITEM NO.	SAMPLE IDENTIFIER	COMPUCHEM NUMBER	CONCENTRATION (mg/L)	DETECTION LIMIT (mg/L)
1.	16597001	366105	.01	.01

BDL = BELOW DETECTION LIMITS

Reviewed by/ID#: [illegible] / 1599 Date: 9-14-90

Reviewed by/ID#: J. Griffith, Ph.D. / 1741 Date: 9-14-90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYSIS

Florida Certification: 82112; E82124

AAD242
09/11/90

Sample Nos: 83690 - 83691

Navy-Lantdiv	C H 2 M H i l l
Attention: Emily Ramuchak Address: LMG	Project No: WDC20368.H0.07 Received: 08/20/90 Reported: 09/11/90
Collected: 08/16/90 by Steven Brown Type: water, grab Location: OCEANA-LANTDIV	

SAMPLE NUMBER	83690	83691
SAMPLE DESCRIPTIONS	LM16597-001 07MW3D 08/16/90 8:50	Laboratory Method Blank
GENERAL ORGANICS		
TOC - Liquid	30.0 09/07/90	<1.0 09/07/90

NOTE: Values are mg/l as substance unless otherwise stated.
Alabama laboratory certification #40080.

Respectfully submitted,

Thomas C. Emenhiser, Laboratory Manager

n/r = not requested
NOTE: This report contains test data and no interpretation is intended or implied.

000083

CH2M HILL
Gainesville Environmental Laboratory
7201 N.W. 11th Place, Gainesville, Florida 32605
904.331.2442
FAX 904.331.5320

CH2M HILL
Engineers
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Economists
Scientists

REPORT OF ANALYSIS

Florida Certification: 82112; E82124

AAD230
09/03/90

Sample Nos: 83544 - 83546

Navy-Oceana	CH2M Hill
Attention: Emily Ramuchak Address: LMG	Project No: WDC20368.H0.07 Received: 08/16/90 Reported: 09/03/90
Collected: 08/14/90 by Steven Brown Type: water, grab	

SAMPLE NUMBER	83544	83545	83546
SAMPLE DESCRIPTIONS	LM16582-002 07MW45 08/14/90 17:30	LM16582-003 07MW42 08/14/90 12:40	Laboratory Method Blank
GENERAL ORGANICS			
TOC - Liquid	25.8 08/30/90	21.9 08/30/90	<1.0 08/30/90

NOTE: Values are mg/l as substance unless otherwise stated.
Alabama laboratory certification #40080.

Respectfully submitted,

Thomas C. Emenhiser, Laboratory Manager

n/r = not requested
NOTE: This report contains test data and no interpretation is intended or implied.

CH2M HILL
Gainesville
Environmental Laboratory
7201 N.W. 11th Place,
Gainesville, Florida 32605
904.331.2442
FAX 904.331.5320

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYSIS

Florida Certification: 82112; E82124

Navy Lantdiv	C H 2 M H i l l
Attention: Emily Ramuchak Address: LMG	Project No: WDC20368.H0.07 Received: 08/17/90 Reported: 09/11/90

Collected: 08/15/90 by Steven Brown
Type: water, grab
Location: OCEANA-LANTDIV

SAMPLE NUMBER	83610	83611	83612
SAMPLE DESCRIPTIONS	LM16590-006 07EQB 08/15/90 15:30	LM16590-007 07FB 08/15/90 17:35	Laboratory Method Blank
GENERAL ORGANICS			
TOC - Liquid	54.0 08/30/90	33.9 08/30/90	<1.0 08/30/90

NOTE: Values are mg/l as substance unless otherwise stated.
Alabama laboratory certification #40080.

Respectfully submitted,

Thomas C. Emenhiser, Laboratory Manager

n/r = not requested
NOTE: This report contains test data and no interpretation is intended or implied.

CH2M HILL Gainesville Environmental Laboratory 7201 N.W. 11th Place, Gainesville, Florida 32605 904.331.2442 FAX 904.331.5320

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYSIS

Florida Certification: 82112; E82124

AAD235
09/11/90

Sample Nos: 83605 - 83612

Navy Lantdiv	C H 2 M H i l l
Attention: Emily Ramuchak Address: LMG	Project No: WDC20368.H0.07 Received: 08/17/90 Reported: 09/11/90
Collected: 08/15/90 by Steven Brown Type: water, grab Location: OCEANA-LANTDIV	

SAMPLE NUMBER	83605	83606	83607	83608	83609
SAMPLE DESCRIPTIONS	LM16590-001 07SW1 08/15/90 9:30	LM16590-002 07SW2 08/15/90 15:40	LM16590-003 07MW2 08/15/90 13:55	LM16590-004 07MW2 DUP 08/15/90 14:50	LM16590-005 07MW5 08/15/90 17:00
GENERAL ORGANICS					
TOC - Liquid	40.8 08/30/90	22.9 08/30/90	38.9 09/07/90	25.7 09/07/90	90.0 09/07/90

NOTE: Values are mg/l as substance unless otherwise stated.
Alabama laboratory certification #40080.

Respectfully submitted,

Thomas C. Emenhiser, Laboratory Manager

n/r = not requested
NOTE: This report contains test data and no interpretation is intended or implied.

CH2M HILL Gainesville Environmental Laboratory 7201 N.W. 11th Place, Gainesville, Florida 32605 904.331.2442 FAX 904.331.5320

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYSIS

Florida Certification: 82112; E82124

AAD608
12/03/90

Sample Nos: 87086 - 87087

Navy - Oceana	C H 2 M H i l l
Attention: Emily Ramuchak Address: LMG	Project No: WDC20368.H0.07 Received: 11/13/90 Reported: 12/03/90

Collected: 11/09/90 by Steven Brown
Type: water, grab
Location: LANTDIV - OCEANA

SAMPLE NUMBER	87086	87087
SAMPLE DESCRIPTIONS	LM17215-001 07 MW1 11/09/90 10:45	Laboratory Method Blank
GENERAL ORGANICS		
TOC - Liquid	28 11/29/90	<1.0 11/29/90

NOTE: Values are mg/l as substance unless otherwise stated.
Alabama laboratory certification #40080.

Respectfully submitted,

T. Ward Dickens, Laboratory Manager

n/r = not requested
NOTE: This report contains test data and no interpretation is intended or implied.

000030

CH2M HILL Gainesville Environmental Laboratory 7201 N.W. 11th Place, Gainesville, Florida 32605 904.331.2442 FAX 904 331 5320

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07SW1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006585

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ Date Analyzed: 08/24/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	8	B
67-64-1	Acetone	8	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

FORM I VOA

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16590
Date Received: 08/16/90

Atten: MR. FRANK LEWIS

Sample Description: 07SW1 SURFACE WATER 0930 GRAB
Laboratory Sample Number: 16590001 Date Collected: 08/15/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/20/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/21/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	104	%rec	08/21/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HL

INRPRPT(v900202)

000158

Engineers
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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/21/90
Lab Sample ID:	16590001	Sample Matrix:	WATER	Date Analyzed:	09/06/90
Client Sample ID:	07SW1	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
319-84-6	alpha-BHC	0.01	U		
319-85-7	beta-BHC	0.02	U		
319-86-8	delta-BHC	0.01	U		
58-89-9	gamma-BHC (Lindane)	0.01	U		
76-44-8	Heptachlor	0.01	U		
309-00-2	Aldrin	0.01	U		
1024-57-3	Heptachlor Epoxide	0.01	U		
959-98-8	Endosulfan I	0.02	U		
60-57-1	Dieldrin	0.02	U		
72-55-9	4,4'-DDE	0.02	U		
72-20-8	Endrin	0.02	U		
33213-65-9	Endosulfan II	0.02	U		
72-54-8	4,4'-DDD	0.02	U		
1031-07-8	Endosulfan Sulfate	0.02	U		
50-29-3	4,4'-DDT	0.02	U		
72-43-5	Methoxychlor	0.04	U		
7421-93-4	Endrin Aldehyde	0.02	U		
89-03-6	Chlordane	0.1	U		
01-35-2	Toxaphene	0.5	U		
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	Dibutylchlorendate - SS	56			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

JMS

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07SW1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004317

Level: (low/med) LOW Date Received: 08/16/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/27/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

HK

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07SW1

Name: CH2M HILL/MGM Contract: _____

ab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590001

ample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004317

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/27/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/14/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16590
Date Received: 08/16/90

Atten: MR. FRANK LEWIS

Sample Description: 07SW1 SURFACE WATER 0930 GRAB
Laboratory Sample Number: 16590001 Date Collected: 08/15/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Alkalinity as CaCO3	EPA310.1	1	14	mg/L	08/21/90
Chloride	EPA325.3	1	10	mg/L	08/20/90
Sulfate	EPA375.4	1.0	23.2	mg/L	08/16/90
Total Organic Carbon	EPA415.2	1.0	40.8	mg/L	08/30/90
Total Organic Halogen as CL-	SW9020	0.01	<0.01	mg/L	08/23/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: [signature]

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

07SW1

ab Name: CH2M_HILL_MGM Contract: 16590

Lab Code: NA Case No.: 16590 SAS No.: 16590 SDG No.: 16590

atrix (soil/water): WATER Lab Sample ID: 16590001

Level (low/med): LOW Date Received: 08/16/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	74.1	B		P
7440-36-0	Antimony	54.2	U		P
7440-38-2	Arsenic	2.1	U		F
7440-39-3	Barium	33.8	B		P
7440-41-7	Beryllium	0.36	U		P
7440-43-9	Cadmium	3.7	U		P
7440-70-2	Calcium	8340			P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	5.4	U		P
7440-50-8	Copper	2.7	U		P
7439-89-6	Iron	123			P
7439-92-1	Lead	1.3	U		F
7439-95-4	Magnesium	3700	B		P
7439-96-5	Manganese	63.2			P
7439-97-6	Mercury	0.080	B		CV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	1660	B		P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	6.2	U		P
7440-23-5	Sodium	6840			P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	2.9	U		P
7440-66-6	Zinc	64.5			P
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/15/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83605E	Date Received:	8/17/90
Proj No:	WDC20368.HO.07	% Moisture	0.00	Date Extracted:	8/20/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/21/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/22/90

Client Sample ID/Description: 07SW1 (LM #16590-1)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		104	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07SW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006586

Level: (low/med) LOW Date Received: 08/16/90

% Moisture: not dec. ____ Date Analyzed: 08/24/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	8	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HC

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07SW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004318

Level: (low/med) LOW Date Received: 08/16/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/27/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

HK

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07SW2

Name: CH2M HILL/MGM Contract: _____

ab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590002

ample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004318

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/27/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16590
Date Received: 08/16/90

Sample Description: 07SW2 SURFACE WATER 1540 GRAB
Laboratory Sample Number: 16590002 Date Collected: 08/15/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/20/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/21/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	104	%rec	08/21/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: HK

INRPRPT(v900202)

000159

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/21/90
Lab Sample ID:	16590002	Sample Matrix:	WATER	Date Analyzed:	09/06/90
Client Sample ID:	07SW2	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
319-84-6	alpha-BHC	0.01	U		
319-85-7	beta-BHC	0.02	U		
319-86-8	delta-BHC	0.01	U		
58-89-9	gamma-BHC (Lindane)	0.01	U		
76-44-8	Heptachlor	0.01	U		
309-00-2	Aldrin	0.01	U		
1024-57-3	Heptachlor Epoxide	0.01	U		
959-98-8	Endosulfan I	0.02	U		
60-57-1	Dieldrin	0.02	U		
72-55-9	4,4'-DDE	0.02	U		
72-20-8	Endrin	0.02	U		
33213-65-9	Endosulfan II	0.02	U		
72-54-8	4,4'-DDD	0.02	U		
1031-07-8	Endosulfan Sulfate	0.02	U		
50-29-3	4,4'-DDT	0.02	U		
72-43-5	Methoxychlor	0.04	U		
7421-93-4	Endrin Aldehyde	0.02	U		
12789-03-6	Chlordane	0.1	U		
1-35-2	Toxaphene	0.5	U		
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	Dibutylchlorendate - SS	64			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

JMS

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/14/90
Page: 2 of 12

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16590
Date Received: 08/16/90

Atten: MR. FRANK LEWIS

Sample Description: 07SW2 SURFACE WATER 1540 GRAB
Laboratory Sample Number: 16590002 Date Collected: 08/15/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Alkalinity as CaCO3	EPA310.1	1	16	mg/L	08/21/90
Chloride	EPA325.3	1	9	mg/L	08/20/90
Sulfate	EPA375.4	1.0	27.5	mg/L	08/16/90
Total Organic Carbon	EPA415.2	1.0	22.9	mg/L	08/30/90
Total Organic Halogen as CL-	SW9020	0.01	<0.01	mg/L	08/23/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

07SW2

Lab Name: CH2M_HILL_MGM Contract: 16590

Lab Code: NA Case No.: 16590 SAS No.: 16590 SDG No.: 16590

Matrix (soil/water): WATER Lab Sample ID: 16590002

Level (low/med): LOW Date Received: 08/16/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	317			P
7440-36-0	Antimony	54.2	U		P
7440-38-2	Arsenic	2.1	U		F
7440-39-3	Barium	41.1	B		P
7440-41-7	Beryllium	0.36	U		P
7440-43-9	Cadmium	3.7	U		P
7440-70-2	Calcium	13100			P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	5.4	U		P
7440-50-8	Copper	2.7	U		P
7439-89-6	Iron	424			P
7439-92-1	Lead	1.3	U		F
7439-95-4	Magnesium	4150	B		P
7439-96-5	Manganese	94.3			P
7439-97-6	Mercury	0.080	B		CV
7440-02-0	Nickel	8.2	B		P
7440-09-7	Potassium	1670	B		P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	6.2	U		P
7440-23-5	Sodium	7500			P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	2.9	U		P
7440-66-6	Zinc	238			P
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

07EQB

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590006

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006582

Level: (low/med) LOW Date Received: 08/16/90

Moisture: not dec. ____ Date Analyzed: 08/24/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	16	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07EQB

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590006

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004322

Level: (low/med) LOW Date Received: 08/16/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/27/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07EQB

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590006

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004322

Level: (low/med) LOW Date Received: 08/16/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/27/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/15/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83610E	Date Received:	8/17/90
Proj No:	WDC20368.HO.07	% Moisture	0.00	Date Extracted:	8/20/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/21/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/22/90

Client Sample ID/Description: 07EQB (LM #16590-6)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		110	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Garman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/13/90
Page: 6 of 8

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16590
Date Received: 08/16/90

Atten: MR. FRANK LEWIS

Sample Description: 07EQB SITE 7 EQUIP. BLK 1530 GRAB
Laboratory Sample Number: 16590006 Date Collected: 08/15/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/20/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/21/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	110	%rec	08/21/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: KK

INRPRPT(v900202)

000163

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/21/90
Lab Sample ID:	16590006	Sample Matrix:	WATER	Date Analyzed:	09/06/90
Client Sample ID:	07EQB	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
319-84-6	alpha-BHC	0.01	U		
319-85-7	beta-BHC	0.02	U		
319-86-8	delta-BHC	0.01	U		
58-89-9	gamma-BHC (Lindane)	0.01	U		
76-44-8	Heptachlor	0.01	U		
309-00-2	Aldrin	0.01	U		
1024-57-3	Heptachlor Epoxide	0.01	U		
959-98-8	Endosulfan I	0.02	U		
60-57-1	Dieldrin	0.02	U		
72-55-9	4,4'-DDE	0.02	U		
72-20-8	Endrin	0.02	U		
33213-65-9	Endosulfan II	0.02	U		
72-54-8	4,4'-DDD	0.02	U		
1031-07-8	Endosulfan Sulfate	0.02	U		
50-29-3	4,4'-DDT	0.02	U		
72-43-5	Methoxychlor	0.04	U		
7421-93-4	Endrin Aldehyde	0.02	U		
789-03-6	Chlordane	0.1	U		
01-35-2	Toxaphene	0.5	U		
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	Dibutylchlorendate - SS	68			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

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REPORT OF ANALYTICAL RESULTS

Date: 09/14/90
Page: 6 of 12

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16590
Date Received: 08/16/90

Atten: MR. FRANK LEWIS

Sample Description: 07EQB SITE 7 EQUIP. BLK 1530 GRAB
Laboratory Sample Number: 16590006 Date Collected: 08/15/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Alkalinity as CaCO3	EPA310.1	1	2	mg/L	08/21/90
Chloride	EPA325.3	1	<1	mg/L	08/20/90
Sulfate	EPA375.4	1.0	<1.0	mg/L	08/16/90
Total Organic Carbon	EPA415.2	1.0	54.0	mg/L	08/30/90
Total Organic Halogen as CL-	SW9020	0.01	0.01	mg/L	08/24/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07FB

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590007

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006583

Level: (low/med) LOW Date Received: 08/16/90

% Moisture: not dec. ____ Date Analyzed: 08/24/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	11	B
67-64-1	Acetone	9	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	110	
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	13	
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	2	J
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07FB

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590007

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004323

Level: (low/med) LOW Date Received: 08/16/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/27/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

07FB

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16590 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16590007

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004323

Level: (low/med) LOW Date Received: 08/16/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/27/90

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	NAVY-LANTDIV	Laboratory:	GAINESVILLE	Date Sampled:	8/15/90
Project:	OCEANA-LANTDIV	Lab Sample Id:	83611E	Date Received:	8/17/90
Proj No:	WDC20368.HO.07	% Moisture	0.00	Date Extracted:	8/20/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/21/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/22/90

Client Sample ID/Description: 07FB (LM #16590-7)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		133	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

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REPORT OF ANALYTICAL RESULTS

Date: 09/13/90
Page: 7 of 8

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16590
Date Received: 08/16/90

Sample Description: 07FB FIELD BLK 1735 GRAB
Laboratory Sample Number: 16590007 Date Collected: 08/15/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/20/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/21/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	133	%rec	08/21/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/21/90
Lab Sample ID:	16590007	Sample Matrix:	WATER	Date Analyzed:	09/06/90
Client Sample ID:	07FB	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
319-84-6	alpha-BHC	0.01	U		
319-85-7	beta-BHC	0.02	U		
319-86-8	delta-BHC	0.01	U		
58-89-9	gamma-BHC (Lindane)	0.01	U		
76-44-8	Heptachlor	0.01	U		
309-00-2	Aldrin	0.01	U		
1024-57-3	Heptachlor Epoxide	0.01	U		
959-98-8	Endosulfan I	0.02	U		
60-57-1	Dieldrin	0.02	U		
72-55-9	4,4'-DDE	0.02	U		
72-20-8	Endrin	0.02	U		
33213-65-9	Endosulfan II	0.02	U		
72-54-8	4,4'-DDD	0.02	U		
1031-07-8	Endosulfan Sulfate	0.02	U		
50-29-3	4,4'-DDT	0.02	U		
72-43-5	Methoxychlor	0.04	U		
7421-93-4	Endrin Aldehyde	0.02	U		
789-03-6	Chlordane	0.1	U		
1-35-2	Toxaphene	0.5	U		
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	Dibutylchlorendate - SS	85			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

JMS

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

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REPORT OF ANALYTICAL RESULTS

Date: 09/14/90
Page: 7 of 12

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16590
Date Received: 08/16/90

Atten: MR. FRANK LEWIS

Sample Description: 07FB FIELD BLK 1735 GRAB
Laboratory Sample Number: 16590007 Date Collected: 08/15/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Alkalinity as CaCO3	EPA310.1	1	36	mg/L	08/21/90
Chloride	EPA325.3	1	17	mg/L	08/20/90
Sulfate	EPA375.4	1.0	34.4	mg/L	08/16/90
Total Organic Carbon	EPA415.2	1.0	33.9	mg/L	08/30/90
Total Organic Halogen as CL-	SW9020	0.01	0.38	mg/L	08/24/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

07-FB 8/15

ab Name: CH2M_HILL_MGM Contract:16590

Lab Code: NA Case No.: 16590 SAS No.: 16590 SDG No.: 16590

atrix (soil/water): WATER Lab Sample ID: 16590007

Level (low/med): LOW Date Received: 08/16/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	120	B		P
7440-36-0	Antimony	54.2	U		P
7440-38-2	Arsenic	2.1	U		F
7440-39-3	Barium	35.6	B		P
7440-41-7	Beryllium	0.36	U		P
7440-43-9	Cadmium	3.7	U		P
7440-70-2	Calcium	24100			P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	5.4	U		P
7440-50-8	Copper	21.4	B		P
7439-89-6	Iron	81.3	B		P
7439-92-1	Lead	1.3	U		F
7439-95-4	Magnesium	2750	B		P
7439-96-5	Manganese	4.5	B		P
7439-97-6	Mercury	0.080	B		CV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	2420	B		P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	6.2	U		P
7440-23-5	Sodium	9840			P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	2.9	U		P
7440-66-6	Zinc	585			P
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

07-EQB

Lab Name: CH2M_HILL_MGM Contract: 16590

Lab Code: NA Case No.: 16590 SAS No.: 16590 SDG No.: 16590

Matrix (soil/water): WATER Lab Sample ID: 16590006

Level (low/med): LOW Date Received: 08/16/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	49.6	B		P
7440-36-0	Antimony	54.2	U		P
7440-38-2	Arsenic	2.1	U		F
7440-39-3	Barium	3.5	B		P
7440-41-7	Beryllium	0.36	U		P
7440-43-9	Cadmium	3.7	U		P
7440-70-2	Calcium	399	B		P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	5.4	U		P
7440-50-8	Copper	2.7	U		P
7439-89-6	Iron	38.0	B		P
7439-92-1	Lead	1.3	U		F
7439-95-4	Magnesium	40.2	B		P
7439-96-5	Manganese	1.6	U		P
7439-97-6	Mercury	0.080	B		CV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	230	U		P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	6.2	U		P
7440-23-5	Sodium	1030	B		P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	2.9	U		P
7440-66-6	Zinc	43.4			P
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

James R. Reed & Associates, Inc.
Environmental Testing & Consulting
813 forrest drive • newport news, virginia 23606 • (804) 599-6750 • FAX# (804) 591-7680

August 23, 1990

AUG
CH2M HILL
MAR/WDC

CH2M Hill
Attn: Frank Lewis
625 Herndon Parkway
Herndon, Virginia 22070

SAMPLE IDENTIFICATION	COLLECTION DATE/TIME	SPIKE RECOVERY	HEXAVALENT CHROMIUM RESULTS (mg/L)
Sample Receipt Date: 8-7-90 @ 10:20			
RE: LANTDIV/NAS OCEANA Site 8			
08-MWI 90-5503	8-6-90 @ 17:30	98%	<0.003
08-MW2 90-5504	8-6-90 @ 14:30	98%	<0.003
08-MW3 90-5505	8-6-90 @ 16:20	98%	<0.003
Sample Receipt Date: 8-15-90 @ 10:55			
RE: OCEANA Site 7			
07-MW40 90-5873	8-14-90 @ 12:40	106%	<0.003
07-MW45 90-5874	8-14-90 @ 17:40	106%	<0.003
07-SW1 90-5875	8-15-90 @ 09:30	106%	<0.003

ALL TESTS ARE DONE IN ACCORDANCE WITH A.P.H.A., A.O.A.C., A.S.T.M. and EPA approved Methods.

James R. Reed & Associates, Inc.
Environmental Testing & Consulting
813 forrest drive • newport news, virginia 23606 • (804) 599-6750 • FAX# (804) 591-7680

SAMPLE IDENTIFICATION	COLLECTION DATE/TIME	SPIKE RECOVERY	HEXAVALENT CHROMIUM RESULTS (mg/L)
Sample Receipt Date: 8-16-90 @ 11:25			
RE: OCEANA Site 7			
07-MW2 90-5899	8-15-90 @ 14:40	98%	0.016
07-MW2 90-5900	8-15-90 @ 14:45	98%	0.020
07-EQB 90-5901	8-15-90 @ 16:00	98%	0.008
07-SW2 90-5902	8-15-90 @ 15:40	98%	0.007
07-MW5 90-5903	8-15-90 @ 17:00	98%	0.007
07-FB 90-5904	8-15-90 @ 17:35	98%	0.012
07-MW3D 90-5905	8-16-90 @ 09:00	98%	0.023

Respectfully submitted,

ALL TESTS ARE DONE IN ACCORDANCE WITH A.P.H.A., A.O.A.C., A.S.T.M. and EPA approved Methods.

James R. Reed & Associates, Inc.
Environmental Testing & Consulting
813 forrest drive • newport news, virginia 23606 • (804) 599-6750 • FAX# (804) 591-7680

November 26, 1990

CH2M Hill
Attn: Frank Lewis
625 Herndon Parkway
Herndon, Virginia 22070

Samples Received: 11/06/90 @ 12:20
Samples Collected: See below

SAMPLE IDENTIFICATION	JRA #	HEXAVALENT CHROMIUM RESULTS (mg/L)
RE: LANTDIV - Oceana Fentress		
11/05/90 @ 18:00 14-MW 7D - Deep Well 7	90-8093	<0.003
11/05/90 @ 18:10 14-MW 7D - Duplicate	90-8094	<0.003
11/06/90 @ 11:05 14 SW1 Site 14 First SW	90-8095	<0 .003
11/06/90 @ 10:30 14 SW2 Site 14 - Second SW	90-8096	<0.003
RE: LANTDIV - Oceana Fentress		
11/06/90 @ 14:40 Shallow Well 7 14-MW7S	90-8162	<0.003
11/06/90 @ 15:25 FENT - Field Blank	90-8163	<0.003
11/07/90 @ 07:45 Well 3 - Fentress Landfill	90-8164	<0.003
11/07/90 @ 09:30 Well 4 - Fentress Landfill	90-8165	<0.003

ALL TESTS ARE DONE IN ACCORDANCE WITH A.P.H.A., A.O.A.C., A.S.T.M. and EPA approved Methods.

James R. Reed & Associates, Inc.
Environmental Testing & Consulting
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RE: LANTDIV - Navy - Fentress Landfill
Grab Samples

SAMPLE IDENTIFICATION	JRA #	HEXAVALENT CHROMIUM RESULTS (mg/L)
11/07/90 @ 14:20 Well 5 14-MW5	90-8227	<0.003
11/07/90 @ 16:10 Shallow Well 2 14-MW2S	90-8228	<0.003
11/07/90 @ 17:40 Well 1 14-MW1	90-8229	<0.003
11/08/90 @ 08:10 Shallow Well 6 19-MW6S	90-8230	<0.003
11/08/90 @ 10:20 Deep Well 6 14-MW6D	90-8231	<0.003
11/08/90 @ 12:15 Deep Well 2 14-MW2D	90-8232	<0.003

ALL TESTS ARE DONE IN ACCORDANCE WITH A.P.H.A., A.O.A.C., A.S.T.M. and EPA approved Methods.

James R. Reed & Associates, Inc.
Environmental Testing & Consulting
813 forrest drive • newport news, virginia 23606 • (804) 599-6750 • FAX# (804) 591-7680

RE: LANTDIV - Oceana Fentress

SAMPLE IDENTIFICATION	JRA #	HEXAVALENT CHROMIUM RESULTS (mg/L)
11/08/90 @ 17:30 5th Green 07-MW3S	90-8265	<0.003
11/09/90 @ 10:45 Fifth Green Landfill Oceana Well 1 07-MW1	90-8266	<0.003

Respectfully submitted,

Carol Isenhour
Vice President

JRA:jsc

ALL TESTS ARE DONE IN ACCORDANCE WITH A.P.H.A., A.O.A.C., A.S.T.M. and EPA approved Methods.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

08-MW1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517006

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2V0006511

Level: (low/med) LOW Date Received: 08/07/90

% Moisture: not dec. ____ Date Analyzed: 08/20/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	6	B
67-64-1	Acetone	7	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HL

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: 08-MW1

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517006

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004202

Level: (low/med) LOW Date Received: 08/07/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/15/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

08-MW1

Name: CH2M HILL/MGM Contract: _____

ab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517006

ample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004202

Level: (low/med) LOW Date Received: 08/07/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/15/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	BJ
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2 1/87 Rev.

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/07/90
Lab Sample ID:	16517008	Sample Matrix:	WATER	Date Analyzed:	09/05/90
Client Sample ID:	08-MW1	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
319-84-6	alpha-BHC	0.01	U		
319-85-7	beta-BHC	0.02	U		
319-86-8	delta-BHC	0.01	U		
58-89-9	gamma-BHC (Lindane)	0.01	U		
76-44-8	Heptachlor	0.01	U		
309-00-2	Aldrin	0.01	U		
1024-57-3	Heptachlor Epoxide	0.01	U		
959-98-8	Endosulfan I	0.02	U		
60-57-1	Dieldrin	0.02	U		
72-55-9	4,4'-DDE	0.02	U		
72-20-8	Endrin	0.02	U		
33213-65-9	Endosulfan II	0.02	U		
72-54-8	4,4'-DDD	0.02	U		
1031-07-8	Endosulfan Sulfate	0.02	U		
50-29-3	4,4'-DDT	0.02	U		
72-43-5	Methoxychlor	0.04	U		
7421-93-4	Endrin Aldehyde	0.02	U		
89-03-6	Chlordane	0.1	U		
1-35-2	Toxaphene	0.5	U		
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	Dibutylchlorendate - SS	97			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 08-MW1 GROUND WATER 1730 GRAB
Laboratory Sample Number: 16517006 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/13/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	95	%rec	08/13/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HK

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/6/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83260E	Date Received:	8/8/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/13/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 08-MW1 (LM #16517-6)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		95	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 08-MW1 GROUND WATER 1730 GRAB
Laboratory Sample Number: 16517006 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Silver	EPA200.7/SW6010	10	<10	ug/L	08/29/90
Aluminum	EPA200.7/SW6010	200	<200	ug/L	08/29/90
Alkalinity as CaCO3	EPA310.1	1	<1	mg/L	08/14/90
Arsenic	EPA206.2/SW7060	10	<10	ug/L	08/14/90
Barium	EPA200.7/SW6010	200	<200	ug/L	08/29/90
Beryllium	EPA200.7/SW6010	5	<5	ug/L	08/29/90
Calcium	EPA200.7/SW6010	5.0	16.3	mg/L	08/29/90
Cadmium	EPA200.7/SW6010	5	<5	ug/L	08/29/90
Chloride	EPA325.3	1	18	mg/L	08/09/90
Cobalt	EPA200.7/SW6010	50	<50	ug/L	08/29/90
Chromium	EPA200.7/SW6010	10	<10	ug/L	08/29/90
Copper	EPA200.7/SW6010	25	<25	ug/L	08/29/90
Iron	EPA200.7/SW6010	100	<100	ug/L	08/29/90
Mercury	EPA245.1/SW7470	0.2	<0.2	ug/L	08/14/90
Potassium	EPA200.7/SW6010	5.0	<5.0	mg/L	08/29/90
Magnesium	EPA200.7/SW6010	5.0	<5.0	mg/L	08/29/90
Manganese	EPA200.7/SW6010	15	27	ug/L	08/29/90
Sodium	EPA200.7/SW6010	5.0	5.5	mg/L	08/29/90
Nickel	EPA200.7/SW6010	40	<40	ug/L	08/29/90
Lead	EPA239.2/SW7421	3	<3	ug/L	08/14/90
Antimony	EPA200.7/SW6010	60	<60	ug/L	08/29/90
Selenium	EPA270.2/SW7740	5	<5	ug/L	08/15/90
Sulfate	EPA375.4	1.0	19.6	mg/L	08/16/90
Thallium	EPA279.2/SW7841	10	<10	ug/L	08/13/90
Total Organic Carbon	EPA415.2	1.0	8.3	mg/L	08/27/90
Total Organic Halogen as CL-	SW9020	0.01	<0.01	mg/L	08/16/90
Vanadium	EPA200.7/SW6010	50	<50	ug/L	08/29/90
Zinc	EPA200.7/SW6010	20	59	ug/L	08/29/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.
COMMENT: ND = NOT DETERMINABLE.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

08-MW1

Lab Name: CH2M_HILL_MGM Contract: 16517

Lab Code: NA Case No.: 16517 SAS No.: 16517 SDG No.: 16517

Matrix (soil/water): WATER Lab Sample ID: 16517006

Level (low/med): LOW Date Received: 08/07/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	66.2	B		P
7440-36-0	Antimony	54.2	U		P
7440-38-2	Arsenic	2.1	U		F
7440-39-3	Barium	44.1	B		P
7440-41-7	Beryllium	0.36	U		P
7440-43-9	Cadmium	3.7	U		P
7440-70-2	Calcium	16300			P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	5.4	U		P
7440-50-8	Copper	6.1	B		P
7439-89-6	Iron	50.5	B		P
7439-92-1	Lead	1.2	U		F
7439-95-4	Magnesium	3300	B		P
7439-96-5	Manganese	27.5			P
7439-97-6	Mercury	0.15	U		CV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	4890	B		P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	6.2	U		P
7440-23-5	Sodium	5470			P
7440-28-0	Thallium	1.1	B		F
7440-62-2	Vanadium	2.9	U		P
7440-66-6	Zinc	59.1			P
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

08-MW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517007

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006467

Level: (low/med) LOW Date Received: 08/07/90

% Moisture: not dec. ____ Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	7	B
67-64-1	Acetone	18	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

08-MW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517007

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004203

Level: (low/med) LOW Date Received: 08/07/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/15/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

HC

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

08-MW2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517007

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004203

Level: (low/med) LOW Date Received: 08/07/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/15/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	9	BJ
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2 1/87 Rev.

Engineers
Planners
CH2M HILL Economists
Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/07/90
Lab Sample ID:	16517007	Sample Matrix:	WATER	Date Analyzed:	09/05/90
Client Sample ID:	08-MW2	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
319-84-6	alpha-BHC	0.01	U		
319-85-7	beta-BHC	0.02	U		
319-86-8	delta-BHC	0.01	U		
58-89-9	gamma-BHC (Lindane)	0.01	U		
76-44-8	Heptachlor	0.01	U		
309-00-2	Aldrin	0.01	U		
1024-57-3	Heptachlor Epoxide	0.01	U		
959-98-8	Endosulfan I	0.02	U		
60-57-1	Dieldrin	0.02	U		
72-55-9	4,4'-DDE	0.02	U		
72-20-8	Endrin	0.02	U		
33213-65-9	Endosulfan II	0.02	U		
72-54-8	4,4'-DDD	0.02	U		
1031-07-8	Endosulfan Sulfate	0.02	U		
50-29-3	4,4'-DDT	0.02	U		
72-43-5	Methoxychlor	0.04	U		
7421-93-4	Endrin Aldehyde	0.02	U		
39-03-6	Chlordane	0.1	U		
8001-35-2	Toxaphene	0.5	U		
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	Dibutylchlorendate - SS	96			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

JKS

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 08-MW2 GROUND WATER 1430 GRAB
Laboratory Sample Number: 16517007 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/13/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	106	%rec	08/13/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/6/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83261E	Date Received:	8/8/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/13/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 08-MW2 (LM #16517-7)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		106	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/14/90
Page: 6 of 13

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 08-MW2 GROUND WATER 1430 GRAB
Laboratory Sample Number: 16517007 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Silver	EPA200.7/SW6010	10	<10	ug/L	08/29/90
Aluminum	EPA200.7/SW6010	200	810	ug/L	08/29/90
Alkalinity as CaCO3	EPA310.1	1	2	mg/L	08/14/90
Arsenic	EPA206.2/SW7060	10	<10	ug/L	08/14/90
Barium	EPA200.7/SW6010	200	<200	ug/L	08/29/90
Beryllium	EPA200.7/SW6010	5	<5	ug/L	08/29/90
Calcium	EPA200.7/SW6010	5.0	9.1	mg/L	08/29/90
Cadmium	EPA200.7/SW6010	5	<5	ug/L	08/29/90
Chloride	EPA325.3	1	11	mg/L	08/09/90
Cobalt	EPA200.7/SW6010	50	<50	ug/L	08/29/90
Chromium	EPA200.7/SW6010	10	<10	ug/L	08/29/90
Copper	EPA200.7/SW6010	25	<25	ug/L	08/29/90
Iron	EPA200.7/SW6010	100	<100	ug/L	08/29/90
Mercury	EPA245.1/SW7470	0.2	<0.2	ug/L	08/14/90
Potassium	EPA200.7/SW6010	5.0	6.5	mg/L	08/29/90
Magnesium	EPA200.7/SW6010	5.0	<5.0	mg/L	08/29/90
Manganese	EPA200.7/SW6010	15	45	ug/L	08/29/90
Sodium	EPA200.7/SW6010	5.0	<5.0	mg/L	08/29/90
Nickel	EPA200.7/SW6010	40	<40	ug/L	08/29/90
Lead	EPA239.2/SW7421	3	4	ug/L	08/14/90
Antimony	EPA200.7/SW6010	60	<60	ug/L	08/29/90
Selenium	EPA270.2/SW7740	5	<5	ug/L	08/15/90
Sulfate	EPA375.4	1.0	18.9	mg/L	08/16/90
Thallium	EPA279.2/SW7841	10	<10	ug/L	08/13/90
Total Organic Carbon	EPA415.2	1.0	22.3	mg/L	08/27/90
Total Organic Halogen as CL-	SW9020	.01	.02	mg/L	08/16/90
Vanadium	EPA200.7/SW6010	50	<50	ug/L	08/29/90
Zinc	EPA200.7/SW6010	20	82	ug/L	08/29/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.
COMMENT: ND = NOT DETERMINABLE.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

08-MW2

Lab Name: CH2M_HILL_MGM Contract: 16517

Lab Code: NA Case No.: 16517 SAS No.: 16517 SDG No.: 16517

Matrix (soil/water): WATER Lab Sample ID: 16517007

Level (low/med): LOW Date Received: 08/07/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	815			P
7440-36-0	Antimony	54.2	U		P
7440-38-2	Arsenic	2.1	U		F
7440-39-3	Barium	73.3	B		P
7440-41-7	Beryllium	0.36	U		P
7440-43-9	Cadmium	3.7	U		P
7440-70-2	Calcium	9130			P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	5.4	U		P
7440-50-8	Copper	8.3	B		P
7439-89-6	Iron	71.1	B		P
7439-92-1	Lead	3.9			F
7439-95-4	Magnesium	2310	B		P
7439-96-5	Manganese	44.6			P
7439-97-6	Mercury	0.15	U		CV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	6530			P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	6.2	U		P
7440-23-5	Sodium	3810	B		P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	2.9	U		P
7440-66-6	Zinc	81.7			P
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

08-MW3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517008

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B1VO006468

Level: (low/med) LOW Date Received: 08/07/90

% Moisture: not dec. ____ Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	10	B
67-64-1	Acetone	22	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

08-MW3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517008

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004204

Level: (low/med) LOW Date Received: 08/07/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/15/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

HL

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

08-MW3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16517 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16517008

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004204

Level: (low/med) LOW Date Received: 08/07/90

Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/15/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	B
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2 1/87 Rev.

CH2M HILL Engineers Planners Economists Scientists

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	08/07/90
Lab Sample ID:	16517006	Sample Matrix:	WATER	Date Analyzed:	09/05/90
Client Sample ID:	08-MW3	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number	ug/L
319-84-6	alpha-BHC	0.01	U		
319-85-7	beta-BHC	0.02	U		
319-86-8	delta-BHC	0.01	U		
58-89-9	gamma-BHC (Lindane)	0.01	U		
76-44-8	Heptachlor	0.01	U		
309-00-2	Aldrin	0.01	U		
1024-57-3	Heptachlor Epoxide	0.01	U		
959-98-8	Endosulfan I	0.02	U		
60-57-1	Dieldrin	0.02	U		
72-55-9	4,4'-DDE	0.02	U		
72-20-8	Endrin	0.02	U		
33213-65-9	Endosulfan II	0.02	U		
72-54-8	4,4'-DDD	0.02	U		
1031-07-8	Endosulfan Sulfate	0.02	U		
50-29-3	4,4'-DDT	0.02	U		
72-43-5	Methoxychlor	0.04	U		
7421-93-4	Endrin Aldehyde	0.02	U		
[illegible]99-03-6	Chlordane	0.1	U		
[illegible]-35-2	Toxaphene	0.5	U		
12674-11-2	Aroclor-1016	0.8	U		
11104-28-2	Aroclor-1221	2	U		
11141-16-5	Aroclor-1232	2	U		
53469-21-9	Aroclor-1242	0.8	U		
12672-29-6	Aroclor-1248	0.4	U		
11097-69-1	Aroclor-1254	0.2	U		
11096-82-5	Aroclor-1260	0.2	U		
	Dibutylchlorendate - SS	17			

U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/13/90
Page: 8 of 10

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 08-MW3 GROUND WATER 1620 GRAB
Laboratory Sample Number: 16517008 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Date Extracted	EPA504.1	----	08/10/90	----	----
1,2-Dibromoethane (EDB)	EPA504.1	0.02	<0.02	ug/L	08/13/90
1,1,2,2-Tetrachloroethane - SS	EPA504.1	----	115	%rec	08/13/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.

Reviewed by: HL

INRPRPT(v900202)

000172

CH2M HILL

Report of Analytical Data - EDB and DBCP

Client:	LANTDIV-NAVY	Laboratory:	GAINESVILLE	Date Sampled:	8/6/90
Project:	LANTDIV-OCEANA	Lab Sample Id:	83251E	Date Received:	8/8/90
Proj No:	WDC 20368.HO.07	% Moisture	0.00	Date Extracted:	8/10/90
Method:	504	Dilution Factor:	1.00	Date Analyzed:	8/13/90
Matrix:	WATER	Instrument ID:	GC#3	Analyst:	JEH
Sampler:	STEVEN R. BROWN	Column:	J & W DB-624	Date Reported:	8/16/90

Client Sample ID/Description: 08-MW3 (LM #16517-8)

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L
96-12-8	1,2-Dibromo-3-chloropropane	0.02	U	ug/L
79-34-5	1,1,2,2-Tetrachloroethane-SS		115	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/11/90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/14/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16517
Date Received: 08/07/90

Atten: MR. FRANK LEWIS

Sample Description: 08-MW3 GROUND WATER 1620 GRAB
Laboratory Sample Number: 16517008 Date Collected: 08/06/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Silver	EPA200.7/SW6010	10	<10	ug/L	08/29/90
Aluminum	EPA200.7/SW6010	200	<200	ug/L	08/29/90
Alkalinity as CaCO3	EPA310.1	1	42	mg/L	08/14/90
Arsenic	EPA206.2/SW7060	10	<10	ug/L	08/14/90
Barium	EPA200.7/SW6010	200	<200	ug/L	08/29/90
Beryllium	EPA200.7/SW6010	5	<5	ug/L	08/29/90
Calcium	EPA200.7/SW6010	5.0	28.4	mg/L	08/29/90
Cadmium	EPA200.7/SW6010	5	<5	ug/L	08/29/90
Chloride	EPA325.3	1	28	mg/L	08/09/90
Cobalt	EPA200.7/SW6010	50	<50	ug/L	08/29/90
Chromium	EPA200.7/SW6010	10	<10	ug/L	08/29/90
Copper	EPA200.7/SW6010	25	<25	ug/L	08/29/90
Iron	EPA200.7/SW6010	100	270	ug/L	08/29/90
Mercury	EPA245.1/SW7470	0.2	<0.2	ug/L	08/14/90
Potassium	EPA200.7/SW6010	5.0	9.2	mg/L	08/29/90
Magnesium	EPA200.7/SW6010	5.0	7.6	mg/L	08/29/90
Manganese	EPA200.7/SW6010	15	140	ug/L	08/29/90
Sodium	EPA200.7/SW6010	5.0	7.3	mg/L	08/29/90
Nickel	EPA200.7/SW6010	40	<40	ug/L	08/29/90
Lead	EPA239.2/SW7421	3	<3	ug/L	08/14/90
Antimony	EPA200.7/SW6010	60	<60	ug/L	08/29/90
Selenium	EPA270.2/SW7740	5	<5	ug/L	08/15/90
Sulfate	EPA375.4	1.0	25.1	mg/L	08/16/90
Thallium	EPA279.2/SW7841	10	<10	ug/L	08/13/90
Total Organic Carbon	EPA415.2	1.0	49.7	mg/L	08/28/90
Total Organic Halogen as CL-	SW9020	.01	.02	mg/L	08/16/90
Vanadium	EPA200.7/SW6010	50	<50	ug/L	08/29/90
Zinc	EPA200.7/SW6010	20	83	ug/L	08/29/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

COMMENT: NR = NOT REPORTED.
COMMENT: ND = NOT DETERMINABLE.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

08-MW3

Lab Name: CH2M_HILL_MGM Contract: 16517

Lab Code: NA Case No.: 16517 SAS No.: 16517 SDG No.: 16517

Matrix (soil/water): WATER Lab Sample ID: 16517008

Level (low/med): LOW Date Received: 08/07/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	41.2	B		P
7440-36-0	Antimony	54.2	U		P
7440-38-2	Arsenic	2.1	U		F
7440-39-3	Barium	78.1	B		P
7440-41-7	Beryllium	0.36	U		P
7440-43-9	Cadmium	3.7	U		P
7440-70-2	Calcium	28400			P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	5.4	U		P
7440-50-8	Copper	4.8	B		P
7439-89-6	Iron	274			P
7439-92-1	Lead	1.2	U		F
7439-95-4	Magnesium	7590			P
7439-96-5	Manganese	138			P
7439-97-6	Mercury	0.15	U		CV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	9150			P
7782-49-2	Selenium	1.0	U		F
7440-22-4	Silver	6.2	U		P
7440-23-5	Sodium	7320			P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	2.9	U		P
7440-66-6	Zinc	82.6			P
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

COMPUCHEM LABORATORIES, INC.

TOTAL ORGANIC HALIDE SUMMARY REPORT

TOTAL ORGANIC HALIDE

ITEM NO.	SAMPLE IDENTIFIER	COMPUCHEM NUMBER	CONCENTRATION (mg/L)	DETECTION LIMIT (mg/L)
1.	16517006	363750	BDL	.01
2.	16517007	363751	.02	.01
3.	16517008	363752	.02	.01

BDL = BELOW DETECTION LIMITS

Reviewed by/ID#: Pat C. / 1599 Date: 8-17-90

Reviewed by/ID#: G. Griffith, Ph.D. / 1741 Date: 8-17-90

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYSIS

Florida Certification: 82112; E82124

AAD197
08/30/90

Sample Nos: 83251 - 83254

LANTDIV-Navy	C H 2 M H i l l
Attention: Emily Ramuchak Address: LRD	Project No: WDC20368.H0.07 Received: 08/08/90 Reported: 08/30/90
Collected: 08/06/90 by Steven Brown Type: water, grab	

SAMPLE NUMBER	83251	83252	83253	83254
SAMPLE DESCRIPTIONS	LM16517-008 08-MW3 08/06/90 16:20	LM16517-006 08-MW1 08/06/90 17:30	LM16517-007 08-MW2 08/06/90 14:30	Laboratory Method Blank
GENERAL ORGANICS				
TOC - Liquid	49.7 08/28/90	8.3 08/27/90	22.3 08/27/90	<1.0 08/27/90

NOTE: Values are mg/l as substance unless otherwise stated.
Alabama laboratory certification #40080.

Respectfully submitted,

Thomas C. Emenhiser

Thomas C. Emenhiser, Laboratory Manager

n/r = not requested
NOTE: This report contains test data and no interpretation is intended or implied.

000096

CH2M HILL Gainesville Environmental Laboratory 7201 N.W. 11th Place, Gainesville, Florida 32605 904.331.2442 FAX 904.331.5320

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-MW1

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526003

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2V0006482

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJ
67-64-1	Acetone	5	BJ
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone (MEK)	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylenes (Total)	5	U

HK

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-MW1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526003

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004207

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/15/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenyl ether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
122-66-7	1,2-Diphenylhydrazine	10	U
101-55-3	4-Bromophenyl-phenyl ether	10	U
118-74-1	Hexachlorobenzene	10	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
92-87-5	Benzidine	50	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	20	B
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-MW1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 16526003

Sample wt/vol: 1000 (g/mL) ML Lab File ID: D1BA004207

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 08/15/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
111-44-4	bis(2-Chloroethyl) ether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
108-60-1	bis(2-Chloroisopropyl) ether	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

Engineers
Planners
CH2M HILL Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Sample Description: 11-MW1 GROUND H2O 1135 GRAB
Laboratory Sample Number: 16526003 Date Collected: 08/07/90 Matrix: WATER

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Total Petroleum Hydrocarbons	EPA418.1	0.06	0.12	mg/L	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11-MW1

Lab Name: CH2M_HILL_MGM Contract: 16526

Lab Code: NA Case No.: 16526 SAS No.: 16526 SDG No.: 16526

Matrix (soil/water): WATER Lab Sample ID: 16526003

Level (low/med): LOW Date Received: 08/08/90

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	1.2	U		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526014

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO010882

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 20 Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene chloride	57	B
67-64-1	Acetone	27	B
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (Total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone (MEK)	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	12	U
108-10-1	4-Methyl-2-pentanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylenes (Total)	6	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS1_DUP

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526015

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D2BN004281

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 20 dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/23/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
111-44-4	bis(2-Chloroethyl) ether	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
100-51-6	Benzyl alcohol	410	U
95-50-1	1,2-Dichlorobenzene	410	U
108-60-1	bis(2-Chloroisopropyl) ether	410	U
621-64-7	N-Nitroso-di-n-propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
111-91-1	bis(2-Chloroethoxy)methane	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
91-20-3	Naphthalene	410	U
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
91-57-6	2-Methylnaphthalene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	2000	U
131-11-3	Dimethylphthalate	410	U
208-96-8	Acenaphthylene	410	U
606-20-2	2,6-Dinitrotoluene	410	U

HK

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS1_DUP

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526015

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D2BN004281

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 20 dec. ____ Date Extracted: 08/17/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/23/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2000	U
83-32-9	Acenaphthene	410	U
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	410	U
7005-72-3	4-Chlorophenyl-phenyl ether	410	U
86-73-7	Fluorene	410	U
100-01-6	4-Nitroaniline	2000	U
86-30-6	N-Nitrosodiphenylamine (1)	410	U
122-66-7	1,2-Diphenylhydrazine	410	U
101-55-3	4-Bromophenyl-phenyl ether	410	U
118-74-1	Hexachlorobenzene	410	U
85-01-8	Phenanthrene	410	U
120-12-7	Anthracene	410	U
84-74-2	Di-n-butylphthalate	410	U
206-44-0	Fluoranthene	410	U
92-87-5	Benzidine	2000	U
129-00-0	Pyrene	410	U
85-68-7	Butylbenzylphthalate	410	U
91-94-1	3,3'-Dichlorobenzidine	820	U
56-55-3	Benzo(a)anthracene	410	U
218-01-9	Chrysene	410	U
117-81-7	bis(2-Ethylhexyl)phthalate	310	J
117-84-0	Di-n-octylphthalate	410	U
205-99-2	Benzo(b)fluoranthene	410	U
207-08-9	Benzo(k)fluoranthene	410	U
50-32-8	Benzo(a)pyrene	410	U
193-39-5	Indeno(1,2,3-cd)pyrene	410	U
53-70-3	Dibenz(a,h)anthracene	410	U
191-24-2	Benzo(g,h,i)perylene	410	U

(1) - Cannot be separated from Diphenylamine

HK

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526014

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D1BN004211

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 20 dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/16/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2000	U
83-32-9	Acenaphthene	410	U
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	410	U
7005-72-3	4-Chlorophenyl-phenyl ether	410	U
86-73-7	Fluorene	410	U
100-01-6	4-Nitroaniline	2000	U
86-30-6	N-Nitrosodiphenylamine (1)	410	U
122-66-7	1,2-Diphenylhydrazine	410	U
101-55-3	4-Bromophenyl-phenyl ether	410	U
118-74-1	Hexachlorobenzene	410	U
85-01-8	Phenanthrene	410	U
120-12-7	Anthracene	410	U
84-74-2	Di-n-butylphthalate	410	U
206-44-0	Fluoranthene	410	U
92-87-5	Benzidine	2000	U
129-00-0	Pyrene	410	U
85-68-7	Butylbenzylphthalate	410	U
91-94-1	3,3'-Dichlorobenzidine	820	U
56-55-3	Benzo(a)anthracene	410	U
218-01-9	Chrysene	410	U
117-81-7	bis(2-Ethylhexyl)phthalate	640	
117-84-0	Di-n-octylphthalate	410	U
205-99-2	Benzo(b)fluoranthene	410	U
207-08-9	Benzo(k)fluoranthene	410	U
50-32-8	Benzo(a)pyrene	410	U
193-39-5	Indeno(1,2,3-cd)pyrene	410	U
53-70-3	Dibenz(a,h)anthracene	410	U
191-24-2	Benzo(g,h,i)perylene	410	U

(1) - Cannot be separated from Diphenylamine

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS1

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526014

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D1BN004211

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 20 dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/16/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
111-44-4	bis(2-Chloroethyl) ether	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
100-51-6	Benzyl alcohol	410	U
95-50-1	1,2-Dichlorobenzene	410	U
108-60-1	bis(2-Chloroisopropyl) ether	410	U
621-64-7	N-Nitroso-di-n-propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
111-91-1	bis(2-Chloroethoxy)methane	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
91-20-3	Naphthalene	410	U
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
91-57-6	2-Methylnaphthalene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	2000	U
131-11-3	Dimethylphthalate	410	U
208-96-8	Acenaphthylene	410	U
606-20-2	2,6-Dinitrotoluene	410	U

HK

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS1_DUP

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526015

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO010883

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 22 Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene chloride	45	B
67-64-1	Acetone	17	B
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (Total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone (MEK)	13	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	13	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	13	U
108-10-1	4-Methyl-2-pentanone	13	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylenes (Total)	6	U

HK

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 11-SS1 SOIL 1315 SOIL
Laboratory Sample Number: 16526014 Date Collected: 08/07/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Ignitability	SW846(1C):7.1	----	NON-IGNITABLE	----	09/04/90
Total Petroleum Hydrocarbons	EPA418.1	2.1	9.3	mg/Kg	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 11-SS1 DUP SOIL DUPLICATE 1320 SOIL
Laboratory Sample Number: 16526015 Date Collected: 08/07/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Ignitability	SW846(1C):7.1	----	NON-IGNITABLE	----	09/04/90
Total Petroleum Hydrocarbons	EPA418.1	2.1	6.3	mg/Kg	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

000039

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11SS1

Lab Name: CH2M_HILL_MGM Contract: 16526

Lab Code: NA Case No.: 16526 SAS No.: 16526 SDG No.: 16526

Matrix (soil/water): SOIL Lab Sample ID: 16526014

Level (low/med): LOW Date Received: 08/08/90

% Solids: 79.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	9.0		N	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GRAY Clarity Before: N/A Texture: CLAY

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SS1 DUP

Lab Name: CH2M_HILL_MGM Contract: 16526

Lab Code: NA Case No.: 16526 SAS No.: 16526 SDG No.: 16526

Matrix (soil/water): SOIL Lab Sample ID: 16526015

Level (low/med): LOW Date Received: 08/08/90

% Solids: 81.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	9.6		N	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GRAY Clarity Before: N/A Texture: CLAY

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526016

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO010886

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 19 Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene chloride	76	B
67-64-1	Acetone	60	B
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (Total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone (MEK)	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	12	U
108-10-1	4-Methyl-2-pentanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylenes (Total)	6	U

HK

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526016

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D1BN004212

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 19 dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/16/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2000	U
83-32-9	Acenaphthene	410	U
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	410	U
7005-72-3	4-Chlorophenyl-phenyl ether	410	U
86-73-7	Fluorene	410	U
100-01-6	4-Nitroaniline	2000	U
86-30-6	N-Nitrosodiphenylamine (1)	410	U
122-66-7	1,2-Diphenylhydrazine	410	U
101-55-3	4-Bromophenyl-phenyl ether	410	U
118-74-1	Hexachlorobenzene	410	U
85-01-8	Phenanthrene	410	U
120-12-7	Anthracene	410	U
84-74-2	Di-n-butylphthalate	410	U
206-44-0	Fluoranthene	410	U
92-87-5	Benzidine	2000	U
129-00-0	Pyrene	410	U
85-68-7	Butylbenzylphthalate	410	U
91-94-1	3,3'-Dichlorobenzidine	820	U
56-55-3	Benzo(a)anthracene	410	U
218-01-9	Chrysene	410	U
117-81-7	bis(2-Ethylhexyl)phthalate	110	J
117-84-0	Di-n-octylphthalate	410	U
205-99-2	Benzo(b)fluoranthene	410	U
207-08-9	Benzo(k)fluoranthene	410	U
50-32-8	Benzo(a)pyrene	410	U
193-39-5	Indeno(1,2,3-cd)pyrene	410	U
53-70-3	Dibenz(a,h)anthracene	410	U
191-24-2	Benzo(g,h,i)perylene	410	U

(1) - Cannot be separated from Diphenylamine

HK

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS2

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526016

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D1BN004212

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 19 dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/16/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
111-44-4	bis(2-Chloroethyl) ether	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
100-51-6	Benzyl alcohol	410	U
95-50-1	1,2-Dichlorobenzene	410	U
108-60-1	bis(2-Chloroisopropyl) ether	410	U
621-64-7	N-Nitroso-di-n-propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
111-91-1	bis(2-Chloroethoxy)methane	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
91-20-3	Naphthalene	410	U
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
91-57-6	2-Methylnaphthalene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	2000	U
131-11-3	Dimethylphthalate	410	U
208-96-8	Acenaphthylene	410	U
606-20-2	2,6-Dinitrotoluene	410	U

HK

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Atten: MR. FRANK LEWIS

Sample Description: 11-SS2 SOIL 1325 SOIL
Laboratory Sample Number: 16526016 Date Collected: 08/07/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Ignitability	SW846(1C):7.1	----	NON-IGNITABLE	----	09/04/90
Total Petroleum Hydrocarbons	EPA418.1	2.0	22.9	mg/Kg	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

000040

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11SS2

Lab Name: CH2M_HILL_MGM Contract: 16526

Lab Code: NA Case No.: 16526 SAS No.: 16526 SDG No.: 16526

Matrix (soil/water): SOIL Lab Sample ID: 16526016

Level (low/med): LOW Date Received: 08/08/90

% Solids: 84.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	11.4		N	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GRAY Clarity Before: N/A Texture: CLAY

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

11-SS3

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526017

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO010887

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 19 Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene chloride	65	B
67-64-1	Acetone	26	B
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (Total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone (MEK)	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	12	U
108-10-1	4-Methyl-2-pentanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylenes (Total)	6	U

HL

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526017

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D1BN004213

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 20 dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/16/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2000	U
83-32-9	Acenaphthene	410	U
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	410	U
7005-72-3	4-Chlorophenyl-phenyl ether	410	U
86-73-7	Fluorene	410	U
100-01-6	4-Nitroaniline	2000	U
86-30-6	N-Nitrosodiphenylamine (1)	410	U
122-66-7	1,2-Diphenylhydrazine	410	U
101-55-3	4-Bromophenyl-phenyl ether	410	U
118-74-1	Hexachlorobenzene	410	U
85-01-8	Phenanthrene	410	U
120-12-7	Anthracene	410	U
84-74-2	Di-n-butylphthalate	410	U
206-44-0	Fluoranthene	410	U
92-87-5	Benzidine	2000	U
129-00-0	Pyrene	410	U
85-68-7	Butylbenzylphthalate	410	U
91-94-1	3,3'-Dichlorobenzidine	820	U
56-55-3	Benzo(a)anthracene	410	U
218-01-9	Chrysene	410	U
117-81-7	bis(2-Ethylhexyl)phthalate	98	J
117-84-0	Di-n-octylphthalate	410	U
205-99-2	Benzo(b)fluoranthene	410	U
207-08-9	Benzo(k)fluoranthene	410	U
50-32-8	Benzo(a)pyrene	410	U
193-39-5	Indeno(1,2,3-cd)pyrene	410	U
53-70-3	Dibenz(a,h)anthracene	410	U
191-24-2	Benzo(g,h,i)perylene	410	U

(1) - Cannot be separated from Diphenylamine

HK

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

11-SS3

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526017

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D1BN004213

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 20 dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/16/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
111-44-4	bis(2-Chloroethyl) ether	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
100-51-6	Benzyl alcohol	410	U
95-50-1	1,2-Dichlorobenzene	410	U
108-60-1	bis(2-Chloroisopropyl) ether	410	U
621-64-7	N-Nitroso-di-n-propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
111-91-1	bis(2-Chloroethoxy)methane	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
91-20-3	Naphthalene	410	U
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
91-57-6	2-Methylnaphthalene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	2000	U
131-11-3	Dimethylphthalate	410	U
208-96-8	Acenaphthylene	410	U
606-20-2	2,6-Dinitrotoluene	410	U

HK

CH2M HILL Engineers Planners Economists Scientists

REPORT OF ANALYTICAL RESULTS

Date: 09/12/90

Client: CH2M HILL/WDC
625 HERNDON PARKWAY
HERNDON, VA 22070

Atten: MR. FRANK LEWIS

Project Number: WDC20368.H0.07
LANTDIV-NAVY/OCEANA
Laboratory Number: 16526
Date Received: 08/08/90

Sample Description: 11-SS3 SOIL 1330 SOIL
Laboratory Sample Number: 16526017 Date Collected: 08/07/90 Matrix: SOIL

Analytical Parameter	Method	Det Limit	Result	Units	Ana Date
Ignitability	SW846(1C):7.1	----	NON-IGNITABLE	----	09/04/90
Total Petroleum Hydrocarbons	EPA418.1	2.1	18.8	mg/Kg	09/04/90

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by: _____

INRPRPT(v900202)

CH2M HILL Montgomery Environmental Laboratory 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11SS3

Lab Name: CH2M_HILL_MGM Contract: 16526

Lab Code: NA Case No.: 16526 SAS No.: 16526 SDG No.: 16526

Matrix (soil/water): SOIL Lab Sample ID: 16526017

Level (low/med): LOW Date Received: 08/08/90

% Solids: 79.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	10.9		N	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GRAY Clarity Before: N/A Texture: LOAM

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS4

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526018

Sample wt/vol: 5.0 (g/mL) G Lab File ID: C1VO010888

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 29 Date Analyzed: 08/17/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	14	U
74-83-9	Bromomethane	14	U
75-01-4	Vinyl chloride	14	U
75-00-3	Chloroethane	14	U
75-09-2	Methylene chloride	27	B
67-64-1	Acetone	19	B
75-15-0	Carbon disulfide	7	U
75-35-4	1,1-Dichloroethene	7	U
75-34-3	1,1-Dichloroethane	7	U
540-59-0	1,2-Dichloroethene (Total)	7	U
67-66-3	Chloroform	7	U
107-06-2	1,2-Dichloroethane	7	U
78-93-3	2-Butanone (MEK)	14	U
71-55-6	1,1,1-Trichloroethane	7	U
56-23-5	Carbon tetrachloride	7	U
108-05-4	Vinyl acetate	14	U
75-27-4	Bromodichloromethane	7	U
78-87-5	1,2-Dichloropropane	7	U
10061-01-5	cis-1,3-Dichloropropene	7	U
79-01-6	Trichloroethene	7	U
124-48-1	Dibromochloromethane	7	U
79-00-5	1,1,2-Trichloroethane	7	U
71-43-2	Benzene	7	U
10061-02-6	trans-1,3-Dichloropropene	7	U
75-25-2	Bromoform	7	U
591-78-6	2-Hexanone	14	U
108-10-1	4-Methyl-2-pentanone	14	U
127-18-4	Tetrachloroethene	7	U
79-34-5	1,1,2,2-Tetrachloroethane	7	U
108-88-3	Toluene	7	U
108-90-7	Chlorobenzene	7	U
100-41-4	Ethylbenzene	7	U
100-42-5	Styrene	7	U
1330-20-7	Xylenes (Total)	7	U

HK

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11-SS4

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526018

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D1BN004214

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 12 dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/16/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1800	U
83-32-9	Acenaphthene	370	U
132-64-9	Dibenzofuran	370	U
121-14-2	2,4-Dinitrotoluene	370	U
84-66-2	Diethylphthalate	370	U
7005-72-3	4-Chlorophenyl-phenyl ether	370	U
86-73-7	Fluorene	370	U
100-01-6	4-Nitroaniline	1800	U
86-30-6	N-Nitrosodiphenylamine (1)	370	U
122-66-7	1,2-Diphenylhydrazine	370	U
101-55-3	4-Bromophenyl-phenyl ether	370	U
118-74-1	Hexachlorobenzene	370	U
85-01-8	Phenanthrene	370	U
120-12-7	Anthracene	370	U
84-74-2	Di-n-butylphthalate	370	U
206-44-0	Fluoranthene	370	U
92-87-5	Benzidine	1800	U
129-00-0	Pyrene	370	U
85-68-7	Butylbenzylphthalate	370	U
91-94-1	3,3'-Dichlorobenzidine	750	U
56-55-3	Benzo(a)anthracene	370	U
218-01-9	Chrysene	370	U
117-81-7	bis(2-Ethylhexyl)phthalate	54	J
117-84-0	Di-n-octylphthalate	370	U
205-99-2	Benzo(b)fluoranthene	370	U
207-08-9	Benzo(k)fluoranthene	370	U
50-32-8	Benzo(a)pyrene	370	U
193-39-5	Indeno(1,2,3-cd)pyrene	370	U
53-70-3	Dibenz(a,h)anthracene	370	U
191-24-2	Benzo(g,h,i)perylene	370	U

(1) - Cannot be separated from Diphenylamine

HK

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

11-SS4

Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 16526 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 16526018

Sample wt/vol: 30.0 (g/mL) G Lab File ID: D1BN004214

Level: (low/med) LOW Date Received: 08/08/90

% Moisture: not dec. 12 dec. ____ Date Extracted: 08/08/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/16/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
111-44-4	bis(2-Chloroethyl) ether	370	U
541-73-1	1,3-Dichlorobenzene	370	U
106-46-7	1,4-Dichlorobenzene	370	U
100-51-6	Benzyl alcohol	370	U
95-50-1	1,2-Dichlorobenzene	370	U
108-60-1	bis(2-Chloroisopropyl) ether	370	U
621-64-7	N-Nitroso-di-n-propylamine	370	U
67-72-1	Hexachloroethane	370	U
98-95-3	Nitrobenzene	370	U
78-59-1	Isophorone	370	U
111-91-1	bis(2-Chloroethoxy)methane	370	U
120-82-1	1,2,4-Trichlorobenzene	370	U
91-20-3	Naphthalene	370	U
106-47-8	4-Chloroaniline	370	U
87-68-3	Hexachlorobutadiene	370	U
91-57-6	2-Methylnaphthalene	370	U
77-47-4	Hexachlorocyclopentadiene	370	U
91-58-7	2-Chloronaphthalene	370	U
88-74-4	2-Nitroaniline	1800	U
131-11-3	Dimethylphthalate	370	U
208-96-8	Acenaphthylene	370	U
606-20-2	2,6-Dinitrotoluene	370	U