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RESOURCE CONSERVATION AND RECOVERY ACT CLOSURE EQUIVALENCY DEMONSTRATION PETITION FOR NEUTRALIZATION BASIN SOLID WASTE MANAGEMENT UNIT 12 NS MAYPORT FL

9/1/1998

HARDING LAWSON ASSOCIATES

RESOURCE CONSERVATION AND RECOVERY ACT
CLEAN CLOSURE EQUIVALENCY DEMONSTRATION PETITION

NEUTRALIZATION BASIN
SOLID WASTE MANAGEMENT UNIT 12

U.S. NAVAL STATION
MAYPORT, FLORIDA

Unit Identification Code: N60201

Contract No. N62467-89-D-0317/028

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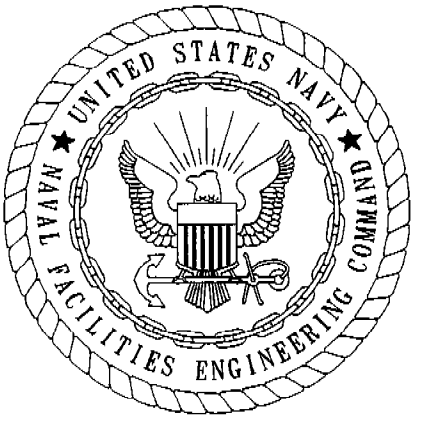

This document Resource Conservation and Recovery Act Clean Closure Equivalency Demonstration Petition, Neutralization Basin, Solid Waste Management Unit 12, U.S. Naval Station, Mayport, Florida has been prepared under the direction of a Florida-registered professional geologist. The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice. If conditions are discovered or determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment and recommendations in this document. This document was prepared for the Clean Closure Equivalency Demonstration Petition for the Neutralization Basin at U.S. Naval Station, Mayport, Florida, and should not be construed to apply for any other purpose or to any other site.

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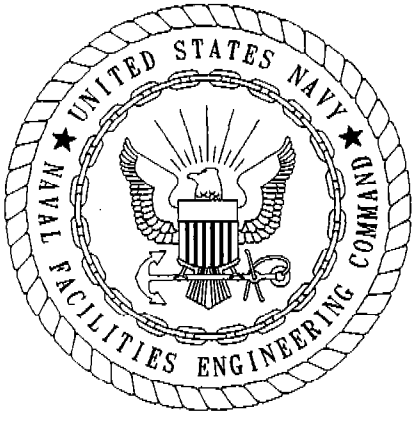

CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Harding Lawson Associates, hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/028 are complete and accurate and comply with all requirements of this contract.

DATE: January 22, 1999

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(DFAR 252.227-7036)

FOREWORD

In order to meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at their facilities.

Subtitle C of the Resource Conservation and Recovery Act (RCRA) required the U.S. Environmental Protection Agency (USEPA) to establish a Federal hazardous waste management program. The RCRA program's objective is to ensure that hazardous wastes are handled safely from generation until final disposition. To meet this objective, the USEPA has issued a series of hazardous waste regulations under Subtitle C of RCRA that are published in Title 40 *Code of Federal Regulations* (CFR) Parts 260 through 265 and Parts 122 through 124.

Parts 264 and 265 of 40 CFR contain standards applicable to owners and operators of all facilities that treat, store, or dispose of hazardous wastes. Wastes are identified or listed as hazardous under 40 CFR Part 261. Part 264 standards are implemented through permits issued by authorized States or USEPA according to 40 CFR Part 270 and Part 271 regulations. Treatment, storage, and disposal regulations in 40 CFR Part 264 issued on July 26, 1982, and July 15, 1985, establish performance standards for hazardous waste landfills, surface impoundments, land treatment units, and waste piles.

Part 265 standards impose minimum technology closure and postclosure care requirements on the owners and operators of certain landfills, surface impoundments, and waste piles. These regulations require removal or decontamination of all waste residues, contaminated containment systems, and contaminated subsoils. RCRA also has clean closure requirements that were introduced in the preamble to the regulations amending 40 CFR Part 265.228(a), published in the March 19, 1987, *Federal Register* (Volume 52, No. 53).

Naval Station (NAVSTA) Mayport is conducting clean closure of surface impoundments at their facility by working through the Southern Division, Naval Facilities Engineering Command. The USEPA and the Florida Department of

Environmental Protection oversee the NAVSTA Mayport environmental program. All aspects of the program are conducted in compliance with State and Federal regulations, as ensured by the participation of these regulatory agencies.

Questions regarding the RCRA Program at NAVSTA Mayport should be addressed to Mr. David Cabiness, Code 1823, at (803) 820-7484.

EXECUTIVE SUMMARY

The Navy has prepared a Resource Conservation and Recovery Act (RCRA) Clean Closure Equivalency Demonstration (CCED) Petition for U.S. Naval Station (NAVSTA), Mayport, Florida. This CCED is submitted in response to a Consent Order (No. 87-1128), issued in September 1987 by the Florida Department of Environmental Regulation (FDER) and to close the subject unit pursuant to 40 *Code of Federal Regulations* (CFR) 264, 265, and 270.1. This petition also incorporates information developed during an ongoing RCRA Corrective Action Program that is being conducted under the Station's Hazardous and Solid Waste Amendment (HSWA) permit identification No. FL9 170 024 260. The HSWA permit was initially issued by the U.S. Environmental Protection Agency (USEPA) on March 25, 1988, and renewed June 15, 1993. This draft RCRA CCED petition presents the findings, conclusions, and recommendations for Clean Closure of the Power Plant Neutralization Basin, Solid Waste Management Unit (SWMU) 12 at NAVSTA Mayport.

The FDER conducted an inspection of The Neutralization Basin on February 23, 1987, and issued Consent Order No. 87-1128 in September 1987, requiring closure of the basin under 40 CFR 265, Interim Standards. Groundwater Monitoring and Closure Plans were submitted to FDER and approved in December 1988. These plans were implemented in January 1989. Results of the sampling and analysis of soils and quarterly groundwater results were submitted to FDER. Following review of the data, FDER requested certification of closure from NAVSTA Mayport, and accepted the closure certification and terminated the consent order in March 1991.

During this period, new regulations were promulgated that required an equivalency demonstration that meets the requirements of 40 CFR 270.1 Subpart A (C)(6) for submittal to the USEPA. The Closure Plan, Groundwater Monitoring Plan and resultant data previously issued to the FDER was submitted for review by the USEPA. As a result of this review, the USEPA suggested that two additional downgradient monitoring wells be installed, additional groundwater samples be collected, and tidal studies be performed. This report includes the additional data generated in response to the USEPA request.

All suspected hazardous residuals have been removed from the basin and appurtenances. In addition, current operational procedures do not require the use of The Neutralization Basin and future modifications to the power plant will no longer permit the discharge of hazardous waste to the basin. The main function of The Neutralization Basin during operation was to neutralize either high or low pH effluent.

Sampling and analysis of site environmental media suggest that a release of hazardous constituents from the Basin to the environment have not occurred and clean closure under 40 CFR 270.1(C) is appropriate. Samples of both soil and groundwater suggest that no releases of high or low pH material have occurred specifically from The Neutralization Basin. However, anecdotal evidence suggests that there was a release from an appurtenance, the sodium hydroxide tank. Groundwater data also suggest that this release has occurred. The sodium hydroxide release has been designated as an area-of-concern that will be investigated under NAVSTA Mayport's RCRA Corrective Action program. Based on these findings, this Clean Closure Equivalency Demonstration Petition for The Neutralization Basin, SWMU 12, supports closure by removal in accordance with 40 CFR 270.1 Subpart A(C)(6).

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
AOC	area of concern
APHA	American Public Health Association
AQUIRE	Aquatic Information Retrieval
bls	below land surface
BOD_5	biochemical oxygen demand, 5-day
BOS	Base Operation Support
CCED	clean closure equivalency demonstration
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
CSF	cancer slope factor
ECPC	ecological chemical of potential concern
ELCR	excess lifetime cancer risk
EP	extraction procedure
EPC	exposure point concentration
ERA	ecological risk assessment
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDER	Florida Department of Environmental Regulation
FOTW	federally owned treatment work
ft/ft	feet per foot
GIR	General Information Report
HHCPC	human health chemical of potential concern
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
MCL	maximum contaminant level
mg/ℓ	milligrams per liter
msl	mean sea level
μmhos/cm	micromhos per centimeter
μg/ℓ	micrograms per liter
NAVSTA	Naval Station
NGVD	National Geodetic Vertical Datum of 1929
PCB	polychlorinated biphenyl
PVC	polyvinyl chloride
PWC	Public Works Center
QA/QC	quality assurance and quality control
RCRA	Resource Conservation and Recovery Act
RFI	Resource Conservation and Recovery Act (RCRA) facility investigation
RGO	remedial goal option

SDWS	secondary drinking water standards
SOUTHNAV-FACENGCOM	Southern Division, Naval Facilities Engineering Command
SU	standard unit
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TDS	total dissolved solids
TIC	tentatively identified compound
TOC	total organic carbon
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
VOC	volatile organic compound

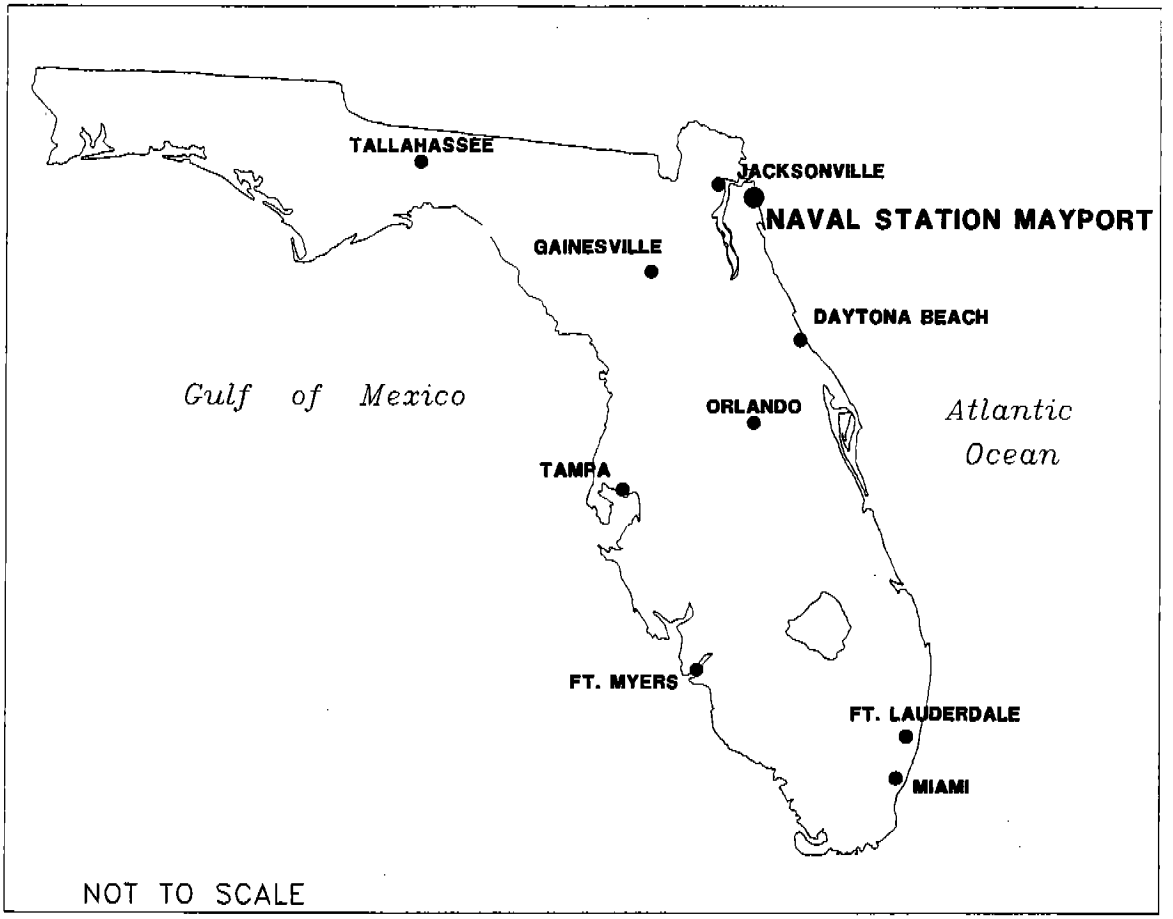
1.0 INTRODUCTION

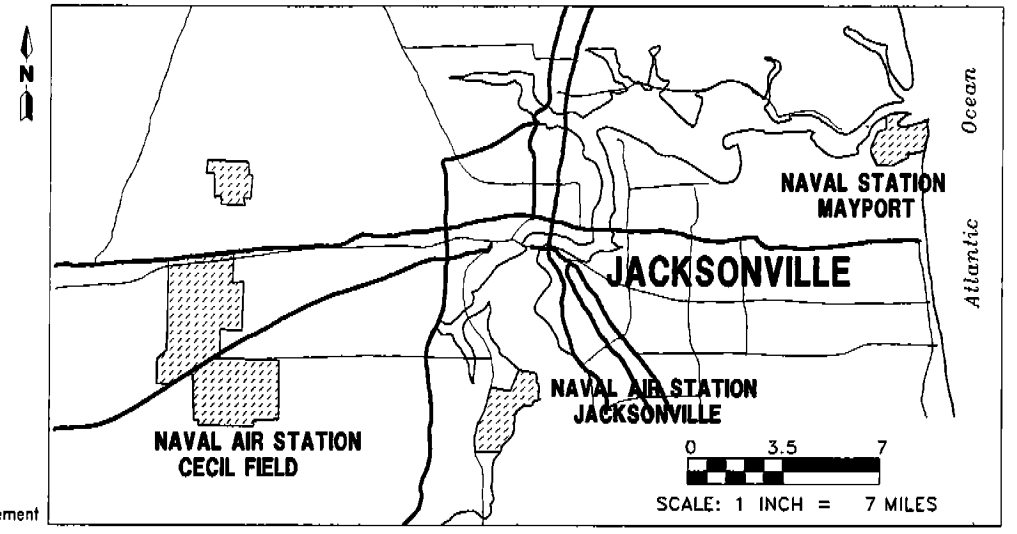
This report documents the activities, findings, conclusions, and recommendations developed as part of a Resource Conservation and Recovery Act (RCRA) Clean Closure Equivalency Demonstration (CCED) petition for Solid Waste Management Unit (SWMU) 12 at Naval Station (NAVSTA) Mayport. NAVSTA Mayport is located on the Atlantic Coast in northeastern Duval County, Florida, at the mouth of the St. Johns River. Figure 1-1 shows the regional location of NAVSTA Mayport and Figure 1-2 shows the location of the Neutralization Basin (SWMU 12) at NAVSTA Mayport. A chronology of previous reports and related correspondence concerning the CCED petition are presented in Appendix A, Section A-1 (Table A-1) and Section A-3, respectively. A Florida Department of Environmental Protection (FDEP) checklist for conducting a CCED is provided in Section A-2 in Appendix A.

This CCED petition for The Neutralization Basin (SWMU 12) also incorporates information developed during an ongoing RCRA Corrective Action program for NAVSTA Mayport which includes conducting an RCRA facility investigation (RFI) at The Neutralization Basin (SWMU 12). The RFI for The Neutralization Basin (SWMU 12) includes human health and ecological risk assessments (ABB Environmental Services, Inc. [ABB-ES], 1995a). Information common to all SWMUs being investigated under the RCRA Corrective Action program is described in an RCRA Corrective Action Program General Information Report (GIR) for NAVSTA Mayport (ABB-ES, 1995b). A list of all SWMUs and Areas of Concern (AOCs) being investigated under the RCRA Corrective Action program at NAVSTA Mayport is provided in Table 1-1, and the locations of the SWMUs are provided on Figure 1-2.

An outline of the contents of the NAVSTA Mayport GIR is provided in Table 1-2. This information includes background sampling information and analytical methodology, risk assessment approach, and the ecological characterization of NAVSTA Mayport. The NAVSTA Mayport GIR also includes a summary of published information, including geography, physiography, demographics, climate, regional geology, and hydrogeology; methods and procedures used to conduct risk assessments; and characterization of stationwide background conditions, including surface and subsurface soil, surface water, sludge, and groundwater that will be used to evaluate the data from each SWMU. The information contained in the NAVSTA Mayport GIR (ABB-ES, 1995b) will not be repeated in this CCED report.

1.1 REGULATORY BACKGROUND. In April 1986 NAVSTA Mayport applied for a hazardous waste operation permit (Part B) for an onsite storage facility. An inspection of the facility was performed by the Florida Department of Environmental Regulation (FDER) on February 23, 1987. Subsequent to the inspection, FDER issued on June 10, 1987, a Notice of Violation for the reported operation of a hazardous waste surface impoundment (existing Neutralization Basin) without a valid FDER permit (see Appendix A, Section A-3, Consent Order dated September 15, 1987). A second inspection on July 15, 1987, was conducted of the surface impoundment (see Appendix A, Section A-3, Consent Order dated September 15, 1987). Based on this inspection, FDER determined that NAVSTA Mayport violated rules contained in Chapter 17-30, Florida Administrative Code (FAC), that adopt, by reference, 40 Code of Federal Regulations (CFR) Part 260.10 and 40 CFR Parts 261 through 266.





NOTE:
SWMU = Solid waste management unit

FIGURE 1-1
FACILITY LOCATION MAP

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

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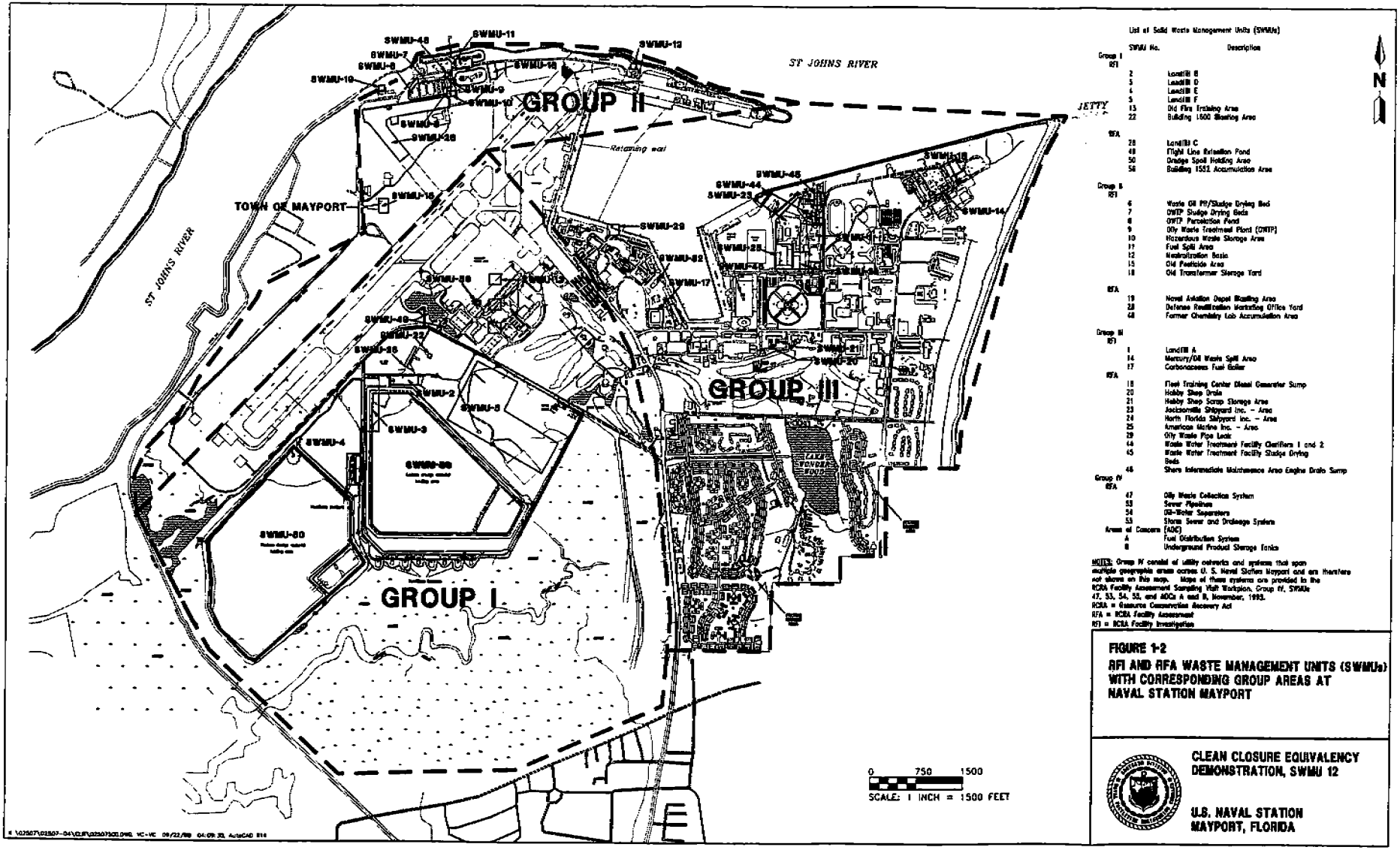

List of Solid Waste Management Units (SWMUs)

	SWMU No.	Description
Group I		
RFI	2	Landfill B
	5	Landfill D
	6	Landfill E
	9	Landfill F
	13	Old Fire Training Area
	22	Building 1600 Blasting Area
RFA	28	Landfill C
	48	Flight Line Extension Pond
	50	Dredge Spoil Holding Area
	58	Building 1502 Accumulation Area
Group II		
RFI	4	Waste Oil Pit/Sludge Drying Bed
	7	OWTP Sludge Drying Beds
	8	OWTP Percolation Pond
	9	Oily Waste Treatment Plant (OWTP)
	10	Hazardous Waste Storage Area
	11	Fuel Spill Area
	12	Neutralization Basin
	15	Old Pesticide Area
	18	Old Transformer Storage Yard
RFA	19	Naval Aviation Depot Blasting Area
	28	Defense Reutilization Marketing Office Yard
	48	Former Chemistry Lab Accumulation Area
Group III		
RFI	1	Landfill A
	14	Mercury/Oil Waste Spill Area
	17	Carbonaceous Fuel Boiler
RFA	18	Fleet Training Center Diesel Generator Sump
	20	Hobby Shop Drain
	21	Hobby Shop Scrap Storage Area
	23	Jacksonville Shipyard Inc. - Area
	24	North Florida Shipyard Inc. - Area
	25	American Marine Inc. - Area
	29	Oily Waste Pipe Leak
	44	Waste Water Treatment Facility Clarifiers 1 and 2
	45	Waste Water Treatment Facility Sludge Drying Beds
	46	Shore Intermediate Maintenance Area Engine Drain Sump
Group IV		
RFA	47	Oily Waste Collection System
	53	Sewer Pipelines
	54	Oil-Water Separators
	55	Storm Sewer and Drainage System
Areas of Concern (AOC)	A	Fuel Distribution System
	B	Underground Product Storage Tanks

NOTE: Group IV consist of utility networks and systems that span multiple geographic areas across U. S. Naval Station Mayport and are therefore not shown on this map. Maps of these systems are provided in the RCRA Facility Assessment Sampling Visit Workplan, Group IV, SWMUs 47, 53, 54, 55, and AOCs A and B, November, 1993.
RCRA = Resource Conservation Recovery Act
RFA = RCRA Facility Assessment
RFI = RCRA Facility Investigation

FIGURE 1-2
RFI AND RFA WASTE MANAGEMENT UNITS (SWMUs) WITH CORRESPONDING GROUP AREAS AT NAVAL STATION MAYPORT

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

Table 1-1
Solid Waste Management Unit (SWMU) and Area of Concern (AOC) Summary

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Group	RFI or RFA/SV	SWMU	NIRP	Description
I	RFI	02	02	Landfill B
I	RFI	03	04	Landfill D
I	RFI	04	05	Landfill E
I	RFI	05	06	Landfill F
I	RFI	13	13	Old Fire-Fighter Training Area
I	RFI	22	NA	Building 1600 Blasting Area
I	RFA/SV	26	03	Landfill C
I	RFA/SV	49	NA	Flightline Retention Ponds
I	RFA/SV	50	NA	Dredge Spoil Disposal Area
I	RFA/SV	56	NA	Building 1552 Accumulation Area
II	RFI	06	08	Waste-Oil Pit
II	RFI	07	8A	OWTP Sludge Beds
II	RFI	08	8B	OWTP Percolation Pond
II	RFI	09	8C	OWTP
II	RFI	10	8D	RCRA Hazardous Waste Storage Area
II	RFI	11	09	Fuel Spill Area
II	RFI	12	11	Neutralization Basin
II	RFI	15	15	Old Pesticide Handling Area
II	RFI	16	16	Old Transformer Storage Yard
II	RFA/SV	19	NA	NADEP Blasting Area
II	RFA/SV	28	10	DRMO Yard
II	RFA/SV	48	NA	Former Chemistry Laboratory
II	RFA/SV	51	NA	Waste Oil Tanks
III	RFI	01	01	Landfill A
III	RFI	14	14	Mercury and Oily-Waste Spill Area
III	RFI	17	17	Carbonaceous Fuel Boiler
III	RFA/SV	18	NA	FTC Diesel Generator Sump
III	RFA/SV	20	NA	Hobby Shop Drain
III	RFA/SV	21	NA	Hobby Shop Scrap Storage Area
III	RFA/SV	23	NA	Jacksonville Ship Yard, Inc., Area

See notes at end of table.

Table 1-1 (Continued)
Solid Waste Management Unit (SWMU) and Area of Concern (AOC) Summary

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Group	RFI or RFA/SV	SWMU	NIRP	Description
III	RFA/SV	24	NA	North Florida Ship Yard, Inc., Area
III	RFA/SV	25	NA	Atlantic Marine, Inc., Area
III	RFA/SV	29	12	Oily Waste Pipeline Break
III	RFA/SV	44	NA	Wastewater Treatment Facility Clarifiers 1 and 2
III	RFA/SV	45	NA	Wastewater Treatment Facility Sludge Drying Beds
III	RFA/SV	46	NA	Shore Intermediate Maintenance Area Engine Drain Sump
III	RFA/SV	52	NA	Public Works Department Service Station Storage Area
IV	RFA/SV	47	NA	Oily-Waste Collection System
IV	RFA/SV	53	NA	Sewer Pipeline
IV	RFA/SV	54	NA	Oil-Water Separators
IV	RFA/SV	55	NA	Storm Sewer and Drainage Pipes
IV	RFA/SV	AOC-A	NA	Fuel Distribution Systems
IV	RFA/SV	AOC-B	NA	Underground Product Storage Tanks

Notes: RFI = RCRA facility investigation.
RFA/SV = RCRA Facility Assessment and Sampling Visit.
NIRP = Naval Installation Restoration Program.
NA = not applicable.
OWTP = Oily Waste Treatment Plant.
RCRA = Resource Conservation and Recovery Act.
NADEP = Naval Aviation Depot.
DRMO = Defense Reutilization and Marketing Office.
FTC = Fleet Training Center.

Table 1-2
Contents of RCRA Facility Investigation General Information Report

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Chapter	Title	Contents
1.0	Introduction	Contains general background information; provides literature and previous investigation data for geography, climate, soil, geology, and hydrogeology.
2.0	NAVSTA Mayport RFI Activities	Describes field procedures used for collection, analysis, and evaluation of environmental samples. Describes data quality assessment techniques and QA/QC procedures. Describes methodology for risk assessments.
3.0	NAVSTA Mayport Background Investigation Findings	Contains the findings from background assessment activities, including hydrogeologic measurements, an ecological study, a tidal influence study, and soil, water, and sludge sample analyses.
4.0	Summary	Provides a summary of all findings and conditions associated with the NAVSTA Mayport SWMUs.

Notes: RCRA = Resource Conservation and Recovery Act.
NAVSTA = naval station.
RFI = RCRA facility investigation.
QA/QC = quality assurance and quality control.
SWMU = solid waste management unit.

A Consent Order (No. 87-1128) was negotiated between NAVSTA Mayport and FDER that required NAVSTA Mayport to submit a closure plan pursuant to 40 CFR 264, Subpart G, that addressed the surface impoundment (see Appendix A, Section A-3, September 15, 1987). The closure plan required a groundwater monitoring plan that complied with the requirements of 40 CFR 264, Subpart F. The Consent Order included a waiver of groundwater monitoring requirements of 40 CFR 264, Subpart F, pursuant to interim standards under 40 CFR 265.90 (e) if NAVSTA Mayport could demonstrate that no migration of hazardous waste or hazardous waste constituents from the surface impoundment (The Neutralization Basin) had occurred. The installation of at least one hydraulically downgradient and one hydraulically upgradient monitoring well was required by FDER for NAVSTA Mayport to demonstrate that no migration of hazardous waste or hazardous waste constituents has occurred from The Neutralization Basin. The Consent Order also required that quarterly groundwater sampling and analyses be conducted for 1 year. The initial quarterly groundwater samples were analyzed for parameters set forth in 40 CFR 265.92(b) and the Florida secondary drinking water standards (SDWS) Chapter 17-22, FAC. The remaining three quarterly groundwater samples were analyzed for pH, 40 CFR 265 Appendix III Metals and any first quarter parameters that were detected at concentration that exceeded Florida SDWS.

The Consent Order (No. 87-1128), issued in September 1987 by FDER, required NAVSTA Mayport to demonstrate closure of The Neutralization Basin under 40 CFR 265, Interim Standards. Draft Closure and Groundwater Monitoring Plans were developed and submitted to FDER for review. Following their review, FDER requested additional information before approving the plans. Both plans were revised to include the additional information requested and reissued in December 1988 (E.C. Jordan Company, Inc. [E.C. Jordan], 1988a and 1988b). FDER approved the revised plans in February 1989. In addition, subsequent to this approval an alternative method for conducting soil borings to collect subsurface soil samples beneath The Neutralization Basin was submitted to FDER in April 1989 (E.C. Jordan, 1989). The alternative method utilized borings drilled at a slant to collect the subsurface soil samples.

Implementation of the groundwater monitoring and closure plans was initiated in early 1989. The results of the sampling and analysis program for soil and groundwater were evaluated and submitted to the FDER in September 1990. On September 25, 1990, the FDER issued a letter to NAVSTA Mayport stating that a complete review of the data had been conducted and the data were found acceptable. The final closure certification was submitted to FDER on November 26, 1990. FDER accepted the closure certification and terminated the Consent Order No. 87-1128 in correspondence dated March 8, 1991.

The letter dated March 8, 1991, also stated that the U.S. Environmental Protection Agency (USEPA) had promulgated new regulations after the effective date of the Consent Order No. 87-1128 in September 1987. These regulations required that a CCED be provided to the USEPA to show that units closed under interim status pursuant to 40 CFR 265 also meet the requirements of 40 CFR 264. The regulation requires an equivalency demonstration of closure-by-removal under 40 CFR 270.1(C) either by submittal of a postclosure Part B permit, or a CCED petition must be prepared and submitted to USEPA for approval. The State of Florida was authorized by the USEPA on December 27, 1994, to oversee implementation of these regulations.

On June 10, 1991, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) provided the USEPA with the Closure and Groundwater Monitoring Plans (E.C. Jordan; 1988a and 1988b) approved by FDER, and results of the four quarterly sampling events performed at The Neutralization Basin. SOUTHNAVFACENGCOM requested that USEPA review this information to determine if the existing groundwater monitoring system, composed of two wells, was sufficient to meet the groundwater monitoring requirements outlined in 40 CFR 264, Subpart F, as required for the CCED.

The USEPA reviewer indicated in correspondence dated October 21, 1991, that the site maps submitted did not demonstrate that space restrictions would be a limiting factor for the installation of additional monitoring wells. The reviewer recommended that a minimum of two additional monitoring wells be installed hydraulically downgradient of the site. In addition, it was indicated that hydrogeologic data should be provided to assess the reliability of water quality data obtained from existing monitoring wells. Specific information requested by the USEPA was the effects of tidal fluctuation on the water table beneath The Neutralization Basin and the relationship between the fluctuating groundwater elevations and the screened intervals of the existing monitoring wells. The reviewer also requested an explanation of deviations from the well construction details provided in the revised Groundwater Monitoring Plan (E.C. Jordan, 1988b).

Because of space restrictions at the site, only one additional hydraulic downgradient monitoring well was installed to conform with the requirements specified in 40 CFR 264, Subpart F. Tidal fluctuations and their attendant impacts on the water table surface were also assessed. The results of these studies are included in Chapter 2.0 of this report.

Groundwater samples were collected on January 27, 1993, and July 6, 1994, from The Neutralization Basin (SWMU 12) monitoring wells MPT-11-MW01S, MPT-11-MW02S, and MPT-11-MW03S in conjunction with the RFI. These groundwater samples were analyzed for chemicals selected from the 40 CFR 264, Appendix IX, Groundwater Monitoring List. Analytical results from the sampling events are included in Chapter 2.0 this report.

Additionally, at the request of the FDEP (FDEP, 1995a) three surface soil samples and a duplicate were collected from 0 to 1 foot below the land surface (bls) on November 14, 1995. The purpose of the sampling event was to assess whether or not surface soil has been adversely impacted by a release from possible basin overflows. Overflowing of the basin has not been reported by the Navy.

1.2 PETITION OBJECTIVES. The goal of the CCED petition is to document that the operation of the surface impoundment (The Neutralization Basin) has not resulted in a release of hazardous chemicals to the environment, and as a result, no remedial measures are necessary to "clean close" The Neutralization Basin. Past and present investigative activities comply with regulations specified in 40 CFR 264, and closure by removal has been achieved in accordance with 40 CFR 270.1(C). The petition goal is accomplished by providing the following information:

- description of past activities undertaken to support closure-by-removal at The Neutralization Basin by CCED petition under 40 CFR 270.1. and

- presentation of additional data obtained during RFI activities that support the final CCED petition for clean closure by removal.

1.3 **SITE DESCRIPTION**. NAVSTA Mayport is located within the corporate limits of the city of Jacksonville, Florida, approximately 12 miles northeast of downtown Jacksonville, on the south bank of the mouth of the St. Johns River. The Atlantic Ocean is located along the eastern boundary of the facility and the St. Johns River, and its tributaries are located along the north and west boundary. The town of Mayport is located to the northwest between the base and the St. Johns River (Figure 1-2). Residential and commercial development is present at the Town of Mayport and the beach communities located to the south of NAVSTA Mayport.

Mayport Turning Basin, which is located at the mouth of the St. Johns River, is a harbor that is dredged routinely for berthing Navy ships. The Turning Basin is surrounded on three sides by retaining walls where Naval ships dock. The northern boundary of Mayport Basin is a peninsular manmodified sand spit on which The Neutralization Basin and associated boiler at Building 1241 are located. The location of The Neutralization Basin and Building 1241 are shown on Figure 1-3. The topography of The Neutralization Basin site is relatively flat. Along the northern boundary of The Neutralization Basin is a 10-foot high riprap (concrete and granite) wall that slopes steeply downward to the St. Johns River. The land surface elevation in the vicinity of The Neutralization Basin is approximately 11 feet above the National Geodetic Vertical Datum (NGVD) of 1929. The Neutralization Basin was constructed below grade. The bottom is approximately 7 feet NGVD and the top is approximately 13 feet NGVD (Figure 1-4).

Within the vicinity of The Neutralization Basin, the St. Johns River and Mayport Turning Basin are tidally influenced with a semidiurnal tide of approximately 5-feet. Tidal fluctuations are also observed in the groundwater beneath The Neutralization Basin site. The depth to groundwater is approximately 9 feet bls. Groundwater flow at The Neutralization Basin is complex with flow direction typically north to northeast toward the St. Johns River. Groundwater flow is influenced by (1) diurnal tidal fluctuations, (2) varying flow rates of the St. Johns River, (3) constriction of flow because of the relatively impermeable retaining walls along Mayport Turning Basin, (4) seasonal variations in precipitation that influence recharge, and (5) the freshwater and saline (marine and brackish) water interface.

According to Franks (1980), The Neutralization Basin is located at the edge of a freshwater layer that varies in thickness from about 40 feet, near the center of Mayport NAVSTA, to zero at the edge of the freshwater layer near the St. Johns River and the Atlantic Ocean. The local surficial aquifer acts as a single unconfined (water table) aquifer to a depth of about 70 feet bls. Franks (1980) also stated "Although the water above a depth of 40 feet is fresh and initially could be used in a water supply system, after a short pumping interval brackish water from the lower zone would rise in response to a reduction in head, contaminating the upper fresh water zone." In a pumping test conducted by Franks an increase in specific conductance occurred after pumping for 30 minutes. The well was pumped at low rates (20 gallons per minute) from a screened interval (25 to 35 feet) located just above the saline freshwater interface that Franks (1980) reported to be between 35 and 44 bls near the center of NAVSTA Mayport.

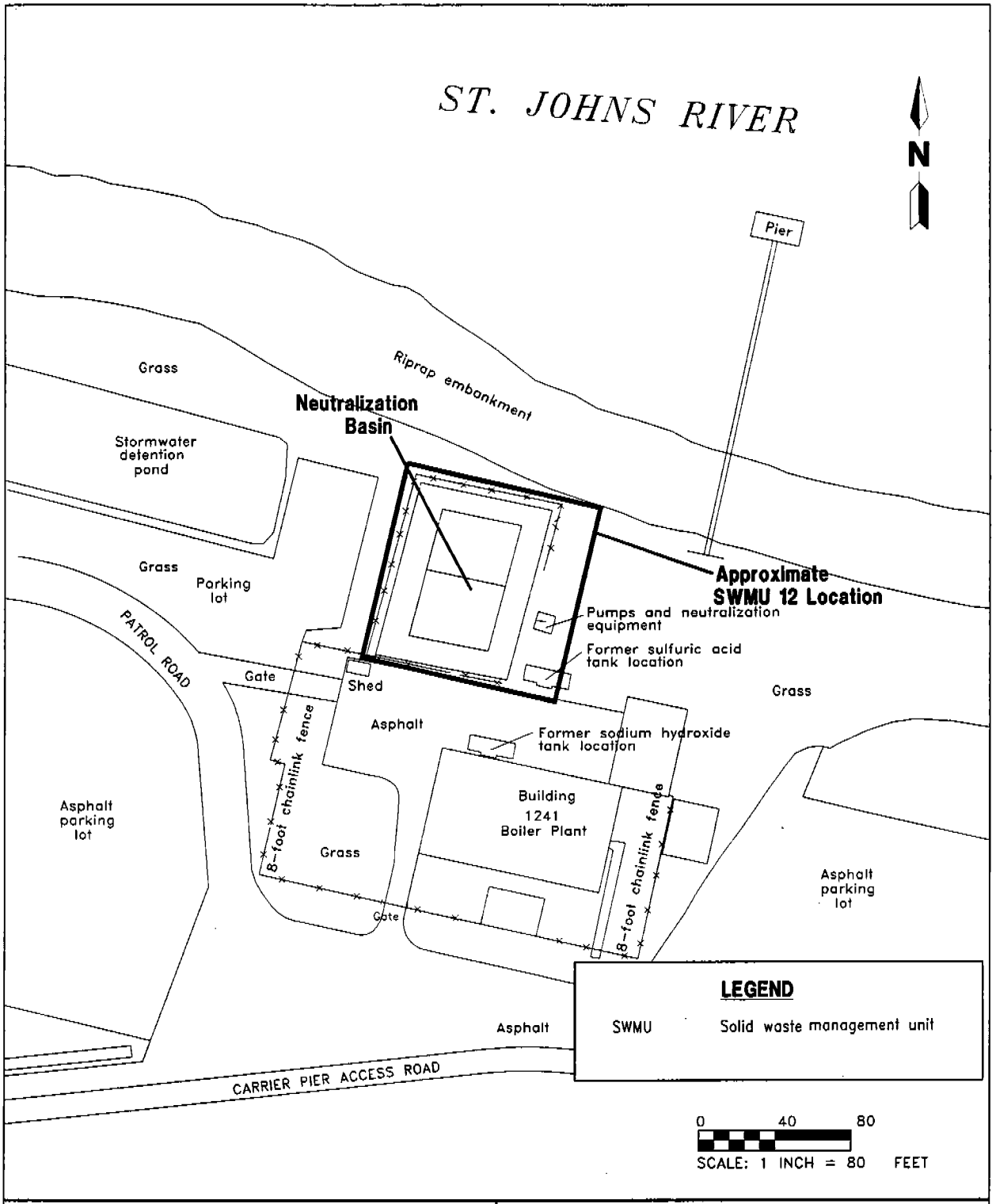

FIGURE 1-3
NEUTRALIZATION BASIN
SWMU 12,
SITE LOCATION MAP

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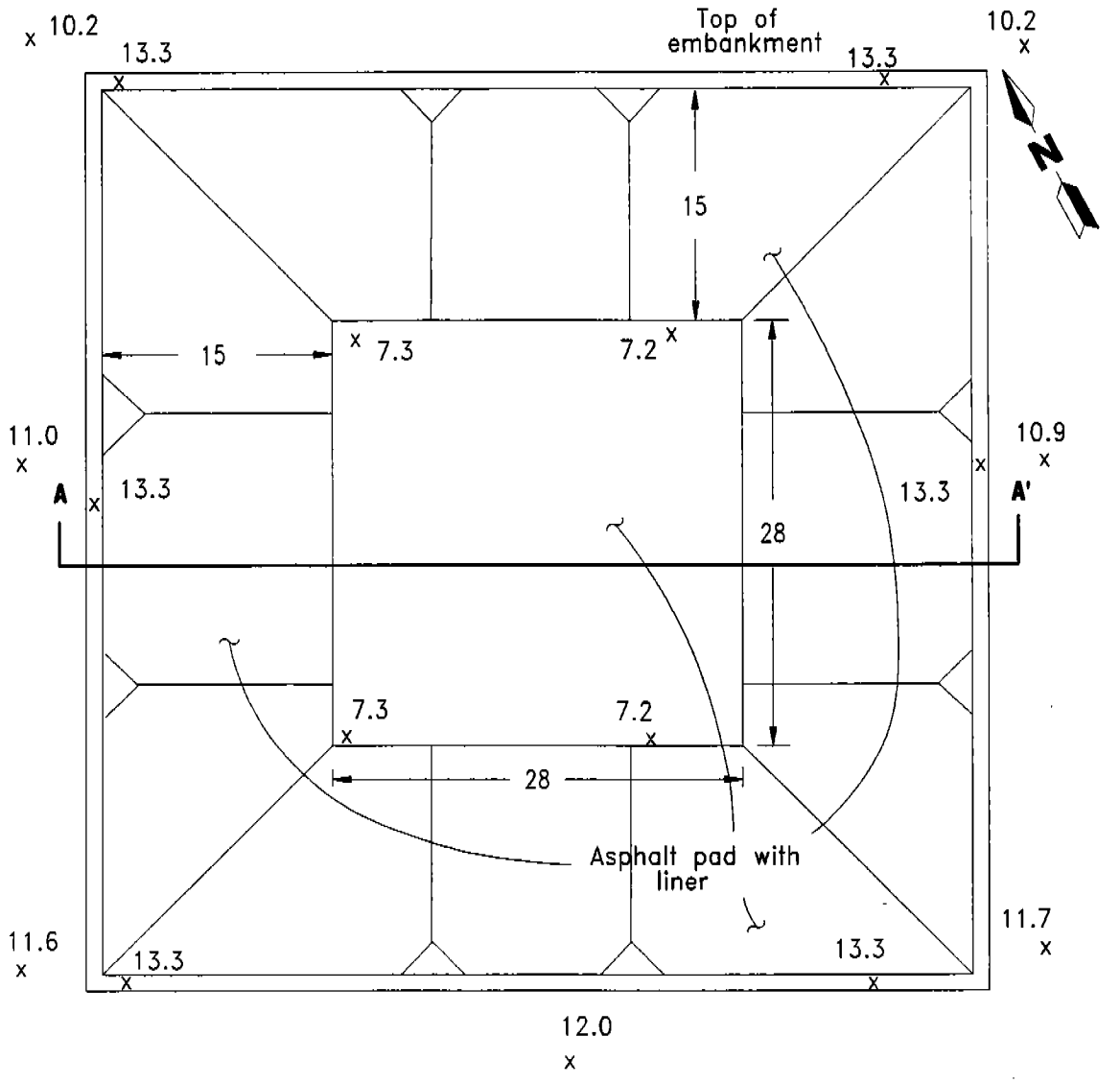
CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION
MAYPORT, FLORIDA



LEGEND

x	Spot elevations (in feet, NGVD)
A —— A'	Cross-section location (Figure 1-5)
SWMU	Solid waste management unit

Note:
Elevations are relative to National Geodetic Vertical Datum (NGVD) of 1929
Dimensions are shown in feet
Elevations and dimensions based on as built construction documents

Reference: NAVSTA Mayport, NAVFAC Drawing No. 5-102-637, June 18, 1985

15 feet
Scale

FIGURE 1-4
PLAN VIEW OF SECOND NEUTRALIZATION BASIN

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

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The surficial aquifer is not used by NAVSTA Mayport for water supply. An inventory of water supply wells at and in the vicinity of NAVSTA Mayport is provided in Paragraph 1.4.6.5 of the NAVSTA Mayport GIR (ABB-ES, 1995b).

Previous Facilities. Prior to the construction of the current Neutralization Basin, two previous neutralization basins had been in operation. The Neutralization Basins will be referred to in the following text as "the first neutralization basin", "the second neutralization basin" and the current or existing "Neutralization Basin". The boiler plant began operations in November 1970. Initially, effluent was disposed of directly into the St. Johns River. The first neutralization basin, was reported by the Navy to have been located northeast of the existing boiler plant (Building 1241). The first neutralization basin began operation in early 1971 and reportedly was unlined. No visible signs of this first neutralization basin exist today.

Early in the 1970s, a second neutralization basin was constructed to replace the first neutralization basin. The second neutralization basin was located northwest of boiler plant (Building 1241) at the site of the current Neutralization Basin. The second neutralization basin was constructed using a synthetic liner over an asphalt base. The second neutralization basin began operation in the early 1970s and, based on discussions with Naval personnel, the liner and asphalt were reported to be in "good condition" until mid-1985 when a storm surge and high winds lifted and split the liner in several places.

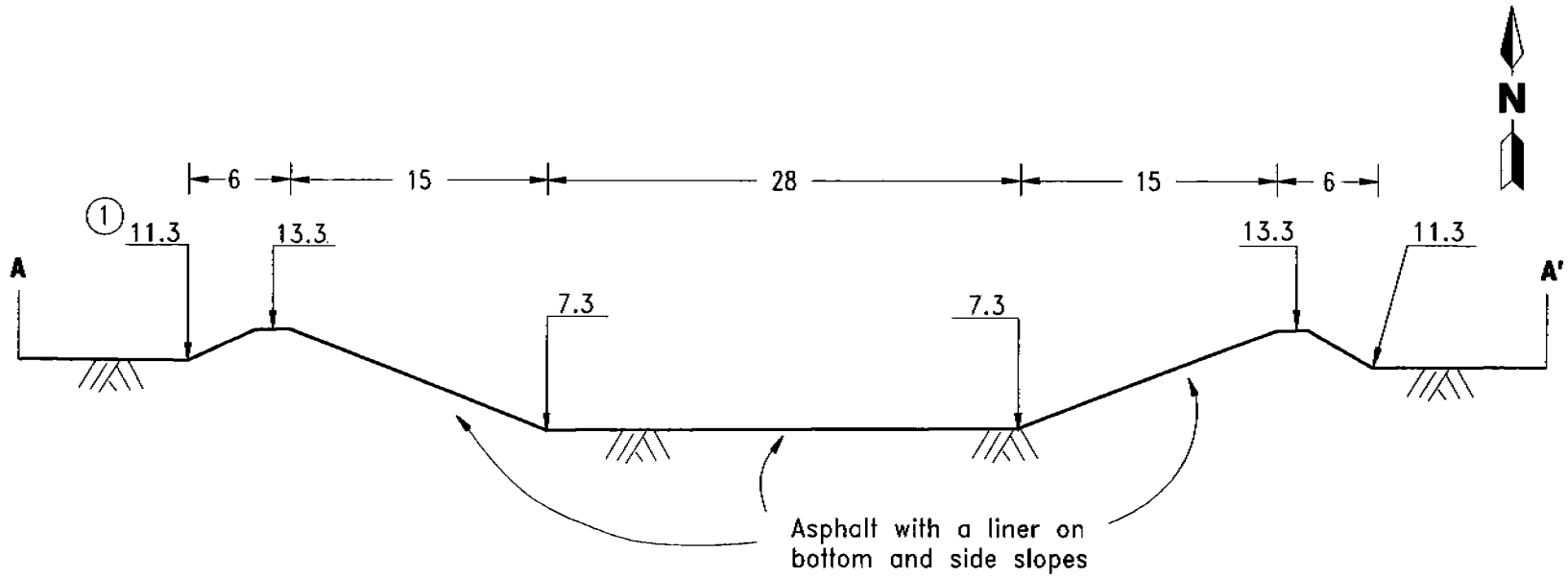
Construction records of the second neutralization basin, including topographical data and dimensions, are shown on Figure 1-4. A cross section of the second neutralization basin with pertinent construction details is shown on Figure 1-5. The construction documents suggest that the second neutralization basin had a safe-storage capacity of 76,000 gallons, assuming a minimum freeboard of 1.5 feet.

Existing Neutralization Basin. The existing Neutralization Basin was reportedly constructed on the location of the second neutralization basin. Construction of the existing Neutralization Basin was completed in late 1986 and was placed in operation in January 1987. The design of the current Neutralization Basin was changed during construction from an asphalt base material to a concrete base.

Elevation and topographic details for the existing Neutralization Basin are shown on Figure 1-6. Pertinent construction dimensions and details are shown on Figure 1-7. The construction design documents suggest that the capacity of the existing Neutralization Basin is approximately 112,300 gallons with a freeboard of 1.5 feet.

The thickness of the concrete base is 6 inches and the side slopes are 4 inches thick. Construction design documents specified 12 inches of compacted soil (95 percent of a modified proctor [American Society for Testing and Materials D1557]) beneath the concrete base material.

The existing Neutralization Basin is approximately 59 feet wide, 78 feet long, and divided into two cells with a depth of 6 feet. A Hypalon™ liner was placed over the concrete base and side slope material, and a 6-foot chainlink fence surrounds the perimeter of the site.



LEGEND

A —— A' Cross-section location

SWMU Solid waste management unit

Notes:

① Elevations are relative to National Geodetic Vertical Datum (NGVD) of 1929

② Elevations and dimensions based on as built construction documents

③ Dimensions are shown in feet

15 feet
Scale

Reference: NAVSTA Mayport, NAVFAC Drawing No. 5-102-637, June 18, 1985

FIGURE 1-5
CROSS SECTION OF SECOND NEUTRALIZATION BASIN

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

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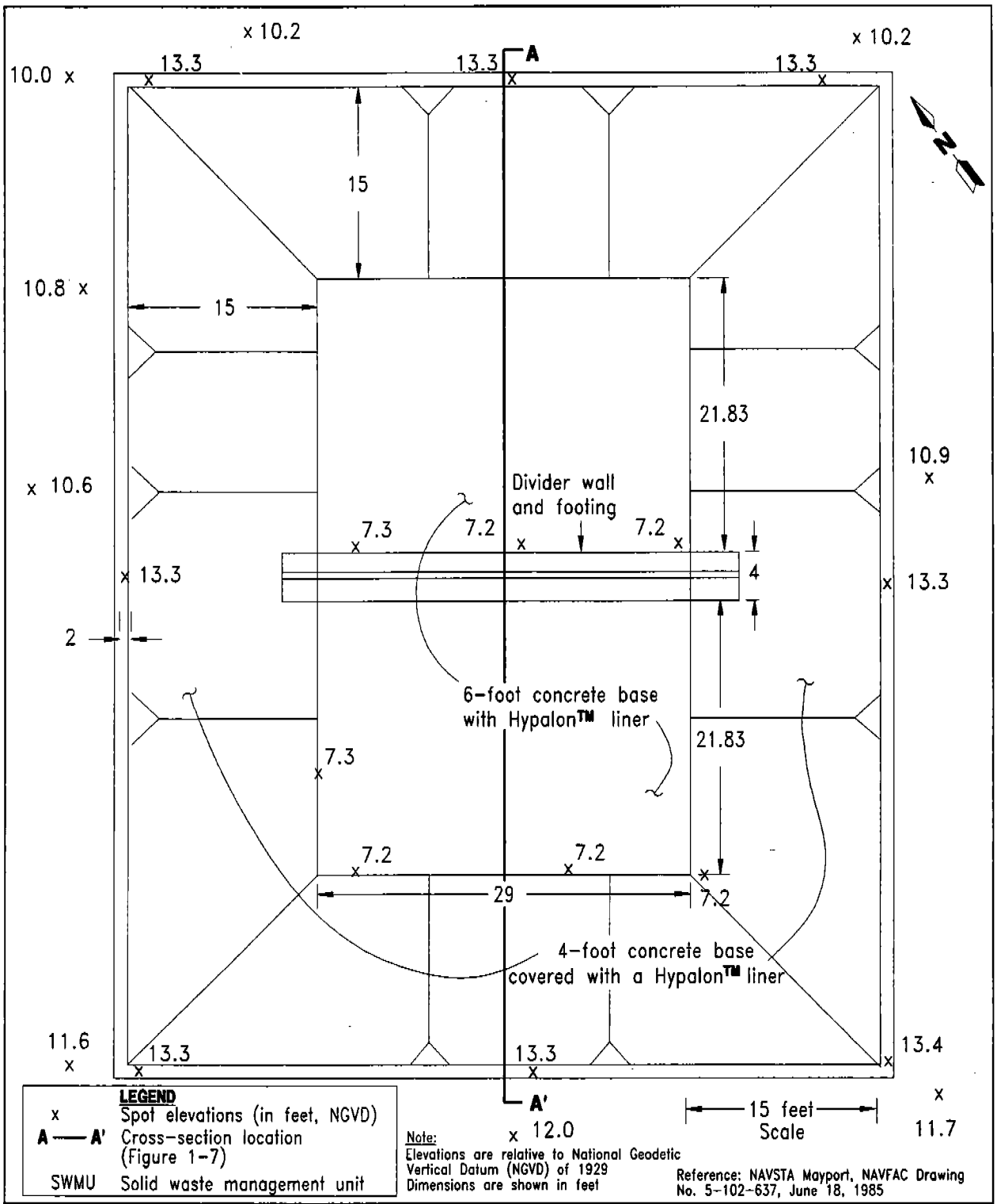

FIGURE 1-6
PLAN VIEW OF EXISTING NEUTRALIZATION BASIN

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

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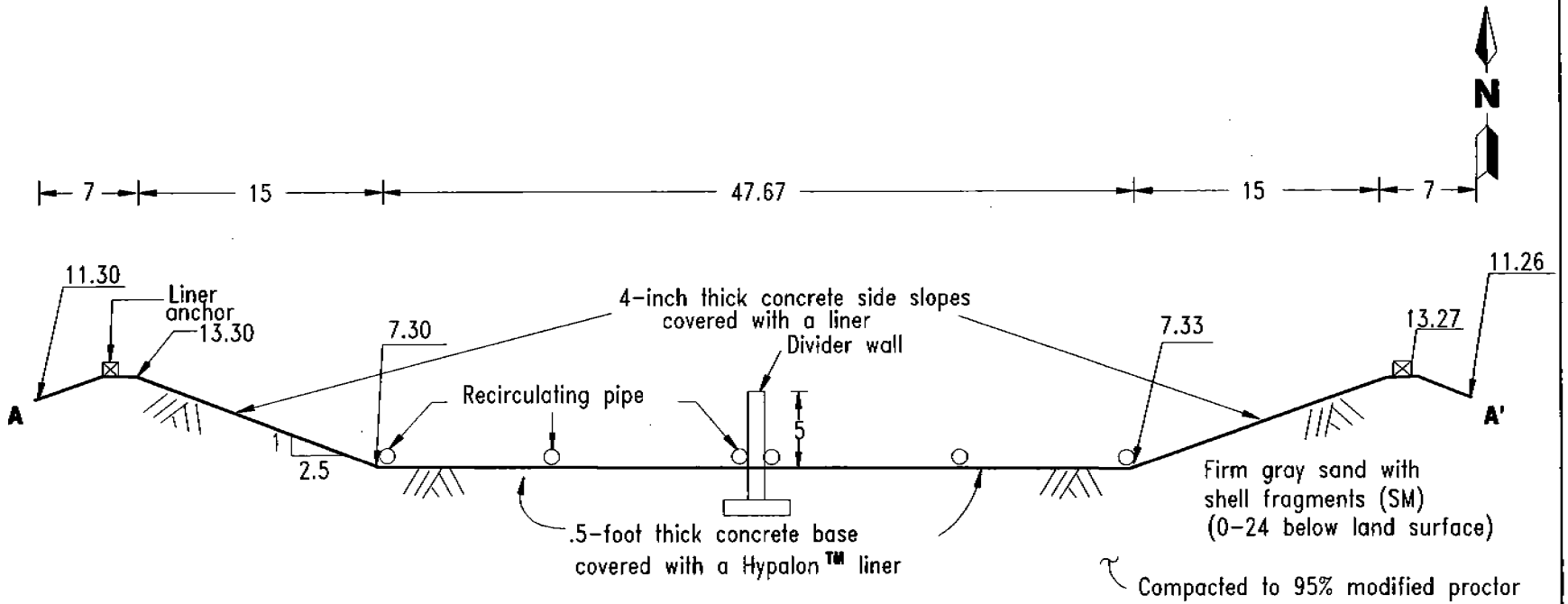

LEGEND

A —— A'	Cross-section location
SWMU	Solid waste management unit

Reference: NAVSTA Mayport, NAVFAC Drawing No. 5-102-637, June 18, 1985

Notes:

1. Liner is continuous.
2. Dimensions (feet) referenced from construction documents provided by the Navy.
3. Soil data based on boring logs provided by the Navy.
4. Elevations are relative to National Geodetic Vertical Datum (NGVD) of 1929 (feet).
5. Side slopes are approximately 25 degrees to the horizontal.

15 feet
Scale

FIGURE 1-7
CROSS SECTION OF EXISTING NEUTRALIZATION BASIN

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

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Past and Present Operations. The first neutralization basin was constructed to receive backwash from recharging ion-exchange columns located within the boiler plant. As previously stated, anecdotal evidence suggests that effluent was disposed of directly into the St. Johns River.

The second neutralization basin and the existing Neutralization Basin were also designed and constructed to receive backwash from the recharging of ion-exchange columns and neutralize the resultant acidic or basic waste. The neutralized wastewater was then discharged to the sanitary sewer system for NAVSTA Mayport's federally owned wastewater treatment plant (FOTW). Subsequent modifications to the operation of the ion-exchange system and ultimately the reverse osmosis system eliminated the discharge of high or low pH wastewater. As a result, the exiting Neutralization Basin was removed from service.

According to facility personnel, from July 1990 to January 1992 the existing Neutralization Basin was used for flow equalization and received and temporarily stored treated, nonhazardous effluent from the anion/cation exchange process used in the boiler plant. Nonhazardous effluent from The Neutralization Basin was then conveyed to the NAVSTA Mayport's FOTW. In January 1992, this process was discontinued and a reverse osmosis system as described below, was adopted.

According to facility personnel from 1992 to mid-1995, the cleaning of the reverse osmosis system consisted of four to five flushing cycles that occur over a 48-hour period. This cleaning process typically generates from 2,400 to 3,600 gallons of an effluent with a pH of approximately 12. This effluent was pumped directly to the NAVSTA Mayport's FOTW. In mid 1995, a government contract services representative stopped the procedure because the effluent's pH exceeded the maximum of 8.5 and was allowed to be released to the FOTW.

In response, the facility personnel pumped the effluent solution to The Neutralization Basin where it was mixed with approximately 80,000 gallons of water from the reverse flow of onsite water softener tanks. These two solutions were thoroughly mixed by circulating the solutions through The Neutralization Basin pH adjustment system, which consists of sprayers located along the bottom of The Neutralization Basin. After the effluent reached a neutral pH, as measured from the circulatory system spout, the water was pumped to the FOTW. The meter used to measure the effluent pH was a Hydac model 910 that was calibrated daily by the Navy's Base Operation Support (BOS) contractor with standard laboratory calibration solutions. However, a record of the pH measurements and meter calibration was not maintained.

The pH of the cleaning process solution and effluent was measured on April 18, 1996, by ABB-ES personnel and a representative of the Navy Public Works Center (PWC) from the Naval Air Station at Jacksonville. The PWC is an organization that monitors the BOS contractor, Cole-John-Jones, in the operation of the boiler plant (Building 1241). The purpose of the site visit was to conduct pH measurements of the process water during reverse osmosis maintenance and prior to release from the facility.

Measurements of pH were obtained from three locations: one at the cleaning process (Location 1) and the other from effluent in The Neutralization Basin before and after mixing (Locations 2 and 3). Location (1) is the sump adjacent to the southeastern corner of The Neutralization Basin that receives cleaning process water from the reverse osmosis system after several cleaning cycles.

Location (2) is an effluent pipe outfall located in the southern cell of The Neutralization Basin. Location (3) is the southern cell of The Neutralization Basin where mixing of the cleaning process water and approximately 80,000 gallons of water from the water softening tanks occurs. A representative of Cole-John-Jones was onsite to conduct the typical reverse osmosis maintenance operation through one full cycle.

Prior to initiation of the operation, water samples were measured to determine pH and temperature from the three locations using a VWR Scientific pH meter. The pH meter was previously calibrated by the BOS contractor using a 2-point calibration at pHs of 7 and 10. At the completion of the process the pH of effluent in The Neutralization Basin was measured after mixing for approximately 10 minutes. Results of the pH measurements are presented in Table 1-3.

Table 1-3
Reverse Osmosis Maintenance Operation pH Measurements

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Sample Location	Time[1]	Temperature (°C)	pH (Standard Units)
Initial Measurements			
Location 1	11:31	55	8.16
Location 2	11:36	49.6	8.14
Location 3	11:39	28.8	8.63
Operational Measurements			
Location 1	11:53	30.5	10.6
Location 1	11:58	33.2	12.09
Location 2	12:02	37.6	10.23
Location 3 pre mixing	12:05	33.6	10.33
Location 3 post mixing	12:14	35.7	10.42

[1] Eastern Daylight Savings Time
Standard Units = less than 6 = acidic, 7 = neutral, and greater than 8 = alkaline.

Note: °C = degrees centigrade.

In an unrelated event, in August of 1995, according to the BOS contractor's boiler plant facility personnel, a new formulation of fuel oil was introduced to the steam plant. The new fuel-oil formulation produced a buildup of material that required pressure washing and or scraping of various boiler components to maintain desired boiler efficiencies. Initially, wastewater with a pH between 3.7 and 4.7 from pressure washing entered the facilities floor drain system and eventually drained to The Neutralization Basin. This wastewater was then mixed with other effluent. According to the BOS contractor's boiler plant facility personnel, beginning in April 1996, rinsate from pressure washing the boilers was collected, drummed and temporarily stored, pending analytical results, at the stations's RCRA permitted less-than-90-day storage area for proper disposal.

In April of 1996, the cleaning processes for the reverse osmosis unit and boilers were reviewed, and it was determined that reverse osmosis washwater could be

pumped directly to the FOTW and that the rinsate from the boiler washing would be collected, drummed, and temporarily stored as previously described.

Currently, the most recent use of The Neutralization Basin has ceased. It is the intention of NAVSTA Mayport personnel to have pipelines from the boiler plant at Building 1241 to The Neutralization Basin removed or capped in the near future (estimated to be between September and November 1998). However, pipes from The Neutralization Basin to the FOTW will remain. The pipes are needed to periodically discharge rainwater that collects in The Neutralization Basin to the FOTW. Currently, the Navy is considering filling in The Neutralization Basin with a clean material obtained from an offsite source, at which time, the pipelines to the FOTW would be capped. Construction specifications have not been prepared at this time.

Additionally, during a recent interview, a facility maintenance contractor employee indicated that in 1992 a release of sodium hydroxide occurred near The Neutralization Basin (SWMU 12). The release occurred when The Neutralization Basin's sodium hydroxide tank was being removed from service. The tank had a faulty pump, which resulted in the tank not being completely emptied prior to its removal. Consequently, the tank's contents (approximately 300 gallons of sodium hydroxide) were released on the ground, about 20 feet east of the southeastern corner of The Neutralization Basin and 40 feet north of the boiler plant (Building 1241). The area surrounding the release was later identified as having stressed vegetation. Consequently, a 6- to 9-inch-thick layers of soil was placed over the area and the soil was seeded.

1.4 REPORT LAYOUT. The CCED report is divided into three chapters. Chapter 1.0 presents the regulatory history of The Neutralization Basin (SWMU 12), the objectives of this CCED petition, and site description.

Chapter 2.0 is organized into three sections: the first two sections describe closure activities that occurred from 1988 through 1990 and 1992 through 1995. The two sections include a description of the field activities that occurred during the specified time intervals, data quality assessment techniques, and analytical results. The third section is the human health and ecological risk assessments that were conducted for the RFI at The Neutralization Basin.

Chapter 3.0 summarizes information that support the conclusion that the operation of the surface impoundment (The Neutralization Basin) has not resulted in a release of hazardous chemicals or materials to the environment, and that, as a result, no remedial measures are necessary to clean close The Neutralization Basin.

2.0 CLOSURE ACTIVITIES

This chapter is divided into three sections: Section 2.1 Closure Activities, 1988 through 1990; Section 2.2 Closure Activities, 1992 through 1995; and Section 2.3 Human Health and Ecological Risk Assessment. Section 2.1 provides a description of the field activities that were based on workplans prepared in 1988 and 1989 (E.C. Jordan, 1988a; 1988b and 1989) and the associated findings. Section 2.2 provides a description field activities that occurred specifically for clean closure and during the RFI for The Neutralization Basin (SWMU 12) and the associated findings. Section 2.3 provides the human health and ecological risk assessments that were conducted for the RFI at The Neutralization Basin (SWMU 12).

Appendix C of this report contains standards, and procedures that were used to conduct the CCED. The procedures provide general operating guidelines for description of field personnel responsibilities, sample identification, sample management, chain-of-custody procedures, project documentation, field changes, corrective actions, decontamination procedures, waste management, and other general project standards and procedures. Field and laboratory Quality Assurance and Quality Control (QA/QC) requirements followed during the CCED and related RFI activities are from closure and monitoring plans for The Neutralization Basin prepared by E.C. Jordan in 1988 and 1989, (E.C. Jordan, 1988a; 1988b and 1989), the NAVSTA Mayport RFI Workplan (ABB-ES, 1991) and USEPA Region IV standard operating procedures (USEPA, 1991 and 1996).

2.1 CLOSURE ACTIVITIES, 1988 THROUGH 1990. Closure activities conducted during this period included the following:

- drilling two soil borings to collect subsurface soil samples beneath The Neutralization Basin;
- drilling two soil borings to install monitoring wells;
- collecting groundwater samples from the two monitoring wells;
- analyzing the subsurface soil samples for extraction procedure (EP) toxicity metals and pH; and
- analyzing the groundwater samples one time for target analytes specified in 40 CFR 265.92(b), and secondary drinking water parameters in FAC 17-22 (currently FAC 62-550.320), and the subsequent 3 quarters for pH, Appendix III metals in 40 CFR 265.92(b) and any first quarter parameter that exceeded FDEP groundwater quality standards in FAC 17-22 (currently, FAC 62-550.310 and .320) (E.C. Jordan, 1988a; 1988b; and 1989).

2.1.1 Soil Sampling and Analysis On May 10, 1989, two slant soil borings were advanced at an angle beneath The Neutralization Basin to collect subsurface soil samples in accordance with Addendum A to the Closure Plan (E.C. Jordan, 1989). Two subsurface soil samples were collected at each boring (four samples total) and analyzed in accordance with the Groundwater Monitoring Plan (E.C. Jordan, 1988b), and Closure Plan Addendum (E.C. Jordan, 1989).

The slant soil boring technique was used (Figure 2-1) because of the configuration of The Neutralization Basin, the location of various appurtenances, and to avoid the drilling of holes through the Hypalon™ liner and concrete bottom. Both slant borings were advanced at an angle of approximately 25 degrees from the horizontal, parallelling the side slope of The Neutralization Basin (Figure 2-2). The two sample locations are approximately 16 to 18 feet and 25 to 28 feet from the east edge of The Neutralization Basin. At both boring locations, two subsurface soil samples were collected with a split-spoon sampler at depths of approximately 2.5 to 3.25 feet and 3.75 and 4.5 feet beneath the concrete bottom of The Neutralization Basin. No water or bottom sediments (sludge) were present in either of the two Neutralization Basin cells during this sampling event.

After the subsurface soil samples were collected they were placed in a cooler refrigerated with ice for express overnight shipment, under chain-of-custody protocol, to the analytical laboratory. Analytes and detection limits are located in Appendix B, Slant Soil Boring Soil Samples.

2.1.2 Well Installation Two monitoring wells were installed on April 25, 1989 to assess groundwater quality beneath The Neutralization Basin site (E.C. Jordan, 1988b) (Figure 2-3). The monitoring well designations were subsequently modified to match the system used for other monitoring wells located at NAVSTA Mayport. In previous reports, the monitoring wells at The Neutralization Basin (SWMU 12) were designated MPT-11-1 and MPT-11-2, they are designated as MPT-11-MW01S and MPT-11-MW02S, respectively.

The locations of the two monitoring wells were chosen based on the assumption that the hydraulic gradient was in a north and northeastern direction toward the St. Johns River and site access restrictions. Monitoring well MPT-11-MW01S was located to the south of the boiler plant (Building 1241) and assumed to be hydraulically upgradient from The Neutralization Basin. The second monitoring well, MPT-11-MW02S, was located at the northeast corner of The Neutralization Basin and assumed to be hydraulically downgradient from The Neutralization Basin. Because of the limited space between The Neutralization Basin and the river bank, monitoring well MPT-11-MW02S was located as close as possible to the northeast corner of The Neutralization Basin.

The borings for monitoring wells MPT-11-MW01S and MPT-11-MW02S were drilled using hollow-stem augers to depths of approximately 20 and 17 feet bls, respectively. The screened interval of each monitoring well was set to intersect the water table. The monitoring wells are constructed of 2-inch inner diameter, Schedule 40 polyvinyl chloride (PVC) casing with the bottom 10 feet screened with 0.01-inch slots. The wells were constructed with a 20/30 silica sand filter pack (to 0.5 foot above the top of the well screen), a 2-foot bentonite seal, and neat cement grout to the land surface. The wells were completed with threaded tops and flush-mount casings to allow equipment access over the wells. The original monitoring well threaded tops were subsequently replaced by air-tight expanding compression gasket locking caps. Construction diagrams for the monitoring wells are presented in Appendix B, Section B-1.

Monitoring wells MPT-11-MW01S and MPT-11-MW02S, as installed, varied from the proposed construction materials outlined in the Groundwater Monitoring Plan (E.C. Jordan, 1988b). A well screen filter pack of 20/30 silica sand and 0.010-inch slotted screen were installed rather than the proposed 6/20 sand pack and 0.015-inch slotted screen as designated in the workplan (E.C. Jordan, 1988b).

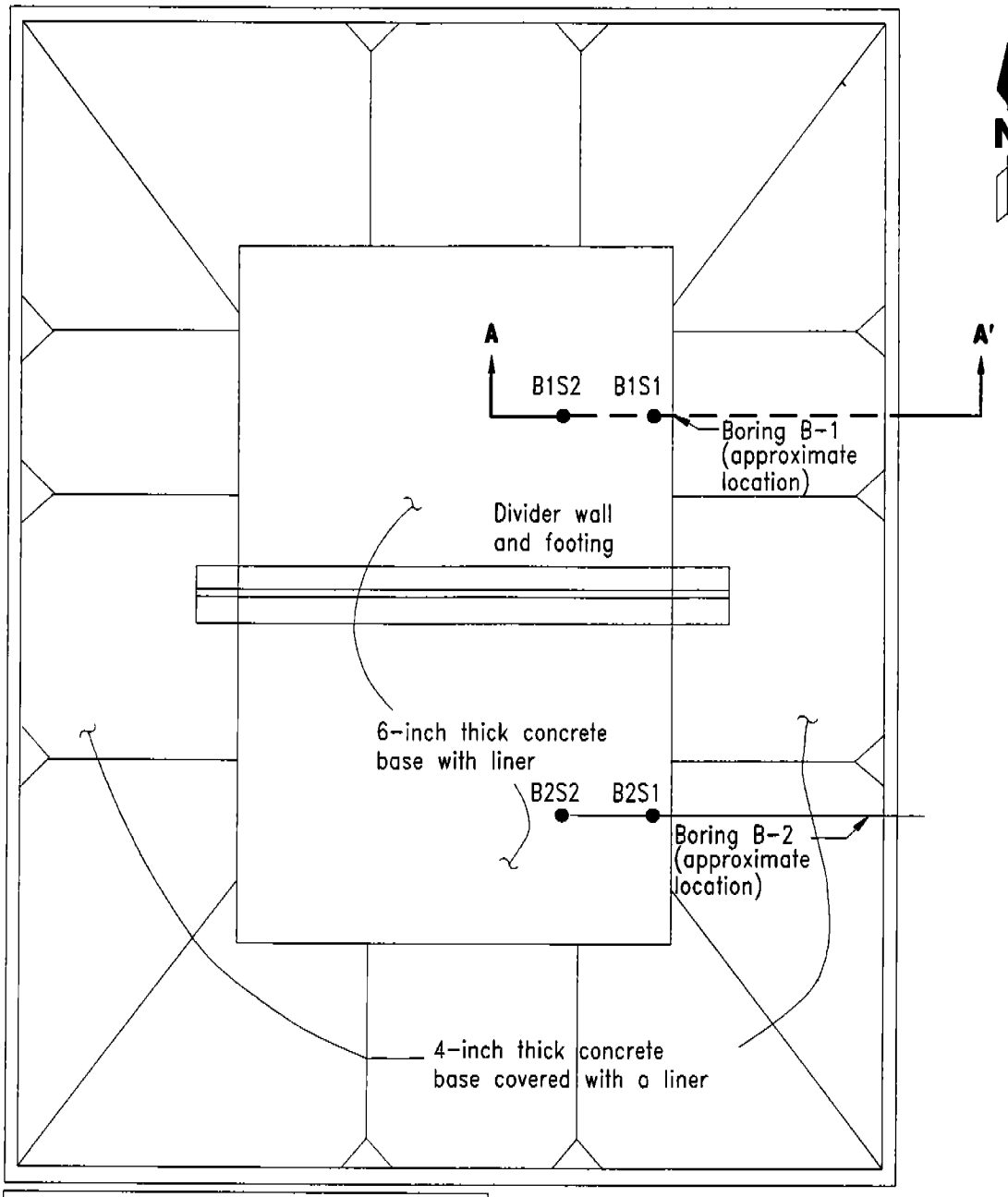
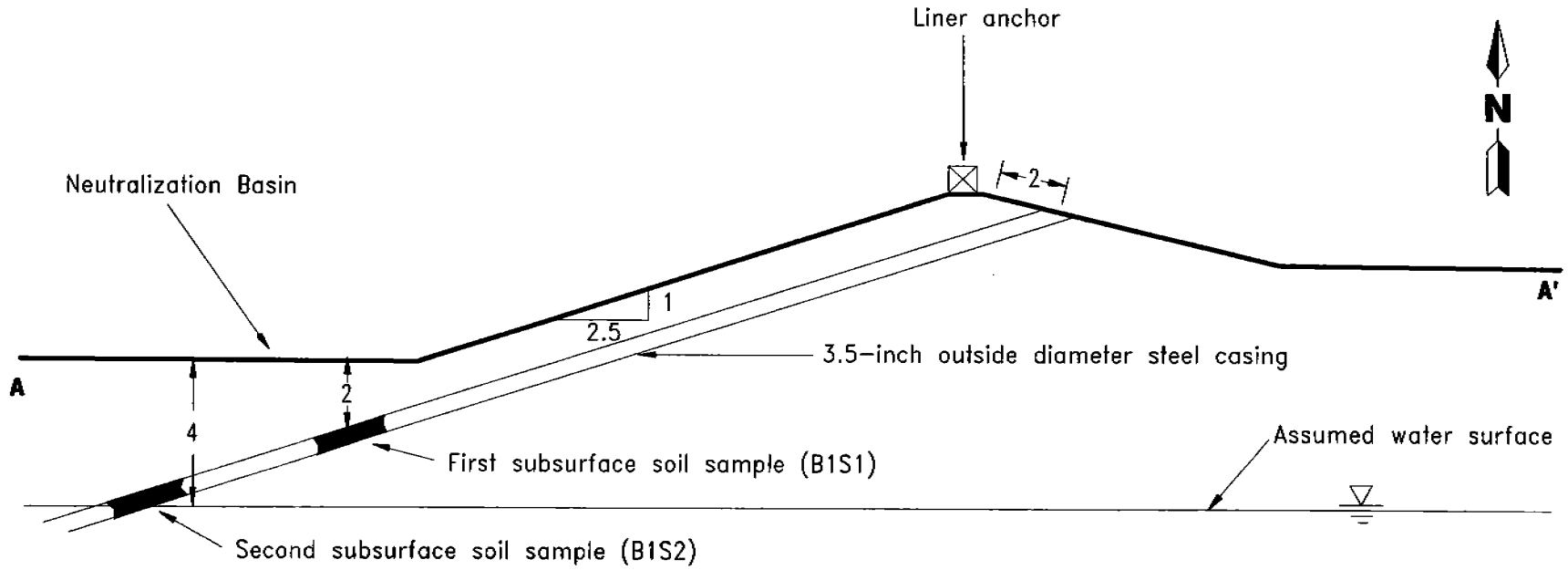


FIGURE 2-1
PLAN VIEW OF SUBSURFACE SOIL SAMPLING LOCATIONS

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION
MAYPORT, FLORIDA

H:/MPT/SWMU12/CCE-DEMO/PS/09-17-96



LEGEND

A —— A'	Cross-section location
SWMU	Solid waste management unit

Notes:
Dimensions are shown in feet

0 3.5 5
SCALE: 1 INCH = 5 FEET

FIGURE 2-2
CROSS-SECTIONAL VIEW OF NEUTRALIZATION BASIN WITH ANGLE BORING AND SUBSURFACE SAMPLE LOCATIONS

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

H:\MPT\SWMU12\CCE-DEMO\PS\09-17-96

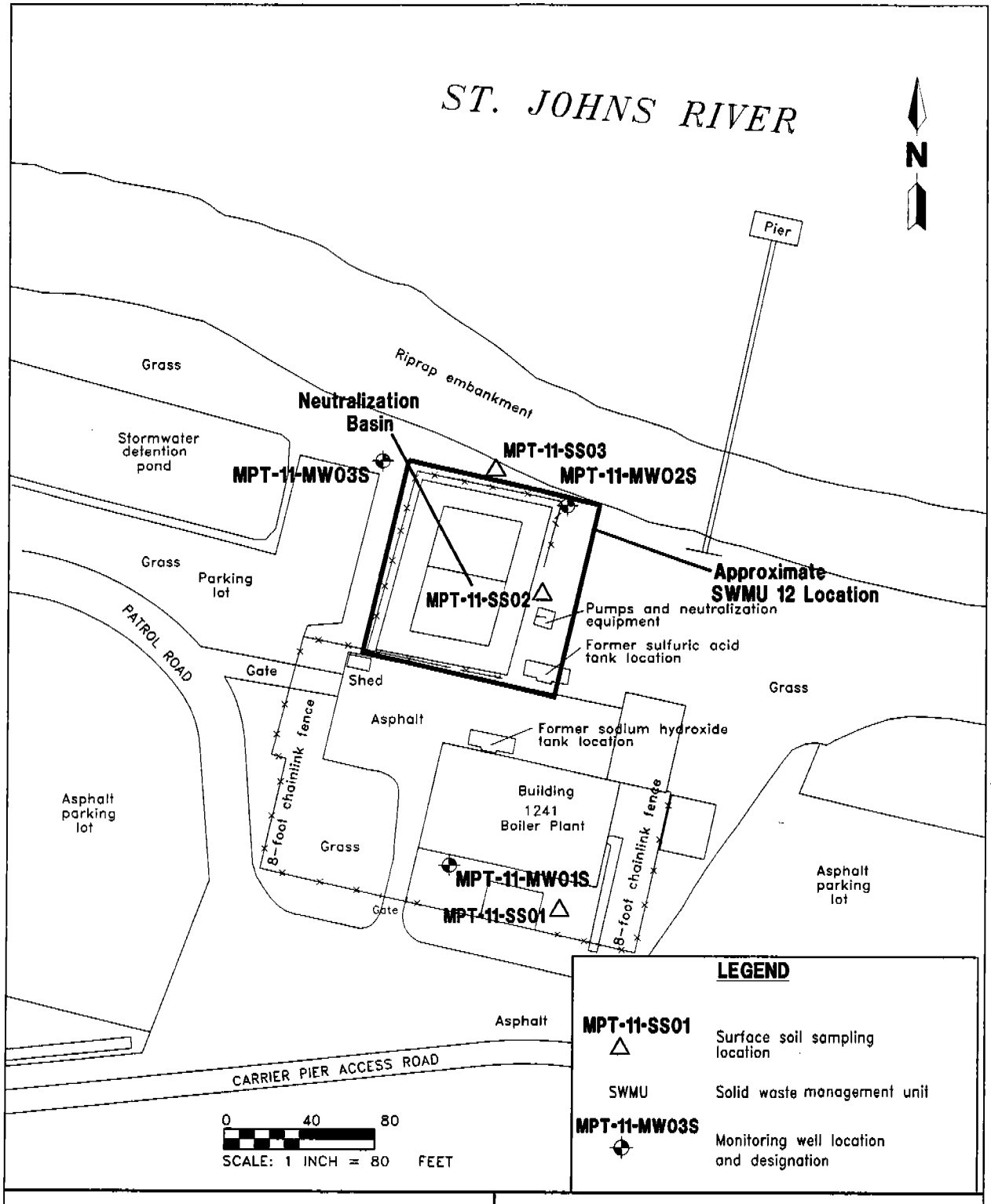


FIGURE 2-3
SURFACE SOIL AND GROUNDWATER SAMPLE LOCATIONS, NEUTRALIZATION BASIN, SWMU 12

H:\MPT\RCRA\DEMO\JMK\09-09-96

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

Site-specific lithologic conditions indicated that sediments characteristic of the shallow surficial aquifer at The Neutralization Basin were composed primarily of poorly graded, fine-grained sand. Based on these lithologic conditions, a smaller slot size and a more narrowly graded sand pack were determined to be more appropriate than was specified in the workplan (E.C. Jordan, 1988b). Therefore, the monitoring well construction materials were modified slightly to ensure the integrity of the monitoring wells and the production of water representative of the formation.

2.1.3 Groundwater Sampling and Analysis Each of the two monitoring wells, MPT-11-MW01S and MPT-11-MW02S, were sampled during four quarterly sampling events (an initial sampling event and three subsequent quarterly sampling events) as described in the Groundwater Monitoring Plan (E.C. Jordan, 1988b). The two monitoring wells, MPT-11-MW01S and MPT-11-MW02S, were sampled on April 25, 1989, July 6, 1989, October 10, 1989, and January 4, 1990. The first round of quarterly samples were analyzed for organic and inorganic parameters in Appendix III 40 CFR 265.92(b), and secondary drinking water parameters in FAC 17-22. Based on the analytical results from the first quarterly sampling event, the remaining three sampling rounds were analyzed only for selected Appendix III metals in accordance with the Groundwater Monitoring Plan (E.C. Jordan, 1988b). No additional quarterly sampling events occurred after January 4, 1990.

The monitoring wells were purged and sampled using a precleaned Teflon™ bailer and monofilament line dedicated to each well. Sample bottles were filled in the order of volatile organic compounds (VOCs) semivolatile organic compounds (SVOCs), pesticides and polychlorinated biphenyls (PCBs), and inorganics.

Samples for inorganic constituents analysis were collected without filtration and were preserved immediately after collection with nitric acid. The inorganic results reported are, therefore, total concentrations and reflect both filterable (suspended) and nonfilterable (dissolved) fractions.

After the groundwater samples were collected, they were placed in a cooler refrigerated with ice for express overnight shipment, under chain-of-custody protocol, to the analytical laboratory.

2.1.4 Analytical Data QA/QC The objective of this section is to summarize the overall QA/QC of analytical results obtained from the initial Neutralization Basin field activities.

Field QA/QC Samples. Four types of field QA/QC samples were used to monitor the potential existence of chemicals (cross-contamination problems) that might have been introduced by field activities during the groundwater sampling events. Below are the four types of QA/QC samples.

Equipment Blank. After sampling equipment was decontaminated, it was rinsed with organic-free water. A random sample of this final rinse water was submitted for analysis as an equipment rinsate blank. This blank was used to assess whether or not chemicals had been introduced due to incomplete equipment decontamination or poor sampling techniques. One rinsate blank per sampling event was analyzed for the same analytical parameters as the corresponding samples.

Rinse Water Source Blank. This was a sample of the organic-free water used for rinsing sampling equipment. This blank was used to assess whether or not chemicals may have been introduced by the rinse water. One field blank was submitted for each batch of decontamination water, or one per field sampling event. The field blank was analyzed for the same parameters as the corresponding field samples.

Trip Blank This blank consisted of a VOC sample container (40 milliliter) that was filled in the analytical laboratory with organic-free water prior to being sent to the field. The trip blank sample container was not opened in the field and was shipped back to the laboratory in a cooler containing field samples for VOC analyses. One trip blank was included in each shipping container that contained samples for Naval Energy and Environmental Support Activity Level C VOC analysis. The purpose of the trip blank was to assess the potential for cross-contamination of samples via VOCs during sample bottle shipment and storage.

Duplicate Sample A duplicate of one of the environmental samples was used to assess sampling accuracy and precision. Duplicate samples were collected for every sampling event.

No organic compounds were detected in any field QA/QC blanks. One inorganic analyte, sodium, was detected in the equipment and field QA/QC blanks. These data are provided in Appendix B, Section B-2

2.1.5 Analytical Results for 1988 Through 1990 This section outlines the findings of the assessment activities conducted between 1988 through 1990 at The Neutralization Basin (SWMU 12). Analytical data reports from the laboratory are provided in Appendix B, Section B-3.

2.1.5.1 **Subsurface Soil Sampling** The subsurface soil samples consisted of a tan-to-brown, fine sand with shells. The pH of the soil samples ranged from 8.18 to 9.16 standard units and averaged 8.71 standard units (Table 2-1). Materials with pH values less than 2 and greater than 12.5 standard units are considered hazardous. The pH values for the subsurface soil samples are within the range that is considered nonhazardous. The pH values appear to be within the range that would be natural for soil containing calcareous materials (U.S. Department of Agriculture [USDA], 1978).

The results of the EP toxicity metals analysis for each of the subsurface soil samples suggest that, if present, the concentrations of metals were less than the analytes individual detection limits (Table 2-1).

Based on these analyses, soil beneath The Neutralization Basin could not be considered hazardous waste according to pH and EP toxicity hazardous waste identification criteria. Additionally, the pH of the subsurface soil samples suggest that there has not been a release of acid or alkaline material from The Neutralization Basin.

2.1.5.2 **Initial Groundwater Sampling** The Appendix III metals, arsenic, cadmium, chromium, and lead were detected in groundwater samples collected during the initial sampling event (Table 2-2).

Table 2-1
pH and Extraction Procedure Toxicity Test for Inorganic Analytes Detected in Subsurface Soil Samples at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analytical Batch Number:	89-1671-1	89-1671-2	89-1671-3	89-1671-4	Detection Limit Extraction Procedure Toxicity Test
Sample Location:	B-1	B-1	B-2	B-2	
Sample Number:	B1S1	B1S2	B2S1	B2S2	
Date Sampled:	10-May-89	10-May-89	10-May-89	10-May-89	
Sample Depth (ft bls):	2.5 to 3.25	3.75 to 4.5	2.5 to 3.25	3.75 to 4.5	
pH (Standard Units)					
pH	8.18	8.87	8.64	9.16	N/A
Inorganic Analytes (mg/ℓ)					
Arsenic	--	--	--	--	0.5
Barium	--	--	--	--	1.0
Cadmium	--	--	--	--	0.1
Chromium	--	--	--	--	0.5
Lead	--	--	--	--	0.5
Mercury	--	--	--	--	0.01
Selenium	--	--	--	--	0.2
Silver	--	--	--	--	0.5

Notes: SWMU = solid waste management unit.
ft bls = feet below land surface.
N/A = not applicable, pH is characterized as hazardous if it is less than 2 and greater than 12.5 Standard Units.
mg/ℓ = milligrams per liter.
-- = concentration of analyte, if present, was less than the detection limit.

Table 2-2
Summary of Analytical Results, First Quarter Groundwater Sampling, April 25, 1989

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Parameter	Units	MCLs[1]	Florida Drinking Water Standard[2]	Laboratory Detection Limit	Concentration Detected in Samples		
					MPT-11-MW01S[4]	MPT-11-MW02S[5]	MPT-11-MW02S[6] (Duplicate)
40 CFR 265 Appendix III Metals							
Arsenic	mg/ℓ	0.05	0.05	0.001	0.007	0.016	0.011
Barium	mg/ℓ	2	2	0.03	--	--	--
Cadmium	mg/ℓ	0.005	0.005	0.0005	0.001	0.002	0.001
Chromium	mg/ℓ	0.1	0.1	0.01	--	--	0.01
Lead	mg/ℓ	0.015	0.015	0.001	--	0.005	--
Mercury	mg/ℓ	0.002	0.002	0.0001	--	--	--
Selenium	mg/ℓ	0.05	0.05	0.01	--	--	--
Silver	mg/ℓ	[3]0.1	[3]0.1	0.0001	--	--	--
40 CFR 265 Appendix III Nonmetals							
Endrin	mg/ℓ	0.002	0.002	0.00007	--	--	--
Fluoride	mg/ℓ	4	[7]4	0.01	0.43	1.5	1.5
Lindane	mg/ℓ	0.0002	0.0002	0.0002	--	--	--
Nitrate-N	mg/ℓ	10	10	0.1	0.3	--	--
Methoxychlor	mg/ℓ	0.04	0.04	0.005	--	--	--
Toxaphene	mg/ℓ	0.003	0.003	0.001	--	--	--
2,4-D[8]	mg/ℓ	0.07	0.07	0.02	--	--	--

See notes at end of table.

Table 2-2 (Continued)
Summary of Analytical Results,
First Quarter Groundwater Sampling,
April 25, 1989

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Parameter	Units	MCLs[1]	Florida Drinking Water Standard[2]	Laboratory Detection Limit	Concentration Detected in Samples		
					MPT-11-MW01S[4]	MPT-11-MW02S[5]	MPT-11-MW02S[6] (Duplicate)
40 CFR 265 Appendix III Nonmetals (continued)							
2,4,5-TP[9]	mg/ℓ	0.05	0.05	0.002	--	--	--
Radium (226)	Pc/ℓ	20	5	0.0 ± 1.2	0.8 ± 0.1	0.9 ± 0.1	0.3 ± 0.1
Gross alpha	Pc/ℓ	15	NR	1.2 ± 1.3	11.4 ± 8.6	0.0 ± 35.8	9.3 ± 14.7
Coliform bacteria	CTN/100 mℓ	NR	1	1	--	--	--
Turbidity	NTU	NR	NR	0.1	6.2	16	14
40 CFR 265.92(b)(2) Parameters							
Chloride	mg/ℓ	250	250	1	170	1,084	1,734
Iron	mg/ℓ	0.3	0.3	0.02	6	4.7	7.3
Manganese	mg/ℓ	0.05	0.05	0.01	0.14	0.24	0.32
Phenols[10]	mg/ℓ	NR	0.01	0.001	--	--	--
Sodium	mg/ℓ	NR	160	0.20	144	740	750
Sulfate	mg/ℓ	500	250	1	412	202	242
40 CFR 265.92(b)(3) Parameters							
pH	Standard units	6.5 to 8.5	6.5 to 8.5	0.01	7.24	7.31	7.37
Specific conductance	μmhos/cm	NR	NR	0.1	1,491	5,630	4,255
Total organic carbon	mg/ℓ	NR	NR	0.1	4	5	4
Total organic halogen	mg/ℓ	NR	NR	0.001	70	70	70

See notes at end of table.

Table 2-2 (Continued)
Summary of Analytical Results,
First Quarter Groundwater Sampling,
April 25, 1989

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Parameter	Units	MCLs[1]	Florida Drinking Water Standard[2]	Laboratory Detection Limit	Concentration Detected in Samples		
					MPT-11-MW01S[4]	MPT-11-MW02S[5]	MPT-11-MW02S[6] (Duplicate)
Secondary Drinking Water Standards							
Color	Color	15	15	5	30	30	30
Copper	mg/ℓ	1	1	0.02	--	--	--
Corrosivity	LSI	NC	NC	0.01	0.44	0.40	0.64
Foaming agents	mg/ℓ	0.5	0.5	NR	0.027	0.060	0.052
Odor	Threshold odor number	3	3	1	1	1	1
Total dissolved solids	mg/ℓ	500	500	1	991	3,264	2,343
Zinc	mg/ℓ	[3]5	[3]5	0.01	0.08	0.04	0.07

[1] MCL Safe Drinking Water Act 40 CFR Part 141 (November, 1994).
[2] Florida Drinking Water Standards (FDWS), Monitoring and Reporting, Chapter 62-550 Florida Administrative Code (January, 1995).
[3] Federal or State Secondary Drinking Water Standard.
[4] Sample designated as MPT-11-01 in Appendix B.
[5] Sample designated as MPT-11-02 in Appendix B.
[6] Sample designated as Duplicate in Appendix B.
[7] State of Florida Secondary Drinking Water Standard is 2 micrograms per liter.
[8] 2,4-Dichlorophenoxyacetic acid.
[9] (2,4,5-Trichlorophenoxy)propionic acid (Silvex).
[10] Carbonic acid.

Notes: MCLs = maximum contaminant levels.
CFR = Code of Federal Regulations.
mg/ℓ = milligrams per liter.
-- = concentration of analyte, if present, was less than the detection limit.
Pc/ℓ = picocuries per liter.
NR = chemical or parameter not regulated by U.S. Environmental Protection Agency or FDWS (62-550).
CTN = (total) coliform count.
mℓ = milliliter.
NTU = nephelometric turbidity units.
μmhos/cm = micromhos per centimeter.
LSI = Langlier Saturation Index.
NC = non corrosive.

- Arsenic was detected in each of the three samples at concentrations ranging from 0.007 to 0.016 milligrams per liter (mg/ℓ). The maximum contaminant level (MCL) for arsenic (0.05 mg/ℓ) was not exceeded.

- Cadmium was detected in each of the three samples at concentrations ranging from 0.001 to 0.002 mg/ℓ. The MCL for cadmium (0.005 mg/ℓ) was not exceeded.

- Chromium was detected as a single occurrence at a concentration of 0.01 mg/ℓ. The MCL for chromium (0.1 mg/ℓ) was not exceeded.

- Lead was detected as a single occurrence at a concentration of 0.005 mg/ℓ. The MCL for lead (0.015 mg/ℓ) was not exceeded.

Two Appendix III analytes, fluoride and nitrate-N, were detected in groundwater samples collected from monitoring wells MPT-11-MW01S, MPT-11-MW02S, and the duplicate at The Neutralization Basin (SWMU 12).

- Fluoride was detected in each of the groundwater samples at concentrations ranging from 0.43 to 1.5 mg/ℓ. The MCL for fluoride (4.0 mg/ℓ) was not exceeded.

- Nitrate-N was detected as a single occurrence at a concentration of 0.3 mg/ℓ. The MCL for Nitrate-N (10.0 mg/ℓ) was not exceeded.

Chloride, iron, manganese, and sodium were detected at concentrations that exceeded the drinking water standards and sulfate was detected at a concentration that approached but did not exceed its standard.

- Chloride was detected at concentrations ranging from 170 to 1,734 mg/ℓ. The MCL for chloride is 250 mg/ℓ. Chloride has been detected at concentrations of 11.4 to 6,600 mg/ℓ in samples collected from background monitoring wells (ABB-ES, 1995b).

- Iron was detected at concentrations ranging from 4.7 to 7.3 mg/ℓ. The MCL for iron is 0.3 mg/ℓ. Iron has been detected at concentrations of 0.015 to 3.9 mg/ℓ in samples collected from background monitoring wells (ABB-ES, 1995b).

- Manganese was detected at concentrations ranging from 0.14 to 0.32 mg/ℓ. The MCL for manganese is 0.05 mg/ℓ. Manganese has been detected at concentrations of 0.003 to 0.39 mg/ℓ in samples collected from background monitoring wells (ABB-ES, 1995b).

- Sodium was detected at concentrations ranging from 144 to 750 mg/ℓ. The MCL for sodium is 160 mg/ℓ. Sodium has been detected at concentrations of 5.3 to 3,630 mg/ℓ in samples collected from background monitoring wells (ABB-ES, 1995b).

- Sulfate, a common form of sulfur found in oxygenated conditions, ranged from 202 to 412 mg/ℓ. Sulfate was also detected at 2.4 mg/ℓ in both the field and equipment blanks. The State MCL for sulfate (250 mg/ℓ) was not exceeded. Sulfate has been detected at concentrations of 13.1 to 1,230 mg/ℓ in samples collected from background monitoring wells (ABB-ES, 1995b).

The chemicals chloride, iron, manganese, sodium and sulfate are commonly found in marine and estuarine waters (Hem, 1992). However, the groundwater samples did not meet the condition (i.e., chloride at concentrations equal to or exceeding 1,500 mg/ℓ) for predominantly marine water as defined in Chapter 17-302.200, FAC. It should also be noted that in a study of the surficial aquifer beneath NAVSTA Mayport, the U.S. Geological Survey (USGS) concluded that the freshwater flow system is expanding and entrained saltwater is still being flushed out (USGS, 1997).

Concentrations of chloride, iron, manganese, sodium and sulfate were highest in the groundwater sample collected from monitoring well MPT-11-MW02S. This monitoring well is closest to the St. Johns River (Figure 2-1). Because the concentrations of these chemicals are likely a result of the well being close to the St. Johns River, the groundwater samples collected during the remaining three quarterly sampling events were analyzed only for select Appendix III metals in accordance with the Groundwater Monitoring Plan (E.C, Jordan, 1988b).

Total organic carbon (TOC) was measured by USEPA Method 415.2 and provides an estimate of the carbonaceous oxygen demand in the groundwater. Values ranged from 4 mg/ℓ to 5 mg/ℓ. TOC can be used as a proxy for the more common measure of biologically degradable carbonaceous matter in water, 5-day biochemical oxygen demand (BOD_5). The value measured for TOC is generally an order of magnitude greater than the corresponding BOD_5 value.

Color as measured by USEPA Method 110.2 was measured at 30 American Public Health Association (APHA) units in each sample. Laboratory-measured pH ranged from 7.24 to 7.37 standard units. The laboratory-measured specific conductance ranged from 1,491 to 5,630 micromhos per centimeter (μmhos/cm). Total dissolved solids (TDS), as measured by a gravimetric method (USEPA Method 160.1), ranged from 991 to 3,264 mg/ℓ. General water quality of the surficial aquifer beneath The Neutralization Basin (SWMU 12), as measured by TDS, suggests that saline conditions are present and potable use of the aquifer without some form of treatment is unlikely (Table 2-2).

2.1.5.3 **Quarterly Groundwater Sampling** Six Appendix III metals (arsenic, cadmium, chromium, lead, mercury, and silver) were detected at various concentrations and combinations in the four quarterly groundwater samples from monitoring wells MPT-11-MW01S, MPT-11-MW02S, and a duplicate from monitoring well MPT-11-MW02S (Table 2-3). The metals listed below were detected in groundwater samples collected from The Neutralization Basin monitoring wells.

- Arsenic was detected in 11 of the 12 groundwater samples at concentrations ranging from 0.004 to 0.016 mg/ℓ. The MCL for arsenic (0.05 mg/ℓ) was not exceeded.

- Cadmium was detected in 10 of the 12 groundwater samples at concentrations ranging from 0.001 to 0.01 mg/ℓ. The MCL for cadmium (0.005 mg/ℓ) was exceeded in a single groundwater sample collected on October 10, 1989, from monitoring well MPT-11-MW01S.

- Chromium was detected as a single occurrence at a concentration of 0.01 mg/ℓ. Chromium was not detected in the groundwater sample from the corresponding environmental sample. The MCL for chromium (0.1 mg/ℓ) was not exceeded.

Table 2-3
Results of Chemical Analysis for Appendix III Metals Detected in Groundwater, Four Quarterly Sampling Events

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Sample Location	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
Florida Drinking Water Standards[1]	0.05	2.0	0.005	0.1	0.015	0.002	0.05	[3]0.1
MCLs[2]	0.05	2.0	0.005	0.1	0.015	0.002	0.05	[3]0.1
Detection Limit	0.001	0.1	0.0001	0.01	0.001	0.0001	0.003	0.0001
April 25, 1989								
MPT-11-MW01S[4]	0.007	–	[5]0.001	–	–	–	–[5]	–
MPT-11-MW02S[6]	0.016	–	[5]0.002	–	0.005	–	–[5]	–
MPT-11-MW02S[7]	0.011	–	[5]0.001	0.01	–	–	–[5]	–
July 6, 1989								
MPT-11-MW01S[4]	0.008	–	0.0011	–	0.006	–	–	0.001
MPT-11-MW02S[6]	0.008	–	0.004	–	0.002	–	–	–
MPT-11-MW02S[7]	0.006	–	0.002	–	–[5]	0.0001	–	–
October 10, 1989								
MPT-11-MW01S[4]	–	–	0.01	–	0.002	–	–	–
MPT-11-MW02S[6]	0.004	–	–	–	–	0.0001	–	–
MPT-11-MW02S[7]	0.004	–	–	–	–	–	–	–
January 4, 1990								
MPT-11-MW01S[4]	0.005	–	0.0007	–	0.003	–	–	–
MPT-11-MW02S[6]	0.007	–	0.0005	–	0.002	–	–	–
MPT-11-MW02S[7]	0.012	–	0.0003	–	–	–	–	–

[1] Florida Drinking Water Standards, Chapter 62-550, FAC (January 1, 1995).
[2] MCLs, Safe Drinking Water Act, 40 CFR Part 141 (November 1994).
[3] Federal and State Secondary Drinking Water Standard.
[4] Sample designated as MPT-11-1 in Appendix B.
[5] Matrix interference, sample detection limit elevated, see Appendix B-5.
[6] Sample designated as MPT-11-2 in Appendix B.
[7] Sample designation as Duplicate in Appendix B.

Notes: All concentrations in milligrams per liter.
MCL = maximum contaminant level.
– = concentration of analyte, if present, was less than the detection limit.

- Lead was detected in 6 of the 12 groundwater samples at concentrations ranging from 0.002 to 0.006 mg/ℓ. The MCL for lead (0.015 mg/ℓ) was not exceeded.

- Mercury was detected in 2 of the 12 groundwater samples at a concentration of 0.0001 mg/ℓ. The MCL for mercury (0.002 mg/ℓ) was not exceeded.

- Silver was detected as a single occurrence at a concentration of 0.001 mg/ℓ. The MCL for silver (0.1 mg/ℓ) was not exceeded.

Cadmium was detected as a single occurrence at a concentration that exceeded its MCL. Cadmium was detected in the groundwater sample from monitoring well MPT-11-MW01S, which is assumed to be hydraulically upgradient from the site. The detection of cadmium at a concentration exceeding the MCL in this groundwater sample would not be representative of a release from The Neutralization Basin. Therefore, statistical evaluation to evaluate whether or not a release has occurred does not appear to be warranted for the quarterly groundwater analytical results.

The concentrations of inorganic target analytes detected in the quarterly groundwater samples for The Neutralization Basin (SWMU 12) may be biased high because of suspended solids (sediment) in the samples (Puls and Powell, 1992 and Kearl and others, 1994). When the groundwater sample is preserved with nitric acid at a pH of 2 or less, some of the inorganics in the sediment may become dissolved in the sample. The source of the sediment is likely the result of using a bailer for groundwater purging and sampling. The groundwater samples potentially contained sediments that, after preserving, introduced inorganics to the sample and biased the analytical results. Turbidity was not measured during the quarterly sampling events.

Additionally, the characterization of a groundwater flow direction(s) was not possible because only two monitoring wells were installed at The Neutralization Basin site. Groundwater level data from monitoring wells MPT-11-MW01S and MPT-11-MW02S are provided in Appendix B, Section B-4.

2.2 CLOSURE ACTIVITIES, 1992 THROUGH 1995 Field activities that occurred during the period between 1992 and 1994 at The Neutralization Basin site included the following:

- drilling a soil boring to install a third monitoring well;

- surveying of the three monitoring wells relative to the National Geodetic Vertical Datum (NGVD) of 1929 (also known as mean sea level [msl]);

- characterization of hydraulic properties for the surficial aquifer beneath The Neutralization Basin site;

- collecting groundwater samples from the three monitoring wells; and

- analyzing the groundwater samples for target analytes (VOCs, SVOCs, pesticides, PCBs and inorganics) selected from the 40 CFR 264, Appendix IX, groundwater monitoring list and the USEPA Contract Laboratory

program target compound list and target analyte list. The analytical methodology used was Test Methods for Evaluation of Solid Waste, USEPA SW846, Third Edition, November, 1986 (and update package, 1992) (USEPA, 1986a). The laboratory analytical program for the NAVSTA Mayport Corrective Action Program is described in more detail in Section 2.2 of the NAVSTA Mayport GIR (ABB-ES, 1995b).

Field activities that occurred during 1995 at The Neutralization Basin site included the following:

- collecting three surface soil samples at The Neutralization Basin site and
- analyzing the surface soil samples for pH and inorganics in the 40 CFR 264, Appendix IX, groundwater monitoring list.
- Summaries of standard operating procedures for these field activities are provided in Appendix C, Section C-1 through C-4.

2.2.1 RFI Field Activities, 1992 through 1995 Field activities for the RFI at The Neutralization Basin (SWMU 12) included installing a third monitoring well, MPT-11-MW03S, at a location assumed to be hydraulically downgradient from The Neutralization Basin, and collecting groundwater samples in 1993 and 1994 from the three shallow monitoring wells MPT-11-MW01S, MPT-11-MW02S, and MPT-11-MW03S. Monitoring well installation and groundwater sampling procedures, background sampling information, and other installationwide sampling information is provided in the NAVSTA Mayport GIR (ABB-ES, 1995b). The boring log and well construction details are presented in Appendix C, Section C-5.

Well Installation. One additional monitoring well, MPT-11-MW03S, was installed on January 24, 1992 to allow the determination of groundwater flow directions and assess groundwater quality beneath The Neutralization Basin site (Figure 2-3). The monitoring well location was selected based on the previous site investigation activities at The Neutralization Basin and site location restrictions. The site location restrictions are shown on the following pages in Photographs 2-1 through 2-4. The location of monitoring well MPT-11-MW03S at the northwest corner of The Neutralization Basin is shown in Photograph 2-2.

The boring for monitoring well MPT-11-MW03S was drilled using hollow-stem augers to a depth of 17 feet bls. The screened interval of the well was set to intersect the water table. The well consists of 2-inch, Schedule 40 PVC casing with the bottom 10 feet screened with 0.01-inch slots. The well was constructed with 20/30 silica sand pack (to 0.5 foot above the screen section), a 1-foot bentonite seal, and cement grout to the surface. The well was completed with an air tight compression-gasket locking cap and flush-mount protective casing to allow equipment access over the well. Monitoring well diagrams are presented in Appendix C Section 5.

A monitoring well elevation and location survey was conducted by a Florida-registered professional land surveyor upon completion of the well installation. The horizontal location and elevation of water-level measuring points were surveyed for each new and existing monitoring well at The Neutralization Basin (SWMU 12). Third-order accuracy was specified for the survey. Horizontal locations were surveyed to an accuracy of 0.1 foot, and elevations were surveyed

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FGB.08.93

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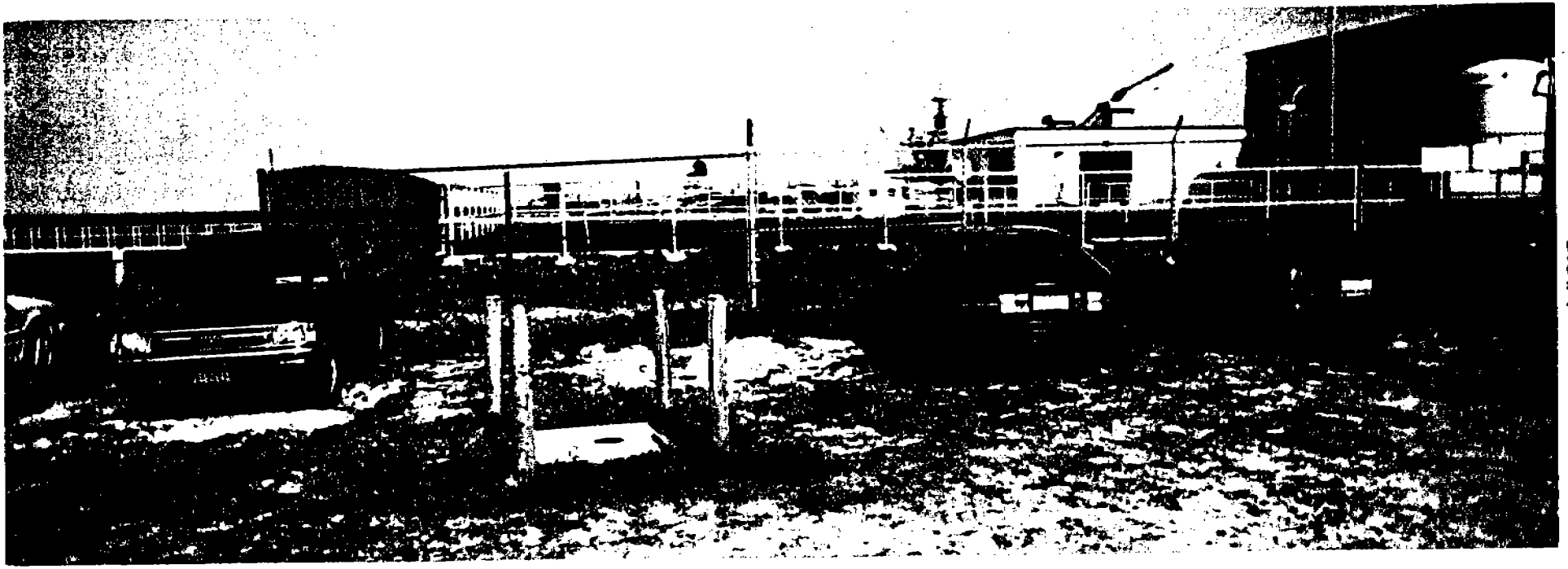
Photograph 3-1

View of northeast corner of Neutralization Basin oriented toward the west. Shows proximity of the Neutralization Basin to the St. Johns River and limited area available for additional monitoring well on the north site of the basin. Grass cover extends into the riprap erosion barrier. The red flag at corner fence post is located adjacent to monitoring well MPT-11-2. (Photographed May 6, 1993).



Photograph 3-2

View of northwest corner of the Neutralization basin, view toward the east. Shows proximity of St. Johns River to the Basin and the location of MPT-11-MW3. (Photographed May 6, 1993)

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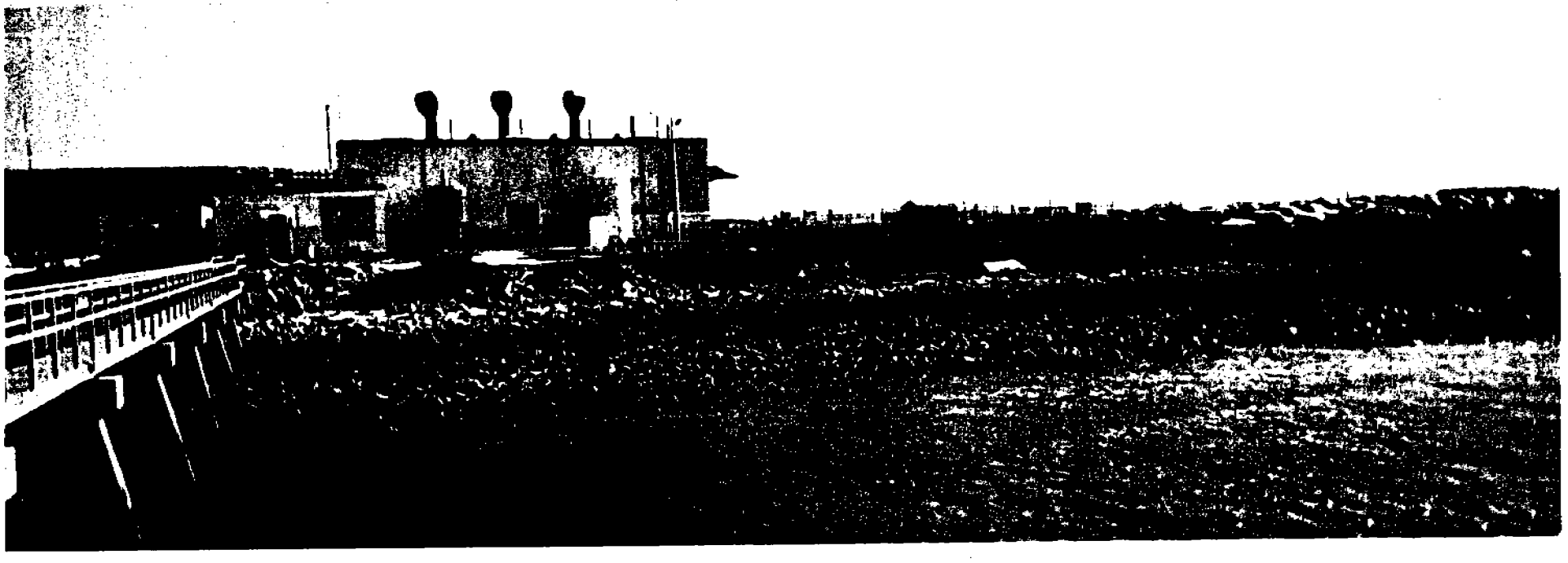

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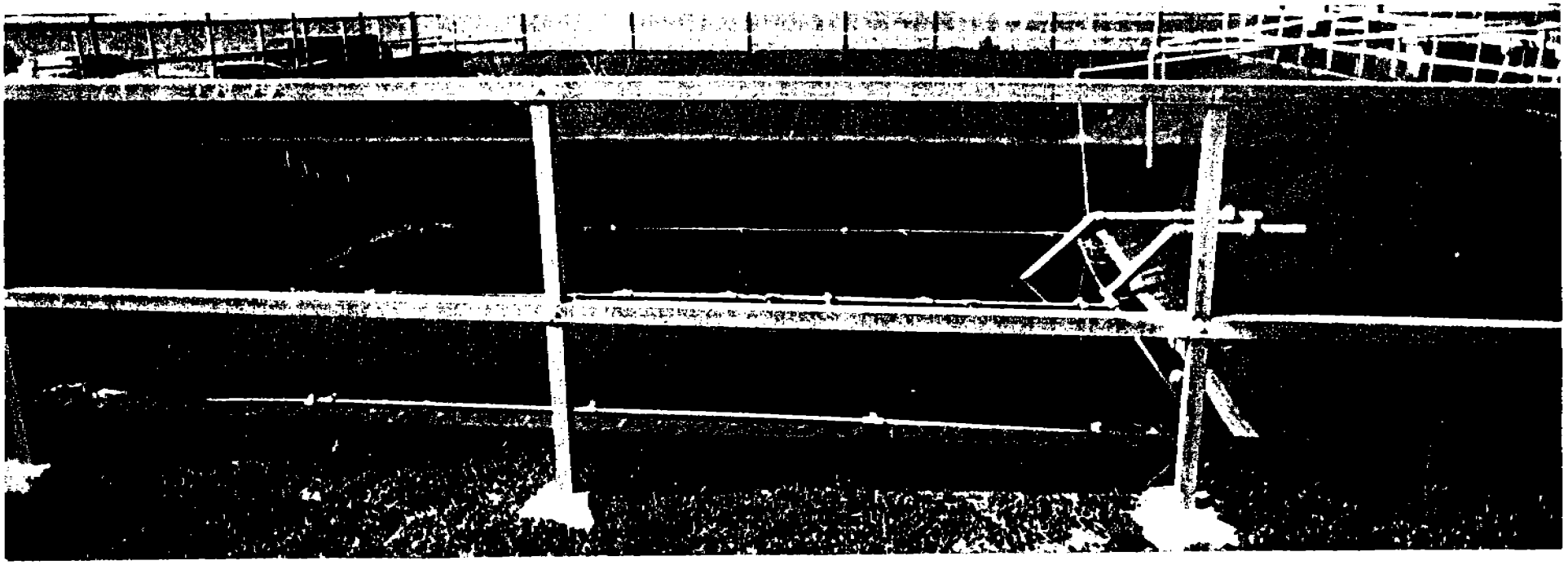
Photograph 3-3

View of the Power Plant and Neutralization Basin from the north. Shows high tide discoloration of riprap and proximity of basin to the St. Johns River. (Photographed May 6, 1993)



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Photograph 3-4

View of Interior of Neutralization Basin, oriented to the north. View shows Hypalon™ Liner, divided cell, and associated appurtenances. (Photographed May 6, 1993)

to an accuracy of 0.01 foot. Horizontal locations are referenced to the Florida State Plane coordinate system and all elevations are based on the NGVD 1929.

Groundwater Sampling Events, 1993 and 1994. Groundwater samples were collected from monitoring wells MPT-11-MW01S, MPT-11-MW02S, and MPT-11-MW03S during sampling conducted events in 1993 and 1994. Bailers were used to purge and sample the wells in 1993, and low-flow purging and sampling was used in 1994. Groundwater sampling procedures are described in more detail in the NAVSTA Mayport RFI Workplan (ABB-ES, 1991) and the NAVSTA Mayport GIR (ABB-ES, 1995b).

After the groundwater samples were collected, they were placed in a cooler refrigerated with ice for express overnight shipment, under chain-of-custody protocol, to the analytical laboratory.

1993 Sampling Event. The monitoring wells were purged and sampled on January 27, 1993, using a precleaned Teflon™ bailer and monofilament lines dedicated to each well. Sample bottles were filled in the order of VOCs SVOCs, pesticides and PCBs, and inorganics. Three groundwater samples and an associated duplicate sample were analyzed as previously described. A listing of target analytes is provided in Appendix C, Section C-6.

Samples for inorganic constituents were collected without filtration and were preserved immediately after collection with nitric acid. The inorganic results reported are, therefore, total concentrations and reflect both filterable (suspended) and nonfilterable (dissolved) fractions.

1994 Sampling Event. Groundwater samples were collected at The Neutralization Basin (SWMU 12) on July 6, 1994, from shallow monitoring wells MPT-11-MW02S and MPT-11-MW03S, and on July 7, 1994, from MPT-11-MW03S (Figure 2-3). No duplicate samples were collected during the 1994 sampling event.

A low-flow sampling method with a peristaltic pump was used to purge the monitoring wells and collect the aliquots to be analyzed for inorganics, SVOCs, pesticides, and PCBs; precleaned Teflon™ bailers were used to collect the aliquot for VOCs. The groundwater samples were analyzed as previously described.

The samples for inorganics analyses were split, and, prior to preservation with nitric acid, one aliquot was filtered (45 micron); the other aliquot was not filtered. The sample number for the filtered sample has the suffix "F". The filtered samples were analyzed only for inorganics.

2.2.2 Surface Soil Sampling and Analysis Three surface soil samples were collected to assess whether or not there has been a possible basin overflow that resulted in an impact to the environment. Two surface soil samples, designated MPT-11-SS02 and MPT-11-SS03, were collected on November 14, 1995 near the eastern and northern perimeter of The Neutralization Basin. A reference (background) sample, MPT-11-SS01, was collected south of Building 1241 (Figure 2-3). Surface soil samples were collected from 0 to 1 foot bls and analyzed for Appendix IX metals, cyanide, and pH.

Surface soil sampling procedures are described in more detail in the NAVSTA Mayport RFI Workplan (ABB-ES, 1991) and the NAVSTA Mayport GIR (ABB-ES, 1995b).

2.2.3 Analytical Data QA/QC Field and laboratory QA/QC requirements followed during the RFI activities are defined in the RFI Workplan (ABB-ES, 1991), the

NAVSTA Mayport GIR (ABB-ES, 1995b) and comply with USEPA Region IV standard operating procedures (USEPA, 1991 and 1996). A summary of the analytical program and precision, accuracy, representativeness, comparability and completeness of the analytical data collected during the RFI for The Neutralization Basin (SWMU 12) is provided in Chapter 2.0 and Appendices C and D of the RFI report for Group II SWMUs (ABB-ES, 1995a). The analytical data as qualified are acceptable for use in site characterization, risk assessment, and corrective measure study (CMS). Data validation narrations for the 1993 and 1994 sampling events are provided in Appendix C, Section C-7.

2.2.4 Aquifer Characterization The objective of the aquifer characterization conducted at The Neutralization Basin was to determine groundwater flow direction and rates, and determine what influence the St. Johns River has on the surficial water table. The aquifer investigation included studies of

- measuring tidal fluctuations of the St. Johns River adjacent to The Neutralization Basin,
- measuring the response of the surficial aquifer relative to tidal fluctuation of the St. Johns River,
- measuring the response of the surficial aquifer relative to local rainfall, and
- measuring the specific conductivity of groundwater at the location of The Neutralization Basin (SWMU 12) monitoring wells and the St. Johns River.

These measurements and comparisons were used to characterize the water table zone of the surficial aquifer beneath The Neutralization Basin site. Below are paragraphs describing tidal influence on the surficial aquifer, specific conductivity and salinity, potentiometric surface, hydraulic conductivity and groundwater flow velocity.

2.2.4.1 Tidal Influence on the Surficial Aquifer The purpose of the study was to characterize the effect of tidal fluctuations in the St. Johns River on the water table zone of the surficial aquifer. The three monitoring wells at The Neutralization Basin site were used to conduct the study. Monitoring well MPT-11-MW01S is located approximately 250 feet from the St. Johns River and monitoring wells MPT-11-MW02S and MPT-11-MW03S, are located within 100 feet of the St. Johns River at low tide (Figure 2-1 and Photographs 2-1 through 2-4).

Graphs depicting the elevation the St. Johns River, the elevation of the water table zone of the surficial aquifer, rainfall intensity data, and the lunar cycle are presented on Figures 2-4 through 2-9. Tidal and groundwater displacement and rainfall versus time were plotted as 7-day periods along the graphs' horizontal axis. Both groundwater and river elevation measurements are relative to msl (NGVD, 1929) and are presented on the left vertical axis. Rainfall intensity in inches is referenced to a scale on the right vertical axis.

Groundwater data from monitoring well MPT-11-MW01S were interrupted by a break in the line to the data logger on June 6, 1995. Therefore, groundwater elevation data are not presented for this monitoring well on Figures 2-7 through 2-9.

Below are paragraphs interpreting the effect of rainfall on the water table zone of the surficial aquifer, general observations made from the tidal fluctuations, and specific observations made concerning the effect of tidal fluctuation relative to the water table zone of the surficial aquifer.

Rainfall Observations Rainfall events were graphed to observe their effect on groundwater and/or river elevations. Prior to the 18th of May, when the study began, the cumulative rainfall for a 2-week period totaled less than 0.7 inches. During the monitoring period, rainfall events occurred on May 19 and 30, 1995, June 4, 1995, June 18, 1995, and June 28, 1995, and are represented on the figures as upward spikes of 2.19, 0.78, 2.10, 3.36, and 1.73 inches, respectively.

Monitoring well MPT-11-MW01S exhibited a minimal response to rainfall and monitoring wells MPT-11-MW02S and MPT-11-MW03S exhibited no apparent response. This suggests that rainfall recharge to the surficial aquifer in The Neutralization Basin (SWMU 12) area is minimized by the surrounding asphalt and concrete ground cover. The rainfall events were localized and did not appear to have an effect on the St. Johns River.

General Tidal Observations Figures 2-4 through 2-9 show short-term daily-(semidiurnal) tidal response at The Neutralization Basin (SWMU 12) with two highs and two lows occurring every 24 hours and 50 minutes. Spring tides (full and new moon lunar phase) occurred on May 29, June 13, and June 27, 1995, and neap tides (half-moon lunar phase) occurred on May 21, June 6, and June 19, 1995, during the study.

Tidal fluctuations observed in the St. Johns River during the monitoring period ranged from approximately -2.54 feet msl on June 11, 1995, to approximately 4.27 feet msl on June 13, 1995. The average river elevation for the period of study was -0.58 feet msl.

The graphed response of spring and neap tides in the St. Johns River correlate with the lunar cycle on Figures 2-6 through 2-9. The typical response of spring and neap tides is not present on Figures 2-4 and 2-5. This may be a result of other variables such as a higher river stage maintained by heavy rainfall in the St. Johns River drainage basin or offshore winds pushing water up the St. Johns River.

Specific Tidal Observations Figures 2-4 through 2-6 show the elevation of groundwater in monitoring wells MPT-11-MW01S, MPT-11-MW02S and MPT-11-MW03S relative to rainfall events and tidal fluctuations. The overall rise and fall of the St. Johns River elevation appears to correlate with the overall rise and

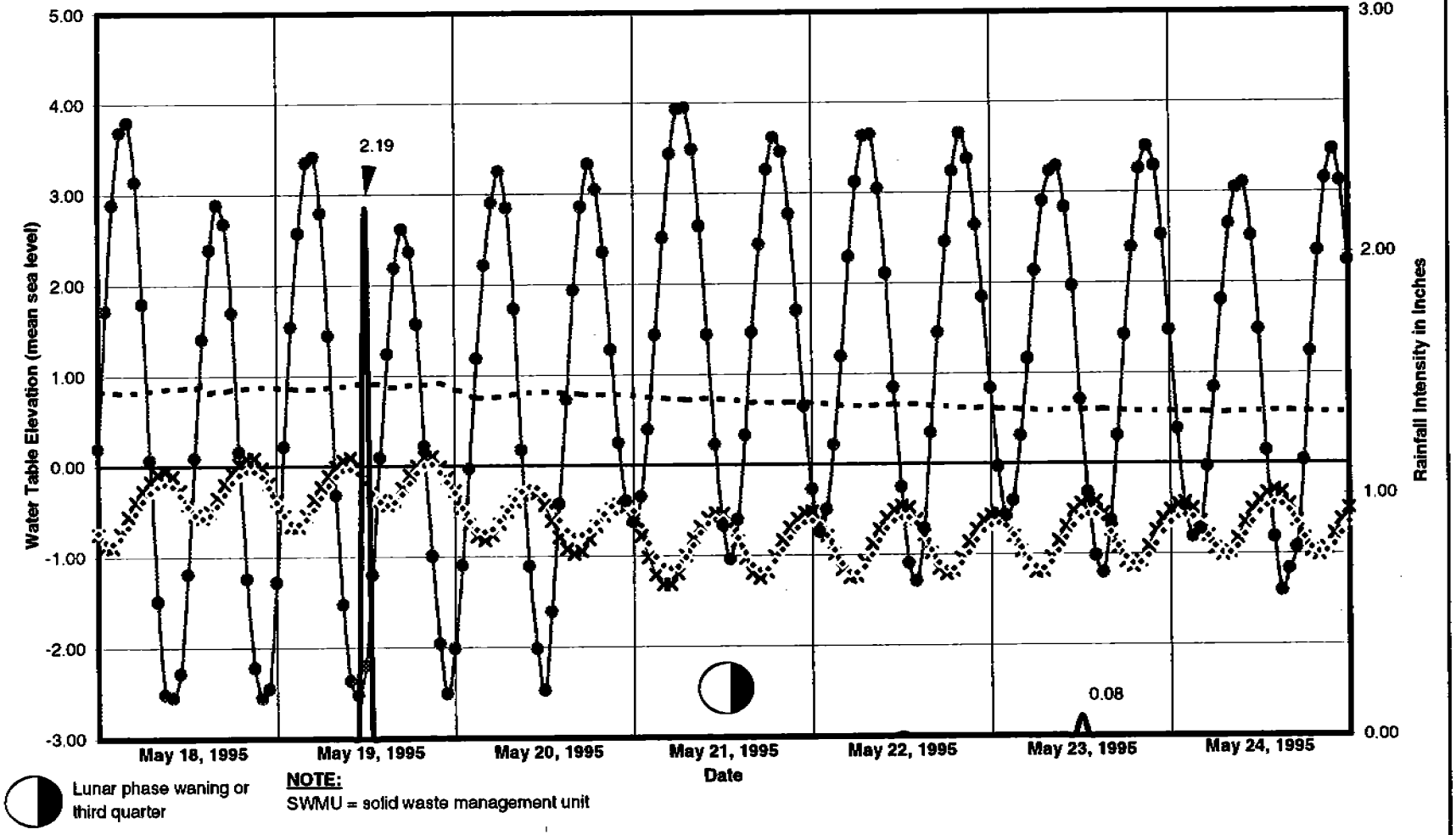


FIGURE 2-4
HYDROGRAPH OF MONITORING WELLS MPT-11-MW01S, MPT-11-MW02S, AND MPT-11-MW03S, THE SAINT JOHNS RIVER, AND RAINFALL INTENSITY, MAY 18 TO MAY 24, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-4 090496MAW

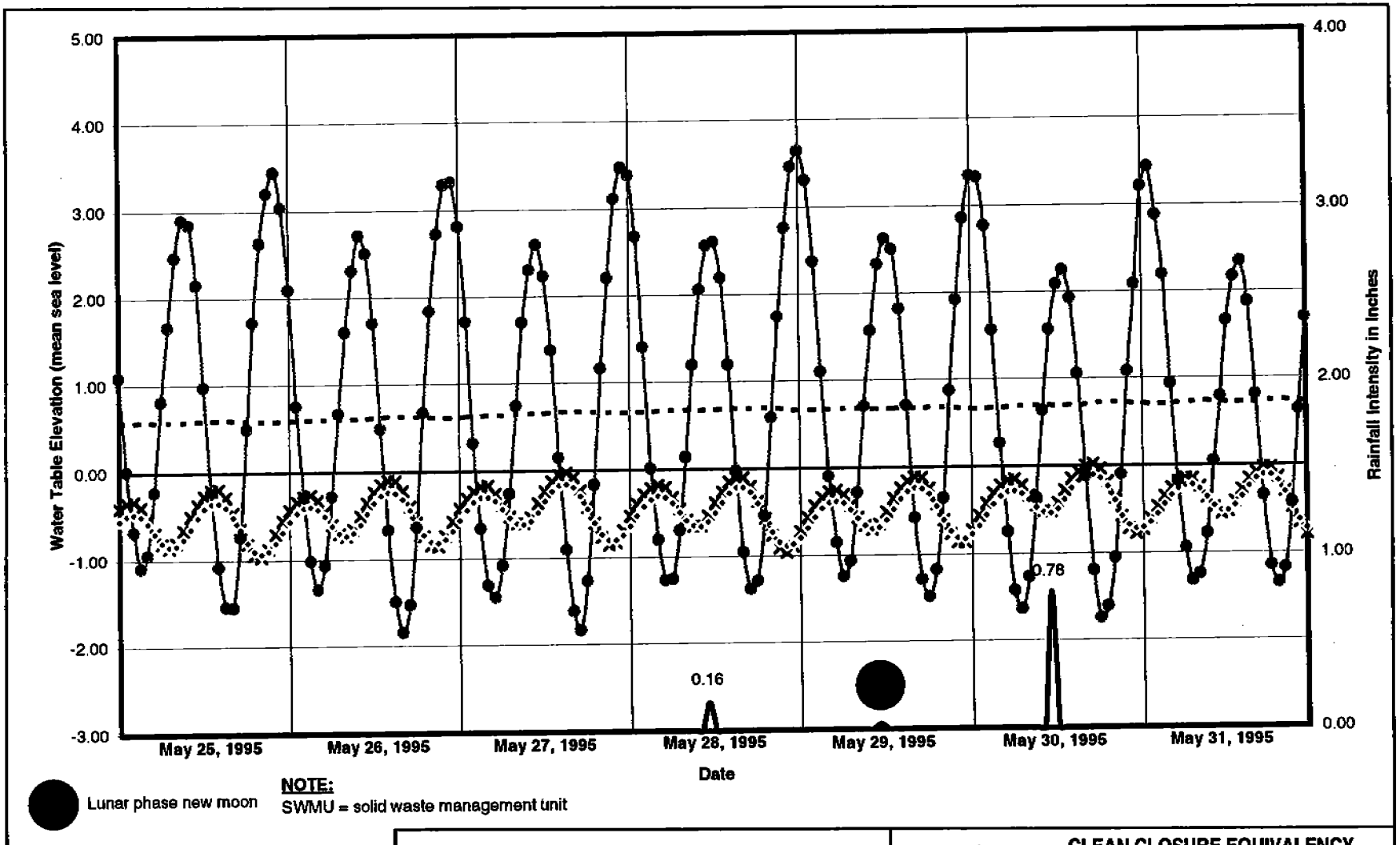


FIGURE 2-5
HYDROGRAPH OF MONITORING WELLS MPT-11-MW01S, MPT-11-MW02S, AND MPT-11-MW03S, THE SAINT JOHNS RIVER, AND RAINFALL INTENSITY, MAY 25 TO MAY 31, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-5 090496MAW

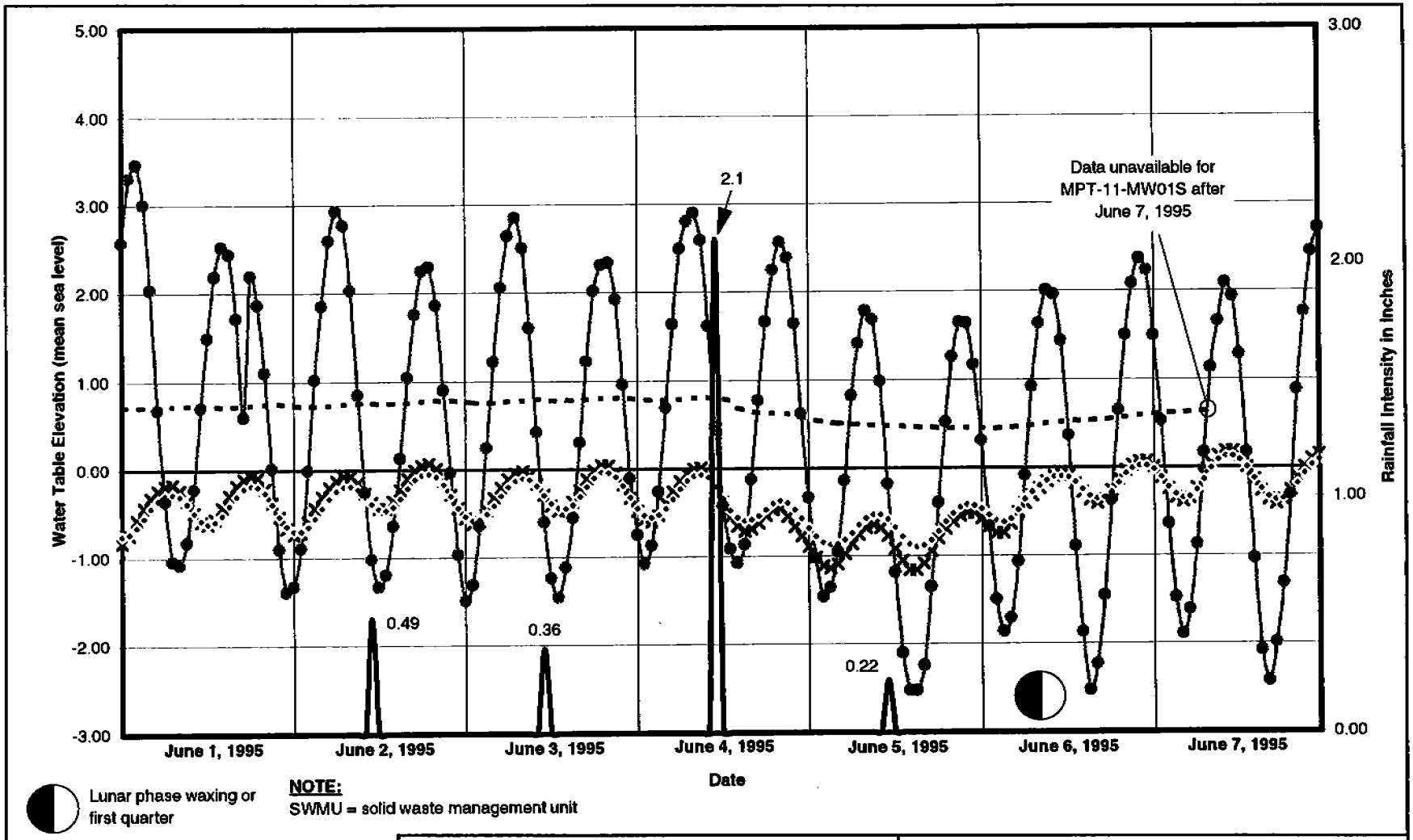


FIGURE 2-6
HYDROGRAPH OF MONITORING WELLS MPT-11-MW01S, MPT-11-MW02S, AND MPT-11-MW03S, THE SAINT JOHNS RIVER, AND RAINFALL INTENSITY, JUNE 1 TO JUNE 7, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-6 090496MAW

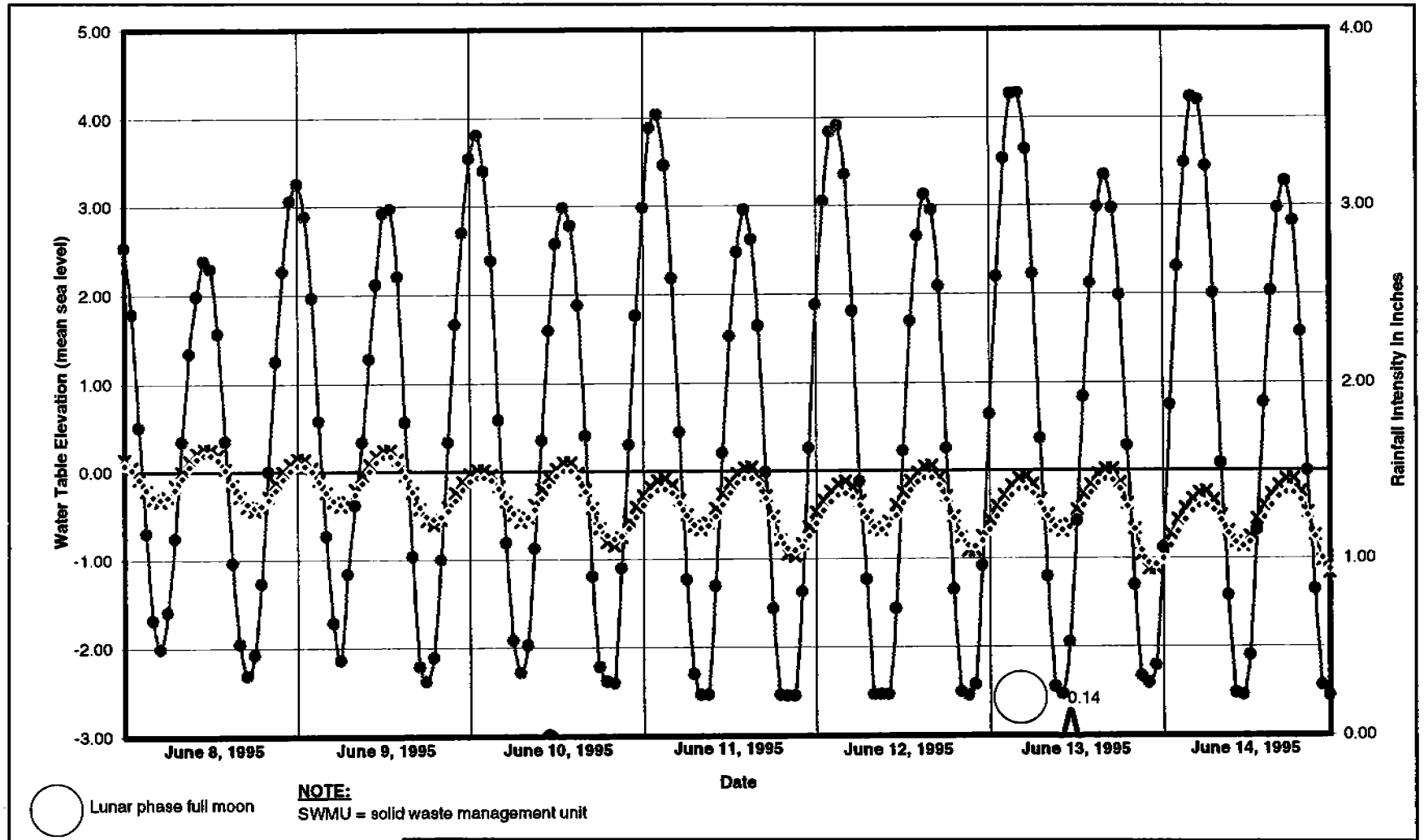


FIGURE 2-7
HYDROGRAPH OF MONITORING WELLS MPT-11-MW02S AND MPT-11-MW03S, THE SAINT JOHNS RIVER, AND RAINFALL INTENSITY, JUNE 8 TO JUNE 14, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

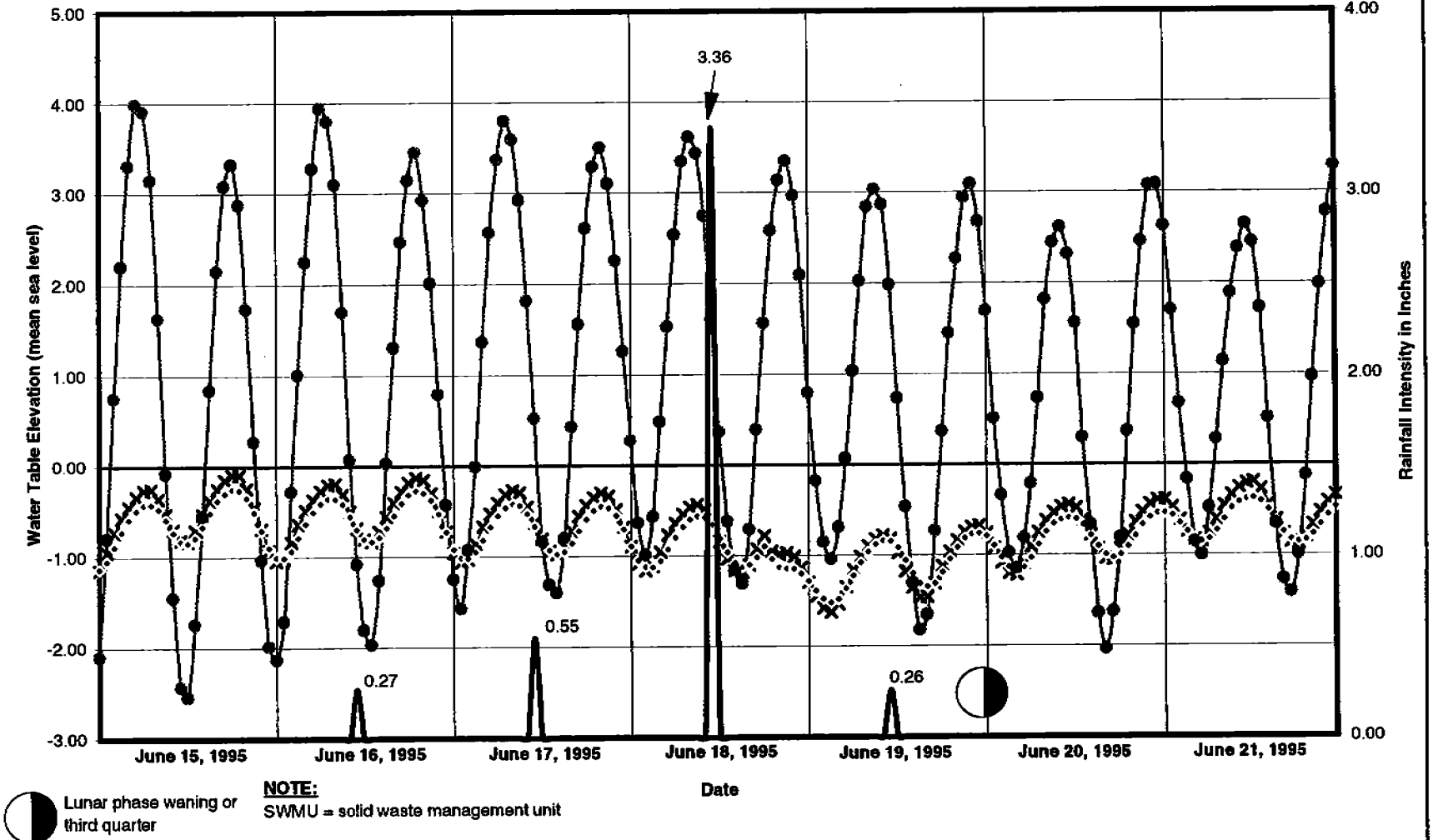
7551-10 FIG 2-7 090696MAW

FIGURE 2-9
HYDROGRAPH OF MONITORING WELLS
MPT-11-MW02S AND MPT-11-MW03S, THE SAINT
JOHNS RIVER, AND RAINFALL INTENSITY,
JUNE 22 TO JUNE 27, 1995

CLEAN CLOSURE EQUIVALENCY
DEMONSTRATION, SWMU 12

U.S. NAVAL STATION
MAYPORT, FLORIDA

7551-10 FIG 2-9 090696MAW



Lunar phase waning or third quarter

NOTE:
SWMU = solid waste management unit

MPT11-MW02S groundwater elevation
MPT11-MW03S groundwater elevation
Saint Johns River elevation
Rainfall

FIGURE 2-8
HYDROGRAPH OF MONITORING WELLS MPT-11-MW02S AND MPT-11-MW03S, THE SAINT JOHNS RIVER, AND RAINFALL INTENSITY, JUNE 15 TO JUNE 21, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-8 090696MAW

fall of groundwater elevations at these monitoring wells. This suggests that the elevation of the St. Johns River has some control on the hydraulic gradient of the surficial aquifer (water table zone) in the vicinity of The Neutralization Basin.

The semidiurnal tidal fluctuations appear to have a slight effect on the elevation of the water table zone at monitoring well MPT-11-MW01S and are strongly correlated with the elevations in monitoring wells MPT-11-MW02S and MPT-11-MW03S. This suggests that tidal effects on the surficial aquifer appear to diminish with distance from the river, a negligible effect as demonstrated by the muted semidiurnal response at MPT-11-MW01S.

The amplitude of the water-level change in monitoring wells MPT-11-MW02S and MPT-11-MW03S appears to be less than 1 foot throughout the study period. A lag time of approximately 4 to 6 hours, relative to the St. Johns River tidal fluctuations, was observed for monitoring wells MPT-11-MW02S and MPT-11-MW03S. Both short- and long-term water table elevation fluctuations in monitoring wells MPT-11-MW02S and MPT-11-MW03S appear to be controlled primarily by the tidal influence of the St. Johns River.

The maximum semidiurnal tidal fluctuations appear to reach elevations higher than the water table elevations. However, a reversal in the flow of the water table zone of the surficial aquifer does not appear to occur because of aquifer hydraulic properties and the duration of the maximum semidiurnal tidal fluctuation.

2.2.4.2 **Specific Conductivity and Salinity** Specific conductivity and salinity measurements were made to characterize the extent to which the St. Johns River influences the water table zone of the surficial aquifer beneath The Neutralization Basin. Specific conductivity measurements were made on March 6, 1993, and April 19, 1993, at the three Neutralization Basin (SWMU 12) monitoring wells. The specific conductivity measurements were made during these two sampling events by slowly lowering the conductance probe down the water column in the well to prevent mixing of the water.

Specific conductivity was also measured in 1995 with the electronic data logger concurrent with the tidal study at the three monitoring wells and St. Johns River. Below are the results of the specific conductivity and salinity measurements.

Specific Conductivity Study 1993 Specific conductivity data for the two 1993 events are presented in Tables 2-4 and 2-5. Table 2-4 presents columns labeled initial and final. These columns represent measurement made before (initial) and after (final) purging the monitoring wells. The monitoring wells were purged by bailing three volumes of the water standing within the well casing. The initial values are lower than the final values and likely represents stagnation of water within the well casing.

The data in Table 2-4 suggest that specific conductivity increases with depth in the three monitoring wells. Additionally, the values for monitoring well MPT-11-MW01S, which is located at a farther distance from the shoreline than monitoring wells MPT-11-MW02S and MPT-S-MW03S, are lower values for specific conductivity. This suggests that the wells located along the St. Johns River are influenced by the intrusion of water from the river, and this influence decreases inland.

Table 2-4
Specific Conductivity Profile of The Neutralization Basin (SWMU 12) Monitoring Wells and Monitoring Well MPT-S-MW03S, March 6, 1993

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Depth in Feet Below Top of Casing	Monitoring Well Number					
	MPT-11-MW01S		MPT-11-MW02S		MPT-11-MW03S	
	Initial	Final	Initial	Final	Initial	Final
9.0	--	--	2,125	2,000	460	1,350
9.5	--	--	4,290	3,900	600	1,400
10.0	--	--	4,300	4,200	900	1,400
10.5	--	--	4,300	4,200	1,450	1,400
11	400	425	4,325	4,300	1,450	1,400
11.5	425	450	4,325	4,450	1,450	1,400
12	425	450	4,350	4,600	1,450	1,400
12.5	425	500	4,375	4,700	1,450	1,400
13	450	500	4,375	4,700	1,450	1,425
13.5	450	500	4,400	4,700	1,450	1,425
14	450	500	4,325	4,700	1,450	1,450
14.5	450	500	4,525	4,700	1,450	1,475
15	450	500	4,700	4,800	1,450	1,500
15.5	450	500	5,000	5,700	1,450	1,500
16	450	500	TD	TD	TD	TD
16.5	450	500				
17	475	500				
17.5	475	500				
18	475	500				
18.5	475	500				
19	475	500				
19.5	475	450				
20	TD	TD				

Notes: All are measured in micromhos per centimeter.
Initial = measurements made prior to purging the monitoring well.
Final = measurements made after purging 3 volumes of water standing within the well casing.

SWMU = solid waste management unit.
-- = not measured.
TD = total depth.

Table 2-5
Specific Conductivity and Salinity Profile of The Neutralization Basin (SWMU 12) Monitoring Wells, April 19, 1993

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Depth in Feet Below Top of Casing	Monitoring Well Numbers or Location							
	MPT-11-MW01S		MPT-11-MW02S		MPT-11-MW03S		St. Johns River[1]	
	S.C. µmhos/cm	Salinity ppt	S.C. µmhos/cm	Salinity ppt	S.C. µmhos/cm	Salinity ppt	S.C. µmhos/cm	Salinity ppt
9	--	--	--	--	1,220	0.5	40,000	26.25
	--	--	--	--	1,220	0.5		
10	--	--	--	--	1,210	0.5		
	--	--	3,000	1.5	1,210	0.5		
11	--	--	2,900	1.5	1,200	0.5		
	--	--	2,850	1.5	1,200	0.5		
12	450	0.0	2,820	1.5	1,200	0.5		
	460	0.0	2,800	1.5	1,200	0.5		
13	460	0.0	2,790	1.5	1,200	0.5		
	458	0.0	2,690	1.5	1,200	0.5		
14	458	0.0	2,700	1.5	1,200	0.5		
	465	0.0	2,550	1.5	1,200	0.5		
15	463	0.0	2,100	1	1,200	0.5		
	453	0.0	1,500	0.75	1,250	0.5		
16	451	0.0	TD	TD	TD	TD		
	451	0.0						
17	450	0.0						
	450	0.0						
18	450	0.0						
	450	0.0						
19	450	0.0						
	450	0.0						
20	TD	TD						

[1]No depth equivalence implied.

Notes: SWMU = solid waste management unit.
S.C. = specific conductivity.
µmhos/cm = micromhos per centimeter.
ppt = parts per thousand.
-- = not measured.
TD = total depth.

Specific conductivity and salinity data were collected on April 19, 1993, to confirm the results of the previous sampling event (Table 2-5). The measurements were made after purging 3 volumes of water contained in the well casing.

The results of the specific conductivity measurements suggest similar values were obtained at monitoring well MPT-11-MW01S and lower values were obtained at monitoring wells MPT-11-MW02S and MPT-11-MW03S. The data show a similar trend of higher values along the shoreline and a lower value inland. However, the trend for salinity to increase with depth was not confirmed. The measurements for monitoring wells MPT-11-MW01S and MPT-11-MW03S remained relatively stable with depth, and the measurements at monitoring well MPT-11-MW02S decreased with depth. The measurement of specific conductivity in the St. Johns River showed several orders of magnitude difference between the value for the river and the values measured in the monitoring wells.

Measurements of salinity on April 19, 1993, suggest that values were relatively stable with depth and the two monitoring wells (MPT-11-MW02S and MPT-11-MW03S) located on the shoreline had higher values.

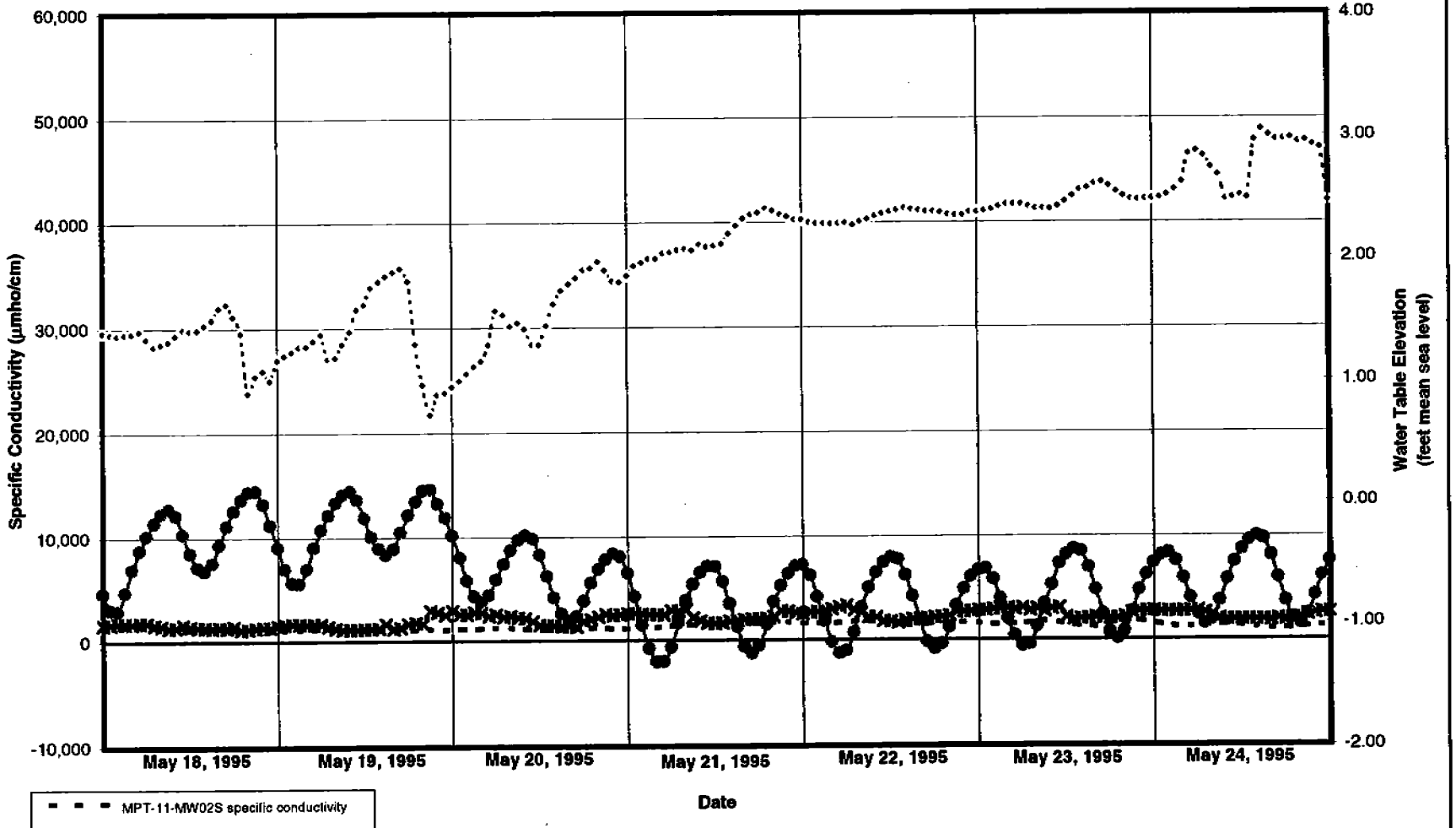
The specific conductivity measurements suggest that monitoring wells MPT-11-MW02S and MPT-11-MW03S are influenced to some extent by water within the St. Johns River, and this influence is likely to vary over semidiurnal and lunar tidal cycles.

1995 Specific Conductivity Study. Specific conductivity versus time was collected for monitoring wells MPT-11-MW02S, MPT-11-MW03S and the St. Johns River. Specific conductivity data from monitoring well MPT-11-MW01S were not obtained because of equipment failure. Specific conductivity data were collected on hourly intervals and corresponded with the hourly water elevation measurements. The specific conductivity data are presented on Figures 2-10 through 2-15.

Figures 2-10 through 2-15 present specific conductivity values for groundwater at The Neutralization Basin (SWMU 12) and the St. Johns River for the period from May 8 to June 27, 1995 along the horizontal axis. Specific conductivity measurements in μmhos/cm relative to time are referenced to a scale on the left vertical axis. Water table elevation measured in monitoring well MPT-11-MW02S is also presented and referenced to msl (NGVD, 1929) on the right vertical axis. Below are general and specific observations made from the graphs of specific conductivity over time.

During the 6-week monitoring period specific conductivity measured in the St. Johns River ranged from 19,406 to 59,110 μmhos/cm, with a average of 43,043 μmhos/cm. The range of specific conductivity values measured in groundwater at monitoring wells MPT-11-MW02S and MPT-11-MW03S during the same period is from 538 to 3,640 μmhos/cm, with an average of 1,262 μmhos/cm.

The graphs presented on Figures 2-10 through 2-15 suggest that the specific conductivity of monitoring wells MPT-11-MW02S and MPT-11-MW03S varies with fluctuations of the St. Johns River during semidiurnal and lunar tidal cycles. This suggests that there may be considerable variation over short periods of time in water quality (fresh, estuarine and marine) at the locations of monitoring wells MPT-11-MW02S and MPT-11-MW03S. The degree of variation is a result of semidiurnal and lunar tidal variations and atmospheric (rain and wind) conditions that contribute to the elevation and quality of water (fresh, estuarine, and marine) of the St. Johns River.



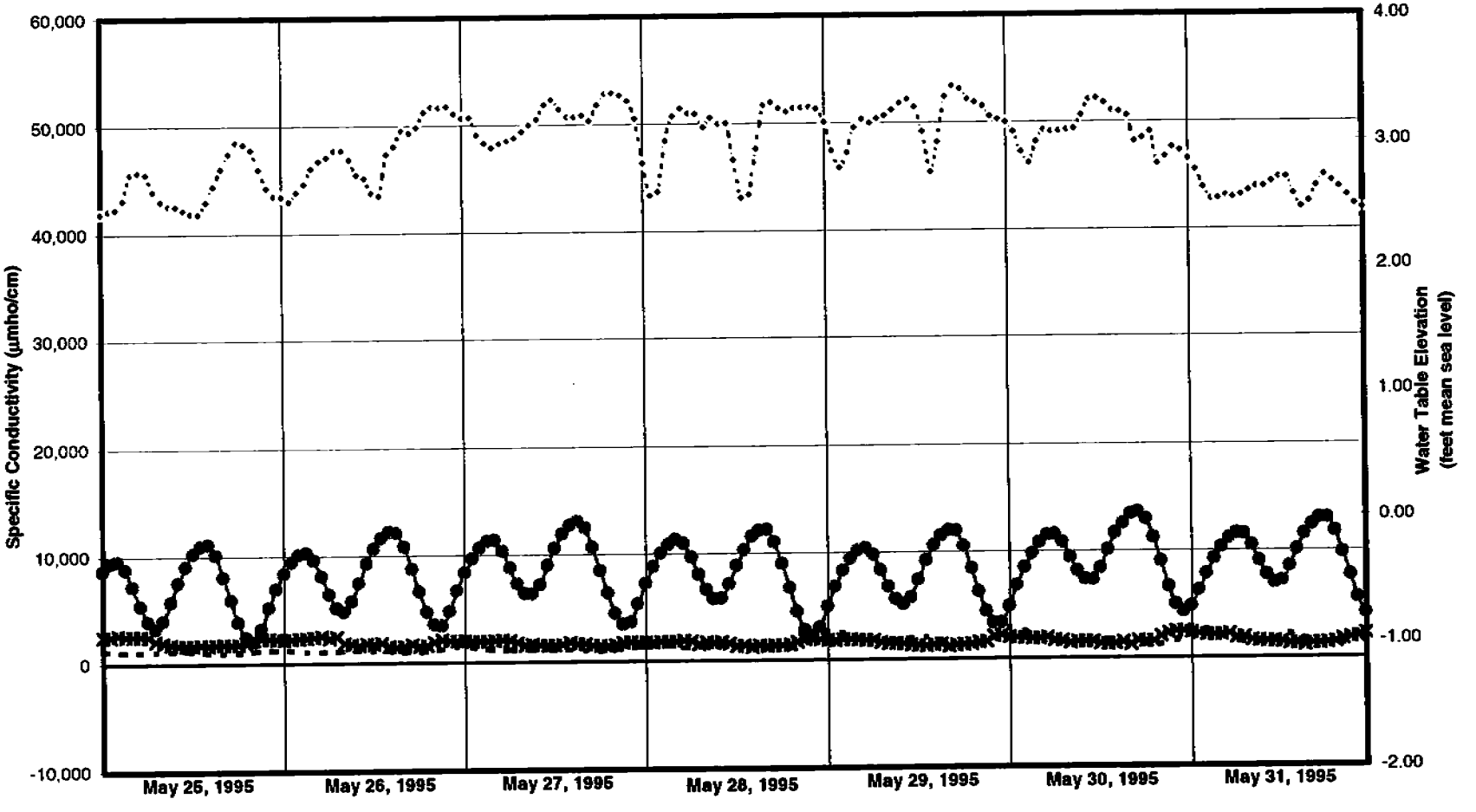
NOTES:
SWMU = solid waste management unit
µmho/cm = micromhos per centimeter

FIGURE 2-10
COMPARISON OF SPECIFIC CONDUCTIVITY AT SWMU 12 AND THE SAINT JOHNS RIVER WITH A HYDROGRAPH OF MONITORING WELL MPT-11-MW02S, MAY 18 TO MAY 24, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-10 090496MAW



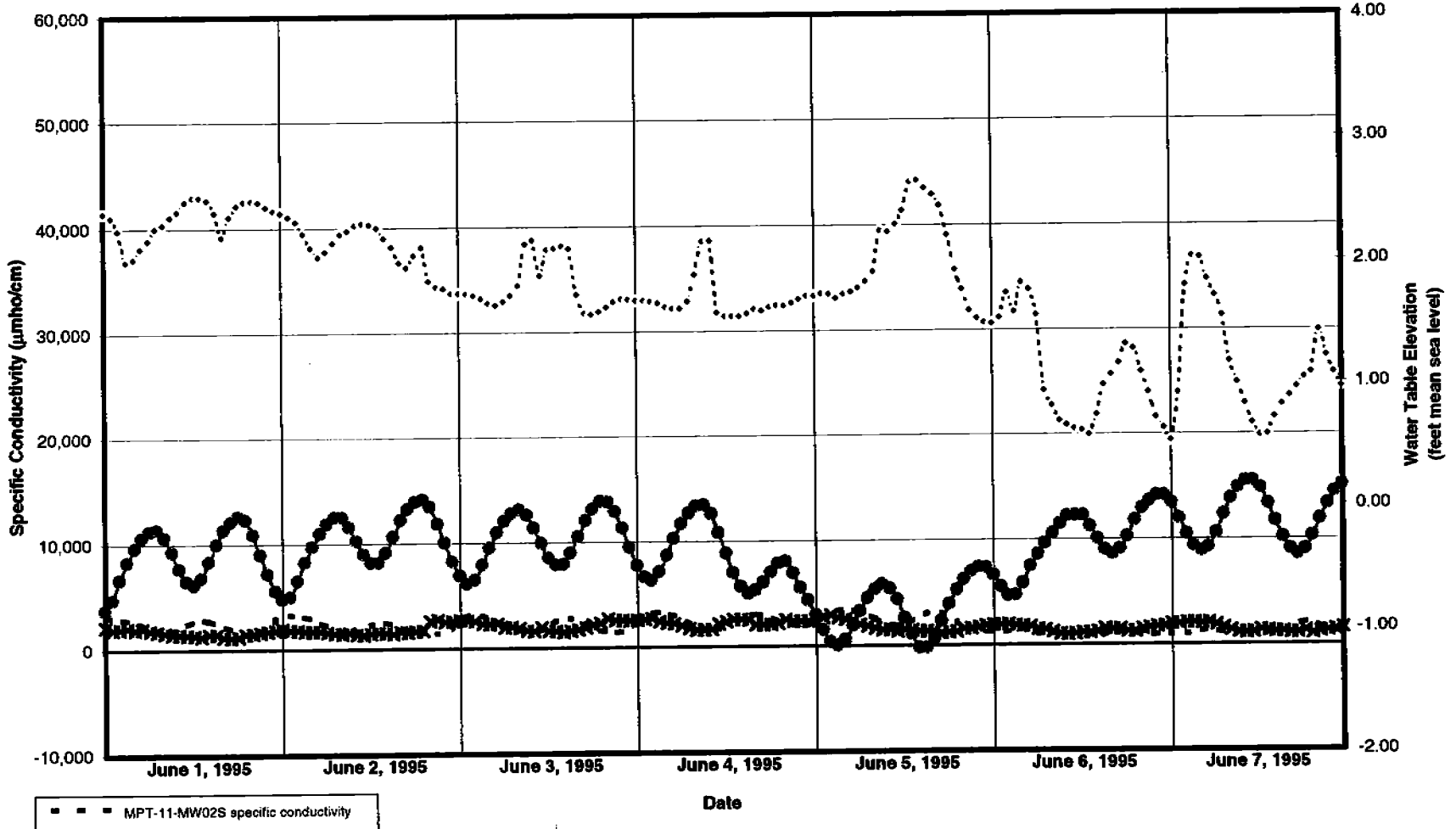
NOTES:
SWMU = solid waste management unit
µmho/cm = micromhos per centimeter

FIGURE 2-11
COMPARISON OF SPECIFIC CONDUCTIVITY AT SWMU 12 AND THE SAINT JOHNS RIVER WITH A HYDROGRAPH OF MONITORING WELL MPT-11-MW02S, MAY 25 TO MAY 31, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-11 090496MAW



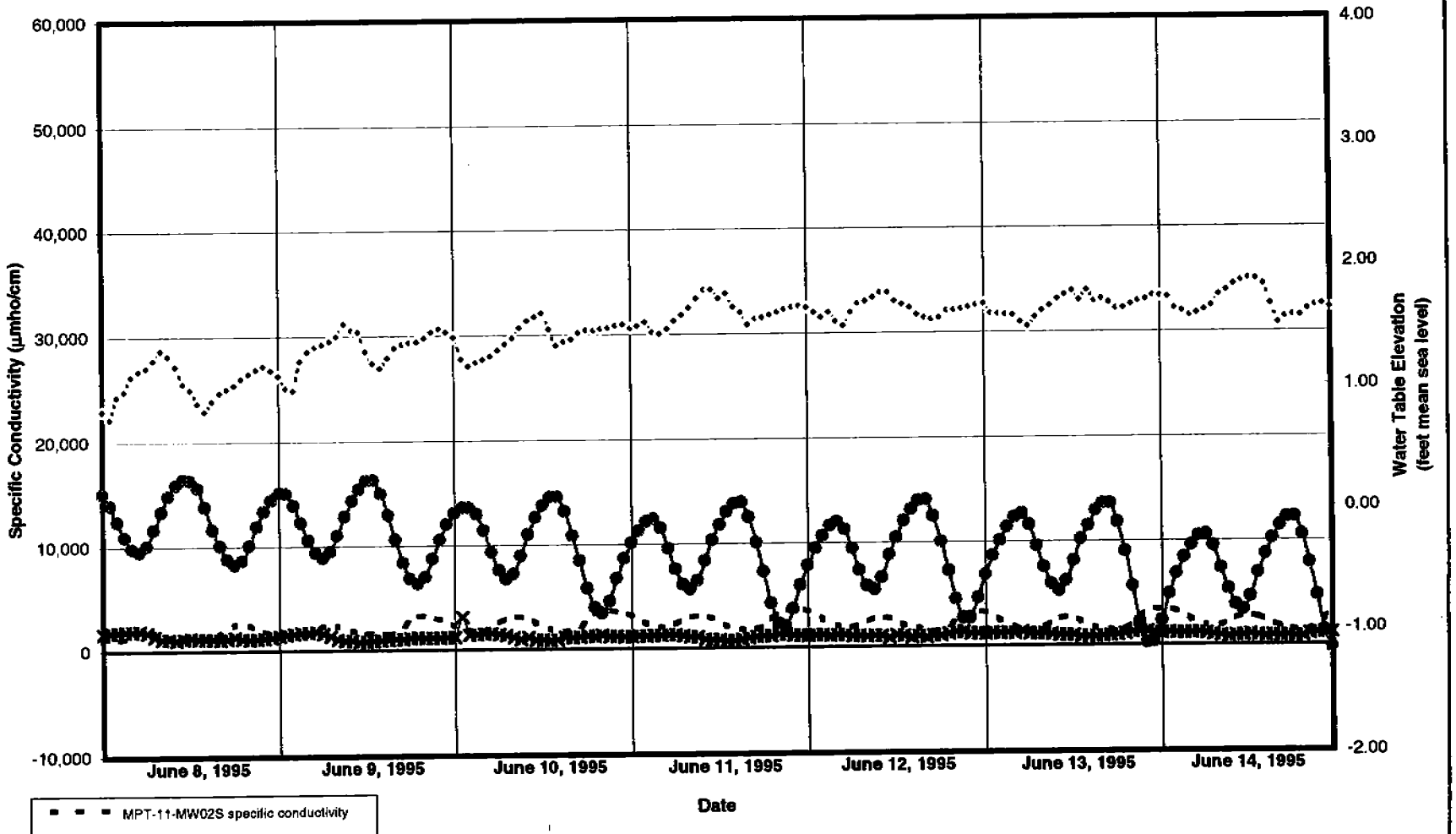
NOTES:
SWMU = solid waste management unit
µmho/cm = micromhos per centimeter

FIGURE 2-12
COMPARISON OF SPECIFIC CONDUCTIVITY AT SWMU 12 AND THE SAINT JOHNS RIVER WITH A HYDROGRAPH OF MONITORING WELL MPT-11-MW02S, JUNE 1 TO JUNE 7, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-12 090496MAW



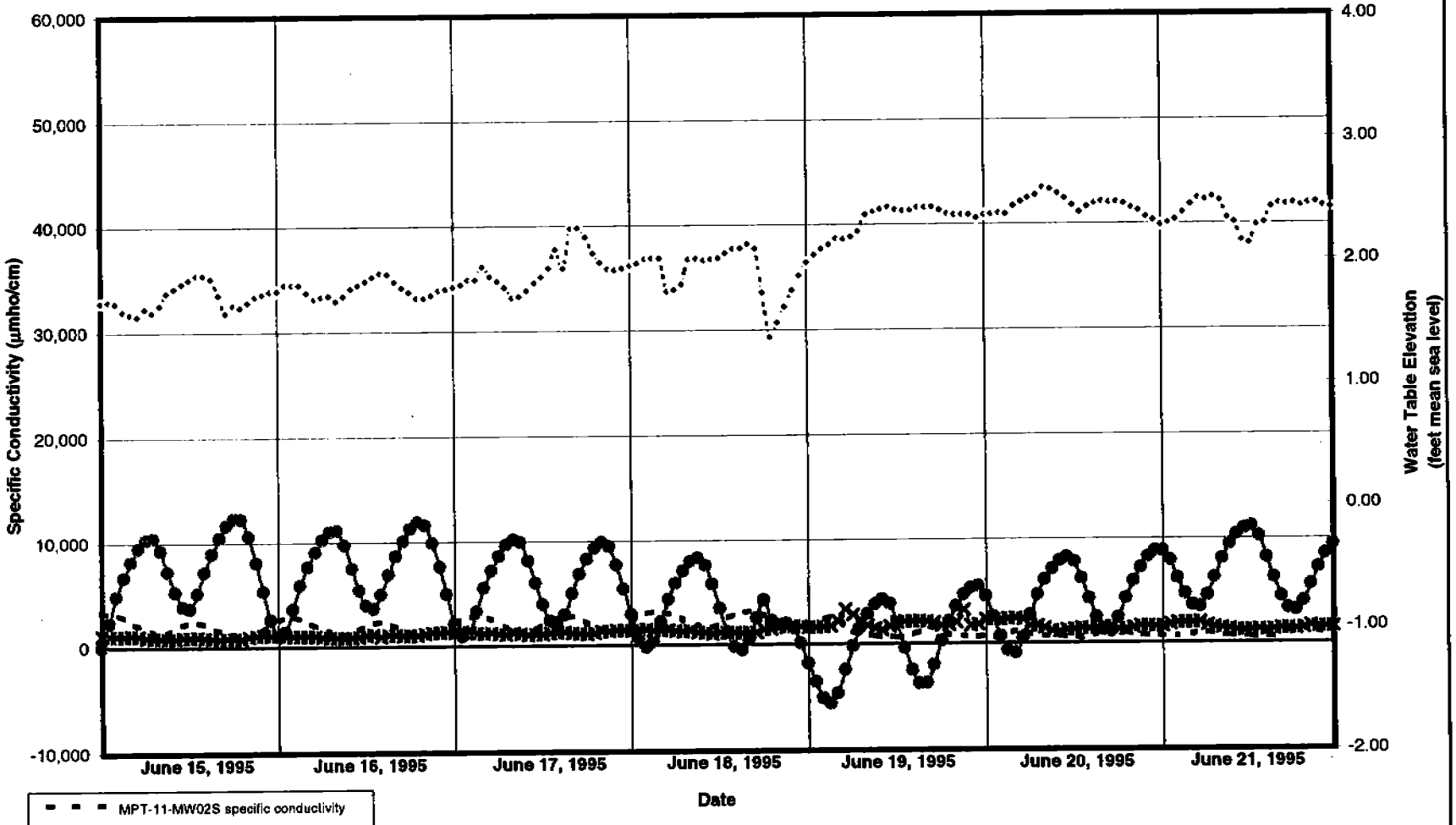
NOTES:
SWMU = solid waste management unit
µmho/cm = micromhos per centimeter

FIGURE 2-13
COMPARISON OF SPECIFIC CONDUCTIVITY AT SWMU 12 AND THE SAINT JOHNS RIVER WITH A HYDROGRAPH OF MONITORING WELL MPT-11-MW02S, JUNE 8 TO JUNE 14, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-13 090496MAW



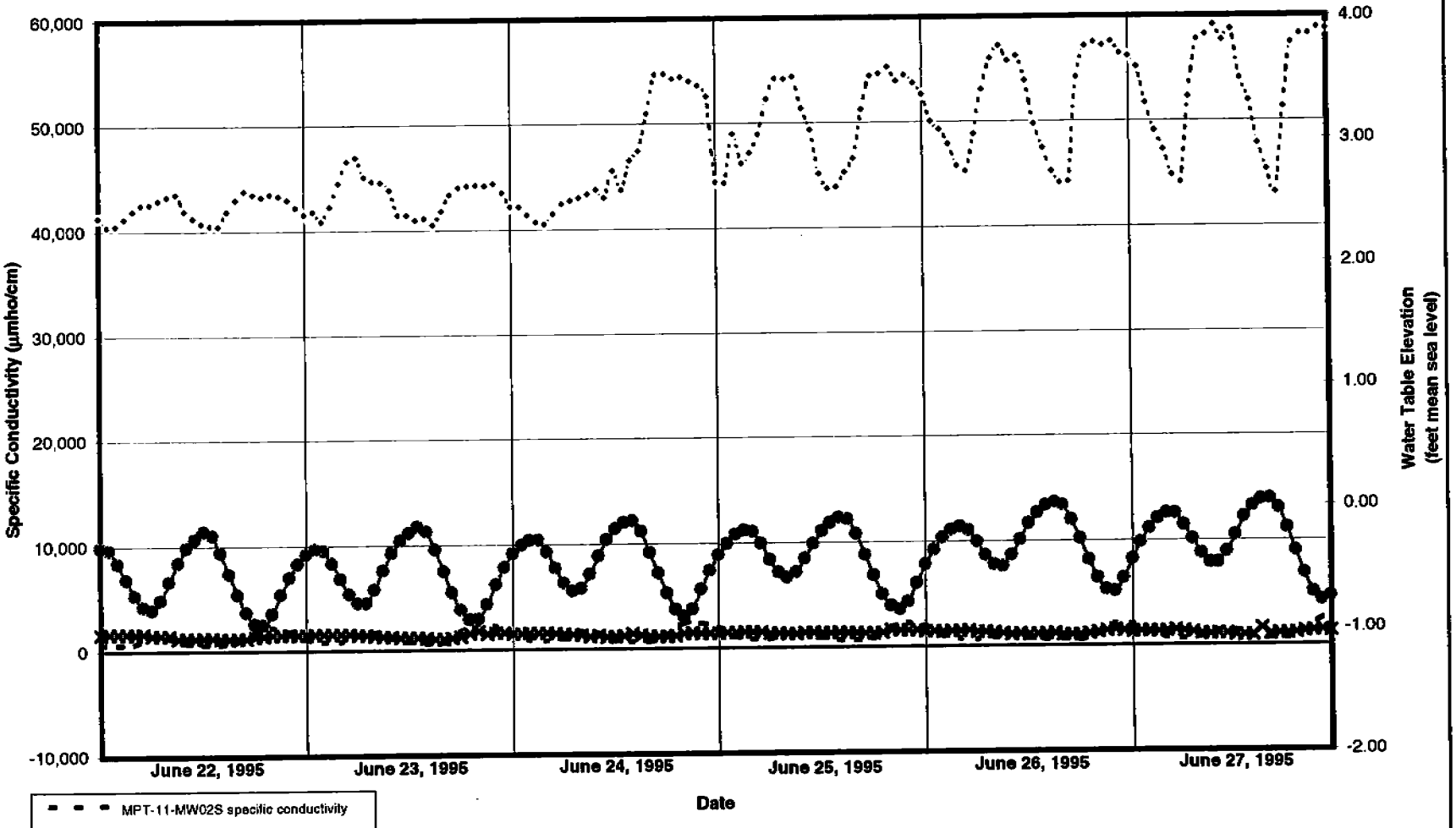
NOTES:
SWMU = solid waste management unit
µmho/cm = micromhos per centimeter

FIGURE 2-14
COMPARISON OF SPECIFIC CONDUCTIVITY AT SWMU 12 AND THE SAINT JOHNS RIVER WITH A HYDROGRAPH OF MONITORING WELL MPT-11-MW02S, JUNE 15 TO JUNE 21, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-14 090496MAW



NOTES:
SWMU = solid waste management unit
µmho/cm = micromhos per centimeter

FIGURE 2-15
COMPARISON OF SPECIFIC CONDUCTIVITY AT SWMU 12 AND THE SAINT JOHNS RIVER WITH A HYDROGRAPH OF MONITORING WELL MPT-11-MW02S, JUNE 22 TO JUNE 27, 1995

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-15 090496MAW

Based on the specific conductance and salinity data, analytical results of groundwater samples collected from monitoring wells MPT-11-MW02S and MPT-11-MW03S may be biased by the intrusion of marine or brackish water into the water table zone of the surficial aquifer.

2.2.4.3 **Potentiometric Surface** The groundwater levels in The Neutralization Basin (SWMU 12) monitoring wells were measured on seven times in 1994 and once in 1995 (Table 2-6). The depth to groundwater at each location was measured relative to the top of casing of the monitoring wells. The reference point is surveyed to the NGVD 1929.

The groundwater elevation data in Table 2-6 were used to prepare potentiometric surface maps of the water table zone of the surficial aquifer (Figures 2-16 through 2-21). The potentiometric surface equipotential lines represent altitudes of equal height above the reference datum. The potentiometric surface map of the water table is used to infer that groundwater flow is from higher to lower altitudes in a direction perpendicular to the equipotential lines. Based on the equipotential lines shown on Figures 2-16 through 2-21, the groundwater flow direction of the surficial aquifer water table zone, beneath The Neutralization Basin (SWMU 12) site, on February 14, 1994, is north towards the St. Johns River.

Based on the data presented on Figures 2-4 through 2-9, there is some uncertainty associated with water-level measurements made from monitoring wells MPT-11-MW02S and MPT-11-MW03S. The uncertainty is associated with the tidal fluctuations that result in variations of less than 1 foot over a semidiurnal tidal cycle. This is illustrated by the groundwater-level measurement data (Table 2-6) for May 13, 1994. The water level in monitoring well MPT-11-MW01S was measured at 0930 hours and after 1430 hours in monitoring wells MPT-11-MW02S and MPT-11-MW03S. Because of the time lag in obtaining the measurements, the groundwater elevation data for May 13, 1994, suggest that the groundwater flow is toward the south and not to the north. However, the groundwater- and river-level elevation data presented on Figures 2-4 through 2-9 suggest that reversal of the groundwater flow direction does not occur.

Based on the groundwater-level data presented in Table 2-6, monitoring well MPT-11-MW01S is hydraulically upgradient from The Neutralization Basin (Table 2-7). Because of the uncertainty associated with semidiurnal tidal fluctuations, monitoring wells MPT-11-MW02S and MPT-11-MW03S appear to be hydraulically downgradient and/or sidegradient from The Neutralization Basin.

The horizontal hydraulic gradient for the water table zone of the surficial aquifer was based on water-level measurements made at monitoring wells MPT-11-MW01S and MPT-11-MW02, which are approximately 200 feet apart. The horizontal hydraulic gradient presented in Table 2-6 (excluding data from May 13, 1994) ranges from approximately 0.001 to 0.0045 foot per foot (ft/ft) and averages approximately 0.0023 ft/ft. The average value will be used to estimate the horizontal groundwater flow velocity.

Discussion of the potentiometric surface of the surficial aquifer on a station-wide basis is summarized in Section 3.2.5 in the NAVSTA Mayport GIR (ABB-ES, 1995b).

Table 2-6
Neutralization Basin (SWMU 12) Water-Level Data

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Monitoring Well	Elevation (NGVD)	February 14, 1994		March 14, 1994		April 19, 1994		May 13, 1994	
		Depth (TOC)	Elevation (msl)	Depth (TOC)	Elevation (msl)	Depth (TOC)	Elevation (msl)	Depth (TOC)	Elevation (msl)
MPT-11-MW01S	12.16	10.77	1.39	10.8	1.36	11.15	1.01	10.77	1.39
MPT-11-MW02S	10.42	9.23	1.19	9.53	0.89	9.5	0.92	8.94	1.48
MPT-11-MW03S	9.97	8.90	1.07	9.16	0.81	9.07	0.9	8.54	1.43

Monitoring Well	Elevation (NGVD)	July 1, 1994		July 24, 1994		August 30, 1994		May 11, 1995	
		Depth (TOC)	Elevation (msl)	Depth (TOC)	Elevation (msl)	Depth (TOC)	Elevation (msl)	Depth (TOC)	Elevation (msl)
MPT-11-MW01S	12.16	11.03	1.13	10.9	1.26	10.75	1.41	11.2	0.96
MPT-11-MW02S	10.42	9.76	0.66	9.4	1.02	9.29	1.13	10.2	0.22
MPT-11-MW03S	9.97	9.34	0.63	8.9	1.07	NM	NC	9.78	0.19

Notes: SWMU = solid waste management unit.
NGVD = National Geodetic Vertical Datum of 1929.
TOC = Top of casing, the top of casing was the datum point surveyed to the NGVD of 1929, for measuring the water level.
msl = mean sea level.
S = Suffix on the monitoring well identifier that designates a shallow monitoring well screened across the water table.
NM = not measured.
NC = not calculated.

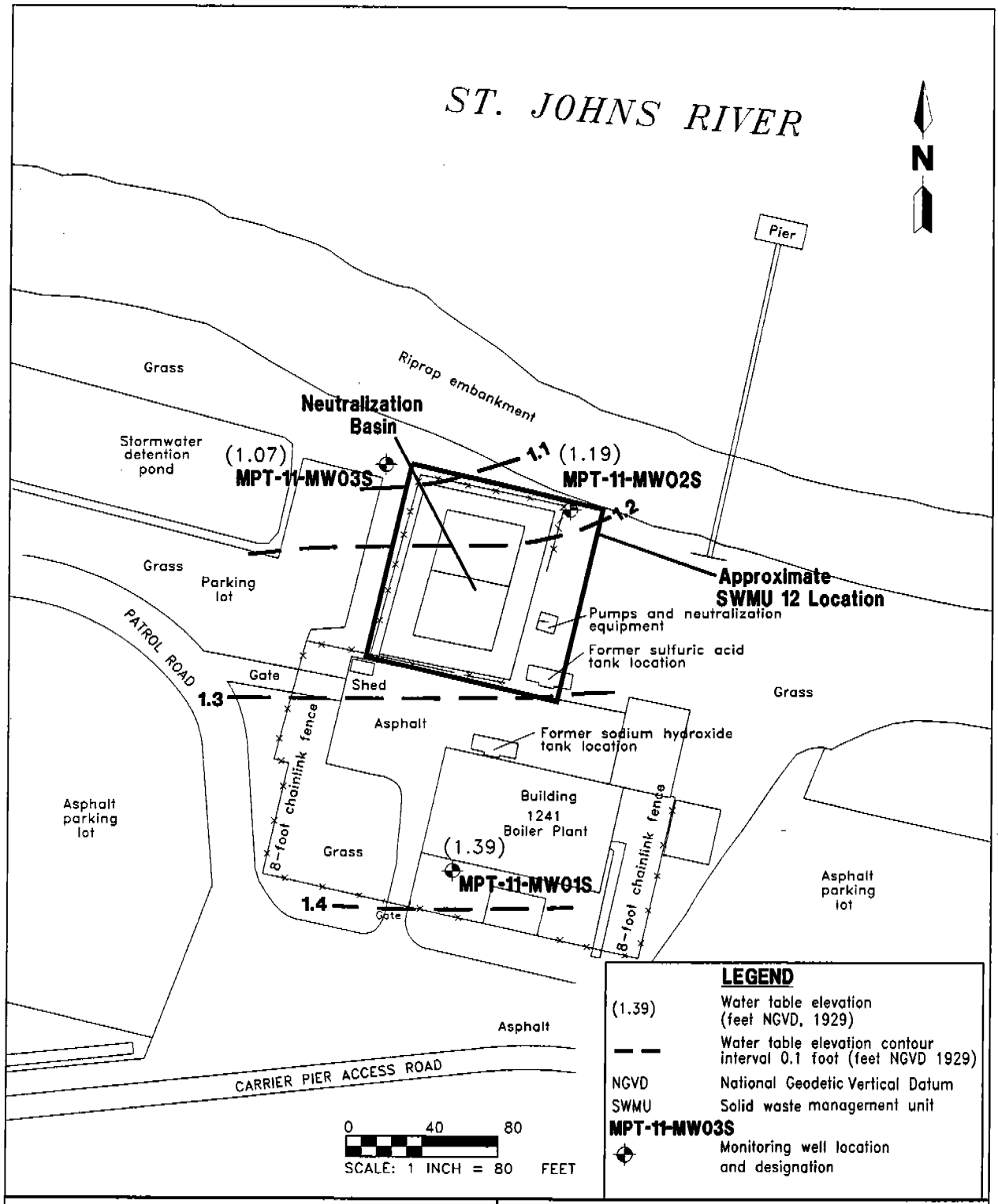


FIGURE 2-16
POTENTIOMETRIC SURFACE, WATER TABLE ZONE SURFICIAL AQUIFER FEBRUARY 14, 1994

H:\MPT\RCRA\JMK\09-09-96

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

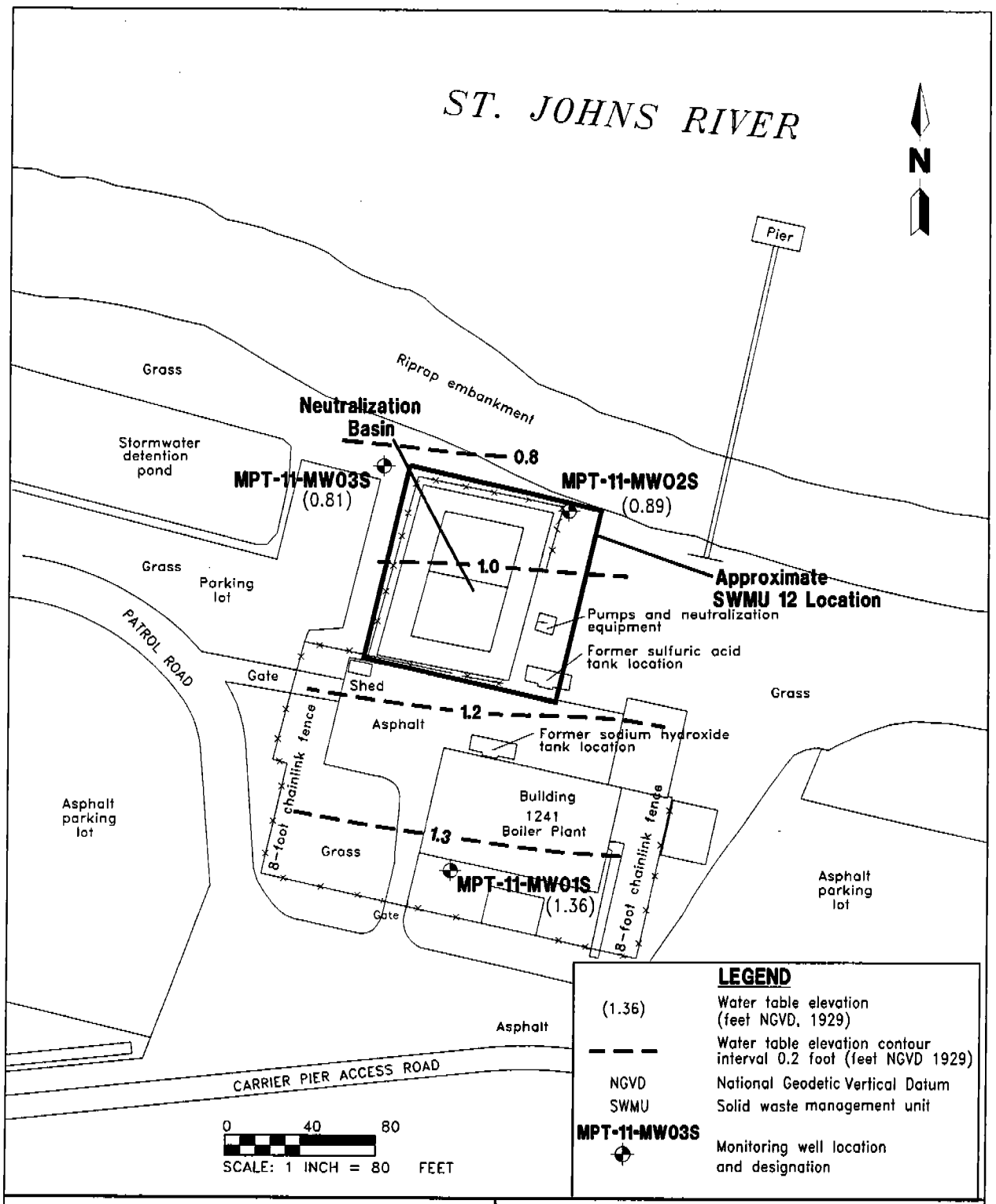


FIGURE 2-17
POTENTIOMETRIC SURFACE, WATER TABLE ZONE SURFICIAL AQUIFER MARCH 14, 1994

H:\MPT\RCRA\DEMO\JMK\09-09-96

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

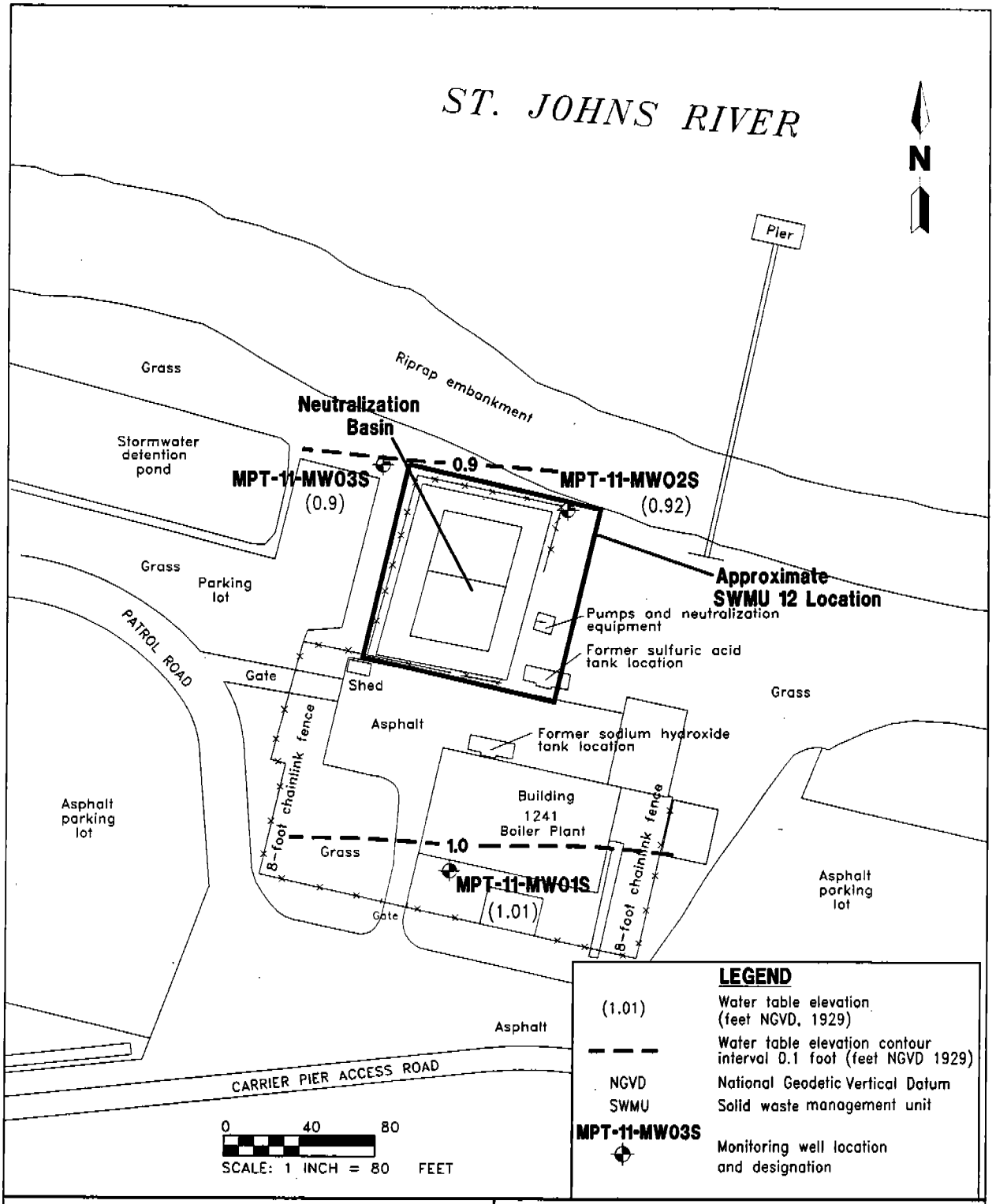


FIGURE 2-18
POTENTIOMETRIC SURFACE, WATER TABLE ZONE SURFICIAL AQUIFER APRIL 19, 1994

H:\MPT\RCRA\DEMO\JMK\09-07-96

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

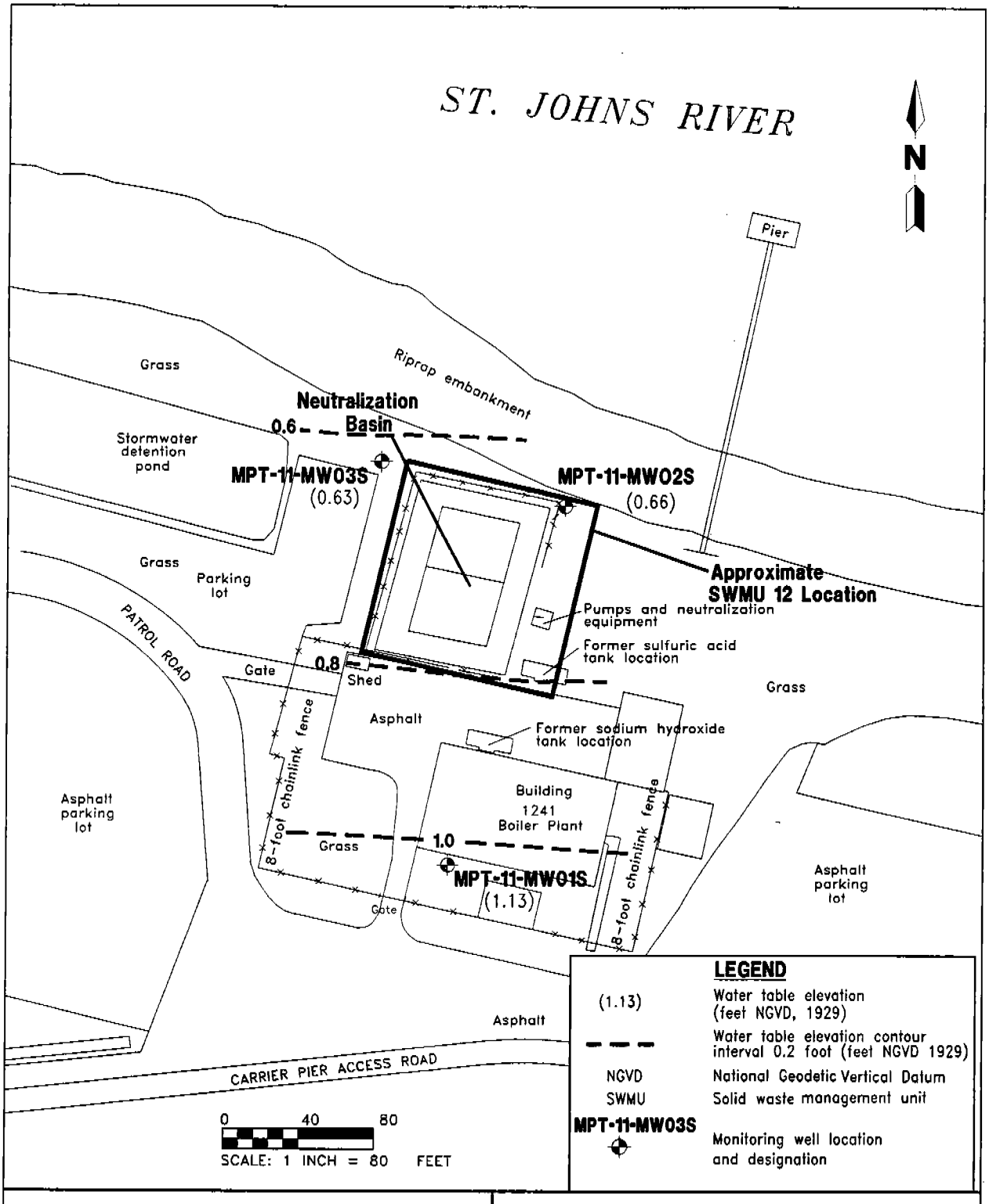


FIGURE 2-19
POTENTIOMETRIC SURFACE, WATER TABLE ZONE SURFICIAL AQUIFER JULY 1, 1994

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CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

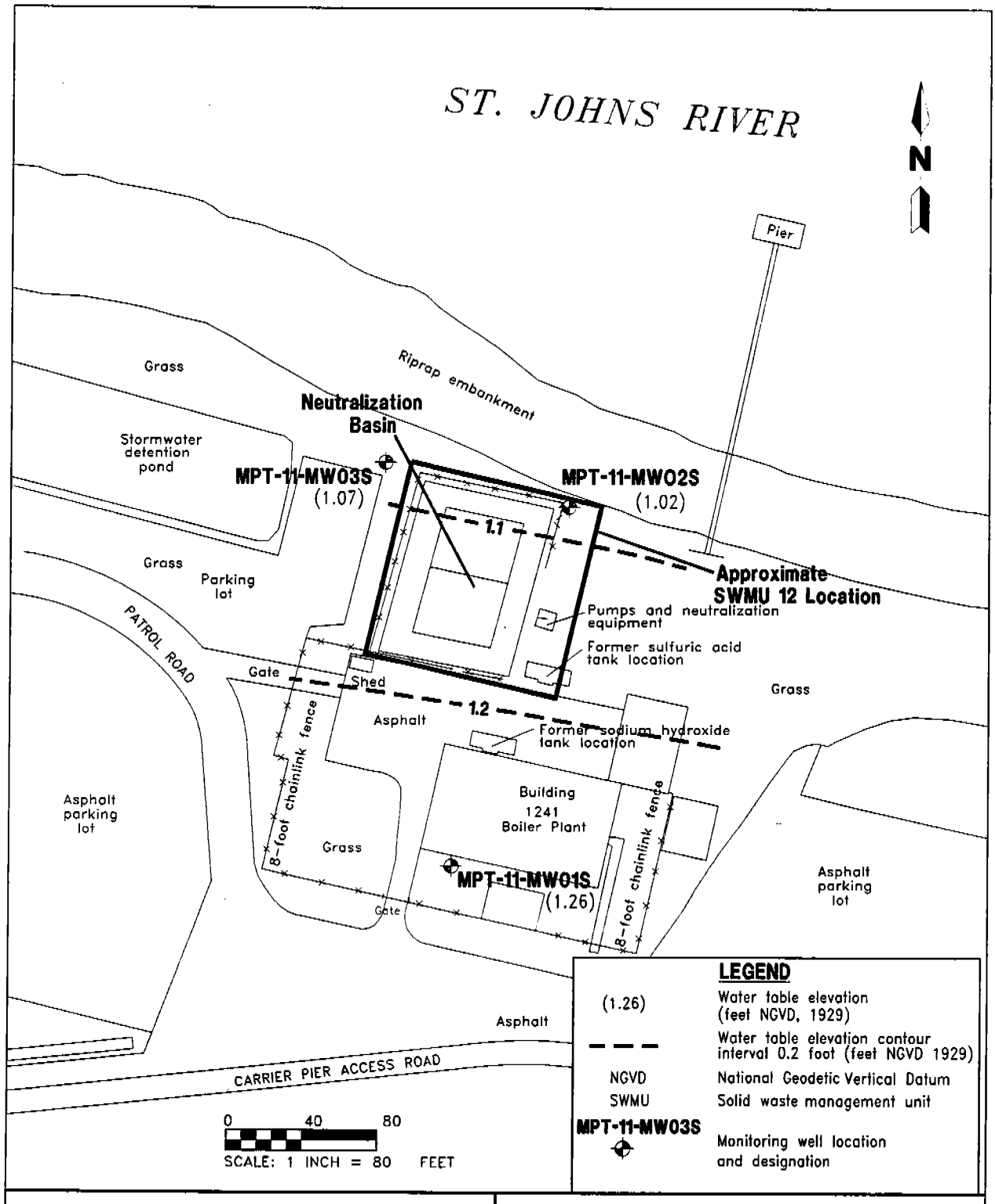

FIGURE 2-20
POTENTIOMETRIC SURFACE, WATER TABLE ZONE SURFICIAL AQUIFER JULY 24, 1994

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CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

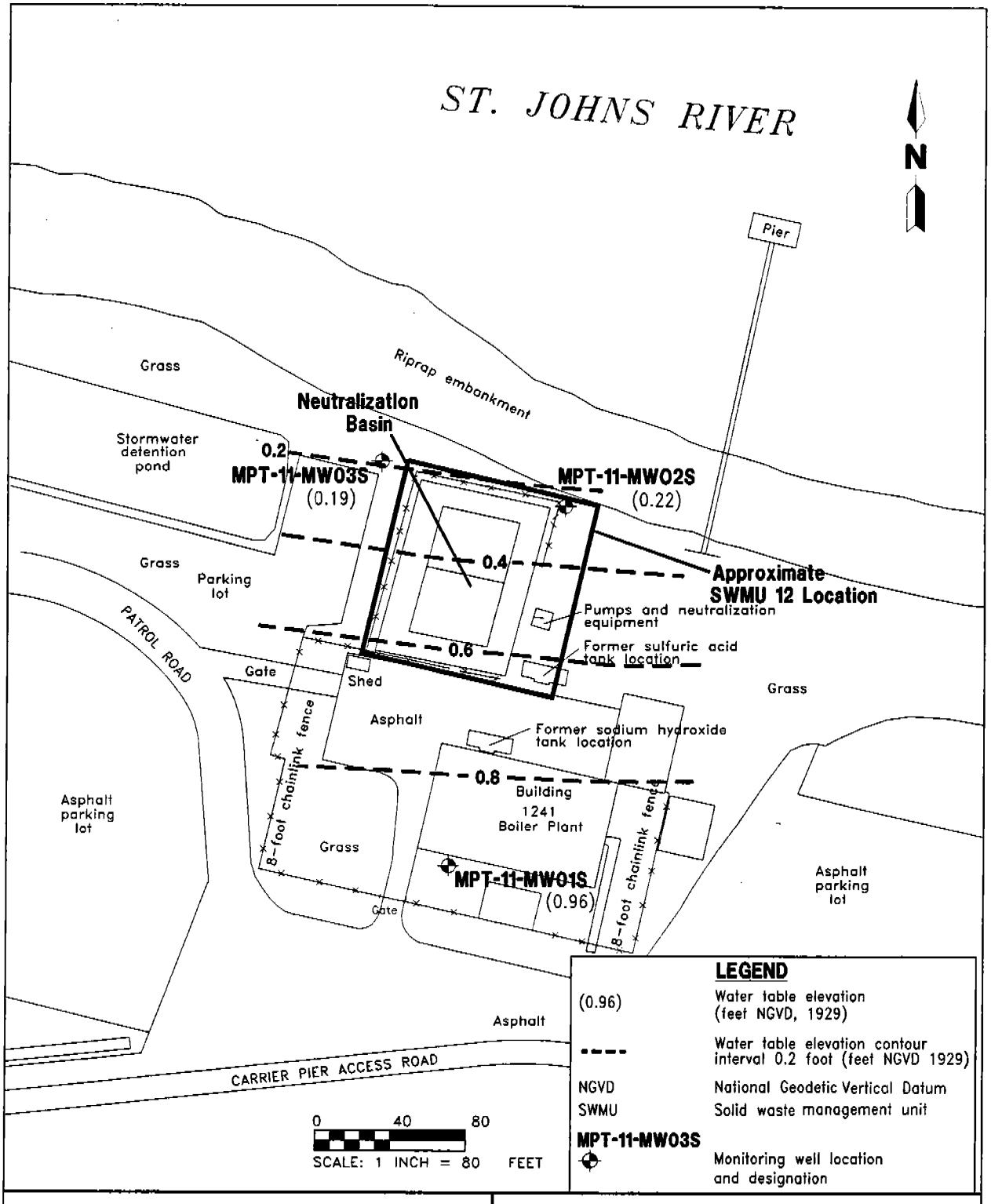

FIGURE 2-21
POTENTIOMETRIC SURFACE, WATER TABLE ZONE SURFICIAL AQUIFER MAY 11, 1995

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CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

Table 2-7
Hydraulic Position of Monitoring Wells Relative to The Neutralization Basin (SWMU 12), February 14, 1995

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

SWMU Number	Monitoring Well No.	Hydraulic Position	Diameter (inches)	Total Depth (feet)	Screened Interval (feet bls)
12	MPT-11-MW01S	U of SWMU 12	2	20	10 to 19.5
12	MPT-11-MW02S	D of SWMU 12	2	17	7 to 17
12	MPT-11-MW03S	D of SWMU 12	2	17	7 to 17

Notes: SWMU = solid waste management unit.
bls = below land surface.
U = hydraulic upgradient.
D = hydraulic downgradient.

2.2.4.4 **Hydraulic Conductivity** *In situ* radial hydraulic conductivity values for the three monitoring wells in the vicinity of The Neutralization Basin (SWMU 12) are presented in Table 2-8. *In situ* radial hydraulic conductivity values range from approximately 3.03 to 14.26 feet per day.

2.2.4.5 **Groundwater Flow Velocity** An approximation of the horizontal linear velocity of groundwater flow in the water table zone of the surficial aquifer in the vicinity of The Neutralization Basin (SWMU 12) is based on the potentiometric surface (hydraulic gradient) of the water table, estimates of radial hydraulic conductivities at monitoring well locations, and an estimate of the porosity (ratio of the volume of voids to total volume of the soil) of the saturated subsurface soil. The horizontal linear velocity was calculated from a modified form of Darcy's equation and represents the ratio of linear travel distance to travel time between two points (Freeze and Cherry, 1979). The horizontal linear velocity is expressed as V_D/N_e, where V_D is the Darcy velocity ($V_D = KI$, K = radial hydraulic conductivity, and I = hydraulic gradient) and N_e is the effective porosity of the saturated geologic stratum. An effective porosity of 0.35 was used in the calculations. (See Section 3.2.3, Physical Characteristics of Soil, in the NAVSTA Mayport GIR [ABB-ES, 1995b]).

Based on the values for horizontal linear velocity and assuming no dilution, dispersion or retardation, a chemical in the water table zone of the surficial aquifer may travel at rates of 7 to 34 feet per year (Table 2-8) and average approximately 23 feet per year.

2.2.5 **Analytical Results, 1992 through and 1995** Surface soil samples were collected in 1995 from two locations adjacent to The Neutralization Basin and at a background location south of Building 1241. Groundwater samples were collected from the three monitoring wells in two sampling events, one in 1993 and the other in 1994. Analytical data reports from the laboratory are provided in Appendix C, Section C-8. Below is a discussion of analytical results from these samples.

2.2.5.1 **Surface Soil Analytical Results** The location of the surface soil samples are shown on Figure 2-3. The surface soil samples consisted of dark to light brown, fine sand to silty sand with shell fragments. The pH of the soil samples ranged from 8.45 to 8.82 standard units and averaged 8.54 standard units (Table 2-9). These values are similar to the subsurface soil samples (8.18 to 9.16 standard units and averaged 8.71 standard units [Table 2-1]) that were previously collected beneath The Neutralization Basin. The pH values for the surface and subsurface soil samples appear to be within the range that would be natural for soil containing calcareous materials (USDA, 1978). This suggests that there has not been a release of acid or alkaline material from The Neutralization Basin.

Inorganic analytes detected in the surface soil samples consisted of arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, zinc, and cyanide (Tables 2-9 and 2-10). The analytical results of surface soil samples, MPT-11-SS02 and MPT-11-SS03, were compared to twice the value of the reference sample, MPT-11-SS01 (Table 2-11). None of the analytes were detected at concentrations greater than its respective background screening value. However, cobalt and mercury were detected in the samples collected adjacent to The Neutralization Basin but not in the background sample, and nickel was detected in the background sample but not in the samples collected adjacent to The Neutralization Basin.

Table 2-8
Average Groundwater Velocities at The Neutralization Basin (SWMU 12), February 14, 1995

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Location	Hydraulic Conductivity[1] (ft/day)	Estimated Gradient[2] (ft/ft)	Estimated Effective Porosity	Estimated Linear Velocity (ft/day)	Estimated Linear Velocity (ft/year)
MPT-11-MW01S	3.03	0.0023	0.35	0.02	7
MPT-11-MW02S	14.26	0.0023	0.35	0.09	34
MPT-11-MW03S	12.03	0.0023	0.35	0.08	29

[1] *In situ* conductivity measurement, July 1995.
[2] Based on the average gradient between monitoring wells MPT-11-MW01S and MPT-11-MW02S for synoptic water table elevations presented in Table 2-6, excluding the data from May 13, 1994.

Notes: SWMU = solid waste management unit.
ft/day = feet per day.
ft/ft = foot per foot.
ft/year = feet per year.

Table 2-9
pH and Inorganic Analytes Detected in Surface Soil Samples at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analytical Batch Number:	RA636003	RA636004	RA636005	RA636006
Sample Location:	MPT-12-SS01	MPT-12-SS02	MPT-12-SS02	MPT-12-SS03
Sample Number:	11S00101	11S00201	11S00201DUP	11S00301
Date Sampled:	14-NOV-95	14-NOV-95	14-NOV-95	14-NOV-95
Sample Depth (ft bls):	0 to 1	0 to 1	0 to 1	0 to 1
pH (Standard Units)				
pH	8.45	8.46	8.46	8.82
Inorganic Analytes (mg/kg)				
Arsenic	0.96 J	1.1 J	1.3 J	1.0 J
Barium	8.0 J	5.3 J	5.3 J	5.9 J
Beryllium	0.05 J	0.08 J	0.06 J	0.06 J
Cadmium	1.2	0.25 J	–	–
Chromium	1.7 J	3.3	3.1	3.4
Cobalt	–	0.65 J	–	–
Copper	3.8 J	1.9 J	2.0 J	2.6 J
Lead	13.7 J	9.7 J	14 J	8.1 J
Mercury	–	–	–	0.05 J
Nickel	2.6 J	–	–	–
Vanadium	10.3 J	5.8 J	6.2 J	5.4 J
Zinc	23.3 J	16.8 J	17.4 J	16.7 J
Cyanide	0.14 J	0.11 J	0.17 J	–

Notes: SWMU = solid waste management unit.
DUP = duplicate.
ft bls = feet below land surface.
mg/kg = milligram per kilogram.
J = estimated value.
– = concentration of analyte, if present, was less than the detection limit.

Table 2-10
Summary of Chemicals Detected in Surface Soil Samples for The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	Frequency of Detection[1]	Minimum Concentration	Maximum Concentration	Mean of Detected Concentrations[2]	Range of Reporting Limits for Nondetects	Sample with Maximum Concentration
Inorganic Analytes (mg/kg)						
Arsenic	4/4	0.96	1.3	1.1	NR	11SS00201DUP
Barium	4/4	5.3	8.0	6.4	NR	11SS00101
Beryllium	4/4	0.05	0.08	0.06	NR	11SS00201
Cadmium	2/4	0.25	1.2	0.69	0.19	11SS00101
Chromium	4/4	1.7	3.4	2.8	NR	11SS00301
Cobalt	1/4	0.65	0.65	0.48	0.62 to 0.65	11SS00201
Copper	4/4	1.9	3.8	2.8	NR	11SS00101
Lead	4/4	8.1	14.0	11.2	NR	11SS00201DUP
Mercury	1/4	0.05	0.05	0.05	0.03	11SS00301
Nickel	1/4	2.6	2.6	2.6	1.8 to 1.9	11SS00101
Vanadium	4/4	5.4	10.3	7.2	NR	11SS00101
Zinc	4/4	16.7	23.3	19.0	NR	11SS00101
Cyanide	3/4	0.11	0.17	0.14	0.08	11SS00201DUP

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed.
[2] Arithmetic mean includes all nonqualified positive detections and "J" qualified samples in which the analyte was detected. Nondetections, "U" and "UJ" values were not used, except for environmental samples and associated duplicates. The environmental sample and associated duplicate were averaged because they represent a single sampling location. Additionally, for target analytes detected only in either the environmental or duplicate sample (i.e., one sample with nonqualified positive detection or a "J" qualifier and the other a nondetection with a "U" or "UJ"qualifier), the average was calculated by using the detected value, and one-half of the "U" or "UJ" qualified value.

Notes: SWMU = solid waste management unit.
mg/kg = milligrams per kilogram.
NR = not reported, analyte detected in each sample.
DUP = duplicate.

Table 2-11
Comparison of Analytes Detected in The Neutralization Basin (SWMU 12) Surface Soil Samples to Background Screening and Benchmark Concentrations

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	Maximum Concentration[1]	Background Screening Concentration[2]	Frequency Above Background Screening Concentration	Florida Residential Soil Cleanup Goal[3]	Frequency Above Florida Residential Soil Cleanup Goal	Florida Industrial Soil Cleanup Goal[3]	Frequency Above Florida Industrial Soil Cleanup Goal
Inorganic Analytes (mg/kg)							
Arsenic	1.3	1.92	0/3	0.8	3/3	3.7	0/3
Barium	5.9	16.0	0/3	5,200	0/3	84,000	0/3
Beryllium	0.08	0.1	0/3	0.2	0/3	1.0	0/3
Cadmium	0.25	2.4	0/3	37	0/3	600	0/3
Chromium	3.4	3.4	0/3	290	0/3	430	0/3
Cobalt	0.65	ND	1/3	4,700	0/3	110,000	0/3
Copper	2.6	7.6	3/3	[4]2,900	0/3	[4]72,000	0/3
Lead	14.0	27.4	0/3	500	0/3	1,000	0/3
Mercury	0.05	ND	ND	23	0/3	480	0/3
Nickel	--	5.2	0/3	1,500	0/3	26,000	0/3
Vanadium	6.2	20.6	0/3	490	0/3	48,000	0/3
Zinc	17.4	46.6	0/3	23,000	0/3	560,000	0/3
Cyanide	0.17	0.28	0/3	1,600	0/3	40,000	0/3

[1] Maximum detected concentrations from sample locations MPT-12-SS02 and MPT-12-SS03.
[2] The background screening value is twice the concentrations for inorganic analytes detected in background sample MPT-12-SS01.
[3] Residential and Industrial soil cleanup goals are from memoranda dated September 29, 1995 and January 19, 1996 from the Florida Department of Environmental Protection (FDEP), Division of Waste Management to Waste Program Administrators (FDEP, 1995b and 1996).
[4] Copper was dropped from the previously referenced memoranda for residential and industrial soil cleanup goals, but was previously provided in a memorandum dated April 5, 1995, from the FDEP, Bureau of Waste Cleanup (FDEP, 1995c).

Notes: SWMU = solid waste management unit.
mg/kg = milligrams per kilogram.
-- = analyte not present in soil samples from locations MPT-12-SS02 and MPT-12-SS03 at concentrations that exceed the detection limit.
ND = analyte not detected at concentrations that exceed the detection limit at background sampling location MPT-12-SS01.

The maximum detected concentration for the analytes detected in the surface soil samples, MPT-11-SS02 and MPT-SS03 collected adjacent to The Neutralization Basin were compared to the Florida Soil Cleanup Goals (FDEP, 1996) (Table 2-11); the background sample (MPT-11-SS01) was not included in this comparison. This comparison suggests that only one analyte, arsenic was detected at concentrations that slightly exceed the residential soil cleanup goal but not the industrial goal.

An estimate was made of the human health risk for residential and industrial exposures to arsenic at the maximum detected concentration (Table 2-12). This estimate suggests that arsenic presents an excess lifetime cancer risk of 1.6×10^{-6} for a residential receptor and 3.5×10^{-7} for an industrial receptor. FDEP uses the soil cleanup goals, which were established at a risk value of 1×10^{-6} as guidance, for site screening purposes, for source removal evaluations, as guidance during evaluation of remedial alternatives and design considerations (FDEP, 1996). It is likely that the use of The Neutralization Basin site area will be industrial for the foreseeable future.

2.2.5.2 **Groundwater Analytical Results** Groundwater samples were collected from the three monitoring wells at The Neutralization Basin site (Figure 2-3). Tables 2-13 through 2-15 present concentrations of analytes detected in each groundwater sample. Table 2-16 presents statistics for each analyte detected, and Table 2-17 compares detected concentrations with benchmarks from Florida Groundwater Guidance Concentrations (FDEP, 1994). The FDEP groundwater guidance concentrations were used because they are equal to or more stringent than the Federal values. Below is a discussion of the results of water quality analyses and of the organic and inorganic target analytes detected in groundwater samples from The Neutralization Basin.

Water Quality. TDS ranged from 374 to 2,550 mg/ℓ; the secondary water quality standard for TDS is 500 mg\ℓ (FAC, 62-520), which was exceeded by the groundwater samples collected from monitoring wells MPT-11-MW02S and MPT-11-MW03S (Table 2-13). A maximum value of 10,000 mg/ℓ is the criterion used to classify groundwater in a aquifer as a Class G-I or G-II drinking water supply. TDS measured in groundwater samples collected from monitoring wells at The Neutralization Basin were less than this value.

Sulfate and chloride were the dominant anions. Concentrations of chloride detected in the groundwater samples ranged from 34 to 1,190 mg/ℓ; the water quality standard for chloride is 250 mg/ℓ (FAC, 62-520, Groundwater Classes, Standards, and Exemptions). Chloride measured in groundwater samples collected from monitoring wells MPT-11-MW02S and MPT-11-MW03S exceeded this standard.

Sulfate, a common form of sulfur found in oxygenated systems, ranged from 29.3 to 105 mg/ℓ; the water quality standard for sulfate is 250 mg/ℓ (FAC, 62-520), which was not exceeded.

Color measured in the groundwater ranged from 7.2 to 11.4 APHA units. The standard for color is 15 APHA units, which was not exceeded.

Sulfide, a common form of sulfur reduced under anaerobic conditions, was measured at less than 2.0 mg/ℓ; currently, there are no standards under FAC, 62-250 for this parameter. Hardness ($CaCO_3$) was measured at 27 to 353 mg/ℓ, which suggests that the water tends to be very hard (greater than 180 mg/ℓ [Durfor and Becker, 1964]).

Table 2-12
Estimated Human Health Risk Based on Maximum Values for Surface Soil Samples at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	Maximum Detected Concentration[1]	Residential Exposure		Industrial Exposure	
		FDEP Soil Cleanup Goal[2]	Estimated Residential Cancer Risk[3]	FDEP Soil Cleanup Goal[2]	Estimated Industrial Cancer Risk[3]
Volatile Organic Compounds (µg/kg)					
Parameters not analyzed.					
Semivolatile Organic Compounds (µg/kg)					
Parameters not analyzed.					
Pesticides and PCBs (µg/kg)					
Parameters not analyzed.					
Inorganic Analytes (mg/kg)					
Arsenic	1.3	0.8	1.6×10^{-6}	3.7	3.5×10^{-7}
Estimated Total Cancer Risk			1.6×10^{-6}		3.5×10^{-7}

[1] The maximum value is from Table 2-10, and represents the maximum value detected for an analyte in an environmental sample.
[2] Residential and industrial soil cleanup goals are from memoranda dated January 19, 1996, and September 29, 1996, from the FDEP, Division of Waste Management to Waste Program Administrators.
[3] The cancer risk is an estimated value based on the assumptions (FDEP, 1996) used to determine the human health-based risk values.

Notes: SWMU = solid waste management unit.
FDEP = Florida Department of Environmental Protection.
µg/kg = micrograms per kilogram.
PCB = polychlorinated biphenyl.
mg/kg = milligram per kilogram.

Table 2-13
Groundwater Quality Parameters for Groundwater Samples at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analytical Batch No.:		M747	M745	M745
Sample Matrix:		Water	Water	Water
Sample Location:		MPT-11-MW01S	MPT-11-MW02S	MPT-11-MW03S
Sample No.:		11MW001S	11MW002S	11MW003S
Date Sampled:	Units	07-JUL-94	06-JUL-94	06-JUL-94
Alkalinity as $CaCO_3$	mg/ℓ	248	1,440	347
Ammonia-N	mg/ℓ	0.7	2.2	0.7
Chloride	mg/ℓ	34	1,030	1,190
Hardness as $CaCO_3$	mg/ℓ	353	27	281
Nitrate/Nitrite-N	mg/ℓ	0.34	0.28	0.12
Oil and grease	mg/ℓ	–	10	–
Phosphorous-P, total	mg/ℓ	0.32	1.16	0.19
Sulfate	mg/ℓ	29.3	105	95.9
Sulfide	mg/ℓ	–	2	–
Total dissolved solids	mg/ℓ	374	2,550	1,370
Total Kjeldahl nitrogen	mg/ℓ	0.7	4.7	1.5
Total organic carbon	mg/ℓ	3.2	23.3	17.2
Color	APHA	15	800	25
pH	Standard	7.5	11.4	7.2

Note: SWMU = solid waste management unit.
mg/ℓ = milligrams per liter.
– = concentration was below the detection limit
$CaCO_3$ = calcium carbonate.
APHA = American Public Health Association.

Table 2-14
Organic Analytes Detected in Groundwater Samples at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analytical Batch No.:	2388	M745	3507	3507	M745
Sample Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Location:	MPT-11-MW02	MPT-11-MW02S	MPT-11-MW03	MPT-11-MW03	MPT-11-MW03S
Sample No.	MPT-11-2	11MW002S	11MW3	11MW3Dup	11MW003S
Date Sampled:	27-JAN-93	06-JUL-94	27-JAN-93	27-JAN-93	06-JUL-94
Volatile Organic Compounds (µg/ℓ)					
Methylene chloride	--	--	--	--	1 J
Acetone	11	--	--	--	--
1,1-Dichloroethane	--	--	1 J	1 J	1 J
1,2-Dichloroethene (total)	--	--	--	--	2 J
1,2-Dichlorobenzene	--	2 J	--	--	--
Semivolatile Organic Compounds (µg/ℓ)					
Phenol	22	43	--	--	--
4-Nitrophenol	--	11 J	--	--	13 J

Notes: SWMU = solid waste management unit.
µg/ℓ = micrograms per liter.
-- = concentration of analyte, if present, was less than the detection limit.
J = estimated value.

Table 2-15
Inorganic Analytes Detected in Groundwater Samples at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analytical Batch No.:	2388	M747	M747	2388	M745
Sample Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Location:	MPT-11-MW01S	MPT-11-MW01S	MPT-11-MW01S	MPT-11-MW02S	MPT-11-MW02S
Sample No.:	MPT-11-1	11MW001S	11MW001SF	MPT-11-2	11MW002S
Date Sampled:	27-JAN-93	07-JUL-94	07-JUL-94	27-JAN-93	06-JUL-94
Inorganic Analytes (µg/ℓ)					
Antimony	–	–	5.4	–	–
Arsenic	14.1	3.2 J	4.2 J	34.3	42.5
Barium	37.2 J	3.9 J	4.9 J	4.3 J	–
Beryllium	1.4 J	–	–	–	–
Calcium	115,000	90,300	96,400	15,200	1,770 J
Chromium	27	–	–	6.3 J	5.1 J
Cobalt	5.1 J	–	–	–	–
Copper	14.5 J	7.4 J	–	6.3 J	19.7 J
Iron	14,200	–	–	888	180
Lead	10.5	–	2.1 J	–	5.7 J
Magnesium	8,720	7,300	8,150	9,440	98.3 J
Manganese	324	7.5 J	10 J	62.6	–
Mercury	–	–	–	–	0.12 J
Nickel	–	–	–	10.8 J	20.4 J
Sodium	NA	15,300 J	17,500 J	NA	831,000
Vanadium	28.7 J	5 J	3.4 J	79.2	110
Zinc	105	–	–	98.8	14.1 J
Cyanide	–	0.69 J	–	–	–

See notes at end of table.

Table 2-15 (Continued)
Inorganic Analytes Detected in Groundwater Samples at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analytical Batch No.:	M745	2388	2388	M745	M745
Sample Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Location:	MPT-11-MW02S	MPT-11-MW03	MPT-11-MW03	MPT-11-MW03S	MPT-11-MW03S
Sample No.:	11MW002SF	11MW3	11MW3Dup	11MW003S	11MW003SF
Date Sampled:	06-JUL-94	27-JAN-93	27-JAN-93	06-JUL-94	06-JUL-94
Inorganic Analytes (µg/ℓ)					
Antimony	6.3	--	--	--	--
Arsenic	40.8	2.7 J	3.2 J	1.7 J	1.3 J
Barium	--	8.8 J	9.5 J	5.6 J	5.6 J
Beryllium	--	--	--	--	--
Calcium	1,370 J	191,000	189,000	173,000	178,000
Chromium	4.5 J	4.6 J	5.2 J	--	--
Cobalt	--	--	--	--	--
Copper	15 J	9 J	12.9 J	--	--
Iron	62.9 J	2,510	3,070	915	390
Lead	9.8	--	--	1 J	1.9 J
Magnesium	40.5 J	44,300	43,500	30,700	31,600
Manganese	--	86.8	88.7	87.2	89.9
Mercury	0.11 J	--	--	--	--
Nickel	17.1 J	--	--	--	--
Sodium	797,000	NA	NA	223,000	232,000
Vanadium	98.2	8.1 J	8.3 J	--	--
Zinc	12.9 J	33.2	19.3 J	--	--
Cyanide	--	--	--	0.94 J	--

The suffix "F" in the sample number indicates a groundwater sample that was filtered through a 45-micron screen prior to preservation. Samples without the suffix "F" were not filtered.

Notes: SWMU = solid waste management unit.
µg/ℓ = micrograms per liter.
-- = concentration of analyte, if present, was less than the detection limit.
J = estimated value.
NA = analysis not requested.

Table 2-16
Summary of Chemicals Detected in Groundwater Samples at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Mean of Detected Concentrations[3]	Reporting Limits for Nondetects	Sample with Maximum Concentration
Volatile Organic Compounds (µg/ℓ)						
1,1-Dichloroethane	2/6	1	1	1	5	11MW003S
1,2-Dichlorobenzene	2/6	1	2	1.5	5	11MW002S
1,2-Dichloroethene (total)	1/6	2	2	2	5	11MW003S
Acetone	1/6	11	11	11	1 to 10	
Methylene chloride	1/6	1	1	1	5	11MW003S
Semivolatile Organic Compounds (µg/ℓ)						
4-Nitrophenol	2/6	11	13	12	50	11MW003S
Phenol	2/6	22	43	32.5	10	11MW002S
Inorganic Analytes (µg/ℓ)						
Arsenic	6/6	1.7	42.5	16.5	NR	11MW002S
Barium	5/6	3.9	37.6	12	1.5	11MW003S
Beryllium	1/6	1.4	1.4	1.4	0.15 to 0.26	
Calcium	6/6	1,770	190,000	97,545	NR	11MW003S
Chromium	4/6	[2]4.9	27	10.8	2.8	11MW002S
Cobalt	1/6	5.1	5.1	5.1	2.6 to 3.6	
Copper	5/6	6.3	19.7	11.8	3.2	11MW002S
Iron	5/6	180	14,000	3,795	26.2	11MW003S
Lead	3/6	1	10.5	3.6	0.97 to 6.1	11MW002S
Magnesium	6/6	98.3	43,900	16,693	NR	11MW003S

See notes at end of table.

Table 2-16 (Continued)
Summary of Chemicals Detected in Groundwater Samples at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	Frequency of Detection[1]	Minimum Concentration[2]	Maximum Concentration[2]	Mean of Detected Concentrations[3]	Reporting Limits for Nondetects	Sample with Maximum Concentration
Inorganic Analytes ($\mu g/\ell$) (continued)						
Manganese	5/6	7.5	324	114	2.6	11MW003S
Mercury	1/6	0.12	0.12	0.12	0.07 to 0.08	11MW002S
Nickel	2/6	10.8	20.4	15.6	9.4 to 9.7	11MW002S
Sodium	3/3	15,300	831,000	356,433	NR	11MW002S
Vanadium	5/6	5	110	46.2	2.1	11MW002S
Zinc	4/6	14.1	105	14.1	2.4 to 3.7	11MW002S
Cyanide	2/3	0.69	0.94	0.82	0.81	11MW03S

[1] Frequency of detection is the number of samples from Tables 2-13 and 2-14 in which the analyte was detected divided by the total number of samples analyzed. The value excludes the samples that were filtered for inorganics (i.e., samples numbers with suffix "F" in Table 2-14).
[2] The value is the average of the detected concentrations in a sample and its duplicate. For nondetected values, one-half the contract-required quantitation limits/contract-required detection limit is used as a surrogate.
[3] Arithmetic mean includes all nonqualified positive detections and "J" qualified samples in which the analyte was detected. Nondetections, "U" and "UJ" values were not used, except for environmental samples and associated duplicates. The environmental sample and associated duplicate were averaged because they represent a single sampling location. Additionally, for target analytes detected only in either the environmental or duplicate sample (i.e., one sample with nonqualified positive detection or a "J" qualifier and the other a nondetection with a "U" or "UJ"qualifier), the average was calculated by using the detected value, and one-half of the "U" or "UJ" qualified value.

Notes: SWMU = solid waste management unit.
$\mu g/\ell$ = micrograms per liter.
NR = not reported, analyte detected in each sample.

Table 2-17
Comparison of Analytes Detected in The Neutralization Basin (SWMU 12) Groundwater Samples to Background Screening and Benchmark Concentrations

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	Maximum Concentration[1]	Background Screening Concentration[2]	Frequency Above Background Screening Concentration	Florida Guidance Concentration[3]	Frequency Above Florida Groundwater Guidance Concentration
Volatile Organic Compounds (µg/ℓ)					
1,1-Dichloroethane	1	NSC	N/A	[4]700	0/3
1,2-Dichlorobenzene	2	NSC	N/A	[5]600	0/3
1,2-Dichloroethene (total)	2	NSC	N/A	[5]70	0/3
Acetone	11	NSC	N/A	[4]700	0/3
Methylene chloride	1	NSC	N/A	[5]5	0/3
Semivolatile Organic Compounds (µg/ℓ)					
4-Nitrophenol	13	NSC	N/A	[4]15	0/3
Phenol	43	NSC	N/A	[6]10	1/3
Inorganic Analytes (µg/ℓ)					
Arsenic	42.5	9.3	1/3	[5]50	0/3
Barium	5.6	39	0/3	[5]2,000	0/3
Calcium	173,000	207,466	0/3	[7]1,055,398	N/A
Chromium	5.1	10.4	0/3	[5]100	0/3
Copper	19.7	2.8	2/3	[8]1,000	0/3
Iron	915	1,728	0/3	[8,9]300	1/3
Lead	5.7	3.6	1/3	[5]15	0/3
Magnesium	30,700	153,984	0/3	[7]118,807	N/A
Manganese	87.2	210	0/3	[8]50	1/3
Mercury	0.12	0.16	0/3	[5]2	0/3
Nickel	20.4	NSC	N/A	[5]100	0/3
Sodium	831,000	1,519,016	0/3	[8,10]160,000	2/3

See notes at end of table.

Table 2-17 (Continued)
Comparison of Analytes Detected in The Neutralization Basin (SWMU 12) Groundwater Samples to Background Screening and Benchmark Concentrations

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	Maximum Concentration[1]	Background Screening Concentration[2]	Frequency Above Background Screening Concentration	Florida Guidance Concentration[3]	Frequency Above Florida Groundwater Guidance Concentration
Inorganic Analytes (µg/ℓ) (continued)					
Vanadium	110	9.2	1/3	[4]49	1/3
Zinc	14.1	41.6	0/3	[5]5,000	0/3
Cyanide	0.94	1.9	0/3	[2]200	0/3

[1] Maximum concentration values for organic chemicals are from Table 2-15 and for inorganics are from samples collected using low-flow sampling techniques on July 6 and 7, 1994 (Table 2-14). The values for the samples filtered for inorganics (i.e., sample numbers with suffix "F" in Table 2-14) were not included.
[2] The background screening concentration is twice the mean of detected concentrations for inorganic analytes. The background concentrations are from the Resource Conservation and Recovery Act (RCRA) General Information Report for U.S. Naval Station (NAVSTA), Mayport, Florida (ABB Environmental Services, Inc. [ABB-ES], 1995b).
[3] Source: Florida Groundwater Guidance Concentrations, Bureau of Drinking Water and Groundwater Resources, Florida Department of Environmental Protection (FDEP), June 1994.
[4] The value is based on the chemical being a systemic toxicant (FDEP, 1994).
[5] The value is a primary drinking water standard for the chemical (FDEP, 1994).
[6] The value is based on the chemicals organoleptic property (FDEP, 1994).
[7] The chemical is an essential nutrient. The value is from Table D-2-1, Appendix D, of the RCRA General Information Report for NAVSTA Mayport, Florida (ABB-ES, 1995b).
[8] The value is a secondary drinking water standard for the chemical (FDEP, 1994)
[9] The chemical is an essential nutrient, a nontoxic dose would be 13,267 µg/ℓ (ABB-ES, 1995b).
[10] The chemical is an essential nutrient, a nontoxic dose would be 396,022 µg/ℓ (ABB-ES, 1995b).

Notes: SWMU = solid waste management unit.
µg/ℓ = micrograms per liter.
NSC = no screening concentration.
N/A = not applicable for organic chemicals.

A summary of nutrients (ammonia-N [ammonia as nitrogen], nitrate/nitrite, phosphorous-P, and total Kjeldahl nitrogen) measured in the surface water samples is provided in Table 2-13.

Results of the water quality indicator parameters suggest that groundwater in the vicinity of The Neutralization Basin meet the criteria of a Class G-II drinking water supply.

Organic Chemical Analytical Results. Organic analytes detected in the groundwater samples consist of five VOCs and two SVOCs (see Tables 2-14 and 2-16). Organic compounds detected in groundwater samples collected in 1993 consisted of 1,1-dichloroethane, acetone, and phenol. Organic compounds detected in groundwater samples collected in 1994 consisted of 1,1-dichloroethane, 1,2-dichlorobenzene, 1,2-dichloroethene, methylene chloride, 4-nitrophenol, and phenol.

1,1-Dichloroethane was detected in groundwater samples collected from monitoring well MPT-11-MW03S (Table 2-14), but did not exceed its benchmark value (Table 2-17).

1,2-Dichlorobenzene was detected as a single occurrence in a groundwater sample collected from monitoring well MPT-11-MW02S (Table 2-14), but did not exceed its benchmark value (Table 2-17).

1,2-Dichloroethene was detected as a single occurrence in a groundwater sample collected from monitoring well MPT-11-MW03S (Table 2-14), but did not exceed its benchmark value (Table 2-17).

Methylene chloride was detected as a single occurrence in a groundwater sample collected from monitoring well MPT-11-MW03S (Table 2-14), but did not exceed its benchmark value (Table 2-17). Methylene chloride is a common laboratory contaminant (USEPA, 1990).

Acetone was detected as a single occurrence in a groundwater sample collected from monitoring well MPT-11-MW01S (Table 2-14), but did not exceed its benchmark value (Table 2-17). Acetone is a common field and laboratory contaminant (USEPA, 1990).

4-Nitrophenol was detected in groundwater samples collected from monitoring wells MPT-11-MW02S and MPT-11-MW03S, but did not exceed its benchmark values.

Phenol was detected in groundwater samples collected from monitoring well MPT-11-MW02S (Table 2-14). The concentration detected in 1994 (43 micrograms per liter [$\mu g/\ell$]) exceeded benchmark values (see Table 2-17). The benchmark for phenol is based on organoleptic properties.

The organic compounds detected in the groundwater samples are not consistent with the use of The Neutralization Basin (i.e., pH adjustment), and it is unlikely that they are related to activities at The Neutralization Basin (SWMU 12). The source of these chemicals is unknown. Additionally, with the exception of phenol, the organic chemicals detected in The Neutralization Basin (SWMU 12) groundwater samples did not exceed Florida groundwater guidance concentrations.

Inorganic Chemical Analytical Results. The concentrations of inorganic target analytes detected in 1993 and other previous groundwater samples for The Neutralization Basin (SWMU 12) may be biased high because of suspended solids (sediment) in the samples (Puls and Powell, 1992 and Kearl and others, 1994). When the groundwater sample is preserved with nitric acid at a pH of 2 or less, some of the inorganics in the sediment may become dissolved in the sample. Because a bailer was used for purging and sampling the monitoring wells prior to the 1994 sampling event, the groundwater samples potentially contained sediments which, after preserving, introduced inorganics to the sample and biased the analytical results. As a result, there is poor correlation between the earlier sampling events and the 1994 analytical results.

Because the low-flow sampling method produces less turbid samples that are more representative of the surficial aquifer than those obtained with a bailer, the preferred data set was from the 1994 sampling event. Therefore, only the data set from 1994 was compared to the benchmark values.

Sixteen inorganic target analytes were detected in groundwater samples (Tables 2-15 and 2-16); five of the analytes (arsenic, copper, lead, nickel, and vanadium) were detected at concentrations greater than background screening values or were detected in The Neutralization Basin (SWMU 12) groundwater samples but not in background samples (Table 2-17). Iron, manganese, sodium, and vanadium were detected in the groundwater samples at concentrations greater than benchmark values (Table 2-17).

Iron was detected at concentrations exceeding its benchmark concentration (secondary drinking water standard) in the groundwater sample from MPT-11-MW03S. The secondary water standard is based on the chemical forming red oxide precipitates that stain laundry and plumbing fixtures. It should also be noted that iron is an essential nutrient and the maximum detected concentration is less than the nontoxic dose of 13,267 $\mu g/\ell$ (ABB-ES, 1995b). The maximum detected concentration was also less than the background screening value of 1,728 $\mu g/\ell$.

Manganese was detected at concentrations exceeding its benchmark concentration (secondary drinking water standard) in the groundwater sample from MPT-11-MW03S. Manganese secondary water standard is based on the chemicals tendency to deposit black oxide stains. The maximum detected concentration was less than the background screening value of 210 $\mu g/\ell$.

Sodium was detected at concentrations exceeding its benchmark concentration (secondary drinking water standard) in the groundwater samples from monitoring wells MPT-11-MW02S and MPT-11-MW03S. It should also be noted that sodium is an essential nutrient and the maximum detected concentration exceeded the nontoxic dose of 396,022 $\mu g/\ell$ (ABB-ES, 1995b). However, the maximum detected concentration was less than the background screening value of 1,519,016 $\mu g/\ell$.

Vanadium was detected at concentrations exceeding its benchmark concentration (based on the chemical being a systemic toxicant) in the groundwater sample from MPT-11-MW03S (see Table 2-12). The maximum detected concentration also was greater than the background screening value of 9.2 $\mu g/\ell$.

The groundwater analytical results also suggest that the sodium hydroxide release (previously described in Section 1.3) may have adversely affected groundwater in

the vicinity of monitoring well MPT-11-MW02S. Below is a description of data that supports this assumption.

- The pH measurements taken before the 1992 release were approximately 7 standard units (SUs). Values for pH measured in groundwater samples collected in 1993 and 1994 from monitoring well MPT-11-MW02S were 10 (field measured) and 11.4 SUs (Table 2-10). These values exceed the Florida guidance concentration of 8.5 SU. The results for pH measured in 1993 and 1994 suggest that the groundwater in the vicinity of this well may have been affected by the sodium hydroxide release.

- The concentration of sodium (831,000 $\mu g/\ell$) detected in the groundwater sample from monitoring well MPT-11-MW02S is several times higher than the concentration detected in the groundwater sample collected from monitoring well MPT-11-MW03S (223,000 $\mu g/\ell$), which is about the same distance from the river. Concentrations of sodium are expected to occur in the groundwater as both wells would be affected by saline river water. The disparity in the detected concentrations suggests that the groundwater in the vicinity of this well may have been affected by the sodium hydroxide release.

- The concentrations of magnesium and calcium detected in the groundwater sample from monitoring well MPT-11-MW02S are at least two orders of magnitude lower than concentrations detected in the sample from MPT-11-MW03S. This may be a result of the displacement of magnesium and calcium by sodium (Hem, 1992).

These findings are the basis for suggesting that the sodium hydroxide spill has affected the groundwater chemistry near MPT-11-MW02S. It is likely that the release has caused some inorganics, which likely are naturally present in the soil, to migrate with precipitation events and become dissolved constituents in groundwater in the vicinity of monitoring well MPT-11-MW02S. An example of this is an increase in the solubility of vanadium (anion) in oxidizing alkaline environments (Hem, 1992).

2.3 HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT (ERA) Below are the results of human health and ecological risk assessments conducted for Neutralization Basin (SWMU 12) for the NAVSTA Mayport Corrective Action Program.

2.3.1 Human Health Risk Assessment (HHRA) for Neutralization Basin (SWMU 12). The location, physical description, and history associated with The Neutralization Basin (SWMU 12) are described in Chapter 2.0. Groundwater samples were collected from the surficial aquifer using bailers in 1993 and low-flow sampling in 1994. Because the low-flow sampling method produces less turbid samples that are more representative of the surficial aquifer than those obtained with a bailer, the preferred data set was from the 1994 sampling event. However, it should be noted that chemicals detected in groundwater samples collected during the 1993 sampling event that were not detected in groundwater samples collected in 1994 were included in the final data set.

Surface soil and subsurface soil samples were not collected for the HHRA. Surface and subsurface soil were not evaluated during the HHRA because there had

not been a reported release to surface soil from effluent overtopping of The Neutralization Basin.

After evaluation and management of the environmental data collected at Neutralization Basin (SWMU 12), human health chemicals of potential concern (HHCPCs) in groundwater were selected, and the potential human health risks associated with groundwater were characterized.

The methodology for the HHRA is described in Section 2.5 of Volume I of the NAVSTA Mayport GIR (ABB-ES, 1995b).

2.3.1.1 **Selection of Chemicals of Potential Concern** HHCPCs are defined as chemicals for which data of sufficient quality are available for use in the risk assessment, that are potentially site-related, and that have maximum detected concentrations that are above standards or guidelines; above risk-based screening concentrations (where available); or, for inorganic analytes, above background screening concentrations (where available). The methodology used to select HHCPCs is described in Subsection 2.5.2 of the NAVSTA Mayport GIR (ABB-ES, 1995b).

Sample locations for the water table zone of the surficial aquifer that were evaluated in the HHRA were MPT-11-MW01S, MPT-11-MW02S, and MPT-11-MW03S (Figure 2-3). HHCPCs were selected from organic analytes detected in groundwater samples from the 1993 and 1994 sampling events and inorganic analytes were selected from only the 1994 sampling event. The 1994 inorganic data was used because the low-flow sampling procedure provided a groundwater sample(s) that is less turbid and more representative of the aquifer zone being monitored. Only the unfiltered groundwater samples were evaluated for the HHRA.

Table 2-18 presents the organic and inorganic analytes detected and HHCPCs selected for groundwater (unfiltered) at The Neutralization Basin (SWMU 12) site. One SVOC (phenol) and two inorganic analytes (arsenic and vanadium) were retained as HHCPCs.

2.3.1.2 **Exposure Assessment** Currently, there is no residential use of the site, and groundwater is not used for any potable or nonpotable purposes. However, if the site was developed for residential use in the future, residents could be exposed to the chemicals detected in groundwater samples. Therefore, groundwater was evaluated in the HHRA. Potential receptors and exposure scenarios are identified below and summarized in Table 2-19 and Figure 2-22. Receptor-specific exposure parameters for each exposure scenario are presented in Appendix D-3 of the NAVSTA Mayport GIR (ABB-ES, 1995b). The risk calculation spreadsheets are found in Appendix E-3 of the RFI Report for Group II SWMUs (ABB-ES, 1995a), which also contains the exposure parameters for each exposure scenario.

Domestic use of the surficial aquifer (adult ingestion and inhalation of volatiles while showering) would be considered appropriate as part of a hypothetical residential exposure scenario at The Neutralization Basin (SWMU 12) if the land use was changed to residential in the future.

Exposure point concentrations (EPCs) for groundwater were calculated according to procedures outlined in Subsection 2.5.6 of the NAVSTA Mayport GIR (ABB-ES, 1995b). The EPCs for analytes selected as HHCPCs are presented in Table 2-20.

Table 2-18
Selection of Human Health Chemicals of Potential Concern in Unfiltered Groundwater Samples Associated with The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Chemical	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Background Screening Concentration[3]	Risk-Based Screening Concentration[4]	Federal MCL[5]	Florida Groundwater Guidance Concentration[6]	Selected as HHCPC? (Yes/No)
Volatile Organic Compounds (µg/ℓ)									
1,1-Dichloroethane	1/3	5 to 5	1 to 1	1	NA	81	NS	700	No[7]
1,2-Dichlorobenzene	2/3	5 to 5	1 to 2	1.5	NA	27	600	600	No[7]
1,2-Dichloroethene (total)	1/3	5 to 5	2 to 2	2	NA	5.5	70	70	No[7]
Methylene chloride	1/3	5 to 5	1 to 1	1	NA	4.1	5	5	No[7]
Semivolatile Organic Compounds(µg/ℓ)									
4-Nitrophenol	2/3	50 to 50	11 to 13	12	NA	230	NS	15	No[7]
Phenol	1/3	10 to 10	43 to 43	43	NA	2,200	NS	10	Yes
Inorganic Analytes (µg/ℓ)									
Arsenic	3/3	10 to 10	1.7 to 42.5	15.8	9.8	0.038	50	50	Yes
Barium	2/3	200 to 200	3.9 to 5.6	4.8	39.0	260	2,000	2,000	No[7,8]
Calcium	3/3	5,000 to 5,000	1,770 to 173,000	88,357	207,466	1,055,398	NS	NS	No[7,8]
Chromium	1/3	10 to 10	5.1 to 5.1	5.1	10.4	18	100	100	No[7,8]
Copper	2/3	25 to 25	7.4 to 19.7	13.6	2.8	140	1,300	1,000	No[7]
Iron	2/3	100 to 100	180 to 915	548	1,728	13,267	NS	300	No[8]
Lead	2/3	3 to 3	1 to 5.7	3.4	2.6	15	15	15	No[7]
Magnesium	3/3	5,000 to 5,000	98.3 to 30,700	12,699	153,984	118,807	NS	NS	No[7,8]
Manganese	2/3	15 to 15	7.5 to 87.2	47.4	210	18	NS	50	No[8]
Mercury	1/3	0.2 to 0.2	0.12 to 0.12	0.12	0.16	1.1	2	2	No[7,8]

See notes at end of table.

Table 2-18 (Continued)
Selection of Human Health Chemicals of Potential Concern in Unfiltered Groundwater Samples Associated with The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Chemical	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Background Screening Concentration[3]	Risk-Based Screening Concentration[4]	Federal MCL[5]	Florida Groundwater Guidance Concentration[6]	Selected as HHCPC? (Yes/No)
Inorganic Analytes (µg/ℓ) (continued)									
Nickel	1/3	40 to 40	20.4 to 20.4	20.4	ND	73	100	100	No[7]
Sodium	3/3	5,000 to 5,000	15,300 to 831,000	356,433	1,519,016	396,022	NS	160,000	No[8]
Vanadium	2/3	50 to 50	5 to 110	57.5	9.2	26	NS	49	Yes
Zinc	1/3	20 to 20	14.1 to 14.1	14.1	41.6	1,100	NS	5,000	No[7,8]
Cyanide	2/3	10 to 10	0.69 to 0.94	0.82	1.9	73	200	200	No[7,8]

[1] Frequency of detection is the number of samples (11MW001S, 11MW002S, 11MW003S) in which the analyte was detected divided by the total number of samples analyzed. (Sample locations MPT-11-MW01S, MPT-11-MW02S and MPT-11-MW03S on Figure 2-3).
[2] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples in which the analyte was not detected.
[3] The background screening concentration is twice the mean of detected concentrations for inorganic analytes. The mean analyte concentrations in background samples are identified in Table D-1-3 of Appendix D to the Resource Conservation and Recovery Act Facility Investigation (RFI) General Information Report (ABB Environmental Services, Inc. [ABB-ES], 1995b).
[4] The risk-based screening concentrations are identified in Table D-1-5 of Appendix D to the RFI General Information Report (ABB-ES, 1995b).
[5] The Federal MCLs (November 1994) are identified in Table D-1-5 of Appendix D to the RFI General Information Report (ABB-ES, 1995b).
[6] The Florida Groundwater Guidance Concentrations (June 1994) are identified in Table D-1-5 of Appendix D to the RFI General Information Report (ABB-ES, 1995b).
[7] The maximum detected concentration did not exceed the risk-based screening concentration, the Federal MCL, or the Florida Guidance Concentration; therefore, this analyte will not be evaluated in the Human Health Risk Assessment (HHRA).
[8] The maximum detected concentration did not exceed the background screening concentration; therefore, this analyte will not be evaluated in the HHRA.

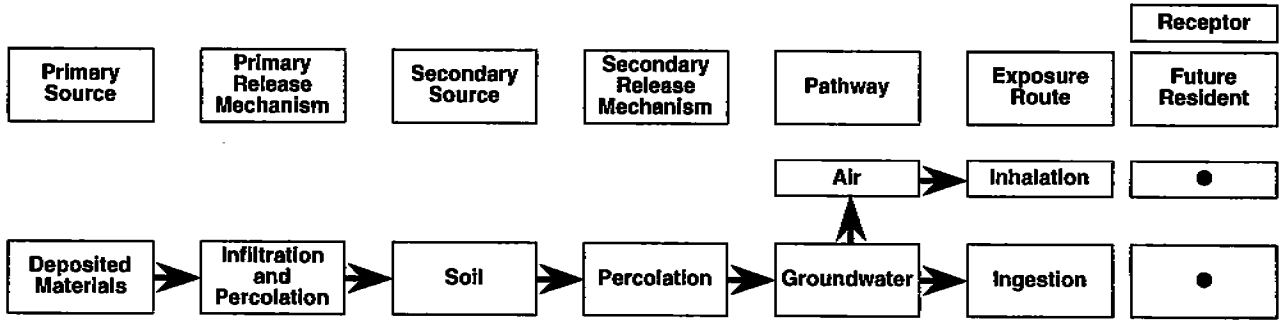
Notes: MCL = maximum contaminant level.
HHCPC = human health chemical of potential concern.
µg/ℓ = micrograms per liter.
NA = not applicable.
NS = no standard or guideline available.
ND = not detected in any background samples.

Table 2-19
Summary of Potential Exposure Pathways at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Medium of Exposure	Route of Exposure	Potentially Exposed Population	Selected for Evaluation?	Reason for Selection or Exclusion
Current Land Use				
Groundwater: Surficial Aquifer	Ingestion of groundwater as drinking water and inhalation of volatiles while showering.	Resident (adult)	No	There are no current exposures to groundwater.
Future Land Use				
Groundwater: Surficial Aquifer	Ingestion of groundwater as drinking water and inhalation of volatiles while showering.	Resident (adult)	Yes	If the site were developed for residential use, residents could be exposed to chemicals in the surficial aquifer.

Note: SWMU = solid waste management unit .



NOTES:
SWMU = solid waste management unit

FIGURE 2-22
COMPLETE EXPOSURE PATHWAYS FOR
HUMAN RECEPTORS,
SWMU 12

CLEAN CLOSURE EQUIVALENCY
DEMONSTRATION, SWMU 12

U.S. NAVAL STATION
MAYPORT, FLORIDA

7551-10 FIG 2-22 090496MAW

Table 2-20
Exposure Point Concentrations for Human Health Chemicals of Potential Concern
Unfiltered Groundwater Samples Associated with
The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Chemical	Frequency of Detection[1]	Maximum Detected Concentration	95 Percent UCL[2]	Exposure Point Concentration[3]
Semivolatile Analytes (µg/ℓ)				
Phenol	1/3	43	NC	43
Inorganic Analytes (µg/ℓ)				
Arsenic	3/3	42.5	NC	42.5
Vanadium	2/3	110	NC	110

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the number of samples analyzed.
[2] The 95 percent UCL was calculated on the arithmetic mean of all samples using one-half the contract-required quantitation limit and contract-required detection limit for nondetected concentrations.
[3] The exposure point concentration equals the 95 percent UCL unless the maximum detected concentration is less than the 95 percent UCL. If there are three or less total samples, the maximum detected concentration is the exposure point concentration.

Notes: SWMU = solid waste management unit.
UCL = upper confidence limit.
µg/ℓ = microgram per liter.
NC = not calculated.

The chemical exposure intakes for the receptor evaluated (adult resident) are presented in the risk calculation spreadsheet in Appendix E-3 of the RFI for Group II SWMUs (ABB-ES, 1995a).

2.3.1.3 **Toxicity Assessment** The purpose of the toxicity assessment is to identify the adverse effects associated with exposure to each HHCPC and to identify the relationship between the level of exposure and the severity or likelihood of adverse effects. The toxicity assessment methodology is described in Subsection 2.5.8 of the NAVSTA Mayport GIR (ABB-ES, 1995b). Appendix D-4 to the NAVSTA Mayport GIR contains brief toxicity summaries for the HHCPCs. Appendix E-1 of the RFI Report for Group II SWMUs (ABB-ES, 1995a) contains dose-response information for the HHCPCs.

The HHCPCs identified in the risk characterization (Paragraph 2.3.1.4) were used to estimate the excess lifetime cancer risk (ELCR) for carcinogens and the hazard index (HI) for noncarcinogens. Dose-response values current as of June 1995 for IRIS and November 1994 for HEAST have been used in this HHRA. Uncertainties associated with chemical-specific toxicity values are discussed in Paragraph 2.3.1.5.

2.3.1.4 **Risk Characterization** Both carcinogenic and noncarcinogenic risks were estimated for each HHCPC and each complete exposure pathway selected for evaluation in the exposure assessment, as described in Subsection 2.5.9 of the NAVSTA Mayport GIR (ABB-ES, 1995b). The FDEP has established risk management goals that are protective of human health at 1×10^{-6} for carcinogens and an HI of 1 for noncarcinogens. Excess lifetime cancer risk in the range of 1×10^{-4} (a chance of 1 in 10,000 for an adverse carcinogenic effect for a continuous lifetime exposure) to 1×10^{-6} represent concentrations that are considered by the USEPA to be protective of human health (Federal National Oil and Hazard Substances Pollution Contingency Plan, Final Rule, [40 CFR, Part 300]).

Risk estimates for potential exposures to HHCPCs detected in groundwater samples are discussed below. Table 2-21 summarizes the risk estimates. The risk characterization results are shown in spreadsheet E-3-1 in Appendix E-3 of the RFI report for Group II SWMUs (ABB-ES, 1995a). Figure 2-23 summarizes the cancer risks associated with The Neutralization Basin (SWMU 12). There is no exposure to groundwater from the surficial aquifer under current land use. The cancer risk for future land use associated with ingestion of groundwater as drinking water is 7×10^{-4} for the adult resident. This value is greater than the USEPA risk management range and FDEP's risk management goal.

No VOCs were selected as HHCPCs, so cancer risk to the adult resident associated with inhalation of VOCs during showering was not evaluated. The only chemical contributing cancer risk to the ELCR for the adult resident via drinking water is arsenic. The concentrations of arsenic detected in the 1994 groundwater samples are below the Federal and Florida drinking water standards, which are both 50 $\mu g/\ell$.

Figure 2-24 presents a summary of the HI for The Neutralization Basin (SWMU 12). The HI associated with adult resident ingestion of groundwater is approximately 4. Arsenic (hazard quotient [HQ] = 3.9) is the major contributor to this HI, with vanadium contributing an HQ of 0.43. No VOCs were selected as HHCPCs, so noncancer risk associated with adult resident inhalation of VOCs during showering was not evaluated.

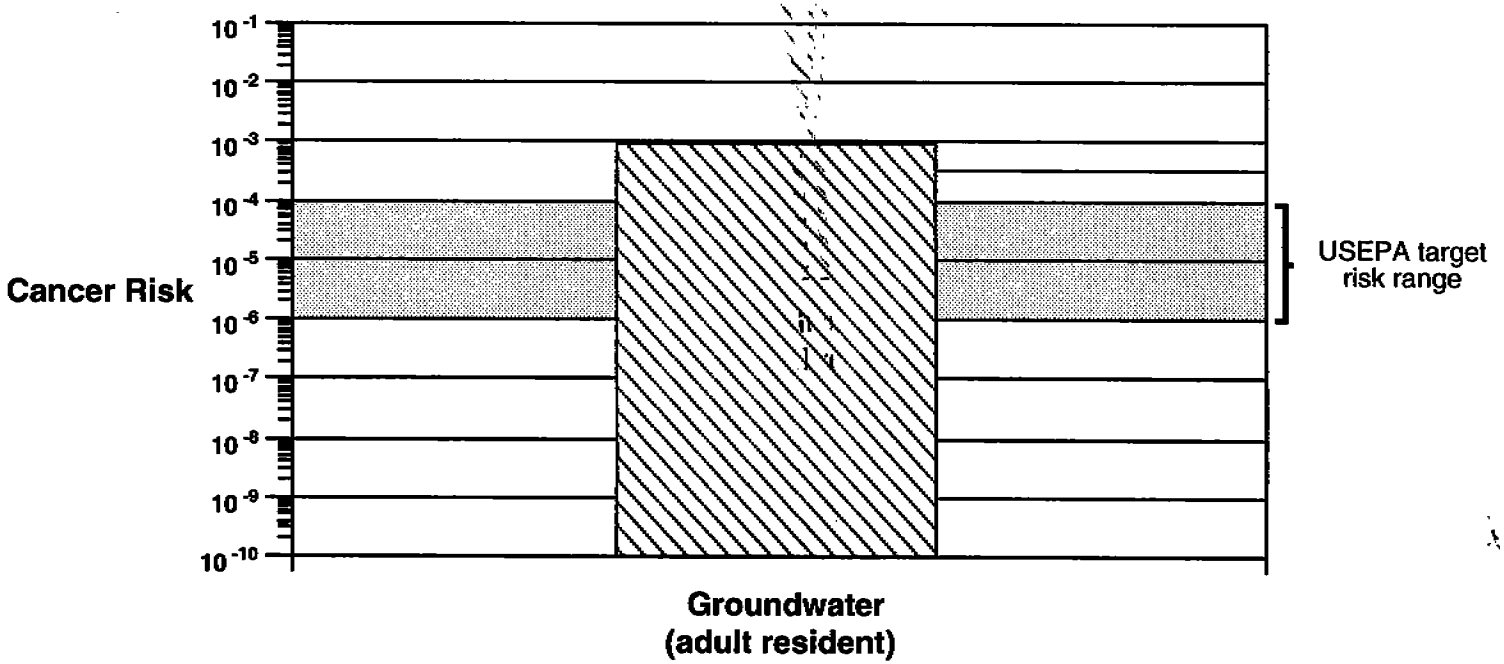
Table 2-21
Human Health Risk Summary for The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Land Use	Exposure Route	Hazard Index	Excess Lifetime Cancer Risk
Future Land Use			
Surficial Aquifer:			
Adult resident	Ingestion of groundwater as drinking water	4	7×10^{-4}
	Inhalation of volatiles while showering	NC	NC
Total adult resident:		**4**	**7×10^{-4}**

Notes: SWMU = solid waste management unit.
NC = not calculated because no volatiles were selected as human health chemicals of potential concern.

Cancer Risk Summary, Future Land Use



NOTES:
SWMU = solid waste management unit
USEPA = U.S. Environmental Protection Agency

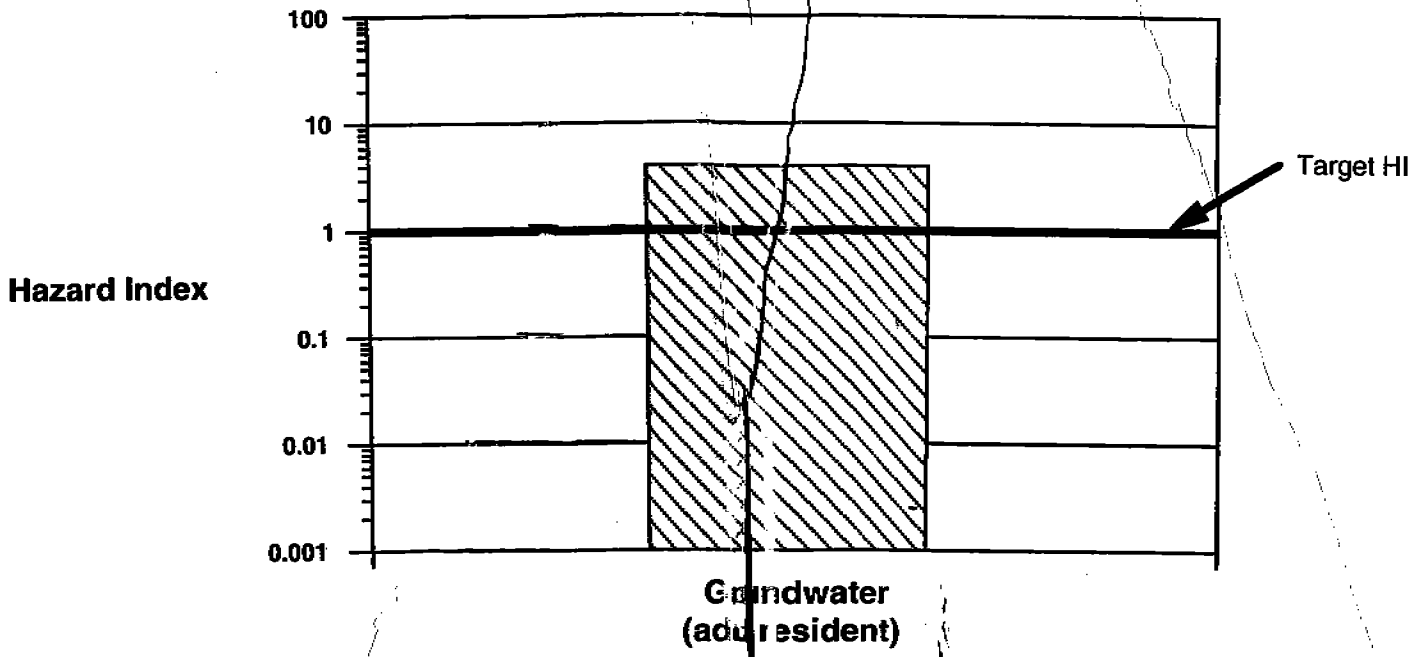
FIGURE 2-23
CANCER RISK SUMMARY,
FUTURE LAND USE,
SWMU 12

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION
MAYPORT, FLORIDA

7551-10 FIG 2-23 090696MAW

Hazard Index Summary, Future Land Use



NOTES:
SWMU = solid waste management unit
HI = hazard index

FIGURE 2-24
HAZARD INDEX SUMMARY,
FUTURE LAND USE,
SWMU 12

CLEAN CLOSURE EQUIVALENCY
DEMONSTRATION, SWMU 12

U.S. NAVAL STATION
MAYPORT, FLORIDA

7551-10 FIG 2-24 090696MAW

A single sample result for arsenic (42.5 µg/ℓ) is higher than the background screening concentration, whereas the other two samples have lower concentrations of at least 10-fold (1.7 µg/ℓ and 3.2 µg/ℓ). This single sample drives all carcinogenic and noncarcinogenic risks at The Neutralization Basin (SWMU 12).

2.3.1.5 **Uncertainty Analysis** General uncertainties associated with the collection, analysis, and evaluation of data; exposure assessment; toxicity assessment; and the risk estimation process are discussed in Subsection 2.5.10 of the NAVSTA Mayport GIR (ABB-ES, 1995b). Site-specific uncertainties that are important for the interpretation of the calculated risk estimates for groundwater at The Neutralization Basin (SWMU 12) are discussed below.

- Residential land use was the assumed future-land use scenario according to USEPA Region IV guidance (USEPA, 1991). It is likely, however, that the area near The Neutralization Basin (SWMU 12) will remain industrial because of its proximity to the Mayport turning basin.

- Because no surface or subsurface soil samples were evaluated in the HHRA, it is uncertain whether or not the chemicals identified in groundwater at The Neutralization Basin (SWMU 12) were also present in the site's soil. The evaluation of only one medium, groundwater, may result in an underestimate of potential risk.

- A single sample is responsible for selection of arsenic as an HHCPC and subsequently for the hypothetical carcinogenic risk associated with future residential groundwater ingestion. This sample may not be representative of the overall site conditions, because the other samples contained arsenic at concentrations consistent with background levels. Also, the detected concentrations of arsenic were below Federal and State drinking water standards.

- The arsenic cancer slope factor (CSF) is a source of uncertainty in the HHRA for the surficial aquifer. Concentrations of arsenic detected in environmental media at NAVSTA Mayport are high enough to consistently result in the determination that arsenic may be a contributor to cancer risks. The oral CSF for inorganic arsenic is based on dose-response data for skin cancer incidence obtained by Tseng, et al. (1968). Individuals in this study were exposed to high levels of inorganic arsenic in drinking water (170 micrograms per milliliter). The arsenic exposure was approximated based on estimates of water intake. Other exposure pathways contributing to total exposure such as ingestion of fish, livestock, and plants were not assessed, potentially resulting in an underestimate of arsenic exposure. The CSF factor was calculated using a model that assumes the dose-response curve is linear at low doses.

- Recent evidence suggests that low doses of arsenic may be largely detoxified by methylation, producing a nonlinear dose-response curve (Goyer, 1991). In the Tseng, et al. study, the saturation of the normal detoxification pathways coupled with an underestimate of exposure, may have resulted in an overestimate of cancer risk for this site. Based on the uncertainties associated with the arsenic CSF, risk management guidance (USEPA, 1988) suggests that cancer risk may be up to tenfold lower than predicted.

- The presence of tentatively identified compounds (TICs) has not been established with a degree of certainty great enough to warrant their inclusion in the HHRA for groundwater at Neutralization Basin (SWMU 12). The relative number of TICs is low in comparison to the number of detected chemicals. Furthermore, few toxicity data are available to evaluate the potential health effects of these analytes even if they were considered for quantitative evaluation. Because TICs were not evaluated, there is a potential for underestimation of the health risks associated with future land use.

- Because The Neutralization Basin (SWMU 12) is located on a thin peninsula between the St. Johns River and the Mayport Turning Basin, where the surficial aquifer is in direct hydraulic connection with the marine and estuarine waters of the St. Johns River, it is not likely, in a hypothetical future use residential scenario, that the groundwater beneath this site would be used as a potable water source.

2.3.1.6 **Remedial Goal Options (RGOs)** As required by USEPA Region IV guidance, RGOs are presented in a table of potential media cleanup levels (Table 2-22). Potential media cleanup levels have been identified for HHCPCs that exceed Federal or State standards or Florida guidance concentrations, or that have associated cancer risks greater than 1×10^{-6} or HQs greater than 0.1. Potential media cleanup levels include concentrations at various risk levels and Federal and State standards and guidance values. These potential media cleanup levels are not actual cleanup levels. These values are provided here for informational purposes to assist risk-management decision making concerning the need for a CMS and for use within the CMS itself.

Potential media cleanup levels were developed for arsenic, the only HHCPC that contributes a cancer risk of greater than 1×10^{-6} to the ELCR of 7×10^{-4} for the unfiltered surficial aquifer groundwater. Potential media cleanup levels were also developed for those HHCPCs (arsenic and vanadium) that contribute an HQ greater than 0.1 to the HI of 4 for the surficial aquifer. Table 2-22 contains a summary of RGOs for The Neutralization Basin (SWMU 12). Inclusion of arsenic in this table is not intended to be a statement that remediation of arsenic is necessary. Arsenic concentrations are less than Federal and State drinking water standards.

RGOs for iron, phenol, manganese, and sodium are also presented in Table 2-22 because the maximum detected concentrations of these analytes in groundwater samples associated with The Neutralization Basin (SWMU 12) exceeded their respective Federal or State MCLs, or Florida guidance concentrations. Use of these guidance concentrations in the development of RGOs should be cod in relation to established background concentrations and detection limits.

2.3.2 **ERA for The Neutralization Basin (SWMU 12)** The following subsections describe the results of the ERA for The Neutralization Basin (SWMU 12). The ERA was completed according to the methodology described in Section 2.4 of the NAVSTA Mayport GIR (ABB-ES, 1995b) and includes selection of ecological chemicals of potential concern (ECPCs) (Subsection 2.4.1), exposure assessment (Subsection 2.4.2), ecological effects assessment (Subsection 2.4.3), risk characterization (Subsection 2.4.4), and uncertainty analyses (Subsection 2.4.5).

Table 2-22
Summary of Remedial Goal Options for Human Health at The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Chemical	Range of Detected Concentrations	Excess Lifetime Cancer Risk Risk Range			Hazard Quotient Risk Range			Federal MCL[1]	Florida Groundwater Guidance Concentrations[2]
		10^{-4}	10^{-5}	10^{-6}	0.1	1	10		
Surficial Aquifer ($\mu g/\ell$)									
Adult resident, groundwater ingestion									
Arsenic	1.7 to 42.5	5.7	0.57	0.06	1.1	10.9	109	50	50
Iron[3]	180 to 915	NA	NA	NA	NA	NA	NA	NS	[4]300
Manganese[3]	7.5 to 87.2	NA	NA	NA	NA	NA	NA	NS	[4]50
Phenol	43 to 43	NA	NA	NA	2,150	21,500	215,000	NS	[5]10
Sodium[3]	15,300 to 831,000	NA	NA	NA	NA	NA	NA	NS	160,000
Vanadium	5 to 110	NA	NA	NA	25.6	256	2,560	NS	[5]49

[1] The Federal MCL (November 1994) are identified in Table D-1-5 of Appendix D to the Resource Conservation and Recovery Act Facility Investigation (RFI) General Information Report (ABB Environmental Services, Inc. [ABB-ES], 1995b).
[2] The Florida Groundwater Guidance Concentrations (June 1994) are identified in Table D-1-5 of Appendix D to the RFI General Information Report (ABB-ES, 1995b).
[3] This analyte was not selected as a human health chemical of potential concern for groundwater because the maximum detected concentration did not exceed the background screening concentration. However, the maximum detected concentration exceeded the analyte's risk-based screening concentration, Federal MCL, or Florida guidance concentration. Therefore, remedial goal options are presented for this analyte.
[4] This value is a Florida secondary standard.
[5] This value is a Florida guidance concentration. The Florida guidance concentrations (June 1994) are identified in Table D-1-5 of Appendix D to the RFI General Information Report (ABB-ES, 1995b).

Notes: SWMU = solid waste management unit.
MCL = maximum contaminant level.
$\mu g/\ell$ = micrograms per liter.
NA = not applicable.
NS = no standard available.

Exposure pathways for ecological receptors at The Neutralization Basin (SWMU 12) are limited to groundwater discharging to the St. Johns River. It is expected that terrestrial receptors would not be present at The Neutralization Basin (SWMU 12) because the area use is industrial and the site is paved with concrete. The St. Johns River is located approximately 75 feet from the SWMU.

2.3.2.1 **Selection of ECPC** Analytes were determined to be an ECPC according to the process described in Subsection 2.4.1 of the NAVSTA Mayport GIR (ABB-ES, 1995b). Aquatic receptors in the St. Johns River may be exposed to chemicals present in groundwater as it discharges through benthic zones to the surface water. This exposure pathway is the basis for screening analytes detected in groundwater samples to determine whether or not they are an ECPC.

Sample locations for the water table zone of the surficial aquifer that were evaluated in the ERA were MPT-11-MW01S, MPT-11-MW02S, and MPT-11-MW03S (Figure 2-3). ECPCs were selected from organic analytes detected in groundwater samples from the 1993 and 1994 sampling events and inorganic analytes were selected from only the 1994 sampling event. The 1994 inorganic data was used because the low-flow sampling procedure provided a groundwater sample(s) that is less turbid and more representative of aquifer zone being monitored.

Only the unfiltered groundwater samples were evaluated for the ERA. Use of unfiltered groundwater data to estimate chemical exposures for aquatic life is highly conservative. The measurement of chemicals in unfiltered samples includes both the fraction of chemicals adsorbed onto particles and the dissolved forms. Only the dissolved fraction of chemicals in the groundwater is likely to be transported in groundwater and discharged to the St. Johns River. Generally, only the fraction of the chemical in the dissolved phase is biologically available and potentially toxic to aquatic organisms (USEPA, 1993).

Table 2-23 provides a summary of the analytical results, including the frequency of detection, range of detected concentrations, mean of detected concentrations, and the screening reference concentrations, for each of the analytes. Calcium, magnesium, and sodium were not included in the screening process because they are naturally occurring nutrients. Eight of 21 analytes detected in groundwater samples collected from The Neutralization Basin (SWMU 12) monitoring wells were selected as ECPCs. The eight analytes include three volatiles (1,1-dichloroethane, 1,2-dichlorobenzene, and 1,2-dichloroethene), one semivolatile (4-nitrophenol), and four inorganics (copper, lead, nickel, and vanadium).

2.3.2.2 **Exposure Assessment** The exposure assessment identifies exposure pathways and estimates the magnitude of chemical exposures for aquatic receptors for ECPCs in groundwater. Exposure pathways for aquatic receptors at The Neutralization Basin (SWMU 12) are identified in the contaminant pathway model (Figure 2-25).

Aquatic receptors in the St. Johns River may be exposed to chemicals in groundwater from The Neutralization Basin (SWMU 12) if it discharges to the surface water of the river. Exposure concentrations of groundwater ECPCs for aquatic receptors in the St. Johns River are estimated based on a worst-case exposure scenario. It is assumed that the average and maximum EPCs of ECPCs in groundwater are the concentrations to which the receptors would be exposed in the St. Johns River. The average and maximum exposure concentrations are equal to

Table 2-23
Selection of Ecological Chemicals of Potential Concern in Groundwater Samples Associated with The Neutralization Basin (SWMU 12)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Screening Reference Concentration[3]	Florida Surface Water Quality Standards[4]	Analyte ECPC? (Yes/No)
Volatile Analytes (µg/ℓ)						
1,1-Dichloroethane	1/3	1	1	ND	NA	Yes
1,2-Dichlorobenzene	2/3	1 to 2	1.5	ND	NA	Yes
1,2-Dichloroethene (total)	1/3	2	2	ND	NA	Yes
Methylene chloride	1/3	1	1	ND	1,580	No[5]
Semivolatile Analytes (µg/ℓ)						
4-Nitrophenol	2/3	11 to 13	12	ND	NA	Yes
Phenol	1/3	43	43	ND	4,600	No[5]
Inorganic Analytes (µg/ℓ)						
Arsenic	3/3	1.7 to 42.5	15.8	9.8	50	No[5]
Barium	2/3	3.9 to 5.6	4.8	39	NA	No[6]
Calcium	3/3	1,770 to 173,000	88,357	207,466	NA	No[6,7]
Chromium	1/3	5.1	5.1	10.4	50	No[5,6]
Copper	2/3	7.4 to 19.7	13.6	2.8	2.9	Yes
Iron	2/3	180 to 915	548	1,728	300	No[6]
Lead	2/3	1 to 5.7	3.4	2.8	5.6	Yes
Magnesium	3/3	98.3 to 30,700	12,699	153,984	NA	No[6,7]
Manganese	2/3	7.5 to 87.2	47.4	210	NA	No[6]
Mercury	1/3	0.12	0.12	0.16	0.025	No[6]
Nickel	1/3	20.4	20.4	ND	8.3	Yes
Sodium	3/3	15,300 to 831,000	356,433	1,519,016	NA	No[6,7]
Vanadium	2/3	5 to 110	57.5	9.2	NA	Yes

See notes at end of table.

Table 2-23 (Continued)
Selection of Ecological Chemicals of Potential Concern in Groundwater
Samples Associated with The Neutralization Basin (SWMU 12)

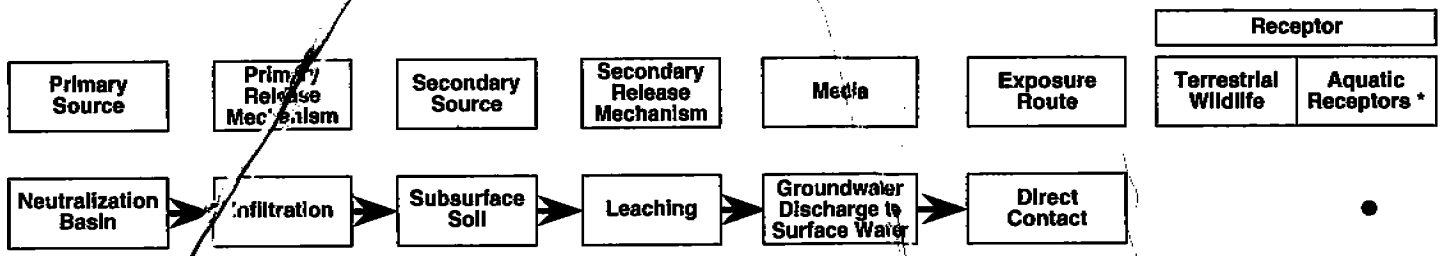
Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Screening Reference Concentration[3]	Florida Surface Water Quality Standards[4]	Analyte ECPC? (Yes/No)
Inorganic Analytes (µg/l) (continued)						
Zinc	1/3	14.1	14.1	41.6	86	No[5,6]
Cyanide	2/3	0.69 to 0.94	0.82	1.9	1.0	No[5,6]

[1] Frequency of detection is the number of samples in which the analyte is detected divided by the total number of samples analyzed (MPT-11-MW01S, MPT-11-MW02S, and MPT-11-MW03S; Figure 2-3).
[2] The average of detected concentrations is the arithmetic mean of all samples in which the analyte was detected; it does not include those samples in which the analyte was not detected.
[3] Background sample locations include MPT-1-MW01S, MPT-S-MW01S, MPT-8-MW05S, MPT-8-MW05I, MPT-8-MW05D, MPT-B-MW01S, MPT-B-MW01I, and MPT-B-MW01D, with a duplicate at MPT-S-MW01S. The average concentrations of analytes detected in the background locations are listed in the Resource Conservation and Recovery Act Facility Investigation General Information Report (ABB Environmental Services, Inc., 1995a). Two times the background concentration is calculated for inorganics.
[4] Florida Department of Environmental Protection, 62-302 Florida Administrative Code (1995 Version); surface water quality standards for Class III marine waters.
[5] Maximum detected concentration is less than the Florida surface water quality standard and, therefore, the analyte will not be evaluated in the Ecological Risk Assessment.
[6] Maximum detected concentration is less than one time the average background concentration for organics or less than two times the average background concentration for inorganics.

[7] Analyte is an essential nutrient and is not present at toxic levels.

Notes: ECPC = ecological chemical of potential concern.
µg/l = micrograms per liter.
ND = not detected in the background samples.
NA = not available.



* Aquatic receptors include invertebrates, plants, algae, amphibians, fish, and reptiles.

NOTES:
SWMU = solid waste management unit

FIGURE 2-25
CONTAMINANT PATHWAY MODEL FOR ECOLOGICAL RECEPTORS, SWMU 12

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

7551-10 FIG 2-25 090496MAW

the respective average and maximum detected concentrations. This worst-case scenario assumes no reduction in chemical concentrations as a result of transport from The Neutralization Basin (SWMU 12) to the St. Johns River and no mixing or dilution once the chemical is discharged.

2.3.2.3 **Ecological Effects Assessment** The ecological effects assessment determines whether or not the ECPC in detected in groundwater samples have the potential to cause or be associated with adverse effects to aquatic receptors. Ecological effects are based on comparison of predicted ECPC exposure concentrations with aquatic toxicity benchmarks. Aquatic toxicity information for the ECPCs is obtained from searches of the USEPA Aquatic Information Retrieval (AQUIRE) database (Appendix F-1 (ABB-ES, 1995a). Table 2-24 provides a summary of the toxicity testing information available from the AQUIRE search and a range of concentrations associated with lethal and sublethal effects to fish, invertebrates, mollusks, and algae. For each ECPC, the effect concentrations from AQUIRE are compared with the exposure concentrations to evaluate potential risks in Paragraph 2.3.2.4.

2.3.2.4 **Risk Characterization** Risks are evaluated for aquatic life associated with exposures to ECPCs in groundwater from The Neutralization Basin (SWMU 12) site as it discharges to the St. Johns River. It is expected that groundwater from Neutralization Basin (SWMU 12) is currently discharging to the St. Johns River. The predicted maximum and average concentrations for groundwater ECPCs in the St. Johns River are compared to the State of Florida surface water quality standards for Class III marine water (Chapter 62-302, FAC), the ambient water quality criteria (USEPA, 1986b), and the lowest reported adverse effect concentration in AQUIRE listed in Table 2-25. For comparison purposes, the concentrations of analytes detected in surface water samples from the St. Johns River at sampling locations north and northeast of The Neutralization Basin (SWMU 12) (MPT-B-SW13, MPT-B-SW14, and MPT-B-SW15) and the background surface water locations (MPT-B-SW1 through MPT-B-SW7) (NAVSTA Mayport GIR [ABB-ES, 1995b]) are also presented in Table 2-25. Benchmarks are not available to assess the potential aquatic toxicity of 1,1-dichloroethane and 1,1-dichloroethene in the marine environment.

The EPCs of copper, lead, and nickel detected in groundwater samples exceeded toxicity benchmark values. Copper was also detected in surface water samples from the St. Johns River at concentrations higher than the benchmarks. Assuming that concentrations of copper, lead, and nickel in groundwater do not change as they discharge to the St. Johns River (a conservative assumption), a risk for aquatic receptors is not expected for the following reason:

- The fraction of metals biologically available and potentially toxic to aquatic receptors is likely to be considerably less than the concentrations measured. The unfiltered analyses of the groundwater included both dissolved and nondissolved phases of the metal. Only the dissolved phase of the metal is considered to be biologically available and potentially toxic to aquatic receptors (USEPA, 1993).

2.3.2.5 **Uncertainty Analyses** A number of uncertainties and assumptions are inherent in the ERA process. The NAVSTA Mayport GIR (ABB-ES, 1995b) summarizes general ERA uncertainties. Specific uncertainties are associated with the evaluation of risks from the ECPCs selected using groundwater samples at The Neutralization Basin (SWMU 12) are included below.

Table 2-24
Results of AQUIRE Search for Toxicity of Groundwater Ecological Chemicals of Potential Concern (ECPCs) at The Neutralization Basin (SWMU 12) to Aquatic Receptors

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte[1]	Fish		Invertebrates		Mollusks		Algae and Aquatic Plants
	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal	Sublethal
Volatile Organic Compounds (µg/ℓ)							
1,1-Dichloroethane	--	--	--	--	--	--	--
1,2-Dichlorobenzene	2 / 9.7 - 7,300	--	4 / 9,400 - 14,300	--	--	--	--
1,2-Dichloroethene	--	--	--	--	--	--	--
Semivolatile Organic Compounds (µg/ℓ)							
4-Nitrophenol	1 / 27	--	1 / 26,400	1 / 10,000	1 / 29,400	--	--
Inorganic Analytes (µg/ℓ)							
Vanadium	--	--	--	--	--	--	23 / 500 - 50,000
Copper[2]	NS	NS	NS	NS	NS	NS	NS
Lead[2]	NS	NS	NS	NS	NS	NS	NS
Nickel[2]	NS	NS	NS	NS	NS	NS	NS

[1] Toxicity information was retrieved from AQUIRE and is included as Appendix F-1 in the Resource Conservation and Recovery Act Feasibility Investigation for Group II SWMUs (ABB Environmental Services, Inc., 1995a).
[2] Toxicity information for copper, lead, and nickel was not searched in AQUIRE because sufficient aquatic toxicity information was retrieved from Ambient Water Quality Criteria (U.S. Environmental Protection Agency, 1986b).

Notes: Values (USEPA, 1986b) are expressed in number of studies per range of concentrations.

AQUIRE = Aquatic Information Retrieval.
SWMU = solid waste management unit.
µg/ℓ = micrograms per liter.
-- = information not available.
NS = not searched.

Table 2-25
Comparison of The Neutralization Basin (SWMU 12) Groundwater Ecological Chemical of Potential Concern (ECPC) Exposure Concentrations (in St. Johns River) with Toxicity Benchmarks

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	St. Johns River Exposure Concentration: Maximum/Average Exposure Point Concentrations for Groundwater[1]	Florida Surface Water Quality Standard[2]	Federal AWQC[3]	AQUIRE[4] (Lowest reported adverse effect concentration)	Concentrations Detected in Surface Waters of St. Johns River[5]	Concentrations Detected in Background Surface Water Samples[6]	Results of Comparison
Volatile Organic Compounds (µg/ℓ)							
1,1-Dichloroethane	1 / 1	NA	NA	NA	ND	ND	Benchmark not available
1,2-Dichlorobenzene	2 / 1.5	NA	129[7]	9.7	ND	ND	Benchmark not exceeded
1,2-Dichloroethene	2 / 2	NA	NA	NA	ND	ND	Benchmark not available
Semivolatile Organic Compounds (µg/ℓ)							
4-Nitrophenol	13 / 12	NA	NA	27	ND	ND	Benchmark not exceeded
Inorganic Analytes (µg/ℓ)							
Copper	19.7 / 13.6	2.9	2.9	NS	4.1 to 5	2.4 to 37.2	Exceedance of 6.8 times the lowest benchmark
Lead	5.7 / 3.4	5.6	8.5	NS	ND	0.91 to 1.5	Exceedance of 1.02 times the lowest benchmark
Nickel	20.4 / 20.4	8.3	8.3	NS	ND	13	Exceedance of 2.5 times the lowest benchmark

See notes at end of table.

Table 2-25 (Continued)
Comparison of The Neutralization Basin (SWMU 12) Groundwater Ecological Chemicals of Potential Concern (ECPC) Exposure Concentrations (in St. Johns River) with Toxicity Benchmarks

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Analyte	St. Johns River Exposure Concentration: Maximum/Average Exposure Point Concentrations for Groundwater[1]	Florida Surface Water Quality Standard[2]	Federal AWQC[3]	AQUIRE[4] (Lowest reported adverse effect concentration)	Concentrations Detected in Surface Waters of St. Johns River[5]	Concentrations Detected in Background Surface Water Samples[6]	Results of Comparison
Inorganic Analytes (µg/ℓ) (continued)							
Vanadium	110 / 57.5	NA	NA	500	1.8	3.4 to 5.2	Benchmark not exceeded

[1] From Table 2-23.
[2] Florida Department of Environmental Protection, 62-302, Florida Administrative Code (1995 Version); surface water quality standards for Class III marine waters.
[3] U.S. Environmental Protection Agency (USEPA) Ambient Water Quality Chronic Criteria (USEPA, 1986b).
[4] From Table 2-24.
[5] Range of detected concentrations from the Resource Conservation and Recovery Act Facility Investigation (RFI) General Information Report (ABB Environmental Services, Inc. [ABB-ES], 1995b).
[6] Background sample locations include MPT-B-SW01, MPT-B-SW02, MPT-B-SW03, MPT-B-SW04, MPT-B-SW05, MPT-B-SW06, and MPT-B-SW07. The concentrations of organic and inorganic analytes detected in background surface water samples are listed in Tables 3-15 and 3-16, respectively, of the RFI General Information Report (ABB-ES, 1995b).
[7] Standard indicated is for chlorinated benzene as a group.

Notes: SWMU = solid waste management unit.
AWQC = ambient water quality criteria.
AQUIRE = Aquatic Information Retrieval
µg/ℓ = micrograms per liter
NA = not available.
ND = not detected.
NS = not sampled.

- The potential for exposure by ecological receptors to the ECPCs in groundwater may be overstated as it is assumed that dispersion, advection, adsorption and attenuation of the chemicals in groundwater do not occur as groundwater is traveling to and discharging into the St. Johns River.

- The analyses of the groundwater included both dissolved and nondissolved phases of the metal. Only the dissolved phase of the metal is considered to be biologically available and potentially toxic to aquatic receptors (USEPA, 1993). The metal concentrations used in the ERA are probably an overestimate of exposure and risks.

- Aquatic toxicity benchmarks are not available for 1,1-dichloroethane and 1,2-dichloroethene, resulting in a possible underestimate of risks.

3.0 CONCLUSIONS

Based on the findings described in Chapter 2.0, this CCED petition for The Neutralization Basin supports clean closure under 40 CFR 270.1(C) because there is no evidence that a release of hazardous chemicals to the environment has occurred. The main function of The Neutralization Basin during operation was to neutralize either high or low pH effluent. During the brief period of operation no leaks from The Neutralization Basin structure were reported by the Navy to have occurred. Samples of both soil and groundwater suggest that no releases of high or low pH material has occurred specifically from The Neutralization Basin. However, anecdotal evidence suggests that there was a release from an appurtenance, the sodium hydroxide tank. Groundwater data also suggest that this release occurred. The sodium hydroxide release has been designated as an AOC that will be investigated under NAVSTA Mayport's RCRA Corrective Action program. Below is a summary of information supporting the conclusion.

- Surface and subsurface soil encountered during sampling activities typically consisted of fine-grained sand and shell material.

- The pH values for surface and subsurface soil samples are within the range that is considered nonhazardous and appear to be within the range that would be natural for soil containing calcareous materials (USDA, 1978). The pH of the surface and subsurface soil samples suggest that there has not been a release of acid or alkaline material from The Neutralization Basin.

- The results of the EP toxicity metals analysis for subsurface soil samples suggest that soil beneath The Neutralization Basin could not be considered hazardous waste according to pH and EP Toxicity hazardous waste identification criteria.

- The groundwater flow direction for the water table zone of the surficial aquifer beneath The Neutralization Basin site was determined to be north toward the St. Johns River.

- The results of a tidal study and measurements of specific conductivity and salinity suggest that semidiurnal and lunar tidal cycles have some influence on water levels and water quality at the location of monitoring wells MPT-11-MW02S and MPT-11-MW03S.

- Results of the water quality indicator parameters suggest that groundwater in the vicinity of The Neutralization Basin meet the criteria of a Class G-II drinking water supply.

- The chemicals chloride, iron, manganese, sodium and sulfate were detected in a monitoring well located adjacent to the St. Johns River at concentrations exceeding secondary drinking water standards, however, these chemicals are commonly found in marine and estuarine waters (Hem, 1992).

- Cadmium was detected during the quarterly sampling event in 1989 in 10 of 12 groundwater samples. One of the groundwater samples collected in 1989 from the hydraulic upgradient monitoring well contained cadmium at a concentration that exceeded the MCL. Cadmium has not been detected in subsequent groundwater samples.

- The organic compounds detected in the groundwater samples are not consistent with the use of The Neutralization Basin (i.e., pH adjustment), and it is unlikely that they are related to The Neutralization Basin (SWMU 12) operation. The source of these chemicals is unknown. With the exception of phenol, the organic chemicals detected in The Neutralization Basin (SWMU 12) groundwater samples did not exceed Florida groundwater guidance concentrations.

- Iron, manganese, sodium, and vanadium were detected in the groundwater samples at concentrations greater than benchmark values (Table 2-17). However, the maximum detected concentration of iron, manganese and sodium were less than their respective background screening values.

- The groundwater analytical results for pH, magnesium, sodium and calcium also suggest that the sodium hydroxide release may have adversely affected groundwater in the vicinity of monitoring well MPT-11-MW02S. It is likely that the release has caused some inorganics, which are naturally present in the soil, to migrate with precipitation events and become dissolved constituents in groundwater in the vicinity of monitoring well MPT-11-MW02S. An example of this is an increase in the solubility of vanadium (anion) in oxidizing alkaline environments (Hem, 1992).

- Surface soil and subsurface soil samples were not collected for the HHRA. Surface and subsurface soil were not evaluated during the HHRA because there had not been a reported release due to overtopping of The Neutralization Basin to surface soil.

- There is no exposure to groundwater from the surficial aquifer under current land use. The cancer risk for future land use associated with ingestion of groundwater as drinking water is 7×10^{-4} for the adult resident. This value is greater than the USEPA risk management range and FDEP's risk management goal. The HI associated with adult resident ingestion of groundwater is approximately 4. Arsenic (HQ = 3.9) is the major contributor to this HI, with vanadium contributing an HQ of 0.43.

- The only chemical contributing cancer risk to the ELCR for the adult resident is arsenic. The concentrations of arsenic detected in the 1994 groundwater samples are below the Federal and Florida drinking water standards, which are both 50 $\mu g/\ell$.

- Eight analytes were selected as ECPCs, including three volatiles (1,1-dichloroethane, 1,2-dichlorobenzene, and 1,2-dichloroethene), one semivolatile (4-nitrophenol), and four inorganics (copper, lead, nickel, and vanadium). Benchmarks are not available to assess the potential aquatic toxicity of 1,1-dichloroethane and 1,1-dichloroethene in the marine environment. The fraction of metals biologically available and potentially toxic to aquatic receptors is likely to be

considerably less than the concentrations measured (USEPA, 1993). The potential for exposure by ecological receptors to the ECPCs in groundwater may be overstated as it is assumed that dispersion, advection, adsorption and attenuation of the chemicals in groundwater do not occur as groundwater is traveling to and discharging into the St. Johns River.

REFERENCES

ABB Environmental Services, Inc. (ABB-ES). 1991. *Interim Final RCRA Facility Investigation (RFI) Work Plan, Volume I (Workplan), II (Sampling Plan), and III (Health and Safety Plan), U. S. Naval Station Mayport, Florida.* Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina (October).

ABB-ES. 1995a. *RCRA Facility Investigation Group II SWMUs U.S. Naval Station, Mayport, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (January).

ABB-ES. 1995b. *RCRA Facility Investigation General Information Report U.S. Naval Station, Mayport, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (January).

Aquatic Information Retrieval System. 1995. U.S. Environmental Protection Agency On-line Aquatic Database Record Search. April (Toxicity Data) and July (Bioconcentration Factors).

Durfor, C.N., and Becker, E. 1964. *Public water supplies of the 100 largest cities in the United States, 1962.* United States Geological Survey Water Supply Paper, 1812, 364 p.

E.C. Jordan Company, Inc. 1988a. *Closure Plan Neutralization Basin at Building 1241, EPA ID No. FL9170024260, U.S. Naval Station, Mayport, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (December).

E.C. Jordan Company, Inc. 1988b. *Groundwater Monitoring Plan Neutralization Basin at Building 1241, EPA ID No. FL9170024260, U.S. Naval Station, Mayport, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (December).

E.C. Jordan Company, Inc. 1989. *Addendum A to the Closure Plan Neutralization Basin at Building 1241, EPA ID No. FL9170024260, U.S. Naval Station, Mayport, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (April).

Florida Department of Environmental Protection (FDEP). 1994. *Groundwater Guidance Concentrations.* Bureau of Drinking Water and Ground Water Resources, Division of Water Facilities. June.

FDEP. 1995a. Correspondence: Draft Equivalency Demonstration Neutralization Basin, Solid Waste Management Unit 12, FL9 170 024 260, Dated March 15, 1995, from Satish Kastury, Administrator, Hazardous Waste Regulation, to Mr. Harold McGill, SOUTHNAVFACENGCOM, October.

FDEP. 1995b. Memorandum from John M. Ruddell, Director, Division of Waste Management, Tallahassee, Florida, to District Directors, Waste Program Administrators. Subject: Soil Cleanup Goals for Florida (September 29).

REFERENCES

FDEP. 1995c. Memorandum from Ligia Mora-Applegate, Bureau of Waste Cleanup to Tim Bahr, Bureau of Waste Cleanup, Tallahassee, Florida. Subject: Soil Cleanup Goals for the Military Sites in Florida (April 5).

FDEP. 1996. Memorandum from John M. Ruddell, Director, Division of Waste Management, to District Directors, Waste Program Administrators. Subject: Applicability of Soil Cleanup Goals for Florida (January).

Franks, B.J. 1980. *The Surficial Aquifer at the U.S. Naval Station Near Mayport, Florida*. U.S. Geological Survey Open-File Report 80-765.

Freeze, R. A., and J. A. Cherry. 1979. *Groundwater*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Goyer, R. A., 1991, Toxicology, The Basic Science of Poisons. Forth Edition; Casarett and Doull, editors; Toxic Effects of Metals: Pergamon Press, New York, New York.

Hem, John, D. 1992. *Study and Interpretation of Chemical Characteristics of Natural Water*. United States Geological Survey Water Supply Paper 2254. U.S. Government Printing Office, Washington, D.C.

Kearl, Peter M., Nic E. Kork, Mike Strites, and Joe Baker. 1994. "Field Comparison of Micropurging V5. Traditional Groundwater Sampling." *Ground Water Monitoring Review* (Fall 1994).

Puls, Robert W., and Robert M. Powell. 1992. "Acquisition of Representative Groundwater Quality Samples for Metals." *Groundwater Monitoring Review* (Summer 1992).

Tseng, W. P., et. al. 1968. "Prevalence of Skin Cancer in an Endemic Area of Chronic Arsenicism in Taiwan." *J. Natl. Cancer Inst.* 40: 453-463.

U.S. Department of Agriculture. 1978. Soil Survey of Jacksonville, Duval County, Florida. U.S. Department of Agriculture, Soil Conservation Service (May).

U.S. Environmental Protection Agency (USEPA). 1986a. Test Method for Evaluation of Solid Waste. SW 846. Third Edition. November. (update package, 1992).

USEPA. 1986b. Quality Criteria for Water 1986. EPA/440/5-86/001. Office of Water Regulations and Standards Division. Washington, D.C.

USEPA. 1988. Memorandum from Lee M. Thomas, Office of the Administrator for Pesticides and Toxic Substances. Subject: Agency Policy on the Carcinogenic Risk Associated with Inorganic Arsenic. Washington, D.C. (June 21).

USEPA. 1990. *National Functional Guidelines for Organic Data Review*. December (revised June 1991).

USEPA. 1991. *Region IV Standard Operating Procedures and Quality Assurance Manual*. February 1.

REFERENCES

USEPA. 1992. Test Methods for Evaluation of Solid Waste. 3rd ed. November 1986 (and update package, 1992).

USEPA. 1993. Technical Memorandum, Office of Water Policy and Technical Guidance. Subject: Interpretation and Implementation of Aquatic Life Metals Criteria. Washington, D.C. (October).

USEPA. 1996. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. USEPA Region IV. Athens, Georgia (May).

U.S. Geological Survey. 1997. "Groundwater Flow in the Surficial Aquifer System and Potential Movement of Contaminants from Selected Waste-Disposal Sites at Naval Station, Mayport, Florida." *Water Investigation Report* 97-4262.

APPENDIX A

CHRONOLOGY OF EVENTS, PREVIOUS REPORTS, CORRESPONDENCE

Appendix A-1	Chronology
Appendix A-2	Clean Closure Equivalency Demonstration Guidance Checklist
Appendix A-3	Correspondence

APPENDIX A-1

CHRONOLOGY

Table A-1
Project Chronology

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Date	Action
04/08/86	Naval Station (NAVSTA) Mayport submitted Resource Conservation and Recovery Act (RCRA) Part B Permit application to Florida Department of Environmental Regulation (FDER).
02/23/87	FDER inspected NAVSTA Mayport for RCRA compliance
06/10/87	FDER issued Notice of Violation to NAVSTA Mayport for operation of surface impoundment.
07/15/87	Second FDER inspection of NAVSTA Mayport.
08/24/87	FDER issued Warning Notice to NAVSTA Mayport with report of 07/15/87 inspection.
09/15/87	FDER issued Consent Order No. 87-1128 to NAVSTA Mayport.
11/03/87	NAVSTA Mayport submitted Draft Closure Plan to FDER.
02/09/88	FDER issued Notice of Deficiency to NAVSTA Mayport requiring revisions to draft Closure Plan.
04/88	NAVSTA Mayport resubmitted Closure Plan and a Groundwater Monitoring Plan to FDER.
11/22/88	FDER issued letter to NAVSTA Mayport transmitting revisions required prior to approval of the Closure Plan and Groundwater Monitoring Plan submitted in April 1988.
12/01/88	E.C. Jordan Co. (E.C. Jordan), submitted revised Closure Plan to U.S. Navy incorporating revisions to April 1988 Closure Plan per FDER comments.
02/22/89	**FDER issued letter to NAVSTA Mayport acknowledging receipt of revised Closure Plan and Groundwater Monitoring Plan, dated December 1988, and found the plans adequate to implement.**
04/24/89	E.C. Jordan implemented field activity at NAVSTA Mayport to install monitoring wells MPT-11-MW01S and MPT-11-MW02S, and sample groundwater for First Quarter Groundwater Sampling Event. Analyzed for Appendix III metals, Appendix III non-metals, and groundwater quality parameters.
05/02/89	E.C. Jordan submitted letter report to U.S. Navy reporting Monitoring Well Construction Details.
05/10/89	E.C. Jordan implemented field activity for closure plan at NAVSTA Mayport using slant drilling techniques for soil sampling. Soil samples analyzed for pH and metals using extraction procedure toxicity test protocols.
05/23/89	Land Surveyors surveyed the elevations of monitoring wells MPT-11-MW01S and MPT-11-MW02S at Neutralization Basin.
06/02/89	E.C. Jordan submitted the First Quarter Groundwater Monitoring Report to U.S. Navy.
06/08/89	E.C. Jordan submitted letter report to U.S. Navy reporting results of closure plan implementation (soil sampling).
06/12/89	E.C. Jordan submitted Monitoring Well Elevation Survey letter to U.S. Navy.
07/06/89	E.C. Jordan completes field activity for Second Quarter Groundwater Sampling Event. Analyzed for Appendix III Metals.
08/08/89	E.C. Jordan submitted the Second Quarter Groundwater Monitoring Report to U.S. Navy.
08/21/89	E.C. Jordan submitted letter report to U.S. Navy concerning mercury analyses on groundwater samples.
10/10/89	E.C. Jordan completed field activity for Third Quarter Groundwater Sampling Event. Analyzed for Appendix III Metals.
11/01/89	FDER issued letter to NAVSTA Mayport listing response and comments to: 1) Monitoring Well Construction Details, dated May 2, 1989; 2) the First Quarter Groundwater Monitoring Report; and 3) the Second Quarter Groundwater Monitoring Report, including the Additional Mercury Analysis Report.

Table A-1 (Continued)
Project Chronology

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Date	Action
11/07/89	E.C. Jordan submitted the Third Quarter Groundwater Monitoring Report to U.S. Navy.
11/20/89	E.C. Jordan submitted a letter to U.S. Navy containing responses to FDER Review Letter, Groundwater Monitoring Plan, dated November 1, 1989.
01/04/90	E.C. Jordan implemented field activity at NAVSTA Mayport to sample and measure tidal influence on monitoring wells during Fourth Quarter Groundwater Sampling Event; analyzed for Appendix III Metals.
02/23/90	E.C. Jordan submitted the Fourth Quarter Groundwater Monitoring Report to U.S. Navy.
07/02/90	FDER issued a letter to NAVSTA Mayport listing response and comments to: 1) NAVSTA Mayport letter response dated December 14, 1989 to the FDER letter dated November 1, 1989; 2) the Third Quarter Groundwater Monitoring Report dated November 7, 1989; and 4) Fourth Quarter Groundwater Monitoring Report dated February 22, 1989.
09/25/90	FDER issued letter to NAVSTA Mayport requesting certification of closure.
10/26/90	**E.C. Jordan issued a revised closure certification to U.S. Navy.**
03/08/91	**FDER issued letter indicating that November 26, 1990, closure certification was adequate and that the requirements of Consent Order No. 87-1128 have been fulfilled and it is therefore terminated.**
05/03/91	United States Environmental Protection agency (USEPA) issued letter to NAVSTA Mayport regarding Clean Closure Equivalency Demonstration (CCED) requirements.
06/10/91	Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) submitted documentation of previous closure activities to USEPA on behalf of NAVSTA Mayport.
10/21/91	USEPA issued letter to SOUTHNAVFACENGCOM providing comments on the Groundwater Monitoring Plan and recommending installation of two additional downgradient monitoring wells.
01/24/92	One additional downgradient monitoring well installed.
08/22/95	Meeting with Florida Department of Environmental Control (formerly FDER) to discuss comments on the CCED petition. (Minutes of meeting provided in Appendix A-3)

APPENDIX A-2

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION GUIDANCE CHECKLIST

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION CHECKLIST

Facility: U.S. Naval Station, Mayport, Florida
I.D. Number: FL 9 170 024 260
PATS Number:
Date of Check List: September 1996

FDEP Checklist	Corresponding Section in the CCED
I. SITE CHARACTERIZATION	
A. Facility Description	
1. Geographic location	1. Chapter 1.0, paragraph 1; Section 1.3, paragraphs 1 through 3; and Figure 1-1.
2. Facility size	2. Figures 1-2 and 1-3; and Section 1.3 of the Resource Conservation and Recovery Act (RCRA) Corrective Action Program General Information Report (GIR), U.S. Naval Station (NAVSTA) Mayport, Florida (ABB-ES, 1995b).
3. Discussion of unit	3. Chapter 1.0, paragraph 2; Table 1-1 and Section 1.3
4. Hydrology	4. Section 1.3, paragraph 4; and Sections 1.4.5 and 1.4.6 of the NAVSTA Mayport GIR (ABB-ES, 1995b).
5. History of operation	5. Section 1.3, paragraphs Past and Present Operations.
6. Release history	6. Section 1.3, paragraphs Past and Present Operations.
7. Location of potentially threatened drinking water wells.	7. Paragraph 1.4.6.5 of the NAVSTA Mayport GIR (ABB-ES, 1995b).
B. Description of Unit	
1. Number of units attempting CCED	1. Chapter 1.0, paragraph 2; and Section 1.2.
2. Unit type before and after closure	2. Section 1.3, paragraphs Previous Facilities, and Existing Neutralization Basin.
3. Unit size and physical description, modifications.	3. Section 1.3, paragraphs Previous Facilities, Existing Neutralization Basin, Past and Present Operations; and Figures 1-4 through 1-7.
4. Period of operation and age of unit	4. Section 1.3, paragraphs Previous Facilities, and Existing Neutralization Basin.
5. List of hazardous waste managed at unit.	5. Section 1.3, paragraphs Past and Present Operations.
6. Description of unit relationship with facility processes.	6. Section 1.3, paragraphs Past and Present Operations.
7. Description of previous releases from the unit.	7. Section 1.3, paragraphs Past and Present Operations.
8. Liner of leachate system	8. Section 1.3, paragraphs Previous Facilities, and Existing Neutralization Basin.
II. DEMONSTRATION OF COMPLIANCE WITH CLEAN CLOSURE EQUIVALENCE REQUIREMENTS	
A. Description of Closure Activities Conducted	
1. Summary of removal, decontamination, completed at closure.	1. Section 1.3, paragraphs Past and Present Operations.
2. Type of closure	2. Section 1.2.
3. Quantity of waste removed, by type	3. Not applicable.
4. Quantity of leachates, sludges, etc.	4. Not applicable.
5. Methods of removal	5. Not applicable.
6. Quantity and types of waste remaining if closure is risk-based.	6. Not applicable.
7. Date of closure activities, start to finish.	7. Section 1.1; and Appendix A, Table A-1.
8. Properly dated copies of State closure acceptance certificate.	8. Appendix A, Section A-3; letter dated March 8, 1991.

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION CHECKLIST

Facility: U.S. Naval Station, Mayport, Florida
I.D. Number: FL 9 170 024 260
PATS Number:
Date of Check List: September 1996

FDEP Checklist	Corresponding Section in the CCED
B. Sampling and Analysis Requirements	
1. General sampling information	1.
a. Sampling results, all media, 40 CFR 261 Appendix VIII constituents (Appendix IX for groundwater) relevant raw data and summarized tabular data.	a. Sections 2.1 and 2.2; Appendix B, section B-6; Appendix C, section C-11.
b. Sampling results for all media should include the following: i. location and type of sample. ii. basis of location of sampling iii. number of samples iv. date of samples v. results of sampling vi. date of analysis vii. USEPA/FDEP approved analytical methods used.	b. i. Subsections 2.1.1, 2.1.2 and 2.1.3; Subsections 2.2.1 and 2.2.2; Figures 2-1 through 2-3; and Appendix A workplans. ii. Subsections 2.1.1, 2.1.2 and 2.1.3; Subsections 2.2.1 and 2.2.2; and Appendix A workplans. iii. Subsections 2.1.1, 2.1.2 and 2.1.3; and Subsections 2.2.1 and 2.2.2. iv. Subsections 2.1.1, 2.1.2 and 2.1.3; and Subsections 2.2.1 and 2.2.2. v. Subsections 2.1.1, 2.1.2 and 2.1.3; Subsections 2.2.1 and 2.2.2; Tables 2-1 through 2-3, and 2-9 through 2-17; Appendix B, section B-6; Appendix C, section C-11. vi. Same as v. vii. Chapter 2.0, paragraph 2, Subsections 2.1.4 and 2.2.3, appendix A workplans.
c. Documentation of clean unit;	c. Paragraphs 2.1.5.1 and 2.2.5.1
d. Hydrologic setting if groundwater not sampled;	d. not applicable
e. FDEP/USEPA 30 day advance notification.	e. not applicable
2. Soil Sampling	2.
a. Soil sampling and analysis information. i. type of samples ii. number of samples iii. parameters analyzed iv. analytical techniques v. characterization	a. i. Subsections 2.1.1 and 2.2.2; and Appendix A, closure plan, December 1988. ii. Figures 2-1 through 2-3; and Subsections 2.1.1 and 2.2.2. iii. Sections 2.1 and 2.2; Subsections 2.1.1 and 2.2.2; Appendix C; and Appendix A, closure plan, December 1988. iv. Same as iii. v. Subsection 2.1.1 and 2.2.2.

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION CHECKLIST

Facility: U.S. Naval Station, Mayport, Florida
I.D. Number: FL 9 170 024 260
PATS Number:
Date of Check List: September 1996

FDEP Checklist	Corresponding Section in the CCED
b. Soil sampling requirements to demonstrate the CCED. i. soil samples analyzed by Appendix XIII and resultant concentrations. ii. additional sampling if constituents detected. iii. comparison of chemicals to Agency recommended limits. iv. Part B submission if contamination evident.	b. - Section 2.2 and Subsection 2.2.2. - Not applicable. - Paragraph 2.2.5.1. - Not applicable.
3. Groundwater Monitoring	
a. Statutory and regulatory requirements for CCED. i. groundwater sample analysis of, 40 CFR 261 Appendix VIII or 40 CFR 264 Appendix IX. ii. removal of soil, if necessary iii. groundwater monitoring program, 40 CFR 264, Subpart F (land disposal unit). a. - surface impoundments b. - waste pile c. - land treatment units d. - landfills	a. i. Tables 2-2 and 2-3; and Paragraphs 2.1.2, 2.1.3, 2.1.5.2, and 2.1.5.3. ii. Not applicable. iii. Not applicable. a. Tables 2-2 and 2-3; and Paragraphs 2.1.2, 2.1.3, 2.1.5.2, and 2.1.5.3. b. Not applicable. c. Not applicable. d. Not applicable.
b. Groundwater monitoring requirements for CCED. i. sampling of all groundwater monitoring wells for Appendix IX. ii. additional sampling required if contaminants detected and waste-specific compounds. iii. quarterly monitoring of waste detected. iv. contaminants remaining in subsoils are not impacting groundwater. v. where groundwater exceeds Agency recommended limits, submit Part B permit.	b. i. Figure 2-3; Paragraphs 2.1.3, 2.1.5.2, 2.1.5.3, 2.2.1, and 2.2.5.2; and Tables 2-2, 2-3, 2-13, 2-14 and 2-15. ii. Not applicable. iii. Figure 2-3; Paragraphs 2.1.3, 2.1.5.2, 2.1.5.3; and Tables 2-2, and 2-3. iv. Paragraphs 2.1.5.1 and 2.2.5.1. v. Not applicable.
4. Surface Water Sampling, if applicable	4. Not applicable
5. Air Emissions, if applicable	5. Not applicable

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION CHECKLIST

Facility: U.S. Naval Station, Mayport, Florida
I.D. Number: FL 9 170 024 260
PATS Number:
Date of Check List: September 1996

FDEP Checklist	Corresponding Section in the CCED
III. QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS	
A. Requirements for QA/QC control:	A.
1. Methods to determine number of samples.	1. Appendix A, closure and workplans.
2. Method to determine depth and location of samples.	2. Appendix A, closure and workplans.
3. An approved QAPP in accordance with Chapter 62-160, FAC.	3. Appendix A, closure and workplans; Appendix C, Technical Memoranda; and RCRA Facility Investigation Workplan for NAVSTA Mayport (ABB-ES, 1991).

APPENDIX A-3

CORRESPONDENCE

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BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION, Complainant, vs. UNITED STATES NAVAL STATION MAYPORT, Respondent.	:	IN THE OFFICE OF THE NORTHEAST DISTRICT OGC CASE NO.: 87-1128

CONSENT ORDER

This Consent Order is made and entered into between the State of Florida Department of Environmental Regulation ("Department") and the United States Navy ("Respondent"), United States Naval Station Mayport, Mayport, Florida 32228.

The Department finds and Respondent neither admits nor denies the following:

1. The Department is the State agency charged with the protection of the air and waters of the State of Florida, and is vested with the power and duty to implement and enforce the provisions of the Florida Air and Water Pollution Control Act, Chapter 403, Part I, Florida Statutes, and the Florida Resource Recovery and Management Act, Chapter 403, Part IV, Florida Statutes and the Rules promulated thereunder, Florida Administrative Code Title 17. Pursuant to these provisions, the Department is authorized to control or prohibit activities which may reasonably be expected to be sources of pollution and which may discharge hazardous substances.

2. Respondent's naval installation, located in Mayport, Florida, is primarily involved in intermediate level maintenance of equipment, ships, aircraft and other support units assigned to the portion of the 2nd fleet stationed at the installation. Respondent's property is further described as Sections 34 and 35, Township 1 South, Range 29 East, latitude: 30°23'34" and longitude: 81°25'06."

3. Respondent is a person within the meaning of Sections 403.031 and 403.703, Florida Statutes.

4. Respondent is a hazardous waste generator as defined in Florida Administrative Code Rule 17-30.020 and Title 40 Code of Federal Regulations (CFR) §260.10. Additionally, Respondent operates a hazardous waste storage facility at the installation.

5. Respondent was issued Department Hazardous Waste Construction Permit No. HC16-64635 for construction of the hazardous waste storage facility. On April 8, 1986, Respondent applied for a hazardous waste operation permit for operation of the storage facility.

6. Respondent's hazardous waste activities are more fully described in the Hazardous Waste Inspection Report dated February 23, 1987, and in the Hazardous Waste Inspection Report dated July 15, 1987. Copies of these reports are attached and incorporated herein as Exhibits I and II respectively.

7. Respondent, as a generator of hazardous waste, is required to comply with all applicable State and Federal hazardous waste regulations, and specifically Florida Administrative Code Chapter 17-30, which adopts and incorporates 40 CFR 260.10 and 40 CFR Parts 261 through 266.

8. On June 10, 1986, as a result of the February 23, 1987 inspection, the Department issued Notice of Violation (NOV) OGC Case No. 87-0539 to Respondent. The NOV alleged that Respondent had violated Section 403.087, Florida Statutes, for failure to amend its contingency plan pursuant to Condition 28 of Construction Permit HC16-64635 and Section 403.722(1), Florida Statutes, for operation of a hazardous waste surface impoundment without a valid Department permit.

9. On July 15, 1987, the Department conducted an inspection at Respondent's facility. As a result of this inspection, the Department alleges that Respondent has violated rules regulating hazardous waste management contained in Florida Administrative Code Chapter 17-30, which adopts by reference the provisions of 40 CFR Part 260.10 and 40 CFR Parts 261 through 266. The specific alleged violations are set forth in the "Summary of Violations" section of Exhibit II.

10. The Department and Respondent have agreed to enter into this Consent Order in order to give Respondent the time necessary to come into compliance with the applicable State and Federal regulations allegedly violated so that the Department may issue Respondent a hazardous waste operation permit for operation of the hazardous waste storage facility.

THEREFORE, having met and reached a resolution of this matter, pursuant to Florida Administrative Code Rule 17-103.110, the Department and Respondent mutually agree, and it is

ORDERED:

11. Within 30 days from the effective date of this Consent Order, Respondent shall make payment to the Department for costs and expenses of the State in the amount of $145.63. An accounting of the costs and expenses, which are recoverable pursuant to Section 403.141(1), F.S., is attached and incorporated herein as Exhibit III. Payment shall be made by cashiers check or money order payable to the "State of Florida Department of Environmental Regulation." Respondent shall render said payment by United States mail to the Department of Environmental Regulation, Northeast District, 3426 Bills Road, Jacksonville, Florida 32207.

12. Within 30 days of the effective date of this Consent Order, Respondent shall amend its contingency plan to include the current and alternate emergency coordinator, the surface impoundment at Building 1241, and any accumulation tanks or containers at the facility which are intended for accumulation of hazardous waste.

13. Within 30 days of the effective date of this Consent Order, Respondent shall submit a closure plan pursuant to 40 CFR 264 Subpart G, which addresses the surface impoundment at Building 1241. The closure plan shall include a ground water monitoring plan which meets the requirements of 40 CFR 264 Subpart F. Pursuant to 40 CFR 265.90(e), the Department may waive the ground water monitoring requirements of 40 CFR 264 Subpart F if Respondent can demonstrate that there has been no migration of hazardous wastes from the impoundment. Provisions for such a demonstration shall be submitted as part of Respondent's closure plan and shall include at a minimum, but not be limited to:

(a) installation of at least one downgradient and one upgradient well; if Respondent cannot locate an unaffected upgradient well, Respondent shall establish a background well and provide appropriate assurances that the water quality would be equivalent to an upgradient well;

(b) one year of quarterly sampling and analyses; the first quarter samples shall be analyzed for the parameters set forth in 40 CFR 265.92(b) and the secondary drinking water quality standards set forth in Florida Administrative Code Chapter 17-22. The remaining three quarterly analyses shall be for pH, 40 CFR 265 Appendix III metals and any first quarter parameters which exceed water quality standards as set forth in Florida Administrative Code Chapter 17-22.

14. The Department shall review the closure and monitoring plan submitted in accordance with paragraph 12, and provide Respondent with a written response to the plan. Respondent shall not implement the plan until Respondent receives written notification from the Department that the plan has been approved.

15. In the event that additional information is necessary for the Department to evaluate the plan submitted pursuant to paragraph 13, the Department shall make a written request to Respondent for the information, and Respondent shall provide all requested information in writing to the Department within 30 days from receipt of said request unless the requested information requires additional field work in which case Respondent shall submit to the Department a written schedule for completing the field work needed to provide the requested information.

16. Once the plan has been approved by the Department, it shall become effective and made a part of this Consent Order. The plan shall be implemented within 30 days of the Department's notification to Respondent that the plan has been approved. The plan shall incorporate all modifications required by the regulations and identified by the Department.

17. If the analysis of the ground water monitoring data collected and analyzed in accordance with the approved ground water monitoring plan does not indicate a significant change in pH or an exceedance of the Maximum Contaminant Levels (MCLs) for the 40 CFR 265.92(b)(1) parameters (parameters characterizing the

suitability of the ground water as a drinking water supply), Respondent shall, within 30 days from receipt of the Department's determination that the ground water has not been adversely impacted by the disposal of hazardous wastes or hazardous waste constituents, submit a certification of closure, pursuant to 40 CFR 264.115.

18. If the analysis of the ground water monitoring data collected and analyzed in accordance with the approved ground water monitoring plan indicates a significant change in pH or an exceedance of the MCLs for the 40 CFR 265.92(b)(1) parameters, Respondent shall be required to conduct a monitoring program in accordance with 40 CFR 264 Subpart F.

19. The 40 CFR 264 Subpart F ground water monitoring plan shall be submitted within 30 days from receipt by Respondent of the Department's determination that the plan is required for surface impoundment. The plan shall meet all the requirements of 40 CFR 264 Subpart F.

20. The Department shall review the monitoring plan submitted in accordance with paragraph 19, and provide Respondent a written response to the monitoring plan. Respondent shall not implement the monitoring plan until Respondent receives written notification from the Department that the plan has been approved.

21. In the event that additional information is necessary for the Department to evaluate the monitoring plan, the Department shall make a written request to Respondent for the information, and Respondent shall provide all requested information in writing to the Department within 30 days from receipt of said request unless the requested information requires additional field work in which case Respondent shall submit in writing to the Department a schedule for completing the field work needed to provide the requested information.

22. When the monitoring plan has been approved by the Department, it shall become effective and made a part of this Consent Order and shall be implemented within 30 days of the Department's notification to Respondent that the monitoring plan has been approved. The monitoring plan shall incorporate all modifications required by the regulations and identified by the Department.

23. Within 30 days of the effective date of this Consent Order, Respondent shall correct and redress all alleged violations not specifically addressed herein which are noted in the inspection report incorporated herein as Exhibit II in accordance with the "Recommended Corrective Actions" section of Exhibit II.

24. Within 45 days of the effective date of this Consent Order, Respondent shall submit to the Department a detailed itemized report describing and certifying compliance with paragraph 23 of this Consent Order.

25. Six copies of all reports, plans, and data required by this Consent Order to be submitted to the Department shall be sent to the Environmental Manager, Enforcement Section, 3426 Bills Road, Jacksonville, Florida 32207.

26. Except as otherwise provided herein, Respondent shall immediately and henceforth comply with all applicable Department rules and regulations regarding hazardous waste management pursuant to Florida Administrative Code Chapters 17-4, 17-30 and 40 CFR Parts 260 through 266.

27. Respondent shall publish the following notice in a newspaper of general circulation in Duval County, Florida. The notice shall be published one time only within 14 days after execution of the Consent Order by the Department.

State of Florida Department of Environmental Regulation
Notice of Proposed Agency Action

The Department of Environmental Regulation gives notice of agency action of entering into a Consent Order with Naval Station Mayport pursuant to Rule 17-103.110(3), Florida Administrative Code (FAC). The Consent Order addresses the requirements of FAC Chapter 17-30 regarding this facility's management of hazardous waste including ground water monitoring and closure of a surface impoundment.

The Consent Order is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the Department of Environmental Regulation, 3426 Bills Road, Jacksonville, Florida 32207.

Persons whose substantial interests are affected by the above proposed agency action have a right, pursuant to Section 120.57, Florida Statutes (F.S.), to petition for an administrative determination (hearing) on the proposed action. The Petition must conform to the requirements of Chapters 17-103 and 28-5, FAC, and must be filed (received) with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida, 32301, within 14 days of publication of this notice. Failure to file a petition within the 14 days constitutes a waiver of any right such person has to an administrative determination (hearing) pursuant to Section 120.57, F.S.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Persons whose substantial interests will be affected by any decision of the Department have the right to intervene in the proceeding. A petition for intervention must be filed pursuant to Model Rule 28-5.207, FAC, at least five days before the final hearing and be filed with the Hearing Officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009 Apalachee Parkway, Tallahassee, Florida, 32301. If no Hearing Officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to an administrative determination (hearing) under Section 120.57, F.S.

28. With regard to any determination made by the Department regarding Respondent's responses to the ground water monitoring or closure plans submitted pursuant to this Consent Order, Respondent may file a Petition for Formal or Informal Administrative Hearing Proceeding, if Respondent objects to the Department's determination pursuant to Section 120.57, FS, and FAC Chapters 17-103 and 28-5. Respondent shall have the burden to establish the inappropriateness of the Department's determination. The petition must conform with the requirements of FAC Rule 28-5.201, and must be received by the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301, within 14 days after receipt of notice from the Department of any determination Respondent wishes to challenge. Failure to file a petition within this time period shall constitute a waiver by Respondent of its right to request an administrative proceeding under Section 120.57, FS. The Department's determination, upon expiration of the 14-day time period if no petition is filed, or the Department's Final Order as a result of the filing of a petition, shall be incorporated by reference into this Consent Order and made a part of it. All other aspects of the Consent Order shall remain in full force and effect at all times. If Respondent seeks an adminstrative proceeding pursuant to this paragraph, the Department may file suit against Respondent in lieu of or in addition to holding the administrative proceeding to obtain judicial resolution of all the issues unresolved at the time of the request for administrative proceeding.

29. Respondent shall allow authorized representatives of the Department access to the property at reasonable times for purposes of determining compliance with this order and the rules and regulations of the Department.

30. The Department hereby expressly reserves the right to initiate appropriate action to prevent or prohibit the future violation of applicable statutes, or the rules promulgated thereunder.

31. The Department, for and in consideration of the complete and timely performance by Respondent of the obligations agreed to in this Consent Order, hereby waives its right to seek judicial imposition of damages, or civil or criminal penalties for violations outlined in this Consent Order. Except as otherwise provided in paragraph 27, Respondent waives its right to a hearing or judicial review of the terms of this Order.

32. Entry of this Consent Order does not relieve Respondent of the need to comply with applicable federal, state, or local laws, regulation, or ordinances. The entry of this Consent Order does not abrogate the rights of substantially affected persons who are not parties to this Order, pursuant to Chapter 120, Florida Statutes.

33. The terms and conditions set forth in the Consent Order may be enforced in a court of competent jurisdiction pursuant to Sections 120.69 and 403.121, Florida Statutes. Failure to comply with terms of this Consent Order shall constitute a violation of Section 403.161(1)(b), Florida Statutes.

34. This Consent Order is final agency action of the Department pursuant to Section 120.69, Florida Statutes, and Florida Administrative Code Rule 17-103.110(3), and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, Florida Statutes. Upon the timely

filing of a petition this Consent Order will not be effective until further order of the Department.

35. No modification of the terms of this Consent Order shall be effective until reduced to writing and executed by both Respondent and the Department.

FOR RESPONDENT:

Date

Captain J. B. Mitchell, Jr., USN
Commanding Officer
U.S. Naval Station Mayport
U.S. Naval Air Facility Mayport
Mayport, Florida 32228

DONE AND ORDERED this day of , 1987, in Jacksonville, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Ernest E. Frey
District Manager

Northeast District
3426 Bills Road
Jacksonville, Florida 32207
Telephone: (904)798-4200

Copies furnished to:

John Ingle, Office of General Counsel, DER
United States Navy
J. L. McCauley, P.E.
Jose' Negron, USNS Mayport
John Dumeyer, EC Jordan

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT
3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207
904/798-4200

BOB MARTINEZ
GOVERNOR
DALE TWACHTMANN
SECRETARY
ERNEST E. FREY
DISTRICT MANAGER
GARY L. SHAFFER
ASSISTANT DISTRICT MANAGER

August 24, 1987

CERTIFIED - RETURN RECEIPT

Captain J.B. Mitchell, Jr., USN
Commanding Officer
U.S. Naval Station - Mayport
Post Office Box 265
Mayport, Florida 32228

Dear Captain Mitchell:

Warning Notice No. NE-W-16-4244
U.S. Naval Station - Mayport
DER/EPA ID FL9 170 024 260
Duval County - Hazardous Waste Enforcement

A hazardous waste compliance inspection was conducted at your facility on July 15, 1987. This inspection was conducted under the authority of Section 403.091, Florida Statutes, and Chapter 403, Part IV, Florida Statutes, and is designed to ascertain the compliance status of your facility with 40 CFR 260-266, adopted in Florida Administrative Code Chapter 17-30.

During the inspection, violations of rules regarding hazardous waste management were noted. These violations are set forth in the "Summary of Violations" section of the enclosed inspection report.

The district has drafted a consent order which will resolve the alleged violations noted in the attached inspection report and the alleged violations noted in the Notice of Violation (OGC Case No. 87-0539) issued to your facility pursuant to an inspection on February 23, 1987. The consent order should be forwarded to you within the next two weeks.

The surface impoundment was formerly a neutralization basin for D002 corrosive hazardous waste from cation/anion exchange. The facility will be submitting a closure plan and a groundwater monitoring plan for the pond; however, the pond will not be physically closed. Currently, the wastewater being discharged to the pond is not D002, but is being adusted to a pH of between 6.5 and 9.5, as required by the NPDES permit. This water is then being pumped to the sanitary sewer. The area around the pond was not marked with the legend "Danger - Unauthorized Personnel - Keep Out".

Mayport also has several 90 day accumulation areas throughout the facility. At AIMD (Aircraft Intermediate Maintenance Department), there was a total of eight 55-gallon drums. One of these drums containing chromic acid was dated 4/1/87, which is past 90 days. There was one drum of an unknown paint stripper without a date and label. There were seven boxes containing spent hydraulic fluid and one bag of spent hydraulic filters without labels and accumulation dates. Inside a flammable locker were empty containers. If the containers have greater than one inch of hazardous waste in them, they are to be labeled and dated. There were two 55-gallon drums of contaminated rags from grease, oils and paint residue, properly dated and labeled. There were four trash cans of contaminated rags without dates. The inspectors were told that these are used during the day and emptied into drums at night. There was also one 55-gallon drum of waste fuel without a date and a drum of glass beads without a date. There was one drum of spent paint dated 2/18/87 and one drum of spent alodine. The alodine drum appeared to be leaking, but the inspectors were told the drum had a liner in it and that rainwater had seeped in between the liner and drum.

AIMD also has five tanks which are labeled "Hazardous Waste" that have been in operation for at least 1 1/2 years. All of the tanks are aboveground, but below grade of the pavement and appear to have 100% secondary containment. EPA and DER were not aware of these tanks prior to this inspection.

Tank one is 500 gallons and contains spent non-halogenated cleaning solvents. Tank two is also 500 gallons and contains synthetic oils. Tank three (500 gallons) contains hydraulic oil and tank four (500 gallons) is empty, but facility officials anticipate accumulating chlorinated solvents in it. Tank five is 1000 gallons and contains hydraulic based oils. The tanks are labeled as hazardous waste, but do not have posted signs stating "Danger - Unauthorized Personnel - Keep Out".

CLOSURE PLAN
NEUTRALIZATION BASIN AT BLDG. 1241

EPA ID NO. FL9170024260

U.S NAVAL STATION - MAYPORT
MAYPORT, FLORIDA

Prepared for:

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA
Contract No. N62467-86-C-0174

Prepared by:

E.C. JORDAN CO., ENGINEERS AND SCIENTISTS
2571 EXECUTIVE CENTER CIRCLE EAST, SUITE 100
TALLAHASSEE, FLORIDA 32301-5001

Project No. 5097-05
R. Michael Nugent, Ph.D. - Project Manager
Myron L. Hayden, Ph.D., P.E. - Engineer of Record

December 1988

Professional Engineer's Certification

This is to certify the engineering features presented in this Closure Plan have been designed by me or under my supervision and found to conform to acceptable engineering principles and practices. In my professional judgement, this Facility, when properly closed, will comply with all applicable Statues of the State of Florida and rules of the Department of Environmental Regulation.

Signature: Myron L. Hayden

Date: December 9, 1988

Myron L. Hayden, Ph.D., P.E.
Manager, Engineering and Remedial Services
2571 Executive Center Circle Drive
Tallahassee, Florida 32301-5001
(904) 656-1293

Florida Registration Number: PE 34067

Seal

Owner/Operator Certification

This is to certify that I understand the Closure Plan as submitted for the purpose of closing the Neutralization Basin on the property described. I have examined and am familiar with the information presented in this document and all attachments. I believe the information contained in this document is true, accurate and complete. Further, I agree to comply with the provisions of Chapter 403, Florida State Statutes, and the rules and regulations of the Florida Department of Environmental Regulation.

Signature: _____

Date: _____

Captain J. B. Mitchell, Jr., USN
U.S. Naval Station - Mayport
Old Mayport Road
Mayport, Florida 32228
(904) 246-5201

CLOSURE PLAN
NEUTRALIZATION BASIN AT BLDG. 1241
NAVAL STATION - MAYPORT
MAYPORT, FLORIDA

INTRODUCTION

This Closure Plan has been prepared to comply with a Consent Order issued by the Florida Department of Environmental Regulation (FDER), with the provisions of Florida Administrative Code Rule 17-30.260, and with 40 CRF 264 and 265 Subpart G for the Neutralization Basin located at the boiler plant, Building 1241, Mayport Naval Station. During a facility inspection, by FDER personnel on February 23, 1987, the Neutralization Basin was designated as receiving D002 corrosive waste, as defined by 40 CFR 261.22 under the Resource Conservation and Recovery Act (RCRA).

A Notice of Violation was issued to the Naval Station at Mayport by FDER requiring the preparation and submittal of a Groundwater Monitoring and Closure Plan for the Neutralization Basin. The Groundwater Monitoring Plan has been prepared for the Neutralization Basin and is part of the Closure Plan. Pertinent information on the site has been included as Appendix A.

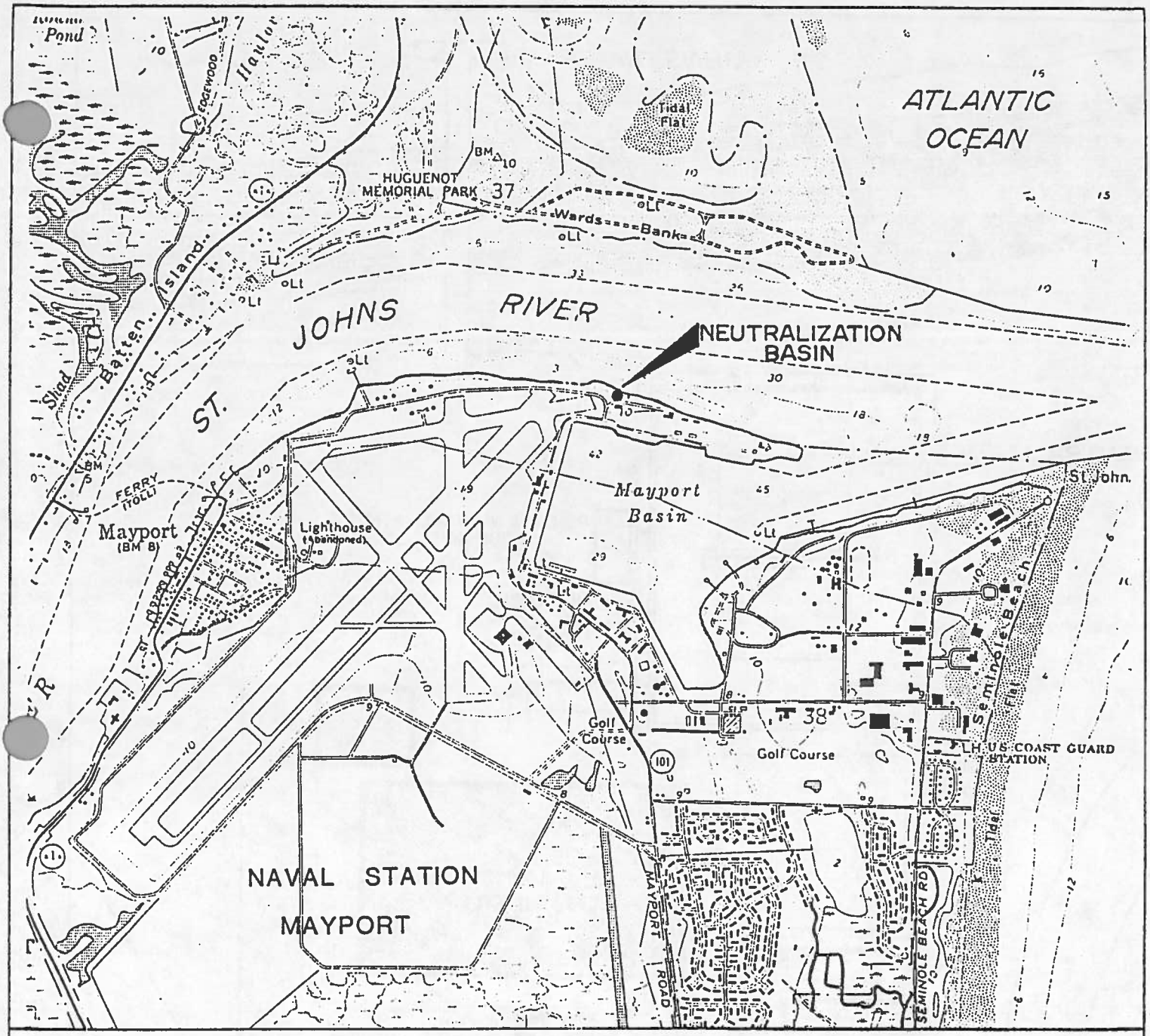
SITE DESCRIPTION

The Neutralization Basin is located on the north side of Mayport Naval Station, adjacent to the St. Johns River next to Building No. 1241. A map of the Naval Station is shown in Figure 1. Details of the site are shown in Figure 2. The Basin is located to the north of the boiler plant (Building 1241) and is used to receive and temporarily store treated water from the anion/cation exchange process used in the boiler plant. Effluent from the basin is conveyed to the sanitary sewer system for Mayport Naval Station through a manhole adjacent to the basin.

Mayport Naval Station is a secure facility with guarded access on a 24-hour basis.

CONSTRUCTION DETAILS

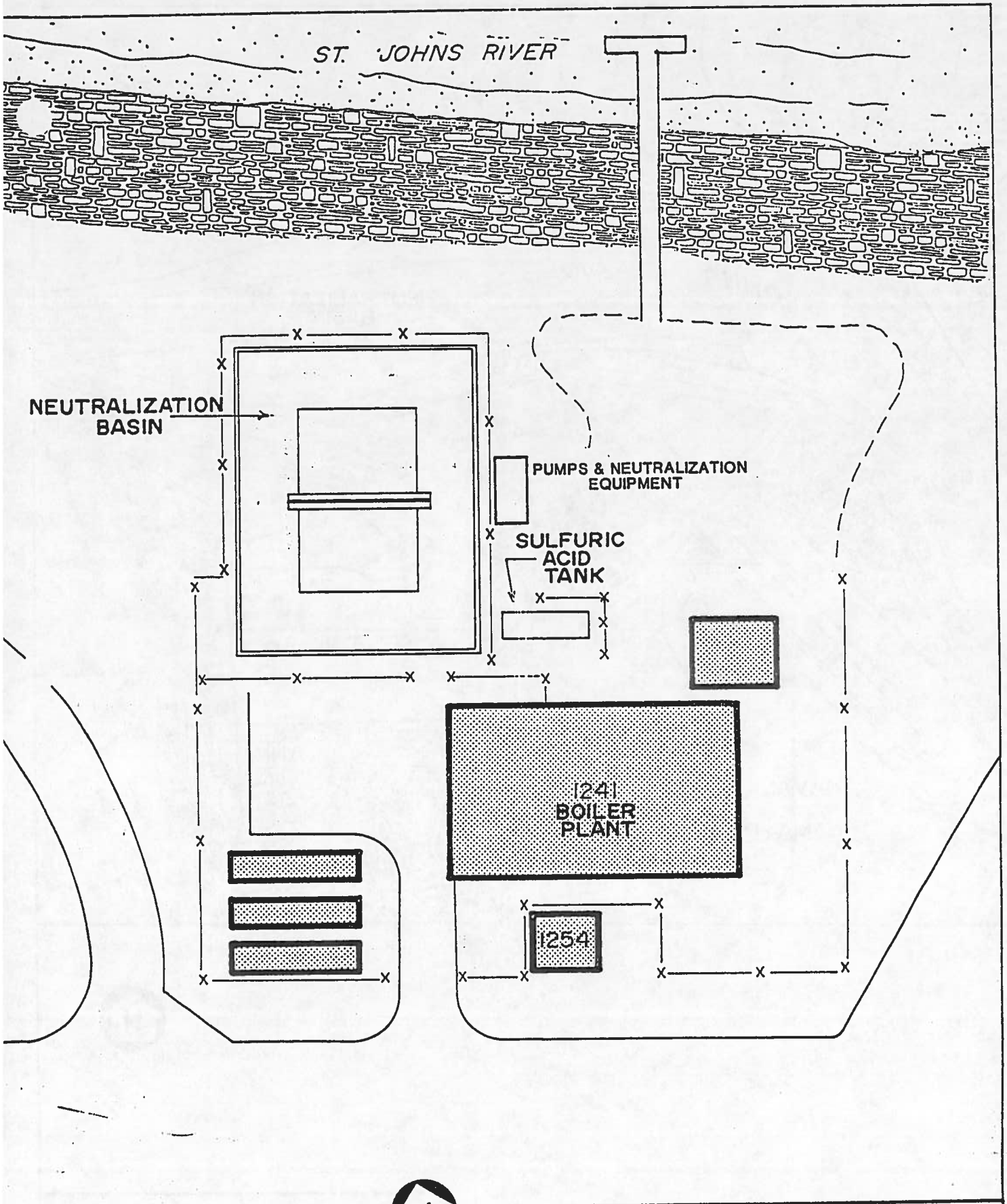
The current Neutralization Basin was constructed in late 1986 at the location of a previous Neutralization Basin which was constructed in 1970. The previous basin was put into operation in February 1971 and was used continuously until the current basin was constructed.



SCALE IN FEET

0 2000 4000

E.C. JORDAN CO. ENGINEERS & SCIENTISTS	NAVAL STATION MAP
U.S. DEPARTMENT OF THE NAVY	CLOSURE PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 1



NOT TO SCALE

E.C. JORDAN CO. ENGINEERS & SCIENTISTS	NEUTRALIZATION BASIN SITE DETAILS
U.S. DEPARTMENT OF THE NAVY	CLOSURE PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 2

The current Neutralization Basin is 59 feet wide and 78 feet long, divided into two cells. Total depth is 6 feet. There is a 6-foot chain link fence around the perimeter of the basin site.

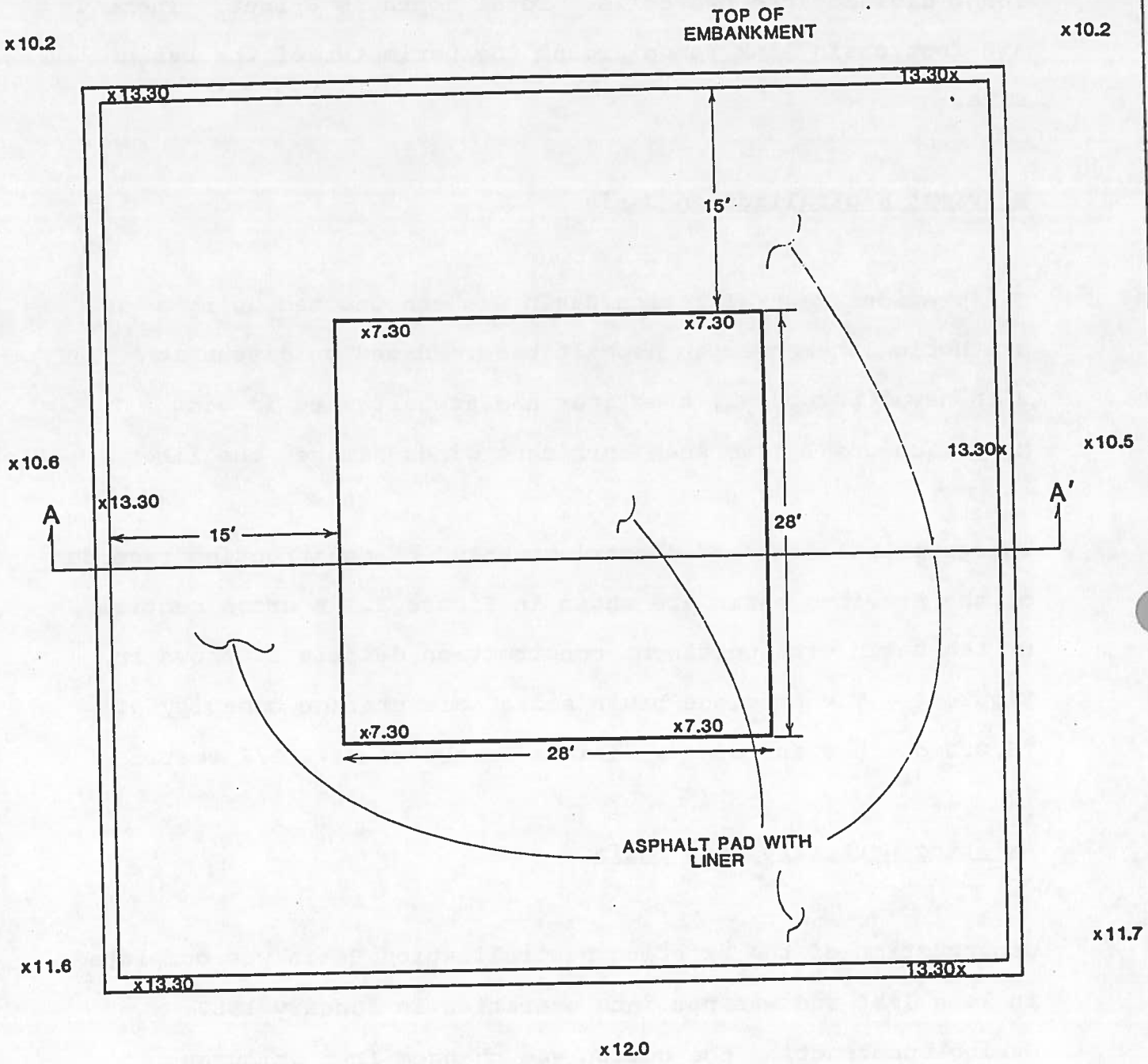
Previous Neutralization Basin

The previous Neutralization Basin was constructed using a synthetic liner over an asphalt base. Based on discussions with naval personnel, the liner and asphalt were in good condition until 1985 when hurricane winds damaged the liner.

Topographical data and dimensions based on construction records of the previous basin are shown in Figure 3. A cross section of the basin with pertinent construction details is shown in Figure 4. The previous basin had a safe storage capacity of 76,000 gallons assuming a minimum freeboard of 1 1/2 feet.

Existing Neutralization Basin

Construction of the existing Neutralization Basin was completed in late 1986 and was put into operation in January 1987. During construction the design was changed from using an asphalt base material to concrete.

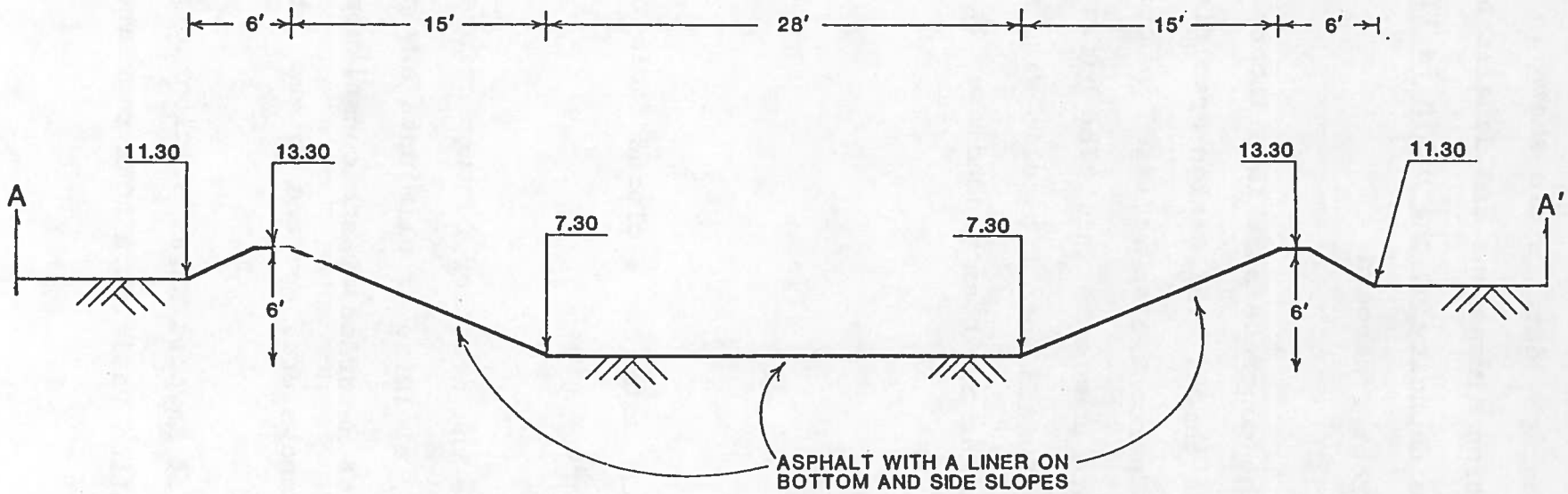


NOTES:

ELEVATIONS AND DIMENSIONS BASED ON AS BUILT CONSTRUCTION DOCUMENTS

ELEVATIONS ARE MSL

E.C. JORDAN CO. ENGINEERS & SCIENTISTS	PLAN VIEW OF PREVIOUS BASIN
U.S. DEPARTMENT OF THE NAVY	CLOSURE PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 3



NOTES:

1. ELEVATIONS ARE MSL
2. CROSS SECTION SHOWN IN PLAN AS A-A' IN FIGURE 3
3. ELEVATIONS AND DIMENSIONS BASED ON AS BUILT CONSTRUCTION DOCUMENTS

E.C. JORDAN CO. ENGINEERS & SCIENTISTS	CROSS SECTION OF PREVIOUS BASIN
U.S. DEPARTMENT OF THE NAVY	CLOSURE PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 4

Elevations and topography details are shown in Figure 5. The pertinent construction dimensions and details are shown in Figure 6. The site capacity of the basin is 112,300 gallons based on an 1 1/2 foot freeboard.

The thickness of the concrete base is 6 inches and the side slopes are 4 inches thick. The design specified 12 inches of compacted soil [95 percent of a modified proctor (ASTM 1557)], beneath the concrete base material. The basin is 59 feet wide, 78 feet long, and divided into two cells with a depth of 6 feet. A hypalon liner has been placed over the concrete base materials.

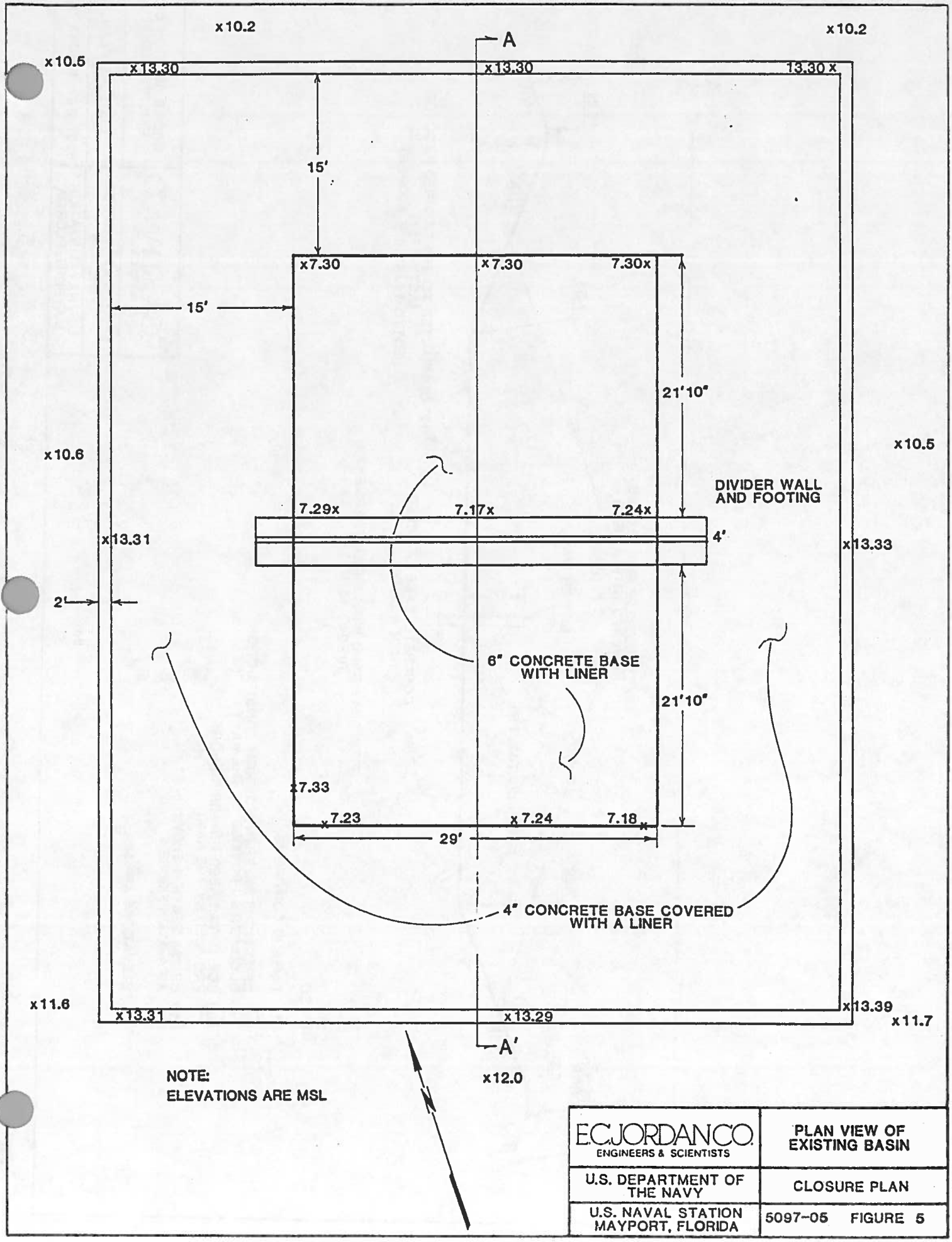
CLOSURE PLAN

The performance standards for a closed facility as outlined in 40 CFR 264 - Subpart G are:

a) minimize the need for further maintenance; and

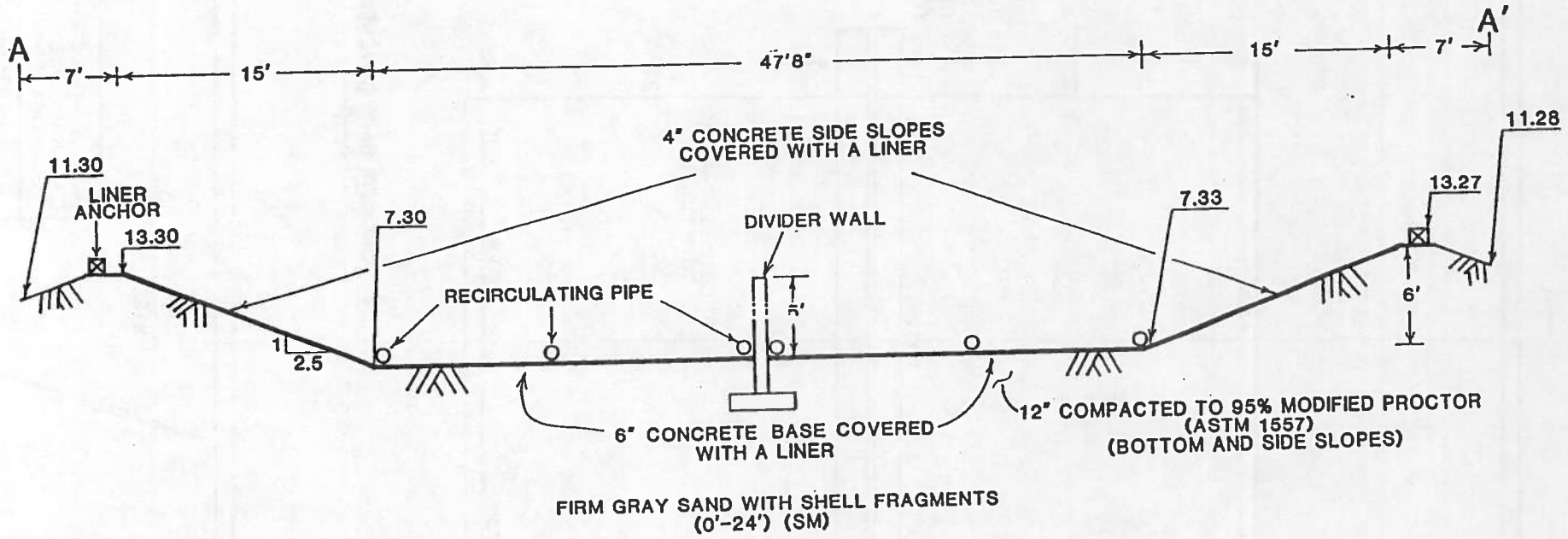
b) control, minimize or eliminate any post-closure escape of hazardous waste constituents or leachate to the groundwaters, surface waters, or atmosphere.

It is the intent of Mayport Naval Station to terminate the use of the Neutralization Basin as a RCRA regulated facility, and



NOTE:
ELEVATIONS ARE MSL

E.C.JORDAN CO. ENGINEERS & SCIENTISTS	PLAN VIEW OF EXISTING BASIN
U.S. DEPARTMENT OF THE NAVY	CLOSURE PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 5



NOTES:

1. LINER IS CONTINOUS
2. DIMENSIONS REFERENCED FROM CONSTRUCTION DOCUMENTS PROVIDED BY THE NAVY.
3. SOIL DATA BASED ON BORING LOGS PROVIDED BY THE NAVY
4. CROSS SECTION SHOWN IN PLAN AS A-A' ON FIGURE 1

ELEVATIONS ARE MSL

E.C.JORDAN CO. ENGINEERS & SCIENTISTS	CROSS SECTION OF EXISTING BASIN
U.S. DEPARTMENT OF THE NAVY	CLOSURE PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 6

E.C.JORDAN CO.

813 8 3820

to convert the basin to an industrial waste treatment facility, as soon as possible.

The Neutralization Basin was designated as a hazardous waste surface impoundment for pH rather than for any specific hazardous waste constituents. There is no analytical data available to indicate whether or not contamination of the soil or groundwater exists beneath the Basin as a result of infiltration of the process water. The data to be obtained from implementation of the subsurface investigation will be used to assess the possible existence of contamination.

At the present time, the basin does not contain any material or liquids with a pH of less than 2 or greater than 12.5. When the facility is operating properly the pH of water entering the basin is approximately 4 or greater.

There are possible operational scenarios for closure of the Neutralization Basin. The primary scenario is for a clean closure with no corrosive or hazardous constituents being present in the soil or groundwater beneath the basin. The alternative scenario is for a closure with contaminated soil beneath the basin.

The determination of which scenario is applicable will depend upon the results of the groundwater monitoring program developed.

CLOSURE PROCEDURE

The following closure steps will apply to all of the scenarios considered:

a) The basin will be operational during closure; therefore, the first step in the closure will be to pump all free liquid from the north cell of the basin into the south cell, where the pH will be adjusted, and released to the sanitary sewer. The sludge in the north cell will be sampled and analyzed for pH and metals using the EPA Toxicity Extraction Procedure. Specific EPA Methods for preparation and analysis of the samples, as well as maximum concentrations for each constituent are provided in Table 1. Concentrations above the values presented in Table 1 indicate that the sludge should be treated as a hazardous waste. If the material is not hazardous, it will be removed using a suction truck and placed in the wastewater treatment facility's (WWTF) sludge drying beds for dewatering and disposal with the WWTF sludge.

After sludge removal from the north cell, all the free liquid from the south cell will be pumped into the north cell. A sludge sample will be taken from the south basin and analyzed as previously described. If the sludge is not hazardous, the sludge from the south basin will then be removed and placed in the WWTF sludge drying beds.

TABLE 1
EPA METHODS AND MAXIMUM CONCENTRATIONS FOR
EP TOXICITY EXTRACTION METHOD ANALYSES[1]

CONSTITUENT	PREPARATION METHOD	ANALYTICAL METHOD	CONCENTRATION[2] MG/L
Arsenic	3020	7060	5.0
Barium	3010	6010	100.0
Cadmium	3010	6010	1.0
Chromium	3010	6010	5.0
Lead	3010	6010	5.0
Mercury	--	7470	0.2
Selenium	3020	7740	1.0
Silver	3010	6010	5.0
pH (soil)	--	946	see Note 3

Notes:

1. From EPA Manual SW-846 "Test Methods for Evaluating Solid Waste." 1986

2. From Resource Conservation and Recovery Act (RCRA) 1976.

3. A waste is considered hazardous under RCRA if its pH is less than 2.0 or greater than 12.5

If the sludge is hazardous, the same procedure of pumping the water to the south cell will be followed. The sludge will be placed in drums, properly labeled and disposed of by the Naval Station. The liquid will then be pumped from the south cell to the north cell and the same sludge removal procedure will be followed. Extreme care will be taken to prevent sludge particles from becoming suspended in the liquid during the pumping.

Equipment used for the sludge removal, if the sludge is hazardous, should consist of protective clothing, drums, and shovels. If the sludge is hazardous because of its pH, the shovels may be rinsed and the rinse water collected. The pH of the rinse water should be adjusted with either sulfuric acid or caustic soda and then released to the WWTF. If the sludge is contaminated with EPTOX metals, a detergent wash with a tap water rinse should be used. The wash and rinse water should be collected in drums and properly disposed of by the Naval Station. If equipment used is minimized, it may be cost effective to drum the shovel and clothing for disposal to avoid the generation of decontamination fluids.

b) After each cell has been cleaned, the liner will be pulled back and a hole made through the concrete and base material in the center of the cell to facilitate augering to a depth of 4 feet. The hole will be advanced vertically using a clean auger to a depth of two feet below the bottom of the basin floor. A soil sample will be taken at the 2 feet depth using a clean split-spoon sampler. The hole will then be advanced to a depth of 4 feet where a second soil sample will be taken. The equipment will be decontaminated between soil samples using procedures outlined in Appendix B. Each soil sample will be analyzed for pH and metals using the EP Toxicity Extraction Procedure and the methods provided in Table 1.

The hole made in the center of each cell will be back-filled with clean soil and compacted to form a firm base. The concrete will be patched using an expansive cement grout to provide for a water tight seal. The hypalon liner will be replaced and anchored.

c) The hypalon liner will be flushed with clean water, which will remain in the basin until testing is complete. The water will be analyzed and treated if necessary prior to disposal.

d) A closure certification will be prepared by the Engineer of Record and submitted to FDER within 60 days of the completion of the closure.

CLOSURE ALTERNATIVES

The following scenarios apply to the closure of the basins after the previously described initial actions are completed. Due to a process change being considered by the Navy, use of the basins may be discontinued and the boiler water released directly to the sanitary sewer system. Therefore, a clean closure alternative addressing this scenario has been included.

Clean Closure with Continued Use of the Neutralization Basins. If no contamination is detected in the downgradient monitoring well or subsurface soil samples, the neutralization basins will continue to be used for treatment of the boiler water prior to its release to the sanitary sewer. Process modifications were made in May 1987 and hazardous wastes (i.e., pH less than 2.0 or greater than 12.5) have since not been released to the basin.

Clean Closure with Removal of the Neutralization Basin. This alternative may be implemented in either the case of no contamination or contamination detected in the soils and/or

groundwater. The differences between the two cases is that health and safety, decontamination, and containment of contaminated soils and debris during closure activities must be considered if contamination is present.

If no contamination is detected, the piping and equipment will be disassembled and turned over to the Naval Station for salvage or disposal. The liner will then be removed and disposed of in an offsite landfill. The slab will be broken up using a backhoe-mounted hydraulic punch and loaded onto trucks for use as fill, if needed on the station, or disposal in an offsite landfill. The area will then be leveled and planted with a suitable cover crop to prevent erosion.

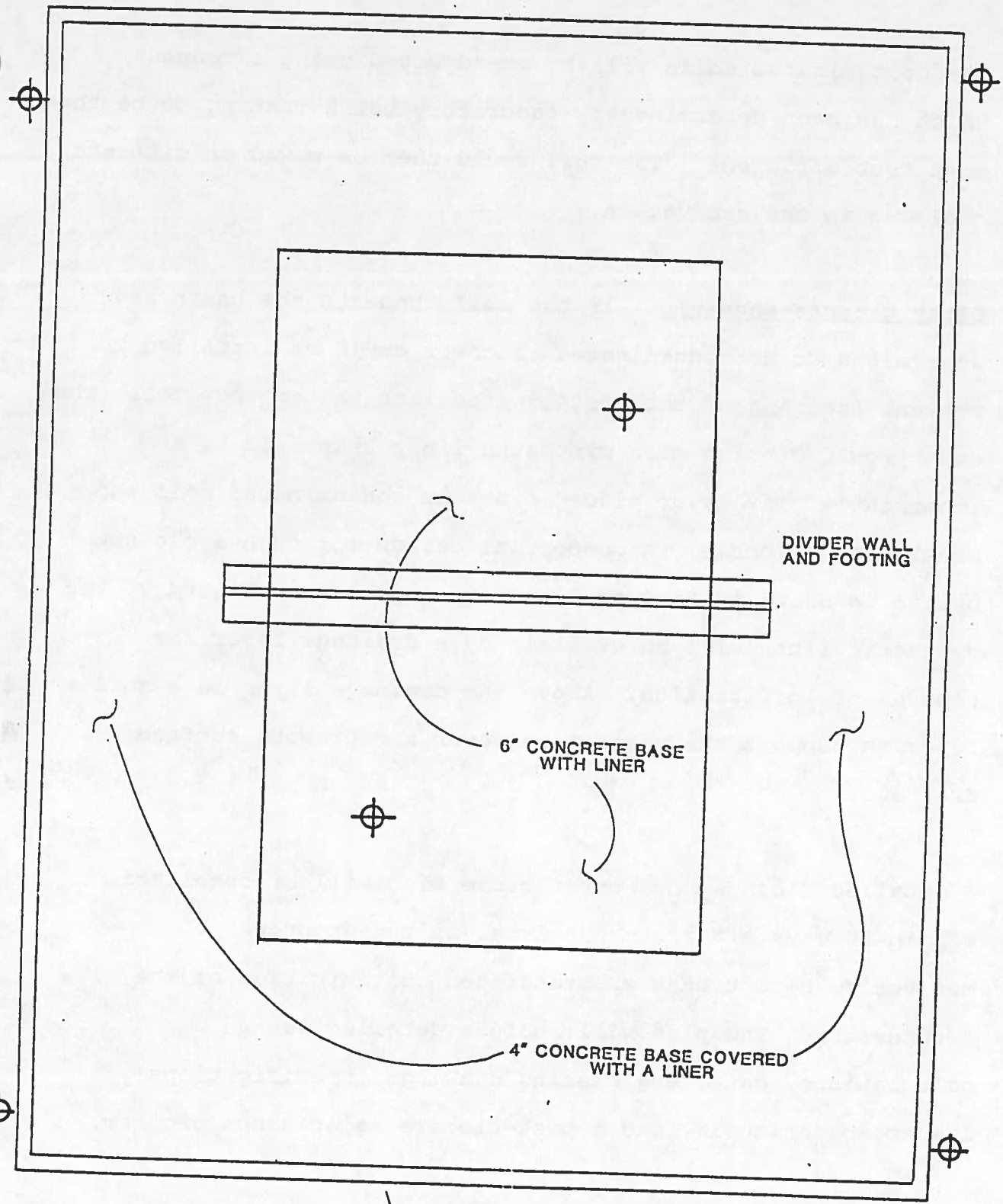
If contamination of soils or groundwater is detected in the initial sampling, an assessment of the extent will be conducted prior to demolition of the neutralization basins. The approach to the assessment will vary depending on the type of contamination present (EPTOX metals, pH, or a combination).

Contamination with EPTOX Metals or a Combination of EPTOX Metals and Hazardous pH. If EPTOX metals are detected, either alone or in combination with extreme pH, the contamination assessment will be conducted by drilling boreholes around and through the basin to determine the vertical extent. Samples will be collected at one foot intervals to a depth of five feet

below the bottom of the slab or until the saturated zone is reached (whichever is deeper). After sampling, the holes will be sealed to prevent further migration of contaminants. Preliminary sampling locations for this scenario are shown in Figure 7.

Upon determination of the volume of contaminated soils, an offsite solidification process will be set up. Laboratory bench testing of samples collected during the assessment will determine the most appropriate and cost-effective stabilization materials to be used. The solidification tests would involve preparing several mixtures of soils and stabilizer(s) followed by leaching tests. Once the stabilization process has been defined and approved, the soils will be excavated and transported to a FDER approved disposal site using covered trucks. At the selected disposal site, the stabilizer(s) and soil will be mixed together in a mixer or pug mill and spread along the surface of the disposal area for curing.

Contamination with Hazardous pH.. If the soils are contaminated by virtue of extremely low or high pH, the slab may be removed with the debris being rinsed thoroughly. The rinse water will be collected and stored temporarily in water tight containers. The pH of the rinse water will be tested and adjusted as necessary prior to disposal into the sanitary sewer.



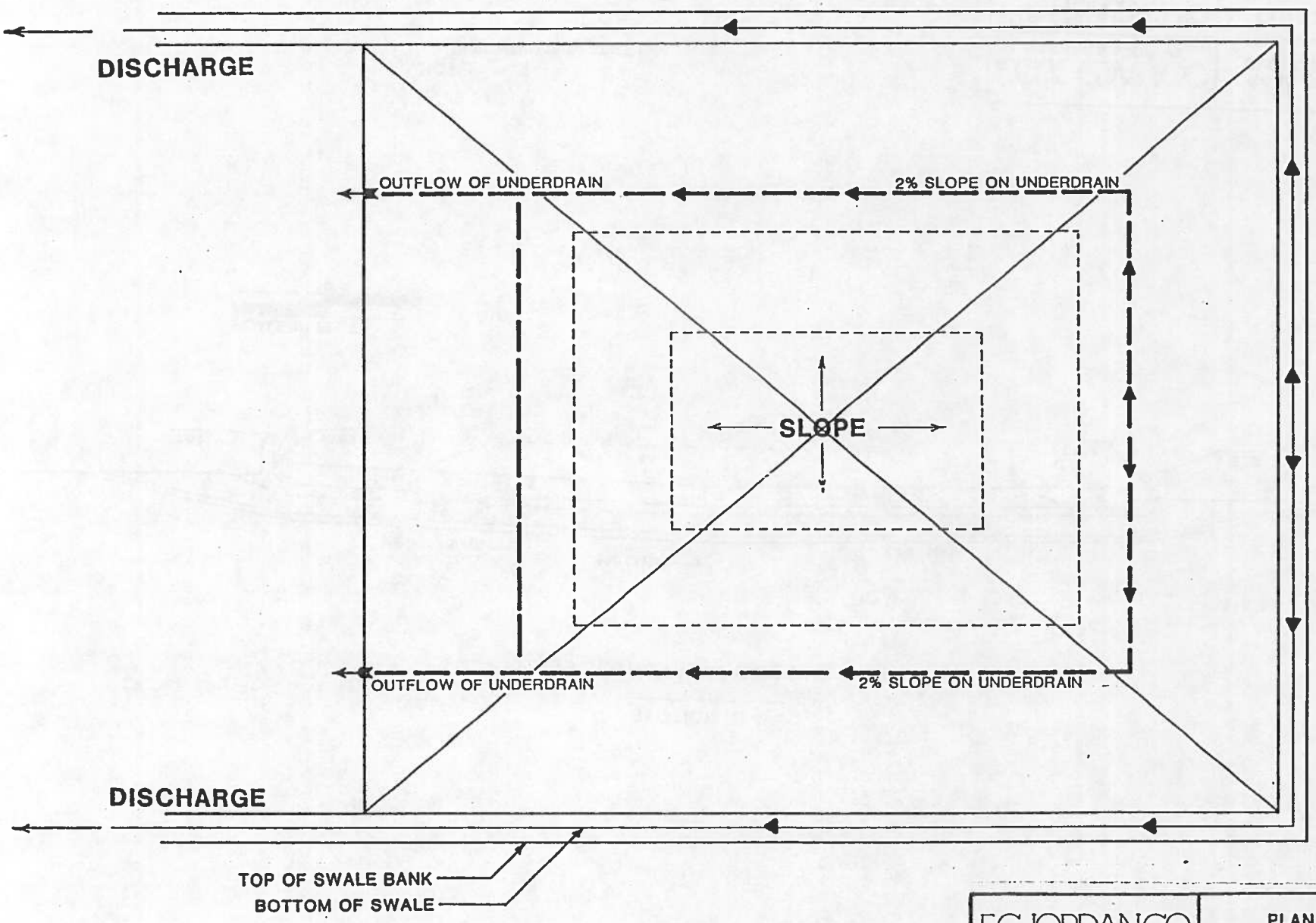
SOIL BORING LOCATION
FOR DETERMINATION OF
CONTAMINATION EXTENT

E.C. JORDAN CO. ENGINEERS & SCIENTISTS	SAMPLING LOCATIONS FOR CLEAN CLOSURE
U.S. DEPARTMENT OF THE NAVY	CLOSURE PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 7

The contaminated soils will be pH-adjusted using a reagent which has been determined by laboratory batch testing to be the most cost efficient. The soil would then be mixed on site and replaced in the excavation.

Dirty Closure Scenario. If the soils beneath the basin are determined to be contaminated, a cover could be installed to prevent leaching of the contaminates into the groundwater. The cover would consist of a synthetic liner underlain by an impermeable clay layer placed over the contaminated soil and construction rubble. A conceptual design for such a closure system is shown in Figures 8 and 9. As shown in Figure 9, the synthetic liner will be overlain by a drainage layer for removal of infiltration. Above the drainage layer is a soil layer to support the vegetation cover and promote surface drainage.

A detailed Closure and Post-Closure Plan will be submitted within 30 days after the submittal of the Groundwater Monitoring Report that substantiated contamination of the groundwater. The plan will include detailed design calculations, data, engineering drawings, specifications, inspection criteria, and a post-closure maintenance program.

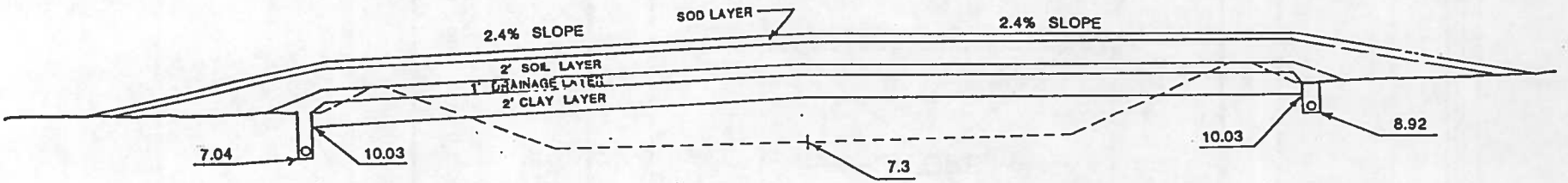


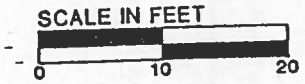
NOT TO SCALE

E.C JORDAN CO. ENGINEERS & SCIENTISTS	PLAN OF CLOSURE COVER
U.S. DEPARTMENT OF THE NAVY	CLOSURE PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 8

SECTION B-B'

CROSS SECTION VIEW (LOOKING EAST)





NOTE:
ELEVATIONS IN FEET MSL

E.C.JORDAN CO. ENGINEERS & SCIENTISTS	CROSS SECTION OF CLOSURE COVER
U.S. DEPARTMENT OF THE NAVY	CLOSURE PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 9

TIME SCHEDULE

Termination of use of the Neutralization Basin as a RCRA-regualted facility will commence after approval of this Closure Plan by FDER. Therefore, the following time schedule will relate to that approval date.

Time	Action
Termination Date	**30 days after FDER approval of Closure Plan**
30 days after termination	Treat or remove any onsite hazardous waste
120 days after termination	Complete closure and certification
----------(if contaminated)----------	
120 days after termination	Commence removal of liner and asphalt base
Upon closure	Begin post closure care if needed
Upon submission	Notify FDER and Duval County by survey plat of disposal area
90 days after closure	Prepare notice in property deed of hazardous waste disposal

APPENDIX A

SITE INFORMATION

SITE INFORMATION

Facility:	Naval Station - Mayport
Location:	Mayport, Duval County, Florida
Owner:	United States Department of the Navy
Commanding Officer:	Captain J. B. Mitchell, Jr., USN
Address:	Post Office Box 265 Mayport, Florida 32228 (904) 246-5201
EPA ID No.:	FL 9170 024 260
Site Name:	Neutralization Basin at Bldg. 1241
Latitude:	30° 23′ 50" N.
Longitude:	81° 24′ 40" W.
Contract Person:	Michael Davenport Environmental Engineer Public Works Department Naval Station - Mayport (904) 246-5268
Engineer of Record:	Myron L. Hayden, Ph.D., P.E. E.C. Jordan Company 2571 Executive Center Circle Drive, S-100 Tallahassee, Florida 32301 (904) 656-1293

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APPENDIX B

EQUIPMENT DECONTAMINATION PROCEDURE

EQUIPMENT DECONTAMINATION PROCEDURE

SAMPLING EQUIPMENT

1. Scrub sampling equipment with a detergent solution (e.g., alconox (tm) in tap water)
2. Rinse with tap water
3. Rinse with deionized water
4. Rinse with isopropyl alcohol
5. Allow to air dry completely
6. Rinse with deionized water if sufficient drying time is not available

EXCAVATION EQUIPMENT

All excavation equipment will be steam cleaned with the washwater being collected and disposed of by the Naval Station.

ADDENDUM A TO THE CLOSURE PLAN NEUTRALIZATION BASIN AT BUILDING 1241

EPA ID NO. FL9170024260

U.S. NAVAL STATION - MAYPORT
MAYPORT, FLORIDA

PREPARED FOR:

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA

PREPARED BY:

E.C. JORDAN CO., ENGINEERS AND SCIENTISTS
2571 EXECUTIVE CENTER CIRCLE EAST, SUITE 100
TALLAHASSEE, FLORIDA 32301-5001

PROJECT NO. 5097-05
R. MICHAEL NUGENT, Ph.D. - PROJECT MANAGER
MYRON L. HAYDEN, Ph.D., P.E. - ENGINEER OF RECORD

APRIL 1989

INTRODUCTION

E.C. Jordan Co. (Jordan) was contracted by the Southern Division Naval Facilities Engineering Command (SOUTHDIV) to develop and implement an alternative to the soil boring procedures described in Jordan's April 1988 Neutralization Basin Closure Plan for the U.S. Naval Station Mayport, Florida. Described in this Addendum are procedures for obtaining soil samples from beneath the the existing basin bottom. The procedures outlined in this Addendum are intended to replace only the two shallow soil borings to be installed through the basin as recommend in the Closure Plan.

Two of six shallow borings recommended in the clean closure scenario of the plan were to be installed through the existing 6-inch thick concrete basin which is covered with a synthetic liner. In order to avoid jeopardizing the integrity of the liner system, an alternative to the method suggested in the Closure Plan was requested by SOUTHDIV.

After an evaluation of various alternatives, Jordan is recommending a procedure which consists of angle drilling from outside the basin to retrieve the soil samples for chemical analysis. This procedure will facilitate obtaining the samples while maintaining the integrity of the liner.

DRILLING AND SAMPLING PROCEDURE

A special drill rig, commonly used to install earth anchors and tiebacks, will be used to advance the borings. Two 3 1/2-inch diameter soil borings will be advanced on an angle of 18 degrees from the horizontal to obtain soil samples in the zone beneath the basin liner and above the water table. The samples will be retrieved from depths of approximately 1 to 4 feet below the bottom of the basin with a split-spoon sampler. Presented in Figure 1 is a plan view of the proposed sampling. Presented in Figure 2 is a cross section of the sample locations and the projected drilling angle.

Prior to use, the drill rig, casing and the tooling to be used in the drilling operation will be decontaminated with a steam cleaner. The process will consist of placing equipment on a sloped surface and spraying it with pressurize steam. It is estimated that the steam cleaning process will take approximately 20 minutes for the casing, 15 minutes for tooling and 15 minutes for the rig.

The borings will be made with a pneumatic drill rig. The drill rig recommend for this project is an Atlas Capco Model 601 which is tract mounted and operates on an air pressure of 100 psi. An external air compressor, capable of continuously delivering 600 cubic feet per minute of air at

a pressure of 100 psi will be connected to the drill rig's pneumatic system.

The borehole will be cased with the decontaminated 3 1/2-inch (outside diameter) schedule 40 flush joint steel casing. The casing will be used to prevent the existing sandy soil from collapsing into the hole. A pneumatic hammer mounted on the drill rig will be used to drive the casing. Soil in advance of the casing will be removed with a rotary air-wash drilling technique. The air-wash technique will be accomplished with a 2 3/4-inch air-wash drill bit which will be connected to a 1 1/2-inch steel pipe that is connected to the rigs pneumatic system. The drill rod and bit will be inserted through the casing at the start of the drilling process. Air from the drill rig's pneumatic system will be circulated through the rod to the bit which releases it into the soil while the bit is rotating and cutting the soil. Cuttings are then washed upward through the casing to the surface by the air flow.
The drilling angle and driven length of casing will be monitored by Jordan during the operation.

When the driven length of casing is 20 feet, the driving process will be temporarily halted to allow a split-spoon sample to be taken. The average depth of this sample will be 2 feet beneath the bottom of the basin. The split-spoon sampler will be decontaminated on-site prior to use and between each soil sample. Decontamination of the sampler will consist of a

scrub wash in a tub containing a water and alconox solution. The sampler will then be rinsed with alcohol and than water before it is used.

The decontaminated split-spoon sampler will be attached to the drilling rod, inserted through the casing and driven two feet beyond the end of the casing with the drill rig's pneumatic hammer. After the sample is recovered from the split-spoon sampler, it will be sealed in a half liter glass jar and placed in a cooler with ice.

After the first sample is retrieved from the borehole, the drill bit will be reattached to the drilling rod and inserted into the casing. The borehole will then be drilled using the same procedure as above until the driven length of casing is 26 feet. To obtain a sample from 4 feet beneath the basin, another split-spoon sample, using the sampling procedure described above will be taken at this location provided that the ground water table does not intersect the sampler. Based on ground water elevation data outlined in the Closure Plan, Jordan estimates that the ground water level in the unconfined surfacial aquifer at this location is approximately four feet beneath the bottom of the basin; however, if the ground water table is above this level, the soil sample to be taken at 4 feet beneath the bottom of the basin will be omitted.

After the second sample is retrieved, the borehole will be sealed with a cement slurry grout. The grout will be injected through the steel casing as it is being removed from the borehole. The drill rig, casing and tooling will be decontaminated as describe previously prior to being reused at the second boring location. The second borehole at the site will be made using the same drilling procedure as describe previously at the location shown on Figure 1. Samples retrieved from the second borehole will use the same sampling procedure and criterion as described for the first borehole.

The samples will be shipped via an overnight carrier to an FDER approved laboratory in accordance with Jordan's FDER approved Quality Assurance Project Plan. Parameter analyzed in the laboratory will be those outline in the Closure Plan.

CONCLUSION

SOUTHDIV requested Jordan to provide an alternate plan for obtaining samples from beneath a Neutralization Basin at the Naval Station Mayport in order to avoid penetration of the its liner system. Jordan is recommending that these soil borings be advanced on an angle from outside of the basin area. Described in this Addendum are drilling, sampling and decontamination procedures necessary to obtain the soil

samples needed from below the basin area as required in the Closure Plan.

PROFESSIONAL ENGINEERS CERTIFICATION

This is to certify the engineering features presented in this Addendum have been designed by me or under my supervision and found to conform to acceptable engineering principles and practices. In my professional judgement, this soil boring and sampling program, will comply with all applicable Statues of the State of Florida and the rules of the Department of Environmental Regulation.

Signature:

Date:

Myron L. Hayden, Ph.D.,P.E.
Manager, Engineering and Remedial Services
2571 Executive Center Circle East, Suite 100
Tallahassee, Florida 32301-5001

Florida Registration Number: PE 34067

Seal

GROUNDWATER MONITORING PLAN
NEUTRALIZATION BASIN AT BLDG. 1241

EPA ID NO. FL9170024260

U.S NAVAL STATION - MAYPORT
MAYPORT, FLORIDA

Prepared for:

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA
Contract No. N62467-86-C-0174

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Project No. 5097-05
R. Michael Nugent, Ph.D. - Project Manager

December 1988

GROUNDWATER MONITORING PLAN
NEUTRALIZATION BASIN AT BLDG. 1241

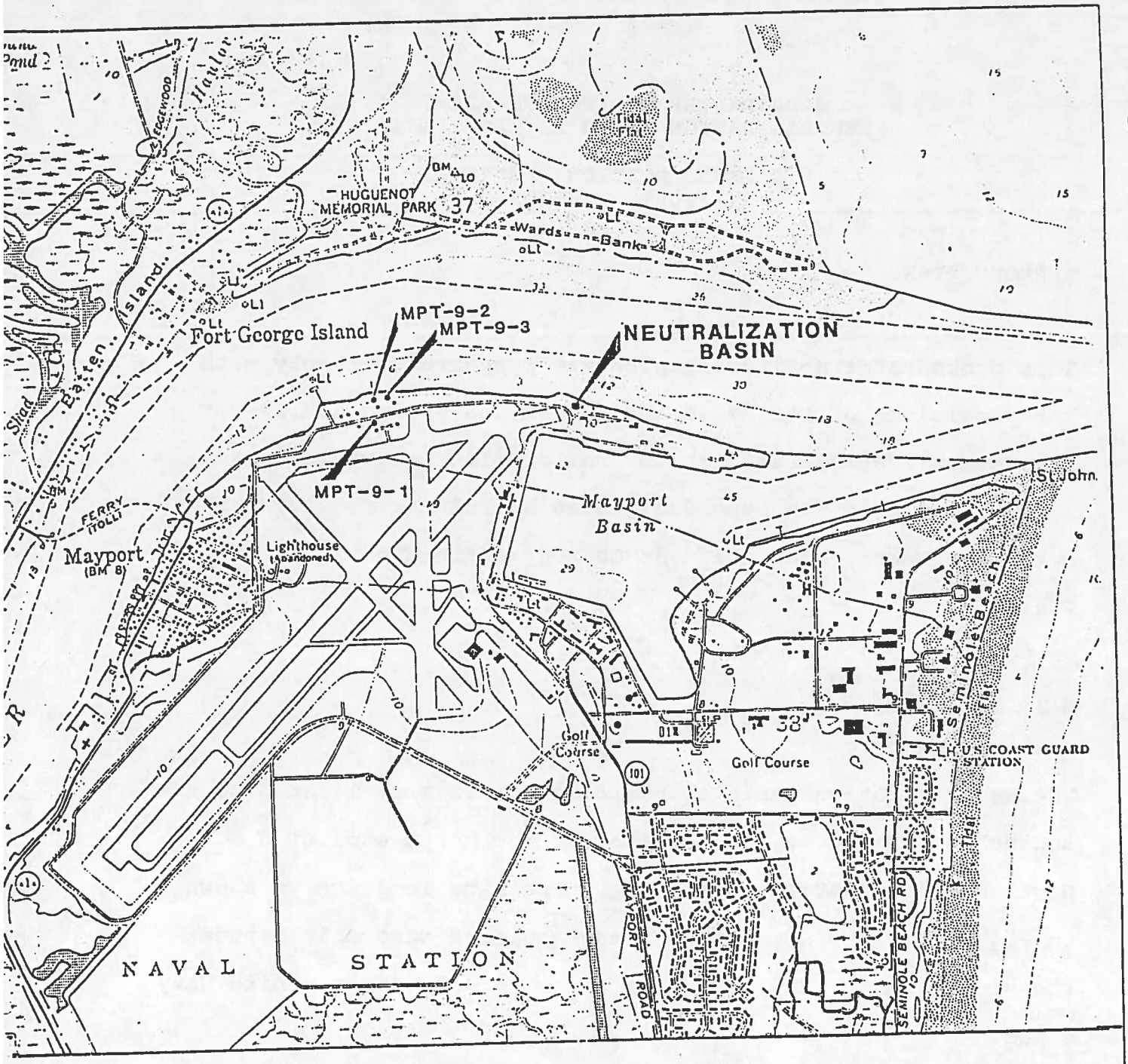
U.S NAVAL STATION - MAYPORT
MAYPORT, FLORIDA

INTRODUCTION

This groundwater monitoring plan was prepared to comply with the provisions of FAC 17-30 and 40 CFR 265.91 and 265.92 for the Neutralization Basin at the boiler plant at Building No. 1241. The basin has been designated by FDER as receiving a corrosive waste, classified as D002 by definition in 40 CFR 261.22.

SITE DESCRIPTION

The Neutralization Basin at Building No. 1241 is located on the south bank of the St. Johns River at the north edge of U.S. Naval Station (NAVSTA) - Mayport. The site location is shown on Figure 1. The site is on a man-modified sand spit between the river and the Mayport Basin which is used for berthing Navy ships.



SCALE IN FEET

0 2000 4000

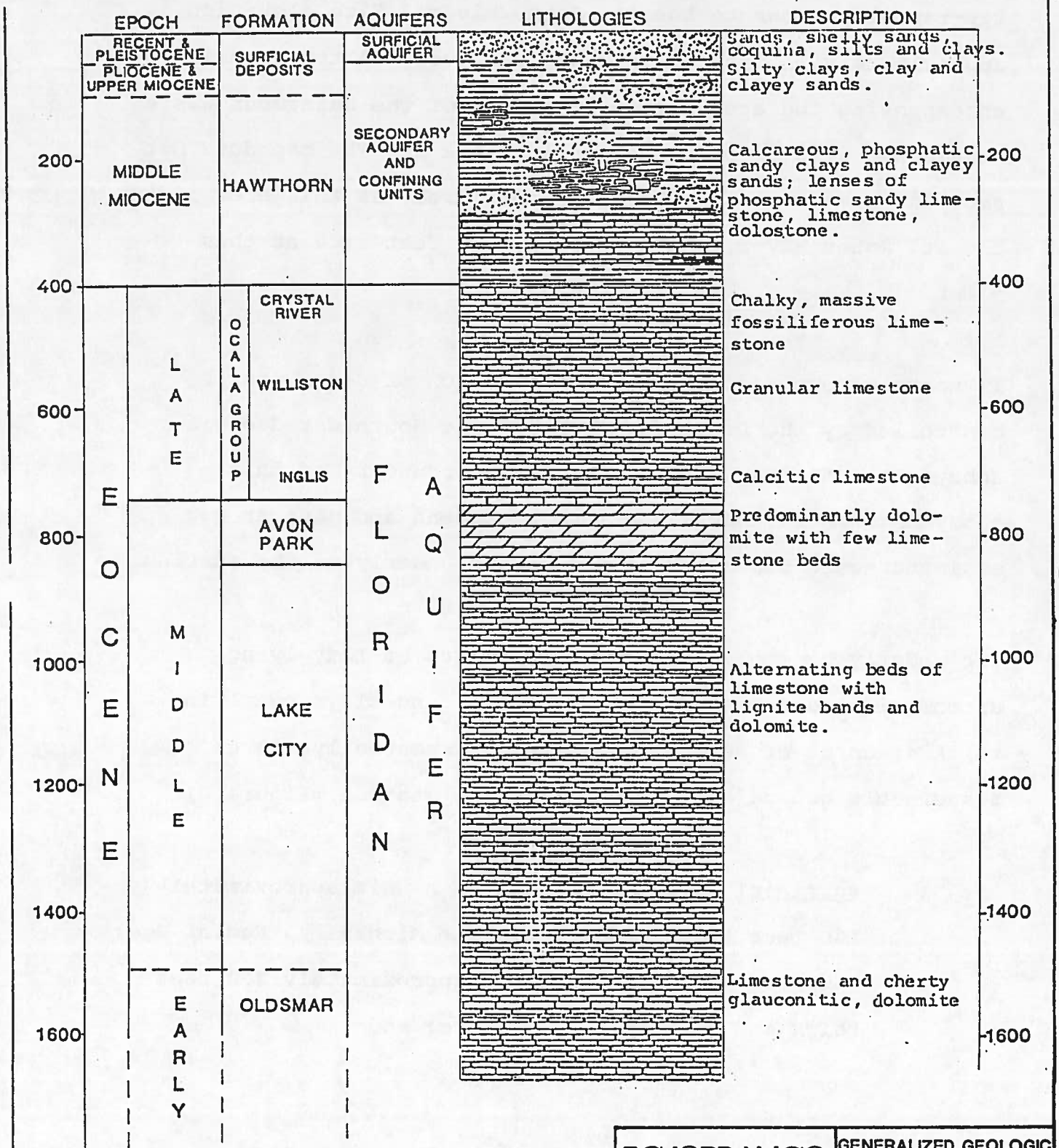
E.C JORDAN CO. ENGINEERS & SCIENTISTS	NAVAL STATION MAP
U.S. DEPARTMENT OF THE NAVY	GROUNDWATER MONITORING PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 1

Topography of the site is relatively flat with a ten foot rip-rap slope down to the St. Johns River. Site elevation is approximately 11 feet above mean sea level. A topographic map encompassing the area within 1000 feet of the hazardous waste management area is presented in Appendix A. The map does not show the area north of the management area, as this area is in the St. Johns River, which is over 2000 feet wide at this point.

In northeastern Florida, the distribution of sediments is controlled by the Penisular Arch and the Southeast Georgia Embayment. NAVSTA Mayport lies at the boundary of this embayment. More than 1,500 feet of Eocene and younger age sediments were deposited in the region underlying the station.

The underlying geologic sequence consists of flay-lying unconsolidated deposits of sands, silts and clays overlying a thick sequence of marine carbonates. Essentially, three discernible geologic units underlie the station (Figure 2):

1. surficial deposits which form a unit approximately 100 feet thick and are of late Miocene to Recent age;
2. Hawthorn Formation which is approximately 300 feet thick and of middle Mocene age; and



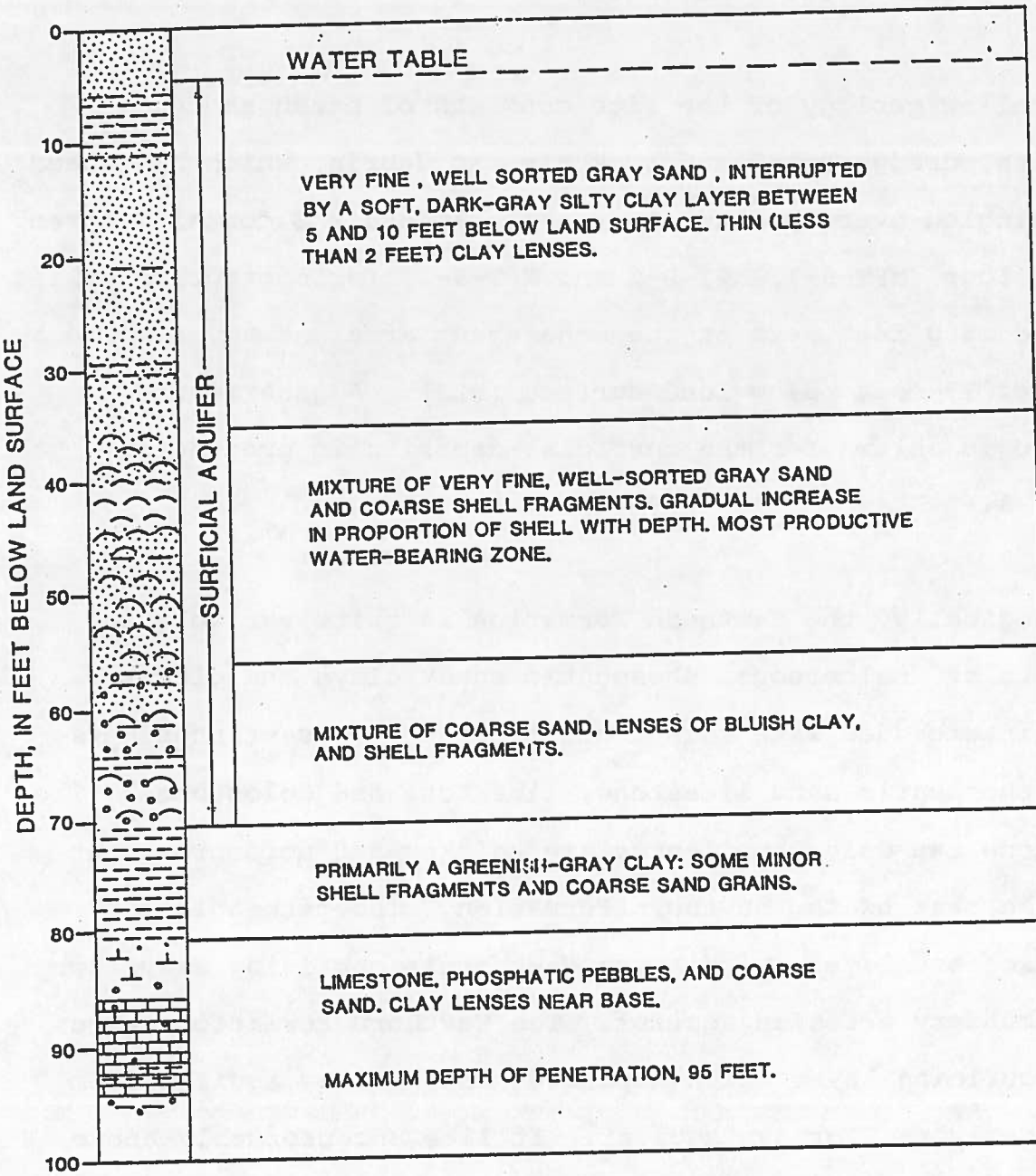
SOURCES: LEVE, 1966, GERAGHTY & MILLER, 1983, ESE, 1986.

E.C JORDAN CO. ENGINEERS & SCIENTISTS	GENERALIZED GEOLOGIC COLUMN BENEATH THE MAYPORT AREA
U.S. DEPARTMENT OF THE NAVY	GROUNDWATER MONITORING PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-06 FIGURE 2

3. marine carbonate sequences of the Floridan aquifer which are of Eocene age and comprise a unit greater than 1,000 feet thick.

The shallow geology of the site consists of beach sand deposits, dredge spoil and rock rip-rap debris, which have been intermingled over the last 45 years. Appendix B contains three boring logs (MPT-9-1, MPT-9-2 and MPT-9-3) for monitoring wells located 2600 feet west of the management area and advanced to a depth of 17 feet below land surface (BLS). A generalized lithologic column for the surficial deposits is present in Figure 3.

Lithologically, the Hawthorn Formation is quite variable and consists of calcareous, phosphatic sandy clays and clayey sands interbedded with thin discontinuous lenses of phosphatic sand, phosphatic sand limestone, limestone and dolostones. The limestone and dolostone lenses are thicker and more prevalent near the base of the Hawthorn Formation. The permeable sand and limestone layers within the Hawthorn's confining clays form the secondary artesian aquifer. The Hawthorn Formation serves as a confining layer which separates the shallow aquifer from the underlying Floridan aquifer. It lies unconformably above the Ocala Group (Crystal River Formation).



SOURCE: FRANKS (1980)

E.C. JORDAN CO. ENGINEERS & SCIENTISTS	GENERALIZED LITHOLOGIC COLUMN SHOWING SEDIMENTS PENETRATED BY TEST WELLS
U.S. DEPARTMENT OF THE NAVY	GROUNDWATER MONITORING PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-06 FIGURE 3

The marine carbonate sequence which makes up the Floridan aquifer, beneath NAVSTA Mayport, consists of the following formations in descending order:

1. the Ocala Group which consists of the Crystal River Formation, the Williston Formation and the Inglis Formation;
2. the Avon Park Limestone;
3. the Lake City Limestone; and
4. the Oldsmar Limestone.

These formations range in age from the late Eocene, Crystal River Formation to the early Eocene, Oldsmar Limestone.

The Crystal River Formation is a white to cream, chalky, massive fossiliferous limestone and is the youngest Eocene formation underlying NAVSTA Mayport. The Williston Formation, which lies conformably between the overlying Crystal River Formation and the underlying Inglis Formation, is a tan to buff granular limestone. The Inglis Formation, of early late Eocene age, is lithologically a tan to buff calcitic limestone which is very similar to the Williston Formation (Leve, 1966).

The Avon Park Limestone of late middle Eocene unconformably underlies the Ocala Group. It consists of alternating beds of tan, hard, massive dolomite and brown to cream, granular calcitic limestone. The Lake City Limestone unconformably underlies the Avon Park Limestone and is early middle Eocene in age. Lithologically it consists of alternating beds of white to brown, chalky to granular limestone with lignite bands and a gray to tan dolomite. Below the Lake City Limestone is the Oldsmar Limestone, of early Eocene age. It consists of a cream to brown, soft, granular limestone and cherty, glauconitic, massive to finely crystalline dolomite (Leve, 1966).

NAVSTA Mayport is situated at the mouth of the St. Johns River, on the south bank (see Figure 1). The facility is bordered on the east by the Atlantic Ocean and to the north and northwest by the St. Johns River. To the south and southwest an extensive tract of tidal marsh exists within the boundaries of the facility.

The facility has one man-made, freshwater lake, Lake Wonderwood, located in the on-base housing area. Lake Wonderwood is approximately 20 acres in size and was created to provide fill for the adjacent housing area. The lake has a

depth of approximately 20 feet and is used by facility personnel as a recreation source.

The other dominant, surface water feature on base is the turning basin, i.e., Mayport Basin. The turning basin was constructed during the early 1940s through dredging the eastern portion of Ribault Bay. Dredge spoil was pumped behind the west bulkhead to fill the old bay in order to elevate the land surface. Subsequent maintenance dredge spoil has been used to fill in other areas of the facility. Originally Mayport Basin was dredged to a depth of 29 feet. In 1952 the basin was deepened to a depth of 40 feet to provide access to larger ships.

Surface runoff from NAVSTA Mayport enters Mayport Basin, the St. Johns River, Lake Wonderwood, Sherman Creek, Pablo Creek, Chicopit Bay, and the Atlantic Ocean. The runways provide an artificial drainage divide between the northwest and southeast portions of the facility. To the north soils along the St. Johns River tend to be very sandy and have high infiltration capacities. In this area there exists little surface runoff and few drainage features are evident.

To the south of the runways, soils are underlain by less permeable deposits and the topography is flatter and lower in

elevation. The predominate drainage feature in this area is Sherman Creek.

The surficial aquifer extends to a depth of approximately 70 feet below land surface (Causey Phelps, 1978; Franks, 1980). It is comprised of unconsolidated deposits of sand, shells and clay which vary in lithology, thickness and permeability throughout the facility. Causey and Phelps (1987) report that the surficial aquifer over most of Duval County is composed of an upper and a lower zone which are separated by deposits of lower permeability at a depth from 25 to 50 feet below land surface. Franks (1980), however, found no evidence of this confining bed in the area east of Jacksonville Shipyard.

Franks (1980) estimated the transmissivity of the primary water-bearing sand and shell zone (35 to 55 feet BLS) of the surficial aquifer to be 2,400 ft^2/day (hydraulic conductivity equal to 34 ft/day). Laboratory testing of a near surface Shelby tube sample (8 to 10 feet BLS), obtained from the landfill area, yielded a hydraulic conductivity of 3.8 ft/day (Geraghty and Miller, 1984). Results from single-hole permeability tests conducted during the study conducted by E.C. Jordan (1987) in September 1987 indicate that the hydraulic conductivity throughout much of the facility exceeds 2.8 ft/day (the upper limit of the test procedure).

Geraghty and Miller (1984), citing the work of Causey and Phelps (1978), report that groundwater in the surficial aquifer at NAVSTA Mayport is fresh in the upper part but becomes brackish below a depth of 40 feet, This was also confirmed by Frazee and McClaugherty (1979) in other area near NAVSTA Mayport. Frazee & McClaugherty (1979) found chloride concentration to be less than 250 mg/l in samples obtained near the water table. At depths greater than 50 feet, the chloride concentration exceeded 4000 mg/l. This condition should be more pronounced near the coast and the St. Johns River.

The secondary artesian aquifer consists of sand and limestone lenses interbedded in the clayey sands and sandy clays of the Hawthorn Formation and is situated between the surficial aquifer and the underlying Floridan aquifer. Spechler (1982) noted that the most productive zone, a limestone layer in the upper part of the Hawthorn, is notably absent in the Mayport area. Water levels in the secondary artesian aquifer indicate that groundwater flow in the Mayport area is towards the northeast (Fairchild, 1972).

The Floridan aquifer system is the principal source of fresh water in northeast Florida. It is comprised in part or in all of the Oldsmar Limestone, Lake City and Avon Park Limestones, the Ocala Group, and a few discontinuous thin water bearing zones in the lower portion of the Hawthorn Formation.

The Ocala Group is a homogeneous sequence of permeable, hydraulically connected, marine limestone beds that contain very few hard dolomite or limestone beds which restrict the vertical movement of water. The Avon Park Limestone consists almost entirely of hard, relatively impermeable, dolomite confining beds and soft, permeable limestone and dolomite water-bearing zones.

The top of the Floridan aquifer occurs at a depth of about 400 feet BLS at NAVSTA Mayport. Published transmissivities of the Floridan aquifer in eastern Duval County range from approximately 85,000 to 160,000 gpd/ft (Leve, 1968).

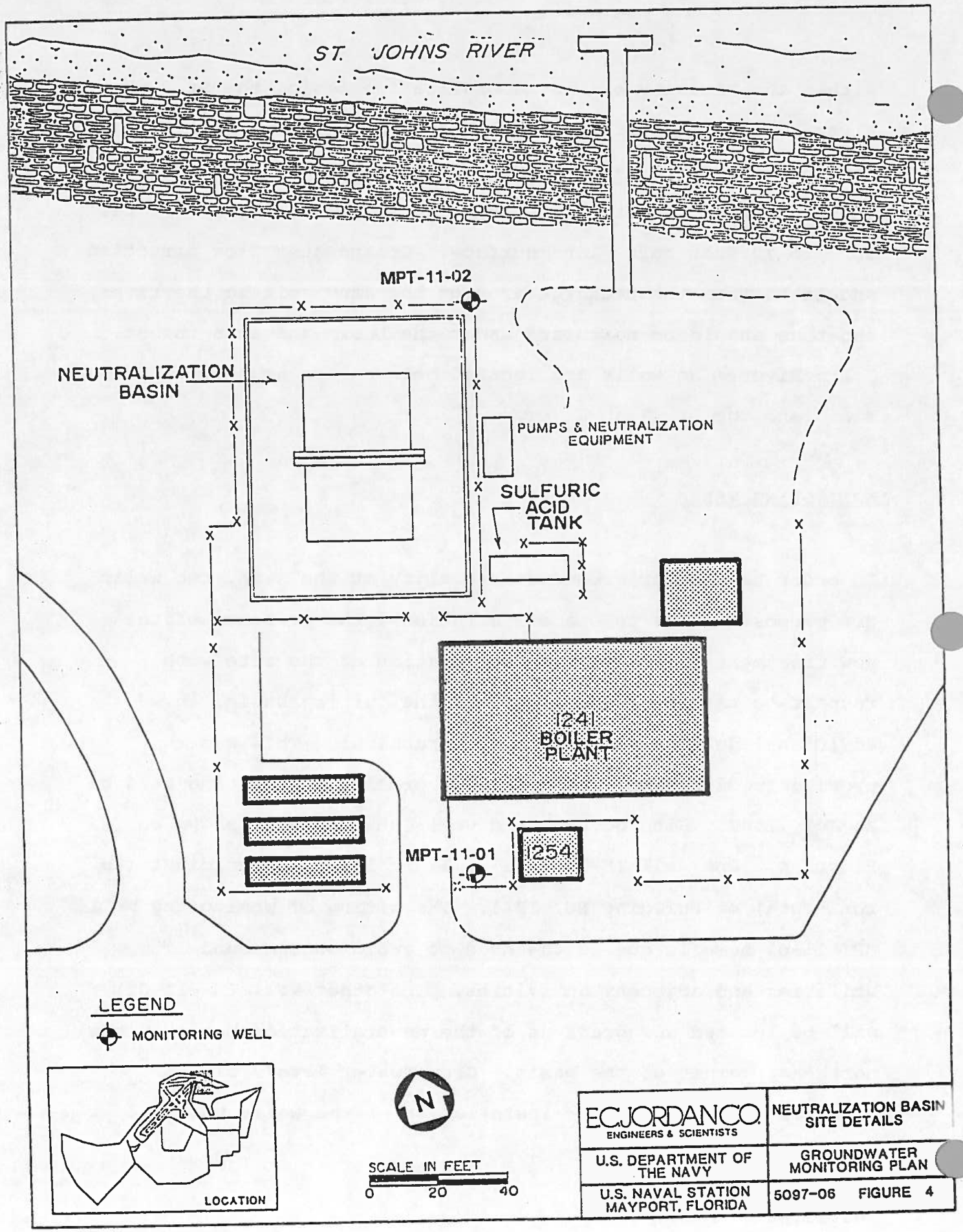
Geraghty and Miller (1983) report that groundwater in the Floridan aquifer, in the vicinity of Mayport, is moving southward toward areas of heavy pumpage along the coast. Floridan wells, in the vicinity of NAVSTA Mayport, are under sufficient artesian pressure to flow at the surface. This results in upward hydraulic gradient between the Floridan and the surficial aquifer.

Water quality in the Floridan aquifer is potable in the Mayport area. The concentrations of total dissolved solids is approximately 400 mg/l and the concentration of chlorides is around 25 mg/l.

Within the vicinity of the neutralization basin, the St. Johns River and the Mayport Basin are tidally-influenced with a diurinal tide of 5 feet. Tidal fluctuation are also expected in groundwater beneath the site. The estimated depth to water is 9 to 10 feet below land surface. Groundwater flow direction should be from the recharge area on the sand spit to the river, and thus should be northward under the basin and into the St. Johns River. No wells are located between the Neutralization Basin and the St. John River.

MONITORING WELLS

In order to monitor groundwater quality at the site, two wells are proposed. Due to space limitations, the presence of the new treatment facility, and the location of the site with respect to the St. Johns River and the turning basin, an additional downgradient well is impractical. This was previously discussed with FDER in a preliminary meeting held on 24 July 1987. Site details and well locations are shown on Figure 4. One well (MPT-11-01) will be located upgradient (to the south) of Building No. 1241. The siting of monitoring well MPT-11-01 here is due to the need to avoid underground utilities and adjacent activities. The other well (MW-11-02) will be located downgradient of the neutralization basin at the northeast corner of the basin. Groundwater levels will be intensely monitored after installation of the wells to

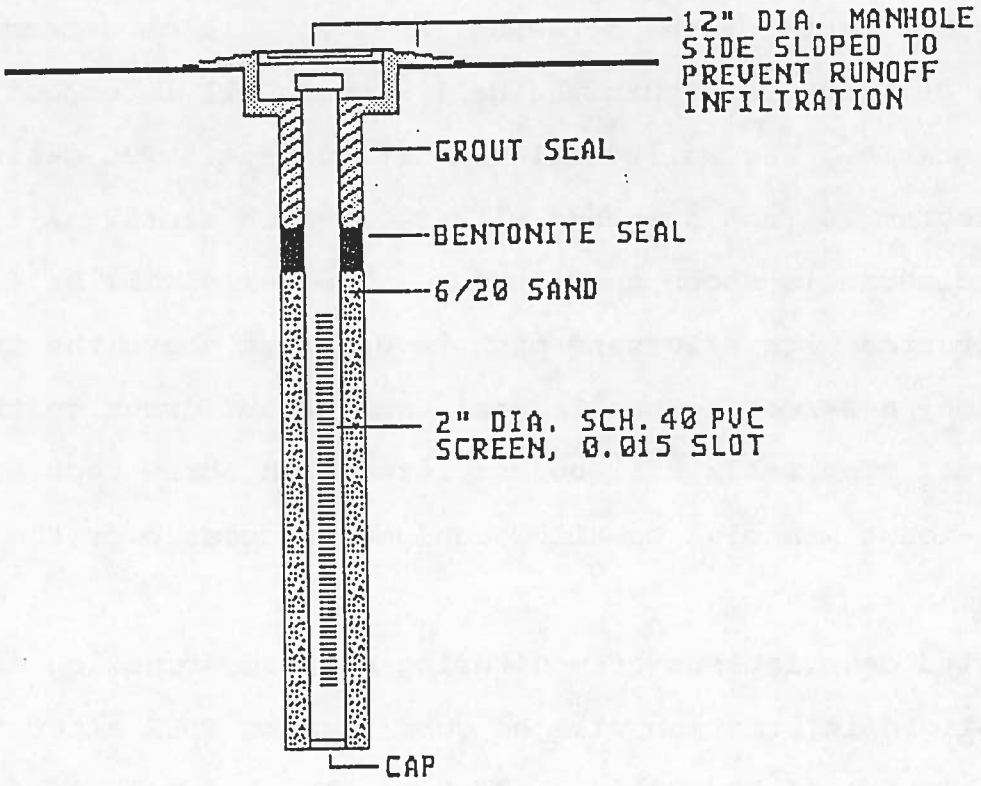


ECJORDAN CO. ENGINEERS & SCIENTISTS	NEUTRALIZATION BASIN SITE DETAILS
U.S. DEPARTMENT OF THE NAVY	GROUNDWATER MONITORING PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-06 FIGURE 4

determine if the water levels are tidally influenced. If the assumed "up" and "downgradient" directions are found to be incorrect, additional wells will be installed.

Drilling permits will be obtained from Duval County prior to drilling. The monitoring wells will be drilled by hollow-stem auger to an anticipated depth of 18 feet below land surface. The exact depth of the screened interval will be determined after drilling such that the well screen will intersect the water table. The wells will consist of 2-inch PVC casing with the bottom 10 feet screened with 0.015-inch slots. A typical well diagram is shown on Figure 5. The wells will be constructed with 6/20 sand pack to 0.5 feet above the screen section, a 2-foot bentonite seal, and cement grout to the surface. The wells will be completed with screw tops and flush-mount manholes to allow equipment access over the wells.

Detailed descriptions of monitoring well construction and litholigic information will be submitted to FDER after the installation of the wells. Additionally, the tops of casings and the land surface, adjacent to the monitoring wells, will be surveyed to within $\pm$0.01 feet Mean Sea Level (MSL).



E.C. JORDAN CO. ENGINEERS & SCIENTISTS	TYPICAL MONITORING WELL DETAIL
U.S. DEPARTMENT OF THE NAVY	GROUNDWATER MONITORING PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-05 FIGURE 5

SAMPLING AND ANALYSIS

Monitoring wells will be measured and sampled in the following manner.

Sampling equipment needed for collecting representative samples of groundwater are as follows:

1) 100-ft electric measuring tape with water-level indicator ("M-scope") consisting of an ammeter, electrode, and 100-ft cable;
2) Several gallons of distilled water and wash bottle;
3) Clean cloth;
4) Plastic sheeting or large garbage bags;
5) Bottom-filling teflon bailer and nylon monofilament line;
6) Graduated bucket;
7) Sample bottles;
8) Sample bottle labels, waterproof marking pen;
9) pH meter;
10) Thermometer;
11) Specific conductivity meter;
12) Preservatives for water samples;
13) Field data forms, chain of custody forms; and
14) Ice chest and ice.

Procedures for Measuring Water Levels

- After unscrewing the casing cap, measure the depth to water in the well. All measurements are made from the top of PVC casing.

- Using the M-scope, drop the probe down the center of the casing and allow cord to hang down the well. When indicator indicates water contact, determine depth to water from top of PVC casing. Record depth to water on field data form to within ±0.01 feet. Subtract this value from elevation of top of PVC casing to find elevation of water level.

- The water-level measurements must be obtained at each sampling point each time water samples are collected.

- Clean M-scope with distilled wear and isopropyl alcohol and wipe dry with clean cloth prior to measuring the next well.

Procedures for Purging Standing Water in Wells

- It is recommended to remove, with a bailer, at least three well volumes of water from the well to insure an accurate sample for groundwater quality measurements. To calculate

the volume of water to be purged, first determine the height of the water column by subtracting the water level below the top of casing from the total depth of the well. Multiply the height of the water column by 3.12 (number of gallons per linear foot in an 8.75 inch diameter hole, this includes the sand pack) to obtain the number of gallons in one well volume. Use the graduated bucket to measure the volume of water removed from the well. Dispose of this purge water at the sewage treatment plant.

- After three well volumes have been purged from the well, analyze the groundwater for pH and specific conductance and record on field data sheet. Repeat this procedure on separate samples, from the same well, until the pH and specific conductance measurements have stabilized for three consecutive readings.

- Clean bailer with distilled water and isopropyl alcohol before using in other wells to prevent cross contamination of groundwater in the monitor wells.

Procedure for Sample Collection and Field Analyses

- Allow well to recharge sufficiently to obtain samples. If a well is pumped dry, it will be allowed to recover and sampled within 2 to 4 hours.

- Analyses of pH (four times), temperature, and specific conductance (four times) should be made in the field at the time of sampling because these parameters change rapidly and a laboratory analysis may not be representative of the true groundwater quality. Remove enough water from well with the teflon bailer to determine temperature of water, specific conductivity, and pH. Record values on field data sheet and discard water. Repeat procedure three more times.

- Collect well sample with a teflon bailer, transfer water from bailer to sample bottles provided by the laboratory. Care should be taken to not agitate sample in order to limit amount of oxygen added to the sample. Minimize the number of containers used in order to limit the addition of outside contaminants. Sample bottles should be prepared as specified by the EPA "Manual of Methods for Chemical Analysis of Water and Wastes" (EPA 625/6-74-003 and EPA 600/4-79-020).

- Complete the required information on the Chain of Custody Form (Figure 6). Required information includes; the project name; signatures of the samplers; the sample numbers, date collected, time collected, type of sample (i.e., grab or composite), sample location, the number of containers, and the sample type; the date and time the

PAGE ___ OF ___

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME						NO. OF CONTAINERS	SAMPLE TYPE												REMARKS
SAMPLERS (SIGNATURE)																				
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION															INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE / TIME	REMARKS

E.C JORDAN CO. ENGINEERS & SCIENTISTS	EXAMPLE OF CHAIN OF CUSTODY FORM
U.S. DEPARTMENT OF THE NAVY	GROUNDWATER MONITORING PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-06 FIGURE 6

samples were delivered for shipping; and the names of those responsible for receiving the samples at the laboratory.

ANALYTICAL PARAMETERS

Groundwater samples will be collected from the two monitoring wells and analyzed quarterly for one year. The analytical laboratory will be Pioneer Laboratory, Inc. (QA/QC number not assigned). First quarter samples will be analyzed for the parameters listed in Title 40 Code of Federal Regulations (CFR) paragraph 265.92(b) and the secondary drinking water quality standards listed in Florida Administrative Code (FAC) Chapter 17-22. These parameters plus their corresponding analytical methods for determination and the method detection limits are presented in Table 1.

The analytical program for the subsequent three quarterly sampling events will consist of measurements of pH, specific conductance, the 40 CFR 265 Appendix III metals. In addition, any first quarter parameter whose concentration exceeds the water quality standard, as established in Chapter 17-22, FAC or existing background concentration or value (whichever is higher) will also be analyzed. The deletion of a first quarter parameter from further analysis, based upon its exceedance of a water quality standard but not the background concentration or value, will be discussed with FDER.

TABLE 1
ANALAYTICAL PARAMETER
GROUNDWATER MONITORING PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA

PARAMETER	EPA METHOD	DETECTION LIMIT (mg/l)
40 CFR 265 APPENDIX III METALS		
Arsenic (Total)	206.2	0.002
Barium (Total)	208.2	0.03
Cadmium (Total)	213.2	0.002
Chromium (Total)	218.2	0.02
Lead (Total)	239.2	0.01
Mercury (Total)	245.1	0.0002
Selenium (Total)	270.2	0.002
Silver (Total)	272.2	0.01
40 CFR 265 APPENDIX III NONMETALS		
Endrin	608	0.00007
Fluoride	340.2	
Lindane	608	0.0002
Nitrate-N	253.3	0.1
Methoxychlor	608	0.1
Toxaphene	608	0.005
2,4-D	615	0.1
2,4,5-TP (Silvex)	615	0.01
Radium	304	
Gross Alpha	302	
Coliform Bacteria	909A*	
Turbidity (applicable to surface waters only)		
40 CFR 265.92(b)(2) PARAMETERS		
Chloride	325.3	1.0
Iron (Total)	236.1	0.02
Manganese (Total)	243.1	0.01
Phenols	420.1	0.001
Sodium	273.1	1.0
Sulfate	375.1	1.0

ANALYTICAL PARAMETERS (Cont'd)

40 CRF 265.92(b)(3) PARAMETERS

pH	
Specific Conductance	
Total Organic Carbon	415.1
Total Organic Halogen	450.1

CHAPTER 17-22.220 SECONDARY DRINKING WATER PARAMETERS
(not specified elsewhere)

Color	110.2	
Copper	220.2	0.01
Corrosivity		
Foaming Agents	425.1	0.025
Odor	140.1	
Total Dissolved Solids	160.1	
Zinc (Total)	289.2	0.02

* Denotes Standard Methods Procedure

EVALUATION OF ANALYTICAL RESULTS

For those parameters that are scheduled for analysis only during the first quarter sampling episode, analytical results from each monitoring well will be numerically compared to FDER drinking water standards, as set forth in Chapter 17-22, FAC. In addition, results from each of the two monitoring well samples will be numerically compared between themselves. The intent of this dual comparison will be to assess whether the potential exists that activities associated with the neutralization basin have resulted in an increase in the concentration of any of the parameters in groundwater. This evaluation will consist of comparing the magnitude of the analytical results for the downgradient monitoring well with those of the upgradient well and the corresponding water quality standards. If the data suggest that activities at the neutralization basin have resulted in an increase in the concentration of a parameter, any necessary parameter modification in the analytical program and the necessity of a groundwater quality assessment will be summarized in report format and discussed with Southern Division and FDER.

groundwater quality assessment will be summarized in report format and discussed with Southern Division and FDER.

For the quarterly monitoring of indicator parameters, results will be statistically compared (Student's t-test) between the two wells after one year of monitoring. If significant differences (0.01 level of significance) are detected, a revised monitoring plan will be submitted to FDER to further evaluate the detected differences, if warranted.

The quarterly monitoring results will be submitted to Southern Division and FDER within 30 days of receipt of the analytical results.

REFERENCES

Causey, L.V. and G.G. Phelps. "Availability and Quality of Water from Shallow Aquifers in Duval County, Florida"; U.S. Geological Survey Water-Resources Investigation 78-92; 1978.

Environmental Science and Engineering, Inc. "Initial Assessment Study, Naval Station Mayport, Florida"; 1986.

Fairchild, R.W. "The Shallow-Aquifer System in Duval County, Florida"; Florida Bureau of Geology, Report of Investigations No. 59; 1972.

Franks, B.J. "The Surficial Aquifer at the U.S. Naval Station Near Mayport, Florida"; U.S. Geological Survey Open-File Report 80-765; 1980.

Frazee, J.M. and D.R. McClaugherty. "Investigation of Ground Water Resources and Saltwater Intrusion in the Coastal Areas of Northeast Florida"; St. Johns River Water Management District Technical Report No. 3; 1979.

Geraghty and Miller, Inc. "Hydrogeologic Assessment and Ground-water Monitoring Plan, U.S. Naval Station, Mayport, Florida"; 1983.

_____. "As-Built Ground Water Monitoring Network Naval Station-Mayport, Mayport, Florida"; 1984.

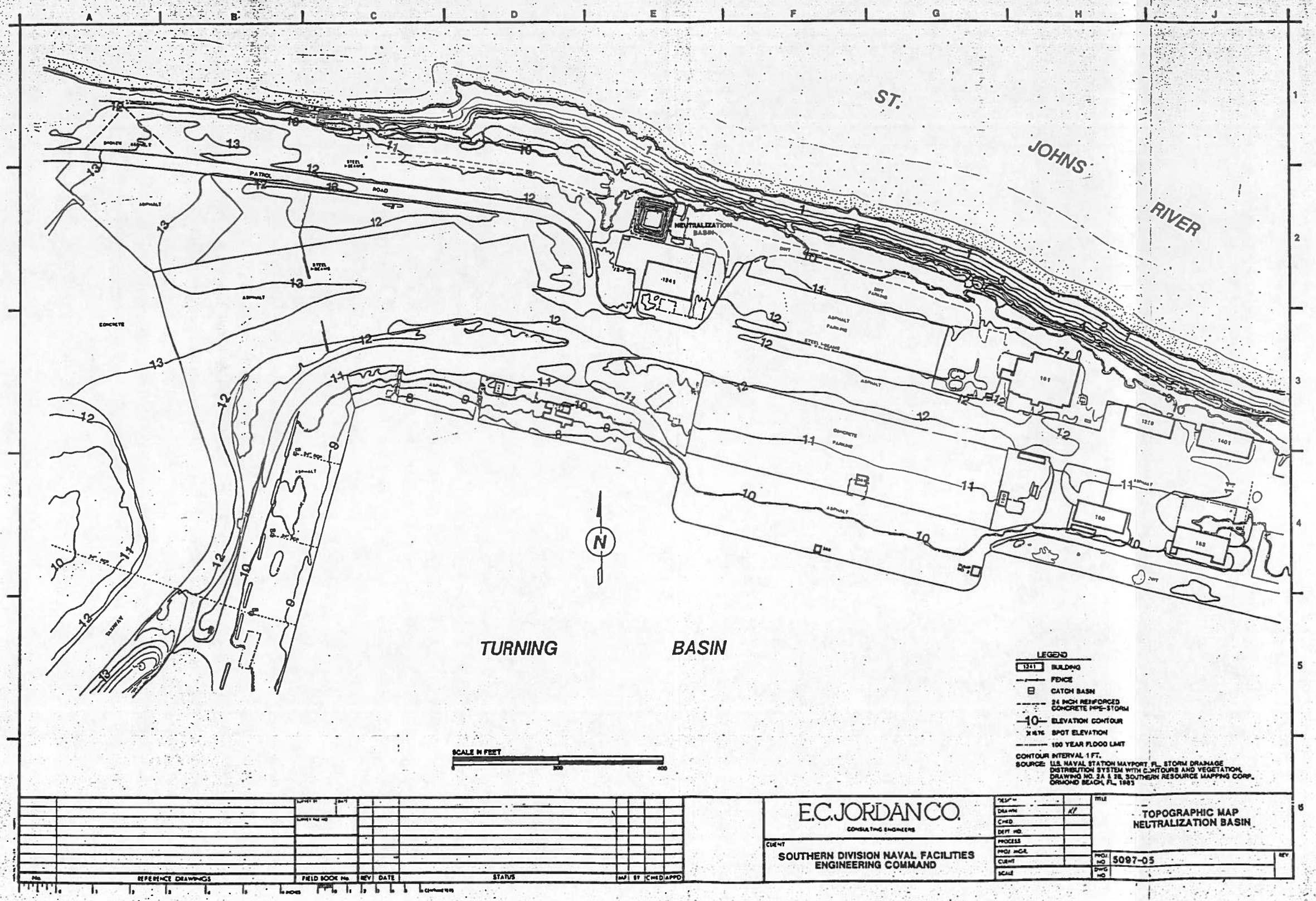
E.C. Jordan Co. "Final Report NIRP Expanded Site Inspection"; April 1988.

Leve, G.W. "Ground Water in Duval and Nassau Counties, Florida"; Florida Geological Survey Report of Investigations 42; 1966.

Spechler, R.M. "Generalized Configuration of the Top of the Limestone Unit of the Lower Part of the Surficial Aquifer, Duval County, Florida"; U.S. Geological Survey Open-File Report 82-336; 1982.

APPENDIX A

TOPOGRAPHIC MAP



REFERENCE DRAWINGS | FIELD BOOK No. | REV | DATE | STATUS | INIT | BY | CHKD | APPD

E.C.JORDAN CO.
CONSULTING ENGINEERS

CLIENT
SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND

DESIGN
DRAWN KF
CHKD
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PROCESS
PROJ MGR.
CLIENT
SCALE

TITLE
TOPOGRAPHIC MAP
NEUTRALIZATION BASIN

PROJ NO 5097-05
DWG NO
REV

APPENDIX B

BORING LOGS

BORING NO. MPT-9-1

CLIENT USN, NAVFACENGCOM SDIV PROJECT NO. 5097-04
CONTRACTOR Monitor Testing DATE STARTED 15 Sept. 1987 COMPLETED 15 Sept. 1987
METHOD Hollow Stem CASING SIZE 2" ID HNU 11.7/10.2 PROTECTION LEVEL D
GROUND EL. Unknown SOIL DRILLED 19 ft ROCK DRILLED N/A TOTAL DEPTH 20 ft
LOGGED BY M.C. Diblin CHECKED BY M.R. Clark DATE 24 Sept. 87 BELOW GROUND appr. 11 ft

SAMPLE NUMBER	DEPTH (ft)	P.I. HEADSPACE	SOIL/ROCK DESCRIPTION	BLOWS/6-IN	RECOVERY
SS-01	0-2	1.1	0-.15 dk black surf soil 0.15-0.8 light to dark gry m-c sand w/shell fragments 0.85-1.55 light tan f-m sand with shell fragments one pebble size clay bleb, dry	7/11/21/27	1.55
SS-02	2-4	4.8	0-1.2 v light tan f-m sand with shell fragments, dry	20/22/29/31	1.7
SS-03	4-6	0.0	0.1 f sand with shell fragments, tan to dk brn, dry 1.0-1.7 white f-m sand with large and small shells and fragments, dry	7/13/14/19	1.3
SS-04	6-8	2.4	0.8 same as above 0.8-1.0 gry uniform plastic clay mottled with brn stringers of clay, dry 1.0-1.4 white f-m sand with shell fragments, dry 1.4-1.6 grey sandy clay, moist, plastic		
SS-05	8-10	23.0	0-0.3 tan well sorted f-m sand with large shell fragments, sat 0.3-0.8 tan well sorted vf-f sand, sat 0.8-1.6 off white f-m sand sand with large and small shell fragments, sat	16/21/27/17	1.6
SS-06	15-17	29.1	0-0.3 light gry f-m sand with shell fragments 0.3-2.0 light gry f-m shelly sand (many shell pieces), sat	8/32/50+	2.0

Materials
3.5 bags sand
end cap
10 ft screen
end cap
12 ft riser
1 bucket bentonite pellets
1 bag Portland cement
1 protective steel casing

BORING NO. MPT-9-2

CLIENT USN, NAVFACENGCOM SDIV PROJECT NO. 5097-04
CONTRACTOR Monitor Testing DATE STARTED 16 Sept. 1987 COMPLETED 16 Sept. 1987
METHOD Hollow Stem CASING SIZE 2" ID HNU 11.7/10.2 PROTECTION LEVEL D
GROUND EL. Unknown SOIL DRILLED 17 ft. ROCK DRILLED N/A TOTAL DEPTH 15.0 ft
LOGGED BY Mark Diblin CHECKED BY M.R. Clark DATE 24 Sept. 87 BELOW GROUND 9 ft

SAMPLE NUMBER	DEPTH (ft)	SOIL/ROCK DESCRIPTION	BLOWS/6-IN	RECOVERY
SS-01	0-2	0.00-1.3' light tan f-m sand w/ shell fragments, dry	12/12/15/13	1.3
SS-02	5-7	0.00-1.5' high tan f-m sand w/ shell fragments, dry	17/9/8/8	1.5
SS-03	7-9	0.00-0.5' tan f sand w/ shells 0.5-0.55' blue shells 0.55-1.3' grades to light gry f-m sand w/ shells	17/9/12/13	1.3
SS-04	10-12	0.00-1.5' light grey f-m sand w/ shells and fragments.	7/9/12/13	1.5
SS-05	15-17	0.00-0.4' same as above	2/12/50+	0.4

Materials
end cap
10 ft screen
7.5 ft riser
end cap
2 1/2 bags sand
.75 bucket bentonite
1 bag Portland cement
1 protective steel casing

BORING NO. MPT-9-3

CLIENT USN, NAVFACENGCOM SDIV PROJECT NO. 5097-04
CONTRACTOR Monitor Testing DATE STARTED 16 Sept. 1987 COMPLETED 16 Sept. 1987
METHOD Hollow Stem CASING SIZE 2" ID HNU 11.7/10.2 PROTECTION LEVEL D
GROUND EL. Unknown SOIL DRILLED 17 ft ROCK DRILLED N/A TOTAL DEPTH 15 ft
LOGGED BY M.C. Diblin CHECKED BY M.R. Clark DATE 24 Sept. 87 BELOW GROUND appr. 8-10 ft

SAMPLE NUMBER	DEPTH (ft)	SOIL/ROCK DESCRIPTION		BLOWS/6-IN	RECOVERY
SS-01	0-2	0-0.4	light tan org top soil w/veg	4/13/27/29	
		0.4-1.0	dk tan f uniform sand		1.5
		1.0-1.5	light tan f-m sand w/shell frags		
SS-02	2-4	0-0.15	tan f-m sand w/shells	16/20/20/19	
		0.15-0.5	light tan f uniform sand w/dk black clayey sand layer appr .1' thick		1.6
SS-3	4-6	0.5-1.15	same as above	22/13/11/12	
		1.15-1.5	interbedded brown clay and red sand with shells		1.5
SS-04	6-8	0-0.8	dk brown m sand with some shells	12/8/8/7	
		0.8-1.55	tan f-m sand with some large shells, uniform		1.55
SS-05	8-10	0-1.0	tan f-m sand, 50% shelly, grading to very f light tan sand at the bottom	7/22/22/35	1.8
SS-06	15-17	0-2.0	gry f-m sand with many shell and fragments	7/11/22/30	2.0

Materials
11 bags sand
end cap
10 ft screen
end cap
7.5 ft riser
1 bucket bentonite pellets
1 bag Portland cement
1 protective steel casing

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT
3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207
904/798-4200

BOB MARTINEZ
GOVERNOR
DALE TWACHTMANN
SECRETARY
ERNEST E FREY
DISTRICT MANAGER
GARY L SHAFFER
ASSISTANT DISTRICT MANAGER

February 9, 1988

CERTIFIED - RETURN RECEIPT

Captain J. B. Mitchell, Jr.
U.S. Naval Station - Mayport
Old Mayport Road
Mayport, Florida 32228

Dear Captain Mitchell:

U.S. Naval Station - Mayport
FL9 170 024 260
Duval County - Hazardous Waste
Consent Order #87-1128
First Notice of Deficiency (NOD)

This letter acknowledges the receipt of a closure plan for the neutralization basin near Building 1241, U.S. Naval Station - Mayport, submitted on November 3, 1987. A review of this plan revealed that the information which you have provided is not complete. You are hereby advised to provide us with the additional information required in the attachment within 30 days of receipt of this letter, pursuant to paragraph 14 of the referenced Consent Order.

These deficiencies constitute a violation of Department rules. Failure to correct these deficiencies within thirty (30) days will be a violation of paragraph 14 of the Consent Order and could subject you to formal enforcement action. If you cannot submit this information within thirty (30) days, you must provide a schedule with dates when this information will be submitted. You must provide an explanation for a time extension.

Six copies of your response should be submitted to this office. You are encouraged to contact the Department to discuss these deficiencies. This exchange of ideas will assist you in developing a complete and adequate response. If you would like to arrange a meeting or if you have any questions, please contact this office.

Sincerely,

Ashwin B. Patel
Hazardous Waste Supervisor

ABP:jf
Enc.

cc: Mike Green w/attachments
Elizabeth Merrill w/o attachments
Satish Kastury w/o attachments
James Scarbrough w/o attachments
John M. Dumeyer w/attachments
Steve Stouter w/o attachments

Physical Closure:

Construction Details (Page 5)

1. The total capacity of the neutralization basin and information about the previous pond must be provided. At a minimum, you should provide us with the date when the pond was put into operation, its size, capacity and construction details of the previous unit. (40 CFR 264.112[b][3])

Closure Plan

2. This section references 40 CFR 265.111. This should be 40 CFR 264 - Subpart G.

3. The first step of closure procedures on page 7 states that "... all residual sludge and liquid will be flushed from the basin and tested to determine pH and Appendix III metals content by EP Tox procedure ..."

   Provide more information to show where and how the flushed liquid and sludge will be stored during analysis and how they will be separated, if separated for final disposal. (40 CFR 264.112[b][4])

   Also, provide information on equipment to be used for closure, including the decontamination procedures, handling and disposal of washwaters generated from decontamination. (40 CFR 264.114)

4. Provide a testing program to determine when the site is clean. The testing program must include:

   - sampling procedures, including locations and frequencies.

   - testing or analytical procedures to be used (only methods from EPA Manual SW-846 or methods approved under 40 CFR 260.21 are acceptable).

   - a detailed discussion of the criteria to be used to evaluate test results in order to determine whether the site is clean closed. (40 CFR 264.112[b][5])

5. Because the neutralization pond was unlined until 1986, there is a possibility of soil contamination underneath the existing liner. Sampling and analysis must be conducted on soils beneath the liner to confirm the presence or absence of contamination (40 CFR 264.112[b][2]). Sampling procedures, locations, parameters and methods should be proposed in accordance with item 4 above. If contamination of soils is indicated, the facility would have the option of removing/treating the affected soils or implementing the contingent closure/post-closure plans.

6. The first paragraph on page 9 states that the hypalon liner, asphalt base and side slopes will be excavated and stockpiled adjacent to the basin for disposal. Such activity will result in another RCRA unit - waste pile(s). You must obtain a construction permit from the Department prior to constructing such a waste pile(s) or other units (Rule 17-30.250(2), FAC). Therefore, it is suggested that the facility does not proceed with this approach unless it has been documented that the materials are not hazardous wastes.

7. The third paragraph on page 9 provides details of the final cover. These are not acceptable.

   a. Pursuant to 40 CFR 264.228(c)(1)(i), the contingent closure plan must provide detailed engineering drawings and information for removal of any wastes or contaminated materials to provide an adequate information for the cover. The plan must address the following issues, as applicable, pursuant to 40 CFR 264.228(a)(2):

      (1) For materials that are to be removed, provide:

      - a description of any processing of the waste residues (e.g., stabilization prior to removal)
      - method of residue and contaminated material removal
      - method of transporting wastes

      (2) Method of stabilization or solidification of liquid and residues to be left in place.

      (3) Procedures and equipment to be used.

      (4) Procedures for equipment decontamination, including:

         (a) Procedures to protect the environment during decontamination.

         (b) Method of removing washwaters and transporting them to off-site waste management units.

         (c) Testing procedures, sampling methods and frequencies, and criteria and parameters to be used to judge when decontamination is complete.

(5) Procedures for protection of surface water and groundwater sources during the work.

(6) Method of controlling wind dispersal of the materials.

(7) Special handling procedures.

b. The plan must also indicate any material testing procedures which will be required to assure adequate support for the cover as supplied by the waste material. The testing program must include the following:

(1) Sampling procedures, including frequency.

(2) Parameters to be tested for, including a justification of the parameters selected.

(3) Test or analytical procedures to be used, including copies of any methods which are not standard test methods.

(4) A detailed discussion of the criteria to be used to evaluate the test results.

c. The closure plan must include calculations and data that demonstrate that the final cover will have sufficient support provided by the waste material (with or without stabilization or solidification as applicable). Documentation such as checklists or supporting calculations must be included in the record, that the engineering calculations have been technically reviewed and were approved.

d. Currently EPA recommends a cover consisting of the following (from bottom to top):

(1) A two-foot thick soil layer having a permeability of 1×10^{-7} cm/sec or less.

(2) A 40-mil or thicker synthetic liner.

(3) A 12-inch thick drainage layer.

(4) A two-foot thick soil layer.

(5) A vegetation crop.

The slope of the final cover surface should be at least 2%.

e. The detailed description and drawings of the cover should include the following items as applicable:

(1) Drawings showing overall plan view of cover with dimensions and cross-sections showing slopes, layers, and thicknesses.

(2) The name, species, and variety of the cover crop.

(3) Strength, thickness, and permeability of the low permeable soil layer.

(4) Strength, thickness, brand name, and manufacturer of synthetic liner.

(5) Description of drainage layer.

(6) Potential subsidence of the cover.

(7) Potential for gas generation.

(8) Material specifications for all the components of the cover system.

(9) Construction specifications for placing the cover.

f. A detailed construction inspection program must be included which describes the following:

(1) Qualifications necessary for the inspector(s).

(2) Test procedures to be used indicating acceptance criteria, sampling procedures and frequency, and testing methods.

(3) Recordkeeping procedures.

(4) Basic duties of the inspectors.

g. Also included must be detailed engineering calculations addressing the following:

(1) Erosion of the cover soils.

(2) Free drainage of precipitation off the cover.

(3) Free drainage of the drainage layer.

(4) Potential of clogging of the drainage area.

h. If a cover design other than the recommended cover is used, the record must also contain detailed engineering calculations which address:

(1) Long-term minimization of liquids through the closed landfill.

(2) A demonstration that the permeability of the cover equals or is less than that of the bottom liner system or natural subsoils present.

Documentation such as checklists or supporting engineering calculations must be included in the record.

8. Pursuant to 40 CFR 264.228(c)(1)(ii), an owner/operator who intends to clean close must submit a contingent post-closure plan.

a. The post-closure plan must include a detailed inspection and maintenance plan to ensure integrity of the final cover and the proper operation of monitoring equipment.

The plan must address the following items as applicable:

(1) Final cover integrity.

(2) Subsidence of the final cover.

(3) Run-on and/or run-off control systems.

(4) Cover erosion.

(5) Leachate removal/detection systems.

(6) Gas collection and control system.

(7) Groundwater monitoring system.

(8) Surveyed benchmarks.

b. The inspection plan must address the following:

(1) Frequency of inspections, including justification of selected frequency.

(2) Items to be inspected.

(3) Problems or conditions to look for.

(4) Procedures to undertake, if a problem exists.

(5) Inspection documentation procedures, such as records, inspection logs, etc.

c. The maintenance plan must provide the procedures which will be followed and an estimate of the materials needed to correct the most likely to occur problems within the post-closure period. The following items should be included, as applicable:

(1) Groundwater well replacement.

(2) Cover erosion.

(3) Cover subsidence.

(4) Control of vegetation growth.

(5) Control of wild animals (which dig holes in the cover).

(6) Replacement of benchmarks.

d. Finally, the plan must describe, in detail, how any leachate collection/detection system will be operated during the post-closure period. The following items must be included:

(1) Frequency of inspection for leachate, including justification of the selected frequency.

(2) Method of leachate removal and transportation.

(3) Disposition of collected leachate.

(4) Any testing procedures used to test the leachate, including anayltical methods and test parameters.

(5) Documentation procedures to document quality, quantity, and dates leachate was observed and/or removed.

Note: You may wish to submit only conceptual contingent closure and post-closure plans required in items 7 and 8 above at the present. If so, the conceptual plans must state that detailed plans would be submitted within 30 days of submittal of any groundwater monitoring report which indicates that groundwater contamination exists.

9. The closure plan must specify that within 60 days of completion of closure, the owner/operator will submit a closure certification signed by owner/operator and an independent registered professional engineer. (40 CFR 264.115)

Time Schedule: (Page 10)

10. The plan states that use of the neutralization basin as a RCRA-regulated facility will terminate after approval of the closure plan, but it does not specify any time frame. Specify that this time frame will be within 30 days of the approval of the plan. (40 CFR 264.112[b][6])

11. The plan also states that treatment and removal of on-site hazardous waste will be commenced 90 days after termination of use of basin. This is not acceptable. Either provide an explanation why 90 days are necessary or reduce it to less than 30 days. (40 CFR 264.112[b][6])

12. The plan states that the survey plat will be submitted 90 days after closure. It should be submitted no later than the submission of the closure certification. (40 CFR 264.116)

Groundwater Monitoring Plan:

Site Description (Pages 1 and 2)

1. Provide supporting documentation for regional and site-specific geology. Also provide soil boring logs referenced on page 2.

2. Provide a topographic map showing a distance of 1000 feet around the hazardous waste management area at a scale of 1 inch to 200 feet. Contours must be shown on the map with intervals sufficient to clearly show the pattern of surface water flow in the vicinity of and from each operational unit of the facility (e.g., contour intervals of 5 feet if relief is greater than 20 feet or an interval of 2 feet if relief is less than 20 feet). The map should clearly show the following:

   - map scale and date.
   - 100-year floodplain area.
   - orientation of the map.
   - access control (fences, gates)
   - buildings and other structures (recreational areas, access and internal roads, storm, sanitary, and process sewerage systems, fire control facilities, etc.).
   - contours sufficient to show surface water flow.
   - loading and unloading areas.
   - drainage or flood control barriers.
   - hazardous waste units including clean-up areas.
   - runoff control system.

   Also provide a topographic map showing the waste management area and the point of compliance. (40 CFR 265.91)

3. The uppermost aquifer and aquifers hydraulically interconnected beneath the facility should be more clearly defined.

Monitoring Wells (Page 3)

4. Groundwater elevation levels should be intensely monitored within the first well after installation to determine if the wells are tidally influenced. If the assumed "up" and "downgradient" are incorrect, additional well(s) must be installed.

5. The exact depth for the screened interval should be determined after drilling and placed to intersect the groundwater table.

6. A detailed description of the monitoring wells construction data should be submitted after well installation.

The groundwater monitoring plan was also reviewed by our QA/QC staff. Their comment is that your submittal does contain some of the required information, but it is not in conformance with the Department guidelines. By policy, all quality assurance plans must follow the DER-QA-001/85 guidelines. A copy is attached for your reference. Please review this document and prepare a site specific Quality Assurance Project Plan (QAPP) accordingly and submit it for the Department's review and approval. If you have any questions regarding the QAPP, please call Mr. Shekhar A. Melkote at 904/487-0505.

5097-03

E.C.JORDAN ENGINEERS & SCIENTISTS

2571 Executive Center Circle East
Suite 100
Tallahassee, Florida 32301-5001
(904)-656-1293

5097-03

June 8, 1989

Commanding Officer
ATTN: Mr. Greg Benjock (Code: 11423)
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, South Carolina 29411-0068

SUBJECT: Results of Closure Plan Implementation
Neutralization Basin, U.S. Naval Station
Mayport, Florida
Contract N62467-86-D-0174

Dear Mr. Benjock:

On 10 and 11 May 1989 personnel from E.C. Jordan Co. and GKN Hayward Baker, Inc. (slant drilling subcontractor) implemented the soil sampling program for clean closure at the subject site. During this time, no water or bottom sediments were present in either of the two basin cells. Hence, neither surface water nor sediment samples could be collected for laboratory analysis.

The following is a discussion of the procedure and laboratory results of this sampling episode.

PROCEDURE

In accordance with Addendum A to the Closure Plan for the Neutralization Basin at Building 1241, a slant drilling exploration program was undertaken for the purpose of obtaining soil samples for laboratory analysis. Slant borings were advanced under each neutralization basin cell with an Atlas CAPCO Model 601 drilling rig. The angle of boring was 25 degrees from the horizontal which paralleled the side slope of the neutralization basin. At both boring locations, soil samples were collected at the 2.5 to 3.25 foot and 3.75 to 4.5 foot interval below the bottom of basin. The horizontal position of the samples was approximately 16 to 18 feet and 21.5 to 23.5 feet from the east edge of the neutralization basin.

Borings were advanced using an air rotary bit while pneumatically advancing a 3.5 inch O.D. casing behind the bit. When the desired sampling location was reached, the bit was removed and a split-spoon sampler installed. Soil

samples were obtained with a split-spoon sampler which was pneumatically advanced. The split-spoon sampler was decontaminated between samples in accordance with Jordan's Site-Specific Quality Assurance project Plan No. 880007C as approved by the Florida Department of Environmental Regulation on 30 August 1988. In addition, prior to each boring, all downhole equipment was steam cleaned. Upon completion of each boring, the bore holes were grouted to the surface with a neat cement.

Soil samples from the split-spoon sampler were placed in appropriate wide-mouth jars and cooled with ice until shipment to the laboratory. On 11 May 1989 the four soil samples were shipped to Pioneer Laboratory, Inc., Pensacola, Florida for the analysis of pH and toxic metals using the Environmental Protection Agency's (EPA) EP toxicity metals extraction procedure.

RESULTS

Both soil samples collected at the 2-foot interval consisted of a green clay. The two samples collected at the 4-foot interval were a tan-to-brown fine sand with shells.

The laboratory report for the four soil samples is attached. Boring B-1 was advanced under the south cell of the neutralization basin while boring B-2 was advanced under the north cell. Sample results labeled S-1 were obtained at the 2.5- to 3.25-foot interval below the base of the neutralization basin. Soil samples labeled S-2 were obtained from the 3.75- to 4.5-foot interval below the basin.

As noted in the laboratory report, the results of the EP toxicity-metals analysis were all below method detection limits for all four samples. The value of soil pH ranged from 8.18 in sample B-1 S-1 to 9.16 in sample B-2 S-2. Based upon the limited analytical results, it would appear that a lower pH exists in the soils at the 2-foot interval than at the 4-foot interval. The pH results are consistent with the sodic soils as found in this area and do not warrant concern.

RECOMMENDATION

Based upon the results of the laboratory analysis of the four soil samples, it is recommended that a clean closure be finalized with the Florida Department of Environmental Regulation. This recommendation is also supported by the results from the first quarter sampling and analysis of the two in-place groundwater monitoring wells.

It has been the pleasure of the E.C. Jordan Co. in assisting you with the closure plan. If you should have any questions or comments on the material presented in this letter report, please do not hesitate to contact either myself or Mr. R. Michael Nugent, Ph.D., at (904) 656-1293 in Tallahassee, Florida.

Sincerely,

E.C. Jordan Co.

Myron L. Hayden

Myron L. Hayden, Ph.D., P.E.
Engineer-of-Record
Florida Registration No. 34067

cc: Mr. Michael Davenport, U.S. Naval Station, Mayport, Florida (w/enclosure)

Mr. R. Michael Nugent, E.C. Jordan Co., Tallahassee, Florida

Seal

June 8, 1989
Date

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: E.C.JORDAN
10001 2571 EXECUTIVE CENTER CIR
SUITE 100
TALLAHASSEE FL 32301-5001

Lab I.D.#: 89-1671
Order Number: P20118
Order Date: 05/12/89
Sampled By: KEVIN WARNER
Sample Date: 05/10-11
Sample Time: VARIOUS

Project Number: 5097-05
Project Name: NAVAL STATION - MAYPORT
Sample Site: BLDG 1241 NEUTRALIZATION BASIN
Sample Type: SOIL

N/S = Not Submitted

R E S U L T S

reported on the following page(s)

Comments: PPM = Parts Per Million, mg/l. BDL = Below Detection Limits.
Method Reference: SW-846, 3rd Edition, November 1986.

Approved By : W. F. Bowen

Pioneer
PLI LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: E.C.JORDAN
10001

Sample Site: BLDG 1241 NEUTRALIZATION BASIN
Sample Type: SOIL

Lab I.D.#: 89-1671
Order Date: 05/12/89
Sampled By: KEVIN WARNER
Sample Date: 05/1D-11
Sample Time: VARIOUS

Parameter	Units	B-1 S-1 89-1671-1	B-1 S-2 89-1671-2	B-2 S-1 89-1671-3	B-2 S-2 89-1671-4	Detection Limit
PH	UNIT	8.18	8.87	8.64	9.16	

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # EB1010

Pioneer
PLI LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: E.C.JORDAN
10001

Sample Site: BLDG 1241 NEUTRALIZATION BASIN
Sample Type: SOIL

Lab I.D.#: 89-1671
Order Date: 05/12/89
Sampled By: KEVIN WARNER
Sample Date: 05/10-11
Sample Time: VARIOUS

'TOX/METALS

EP TOXICITY-METALS ANALYSIS

Parameter	Units	B-1 S-1 89-1671-1	B-1 S-2 89-1671-2	B-2 S-1 89-1671-3	B-2 S-2 89-1671-4	Detection Limit
SILVER,EPTOX	PPM	BDL	BDL	BDL	BDL	0.50
ARSENIC,EPTOX	PPM	BDL	BDL	BDL	BDL	0.50
BARIUM,EPTOX	PPM	BDL	BDL	BDL	BDL	1.0
CADIUM,EPTOX	PPM	BDL	BDL	BDL	BDL	0.10
CHROMIUM,EPTOX	PPM	BDL	BDL	BDL	BDL	0.50
MERCURY,EPTOX	PPM	BDL	BDL	BDL	BDL	0.01
LEAD,EPTOX	PPM	BDL	BDL	BDL	BDL	0.50
SELENIUM,EPTOX	PPM	BDL	BDL	BDL	BDL	0.20

end of report

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # E81010

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Client: E. C. Jordan

Method of Shipment: Federal express

Bill of Lading/Air Bill # 1963859365

Date Received: 5-12-89

Sample Type: Soil

Pioneer Lab I.D.# 89-1671

Sample					
1	B-1 S-1	11		21	
2	B-1 S-2	12		22	
3	B-2 S-1	13		23	
4	B-2 S-2	14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Is there a chain of custody? (Y) N

Is it a Pioneer Lab chain of custody? Y (N)

Is the chain of custody signed? (Y) N

Is chain of custody complete? (Y) N

Are sample tags present? (Y) N

Do sample tags and chain of custody agree? (Y) N

Were samples received cold? (Y) N

Were any containers broken or leaking? Y (N)

Were samples received within holding time? (Y) N

Were all samples preserved correctly? (Y) N

Extra Information From Bottles

Project Number:

Sampled By:

Sample Site:

Sample Date:

Sample Time:

Sample Type:

Special Instructions

Special turnaround time? _____ Q.C. Level 1 2 3 4 (N)

Bottle Order? (Y) N Purchase Order #: _____

Task Order # _____

- - - - - LIMIT OF LIABILITY - - - - -

PLI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF PLI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS, TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES PLI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

CLIENT NOTIFIED YES ( ) NO (✓)
DATE/TIME:

NOTES: No QC per John H.

INSPECTED BY: Melissa Pope / Pioneer Lab

DATE INSPECTED: 5-12-89

CERTIFICATION NUMBERS: FL LAB ID # 61142 • EPA # FL094 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # E81010

84-1611

CHAIN OF CUSTODY RECORD

PROJECT NO. 5097-05

PROJECT NAME: NAVAL STATION MAYPORT BLDG 1241 NEUTRILIZATION BASIN

SAMPLERS (SIGNATURE)

	STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: PH	SAMPLE TYPE: BTEX/METALS	REMARKS (INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE)
1-	B-1 S-1	5/10/84	15:30			BENEATH NEUTRILIZATION BASIN	1	✓	✓	
2-	B-1 S-2	5/10/84	16:20			"	1	✓	✓	
3-	B-2 S-1	5/11/84	7:20			"	1	✓	✓	
4-	B-2 S-2	5/11/84	8:00			"	1	✓	✓	

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Kevin Warren	5/11/84 16:30	[illegible]	[illegible]		
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE) 5/12/84 1050	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE / TIME	REMARKS	

EC JORDAN CO

E.C.JORDAN ENGINEERS & SCIENTISTS

2571 Executive Center Circle East
Suite 100
Tallahassee, Florida 32301-5001
(904)-656-1293

5097-03

June 2, 1989

Commanding Officer
ATTN: Mr. Greg Benjock (Code: 11423)
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, South Carolina 29411-0068

SUBJECT: Results of First Quarter Sampling
Groundwater Monitoring Plan
Neutralization Basin, U.S. Naval Station
Mayport, Florida
Contract N62467-86-D-0174

Dear Mr. Benjock:

On 25 April 1986 personnel from E.C. Jordan Co. and Environmental Monitoring Corp. (monitoring well/driller subcontractor) implemented the Groundwater Monitoring Plan at the subject site. During the course of the day, two monitoring wells (MPT-11-01 and MPT-11-02) were installed at the locations indicated in Figure 1 (attached). Boring logs and monitoring well construction details for the two wells are attached. Subsequent to monitoring well installations and development, a groundwater sample was collected from each of the new monitoring wells. The two groundwater samples, plus the four QA/QC samples (trip blank, field blank, equipment blank, and duplicate [MPT-11-02]), were shipped, the next day, to Pioneer Laboratory, Inc., Pensacola, Florida for the analysis of 40 CFR 265 Appendix III constituents, 40 CFR 265.92(b)(2) and (3) constituents, and the secondary drinking water parameters.

On 23 May 1989 L.D. Bradley, Land Surveyor, surveyed the elevation of monitoring well measuring points and horizontal position relative to Naval Station Mayport datum. Their report will follow.

RESULTS

The laboratory report on the first quarter groundwater samples plus the QA/QC samples is attached. This data is summarized in Table 1. As can be noted in Table 1, the concentration of the majority of the parameters analyzed for are below Florida Drinking Water Standards. Parameters which exceeded drinking water standards are to be expected in that they reflect

concentrations found in saline waters (e.g., chloride, sulfates, sodium, etc.). In addition, concentrations for those compounds or elements found in sea water were greater in the groundwater sample obtained from monitoring well MPT-11-02. This well is closer to the St. Johns River.

RECOMMENDATION

Based upon the results of the first quarter's sampling event, it is recommended that the subsequent analytical program be limited to pH, special conductance, and 40 CFR 265 Appendix III metals. This recommendation is in keeping with that proposed in the Groundwater Monitoring Plan, dated December 1988.

Should you have any comments on the material presented, you may contact me at (904) 656-1293 in Tallahassee, Florida.

Very truly yours,

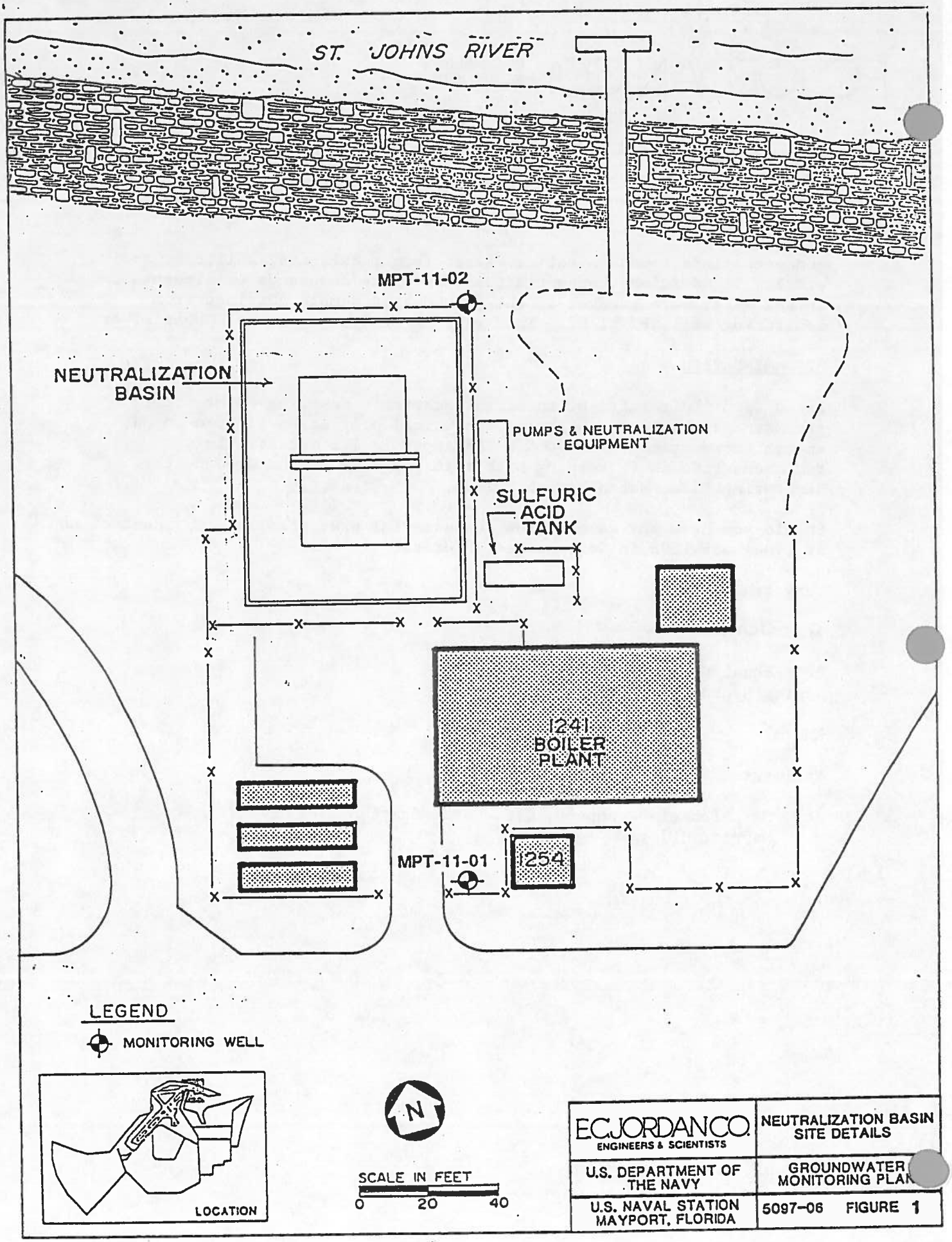
R. MICHAEL NUGENT

R. Michael Nugent, Ph.D.
Senior Hydrologist

RMN/ml

Enclosures

cc: Mr. Michael Davenport, U.S. Naval Station,
Mayport, Florida



ECJORDANCO. ENGINEERS & SCIENTISTS	NEUTRALIZATION BASIN SITE DETAILS
U.S. DEPARTMENT OF THE NAVY	GROUNDWATER MONITORING PLAN
U.S. NAVAL STATION MAYPORT, FLORIDA	5097-06 FIGURE 1

TABLE 1
SUMMARY OF ANALYTICAL RESULTS
FIRST QUARTER SAMPLING
U. S. NAVAL STATION, MAYPORT

PARAMETER	FLORIDA DRINKING STANDARD	MPT-11-0	MPT-11-02	MPT-11-02 (DUP)
		40 CFR 265 APPENDIX III METALS		
Arsenic (mg/l)	0.05	0.007	0.016	0.011
Barium (mg/l)	1.	BDL	BDL	BDL
Cadmium (mg/l)	0.010	0.001	0.002	0.001
Chromium (mg/l)	0.05	BDL	BDL	0.010
Lead (mg/l)	0.05	BDL	0.005	BDL
Mercury (mg/d)	0.002	BDL	BDL	BDL
Selenium (mg/d)	0.01	BDL	BDL	BDL
Silver (mg/l)	0.05	BDL	BDL	BDL
		40 CFR APPENDIX III NON-METALS		
Endrin (ug/l)	0.2	BDL	BDL	BDL
Fluoride (mg/l)	4.0	0.43	1.5	1.5
Lindane (mg/l)	4.	BDL	BDL	BDL
Nitrate-N (mg/l)	10	0.3	BDL	BDL
Methoxychlor (mg/l)	0.1	BDL	BDL	BDL
Toxaphene (ug/l)	5.	BDL	BDL	BDL
2,4-D (mg/l)	0.1	BDL	BDL	BDL
2,4,5-TP (mg/l)	0.01	BDL	BDL	BDL
Radium (pC/l)	5			
Gross Alpha (pC/l)	15			
Coliform Bacteria (CTN/100ml)	1	BDL	BDL	BDL
Turbidity (NTU)		6.2	16	14

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TABLE 1
SUMMARY OF ANALYTICAL RESULTS
FIRST QUARTER SAMPLING
U. S. NAVAL STATION, MAYPORT
(continued)

PARAMETER	FLORIDA DRINKING WATER STANDARD	MPT-11-01	MPT-11-02	MPT-11-02 (DUP)
40 CFR 265.92(b)(2) PARAMETERS				
Chloride (mg/l)	250.	170	1,084	1,734
Iron (mg/l)	0.3	6	4.7	7.3
Manganese (mg/l)	0.05	0.14	0.24	0.32
Phenols (mg/l)		BDL	BDL	BDL
Sodium (mg/l)	160.	144	740	750
Sulfate (mg/l)	250.	412	202	242
40 CFR 265.92(b)(3) PARAMETERS				
pH		7.24	7.31	7.37
Specific Conductance (umho/cm)		1,491	5,630	4,255
Total Organic Carbon (mg/l)		4	5	4
Total Organic Halogen (mg/l)		70	70	70
SECONDARY DRINKING WATER STANDARDS				
Color (color units)	15	30	30	30
Copper (mg/l)	1	BDL	BDL	BDL
Corrosivity (LL.S.I.)		0.44	0.40	0.64
Foaming Agents (mg/l)	0.5	0.027	0.060	0.052
Odor (threshold odor number)	3	1	1	1
Total Dissolved Solids (mg/l)	500	991	3,264	2,343
Zinc		0.08	0.04	0.07

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F01.ML.06.01.89

Florida Department of Environmental Regulation
Northeast District • Suite 200, 7825 Baymeadows Way • Jacksonville, Florida 32256-7577 • 904-448-4300
Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary
Ernest Frey, Deputy Assistant Secretary

September 25, 1990

CERTIFIED - RETURN RECEIPT

Captain Peter Long, Commanding Officer
U.S. Naval Station - Mayport
Post Office Box 265
Mayport, Florida 32228

Dear Captain Long:

RCRA Military [illegible]

U.S. Naval Station - Mayport
FL9 170 024 260
OGC Case No. 87-1128
Duval County - Hazardous Waste

The Department has completed the review of additional information dated September, 1990 and finds it acceptable. With the submittal of this information and four quarter's groundwater reports, the Department has determined that you have complied with paragraphs 12, 13, 14 and 15 of the Consent Order. Pursuant to paragraph 16 of the Consent Order, the Department has determined that there is no significant increase in pH or in any of the 40 CFR 265.92(b)(1) parameters which were required to be sampled. Therefore, the Department requests that you submit a certification of closure, signed both by the facility owner/operator and by an independent professional engineer registered in the State of Florida, pursuant to 40 CFR 265.115.

Pursuant to paragraph 16 of the Consent Order, the certification must be submitted within 30 days of the receipt of this letter.

If you have any questions regarding this letter, please contact me at the letterhead address or telephone number.

Sincerely,

Ashwin B. Patel
Hazardous Waste Supervisor

ABP:jf

cc: James Scarbrough
Satish Kastury
Mike Davenport

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Florida Department of Environmental Regulation

Northeast District • Suite B200, 7825 Baymeadows Way • Jacksonville, Florida 3225(

Lawton Chiles, Governor

Carol M. Browner, Secretary

March 8, 1991

Captain Peter Long
U.S. Naval Station - Mayport
Post Office Box 265
Mayport, Florida 32228

Dear Captain Long:

US Naval Station - Mayport
FL9 170 024 260
Duval County - Hazardous Waste
OGC Case No.: 87-1128

This letter is to inform you that the Department has reviewed your November 26, 1990 closure certification and determined that it meets the requirements of 40 CFR 265.115, as groundwater monitoring at the surface impoundment was conducted pursuant to 40 CFR 265 Subpart F. The Department hereby accepts the certification and also determines that with the submittal of this certification U.S. Mayport has fulfilled all of the requirements of Consent Order No. 87-1128. Termination of the order is effective this day.

EPA promulgated new regulations, after the effective date of the Consent Order, that apply to facilities like yours which closed units pursuant to 40 CFR 265. These new regulations require an equivalency demonstration to show that units closed pursuant to 40 CFR 265 meet the requirements of 40 CFR 264. An equivalency demonstration must be prepared in accordance with 40 CFR 270.1(C) and submitted to EPA for approval because the State of Florida is not authorized for these new regulations.

If you have any questions regarding equivalency demonstration, please contact EPA Region IV permitting section at (404)347-3433. For any questions regarding this letter, please contact Ashwin B. Patel of this office at the letterhead address or telephone number (904)448-4320.

Sincerely,

Ernest E. Frey
Deputy Assistant Secretary

EEF:apb
cc: Satish Kastury
James Scarbrough
Mike Davenport

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

MAY 0 3 1991

4WD-RCRAFFB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

USN Air Station Mayport
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Post Office Box 10068
Attention: Code 18123
Charleston, South Carolina 29411-0068

RE: RCRA Post-Closure Care Permit Requirements
40 CFR §264 - Interim Status Clean Closure Equivalency Standards
EPA I.D. Number FLD 170 024 260

Dear Sirs:

In 1988, you were informed by letter from this Agency, that certain land disposal units at your facility are subject to 40 CFR §270.1(c) clean closure equivalency standards because the units either received hazardous wastes after July 26, 1982, or certified closure, according to 40 CFR Part 265 interim status standards, after January 26, 1983. The referenced letter also requested that we be notified of whether you intend to petition for clean closure equivalency or submit a post-closure Part B permit application to address the subject units.

In response to the 1988 notification, you stated your intent to petition for clean closure equivalency. This letter is to transmit the enclosed guidance materials, prepared by the U.S. Environmental Protection Agency (EPA) - Region IV, outlining the requirements of a closure equivalency demonstration.

All clean closure equivalency demonstrations submitted to EPA Region IV must include, at a minimum, (1) detailed information discussing the procedures used to close each unit for which equivalency is being demonstrated and (2) groundwater data which supports the demonstration. The required groundwater data must be derived from a monitoring system which is capable of detecting releases from the specific units subject to the clean closure equivalency standards. If your present groundwater monitoring system does not have the necessary detection capabilities, you have the alternative of modifying the existing system, or installing a new system if none exists, so that 40 CFR Part 264 groundwater monitoring standards are met. In this case, a proposed groundwater monitoring plan and implementation schedule must also be submitted to EPA for approval.

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Review of the enclosed documents may result in a change in your decision to demonstrate clean closure equivalency. Therefore, we request that you re-notify us within thirty (30) days of receipt of this letter of whether or not you intend to petition for an equivalency determination. Please note that this is not a request for submittal of an equivalency demonstration nor a call for a post-closure Part B permit application. EPA will begin formally calling for submittal of equivalency demonstrations during calendar year 1991; Part B applications will be called at a later date. This is merely a request for information.

Please address your response to:

U.S. Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365
Attention: James H. Scarbrough

If you should have any questions regarding this matter, please contact Susan Zazzali of my staff at (404) 347-3433.

Sincerely yours,

James H. Scarbrough

James H. Scarbrough, P.E., Chief
RCRA & Federal Facilities Branch
Waste Management Division

Enclosures:
1) Guidance document, "Guidance on Demonstrating Equivalence of Part 265 Clean Closures with Part 264 Reouirements", May 12, 1989
2) Copy of EPA - Region IV, Guidance for Preparing Clean Closure Equivalency Demonstrations
3) Copy of 40 CFR §270.1(c)(5) and (6)

cc: Satish Kastury, FDER, Tallahassee
FDER, Jacksonville

5090
Code 18124

10 JUN 1991

James H. Scarborough
U.S. Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, GA 30365

NAVAL STATION MAYPORT, FLORIDA, EQUIVALENCY DEMONSTRATION, EPA I.D. NUMBER FLD 170 024 260

Dear Mr. Scarborough:

The letter from Naval Station Mayport of 3 May 1989 informed you of our intention to submit a petition for an equivalency demonstration for the neutralization pond at the Boiler Plant in Building 1241. Your letter, 4WD-RCRAFFB of 3 May 1991 forwarded additional guidance on preparing a closure equivalency demonstration.

Pursuant to the phone conversation between your Mr. Hugh Hazen and our Ms. Cindy Burns, I am forwarding the following enclosures for your review and recommendation: 1) Groundwater Monitoring Plan; 2) Monitoring Well Construction Details of 2 May 1989; 3) Results of First Quarter Sampling of 2 June 1989; 4) Results of Second Quarter Sampling of 8 August 1989; 5) Results of Third Quarter Sampling of 7 November 1989; 6) Results of Fourth Quarter Sampling of 23 February 1989. The Florida Department of Environmental Regulation determined that our groundwater monitoring at the surface impoundment was conducted in accordance with 40 CFR 265, Subpart F, and that our closure certification met the requirements of 40 CFR 265.115.

As stated in the Groundwater Monitoring Plan, a preliminary meeting was held on 24 July 1987 between the Florida Department of Environmental Regulation and the Navy, where it was determined that because of space limitations, the presence of the new treatment facility, and the location of the site with respect to the St. John's River and the turning basin, two wells were sufficient to perform groundwater sampling in accordance with 40 CFR 265, Subpart F. Florida Department of Environmental Regulations consent Order No. 87-1128 required the installation of one downgradient and one upgradient well. For this reason we request that you review the enclosed information to determine whether or not the existing groundwater monitoring system is sufficient to met the 40 CFR 264 groundwater monitoring standards required for the equivalency demonstration. It is our intention to conduct additional groundwater monitoring tests to check for the presence of 40 CFR 264 Appendix IX constituents.

5090
Code 18124

NAVAL STATION MAYPORT, FLORIDA, EQUIVALENCY DEMONSTRATION, EPA I.D. NUMBER FLD 170 024 260

If you have any questions or comments regarding this matter, please contact Ms. Cindy Burns at (803) 743-0569.

Sincerely,

ELAINE M. MORRISON, P.E.
Manager, Hazardous Waste
Management Section

Encl:
(1) Groundwater Monitoring Plan
(2) Monitoring Well Construction Details of 2 May 1989
(3) Results of First Quarter Sampling of 2 June 1989
(4) Results of Second Quarter Sampling of 8 August 1989
(5) Results of Third Quarter Sampling of 7 November 1989
(6) Results of Fourth Quarter Sampling of 23 February 1989

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4WD-RCRAFFB

OCT 11 1991

Ms. Elaine M. Morrison, P.E., Manager
Hazardous Waste Management Section
Department of Navy
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P. O. Box 10068
Charleston, S.C. 29411-0068

RE: Mayport Naval Station
Equivalency Demonstration - Groundwater Monitoring Plan
EPA I.D. FL9 170 024 260

Dear Ms. Morrison:

We have performed a courtesy review of the Groundwater Monitoring Plan, submitted for the Clean Closure Equivalency Demonstration, for the neutralization pond at the Boiler Plant in Building 1241. Our comments are as follows:

1. The proposed plan recommends only one downgradient monitoring well for the above referenced site. "Space limitation" is cited as a reason for installing only one well. The regulations of 40 CFR § 264.97 require installation of a sufficient number of wells at appropriate locations and depths to yield groundwater samples from the upper most aquifer. The maps submitted to the Environmental Protection Agency (EPA) do not indicate that space limitation will be a limiting factor for installation of additional wells. It is recommended that at least two more hydraulically downgradient monitoring wells be installed at the limit of the waste area.

2. Information about groundwater table elevations at the site should be submitted in order to determine the reliability of water quality samples taken from existing monitoring wells. Specifically, the effect of tidal fluctuations on groundwater elevations beneath the site should be clarified. In addition, the relationship between the fluctuating groundwater elevations and screened intervals of the monitoring wells should be examined and explained.

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3. There is a discrepancy between certain well construction details of the two existing monitoring wells referenced in the E. C. Jordan Co. submittal to Mr. Greg Benjouc, Naval facility Engineering Command on March 2, 1989, and the Groundwater Monitoring Plan. Specifically, the plan called for the wells to be constructed with 6/20 sand pack and 0.015 slotted screen. Instead, the wells were constructed with 20/30 sand pack and 0.001-inch slotted screen. Reasons for these discrepancies should be explained.

4. The equivalency demonstration petition, when submitted, should be consistent with Agency guidance on this topic as provided to you on May 3, 1991, part of which is reiterated below.

I. Site Characterization

a. Facility Description
b. Description of the unit requiring Equivalency Demonstration

II. Demonstration of Compliance with Clean Closure Equivalency Requirements

a. Description of Closure Activities conducted
b. Sampling and Analysis Requirements

1. General Sampling Information
2. Soil Sampling
*3. Groundwater Monitoring
4. Surface Water Sampling (if applicable)
5. Air Emissions (if applicable)

* Groundwater Monitoring plan submitted and reviewed. Refer to comments 1-3 above.

Please note that EPA will have formal comments upon submission of the official equivalency petition. All of the required information should be submitted in a single document.

If you have any questions in this matter, please contact Harry Desai, of my staff, at (404) 347-3433.

Sincerely yours,

James H Scarbrough

James H. Scarbrough, P.E., Chief
RCRA & Federal Facilities Branch
Waste Management Division

cc: Satish Kastury, FDER, Tallahassee, Fl.
Commanding Officer, N422, Mayport, Fl.
Naval Facility Eng. Command (Code 18123), Charleston S.C.
Commander, Naval Surface Force (N912) Norfolk, VA.
Ernest Frey, FDER, Jacksonville, FL. 32256-7577

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

October 16, 1995

Mr. Harold McGill
2155 Eagle Dr., P.O. Box 190010
Department of the Navy Southern Division
Naval Facilities Engineering Command
North Charleston, S.C. 29419-9010

RE: DRAFT EQUIVALENCY DEMONSTRATION NEUTRALIZATION BASIN, SOLID WASTE MANAGEMENT UNIT 12, FL9 170 024 260, DATED MARCH 15, 1995.

Dear Mr. McGill:

Based on the meeting between the Department and the facility on August 22, 1995, the Department has reviewed the additional information found in Resource Conservation and Recovery Act Corrective Action Program General Information Report date July 1995 in support of Mayport's draft Equivalency Demonstration, and generated a revised review comments to replace the earlier ones dated on July 11, 1995.

If you should have any questions, please call Xinlan Liu of my staff at (904)488-0300.

Sincerely,

Satish Kastury, Administrator
Hazardous Waste Regulation

SK/xl

Enclosure

cc (with enclosure):

Kent Williams, EPA/Region IV
Ashwin DEP/ Jacksonville

U.S. NAVAL STATION MAYPORT
FLD FL9 170 024 260
CLEAN CLOSURE EQUIVALENCY DEMONSTRATION PETITION

SPECIFIC COMMENTS

(page/paragraph)

1. 1-1/1: It would be appropriate to identify SWMU 12 as the "Neutralization Basin" that is identified on Figure 1-2. This is not done until 1-1/2.

2. Figure 1-2, Neutralization Basin Site Location Map, is nearly illegible, and has no legend.

3. 1-4/3: The last sentence must be revised since Florida was authorized to process equivalency demonstrations on December 27, 1994.

4. 1-4/6: We presume that the reference here should be 40 CFR Part 264.

5. 1-5/3: This paragraph will need to be changed to reflect that the previous work was done pursuant to a QAPP approved in August 1988 for the "US Naval Station Neutralization Basin at Building 1241". The subsequent sampling was done pursuant to the RFI Workplan.

6. 2-1/2: It might be appropriate to better clarify that the topographic elevation of 11' NGVD is at the top of the basin, and the basin was built below grade as shown in Figure 2-3.

7. 2-5/1 and /2: The discussions about the initial basin, second basin, and the Neutralization basin are confusing. What are the relationships of the initial basin to the second basin and the second basin to the Neutralization basin? On 2-5/2, there is reference to the "initial" basin which we presume is the "first" basin which began operation in early 1971 (see 2-1/4) but this should be verified. It appears that there is enough historical information here but suggest that this section be clarified.

8. 2-13/4: Section 2.3, and Figures 2-8 and 2-9 should use the same nomenclature for the soil samples since there are 3 listed: "B1S1, B1S2...", "First Sample" and "Second Sample" or "S1" and "S2". We suggest the first identifiers be used.

9. 2-16/1: The table on page 2-12 presents detection limit for total medals in the soil analysis, and the text mentions a toxicity analysis. It is not clear if both total metals and toxicity were performed. To meet current Department requirements to demonstrate that no remaining hazardous wastse or constituents are present, the Department requests the facility to take a surface soil sample (0-1 feet) for total metals analysis for the constituents listed in the table. The sample should be collected adjacent to the low point along the edge of the impoundment liner where overtopping of the liner could have occurred. Total metal concentrations will be compared with state cleanup goals for the constituents.

10. 2-17: The Quality Assurance Project Plan (QAPP) approved in August 1988 stated that Analytical Technologies would be doing the laboratory work. However, the raw data in this report shows that CH2MHILL did the Appendix IX work for the January 1993 sampling event. This discrepancy must be clarified.

12 2-20/2: In the last sentence, the MCL for mercury should be 0.0002 mg/L instead of 0.0001 mg/L.

13. 3-14/3: The location of, and construction details for well S-3 must be provided. Installation details need not be provided.

14. 3-19:

a. Beryllium has an MCL of 4 µg/l (Rule 62-550.310, F.A.C.)

b. Copper has an MCL of 1,000 µg/l (Rule 62-550.320, F.A.C.)

c. Lead has an MCL of 15 µg/l (Rule 62-550.310, F.A.C.)

d. Nickel has an MCL of 100 µg/l (Rule 62-550.310, F.A.C.)

e. Zinc has an MCL of 5,000 µg/l (Rule 62-550.320, F.A.C.)

Items not submitted in the Equivalency Demonstration:

15. Appendix A

a. Section 1. There is no brief discussion or list of all units (Solid Waste Management Unit and regulated units) which are or have been at the facility.

b. Figure 3: From which wells did this figure come?

d. DEP Rules 17-XXX were changed to Rules 62-XXX in 1994.

e. Was there ever any overtopping of the basins? Were there inspection records to verify this? Was the area ever flooded during the operation of any of the 3 basins?

f. A Waste analysis from the facility operations is not found in this Clean Closure Equivalency Demonstration Petition.

16. a. Appendix B of the Groundwater Monitoring Plan: Why were the boring logs from monitor wells MPT-9-1, MPT-9-2, and MPT-9-3 included when these wells are not associated with the Neutralization Basin?

b. In table B-3, the t-test is performed. However, Appendix C-6 (Statistics) discusses using different statistical analyses on different parameters based on the numbers of non-detects. In discussion with EPA Region IV, this cannot be done because valid comparisons cannot be made especially if statistical methods for the same parameter change from quarter to quarter. Finally, the monitor wells and numerical values for the various parameters in Appendix C-6 do not match those in Table B-3. If Appendix C-6 is not germane to the equivalency demonstration it should be deleted.

17. a. Appendix C-8, Table C-8: The Appendix IX analysis missed several parameters. This table does not include all of the Appendix IX sampling was conducted. The table should either be revised to include all Appendix IX parameters or deleted. In either case, a summary table with detected Appendix IX parameters must be included.

b. Also, the chain of custody for the Appendix IX is too light (the actual analytical methods at the top of the page cannot be read).

18. No details (i.e., inventory depth; construction details; cones of depression, where applicable; etc.) were submitted on all wells (withdrawal, injection, etc.) within one mile of the Neutralization Basin, if any exist.

Naval Station **MAYPORT**

PROJECT TEAM

MEMORANDUM

DATE: August 29, 1995

TO: Harold McGill, SouthDiv

INFO: Cheryl Mitchell, Mayport
David Driggers, SouthDiv

FROM: Peggy Layne, ABB-ES

SUBJECT: Neutralization Basin CCED
Meeting with FDEP

Attached please find minutes of our meeting with FDEP on August 22 to discuss their comments on the Clean Closure Equivalency Demonstration Petition. Please call me or Frank Lesesne with any questions or comments.

MEETING MINUTES

Date: August 22, 1995

Place: FDEP
Tallahassee FL

Purpose: Discuss FDEP comments dated July 11, 1995, on Clean Closure Equivalency Demonstration Petition for the Neutralization Basin, SWMU 12, Naval Station Mayport, FL

Attendees:

Xinlan Liu	FDEP Tallahassee	904-921-9243
Camille Plautz	FDEP Tallahassee	904-921-9242
Doug Outlaw	FDEP Tallahassee	904-921-9259
Frank Lesesne	ABB-ES	904-656-1293
Peggy Layne	ABB-ES	904-656-1293
Cheryl Mitchell	Naval Station Mayport	904-270-6730
Merlin Russell	FDEP Tallahassee	904-488-0300
Harold McGill	Southern Division	803-743-0659

Discussion:

Merlin Russell opened the meeting and stated that there is no deadline for submittal of the final Clean Closure Equivalency Demonstration Petition. Once the final petition is submitted, the regulatory timeclock begins, so it is to everyone's benefit to get all the issues resolved and make sure that the information is complete prior to submitting the final document.

ABB-ES reviewed the history of the neutralization basin closure, pointing out that closure of the site under interim status standards was approved by FDEP in 1990. Changes to the regulations resulted in the requirement for an Equivalency Demonstration. Little guidance was provided by EPA prior to preparation of draft petition, then the program was delegated to the state. ABB-ES emphasized the Navy's intention to comply with regulatory requirements and expressed concern that the target seems to be moving.

Discussion then centered on FDEP's comments dated July 11, 1995.

Major issues raised in FDEP's comments centered on whether the quality of the data collected for the RFI was acceptable for the CCED, whether total metals analysis in soils would be required, and whether sufficient hydrogeologic data was available for evaluation.

Data Quality

FDEP's QA section reviewed the data validation reports and raised questions about the acceptability of some of the data for the equivalency petition. ABB-ES pointed out that samples

prior to 1990 were analyzed according to the FDEP approved QAPP in effect at the time, while samples collected subsequent to 1990 were analyzed according to the EPA approved QAPP for the RCRA Corrective Action Program at Mayport.

Samples collected after 1990 were analyzed according to SW-846 methodology, but validated against EPA CLP functional guidelines, which have differing requirements. CLP functional guidelines are used by substituting the equivalent tuning, calibration, surrogate, and spike requirements from SW-846 into the CLP decision tree for data quality evaluation. The data collected and validated in this manner for the RCRA Corrective Action Program are considered acceptable for site characterization, risk assessment, and remedial design by EPA.

FDEP agreed to consult with EPA regarding the data quality issues.

Metals Analysis in Soil

Soil samples were analyzed for EP Toxicity and not total metals, an approach that was acceptable to FDEP at the time of the original closure. FDEP pointed out that one of the reasons for the equivalency demonstration requirement was to address such gaps in previous regulations, and in some cases total metals analysis is required for closure. Such requirements are determined on a case by case basis.

FDEP agreed to consider the available information on the neutralization basin and reach a decision regarding the need for total metals in soil. FDEP also noted that soil samples from beneath the neutralization basin would not be required. If additional soil analyses are determined to be necessary, the samples can be collected directly adjacent to the basin.

Hydrogeologic Data

Several FDEP comments requested additional data on the geology and hydrogeology of Mayport and the surrounding area. ABB-ES pointed out that a comprehensive background document, the RCRA Corrective Action Program General Information Report (ABB-ES, July 1995) has been prepared and submitted to FDEP containing data on the geology and hydrogeology of Mayport. The report is available through Jim Cason in FDEP's technical review section.

FDEP agreed to review the General Information Report and determine whether it contains adequate information on site geology and hydrogeology.

Other issues

FDEP noted that the statistical analysis used to compare upgradient and downgradient groundwater quality differed from the original closure documentation and that tables in the text did not appear to correlate with the appendix. FDEP stated that if no analytes were present above MCLs or detection limits then statistical analysis would not be required. ABB-ES agreed to review and clarify the discussion of the statistical analysis in the petition.

Many FDEP comments requested clarification or additional explanation of information presented in the equivalency petition. The Navy agreed to provide written responses to FDEP's comments for review prior to submittal of the final petition.

Action Items

FDEP

1. Discuss data quality issues with EPA.
2. Reach a decision regarding the need for total metals in soil.
3. Review General Information Report to determine whether it presents necessary geology and hydrogeology data.

Navy/ABB-ES

After receiving direction from FDEP on the above three issues, the Navy will prepare a written response to FDEP's comments on the Equivalency Petition for review prior to preparation of the final petition.

APPENDIX B

1988 THROUGH 1990 FIELD INVESTIGATION DATA

Appendix B-1	Boring Logs and Well Construction Details
Appendix B-2	Quality Assurance/Quality Control Summary Analytical Results
Appendix B-3	Laboratory Analytical Data Reports
Appendix B-4	Groundwater Elevation Data

APPENDIX B-1

BORING LOGS AND WELL CONSTRUCTION DETAILS

TITLE: U.S. Naval Station, Mayport, FL	LOG of WELL: MPT-11-MW01S		BORING NO. MPT-11-1
CLIENT: SOUTHERN DIVISION, NAVFACENGCOM			PROJECT NO: 5097-04
CONTRACTOR: MONITOR TESTING		DATE STARTED: 4/25/89	COMPLTD: 4/25/89
METHOD: H.S.A.	CASE SIZE: 2"	SCREEN INT.: 10 - 19.5'	PROTECTION LEVEL: D
TOC ELEV.: 12.16 FEET.	MONITOR INST.: PID	TOT DPTH: 20.0 FEET.	DPTH TO ▽ 10.0 FEET.
LOGGED BY: M. C. Diblin	WELL DEVELOPMENT DATE: 9/22/87		SITE: SWMU 12 (Site 11)

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
							SM	Posthole	
		SS1			Sand- brown and gray ,fine sand with shells		SP	8,10,9,13	
					Sand- tan, fine sand with interlayered shell lenses				
5		SS2			Sand- as above			8,12,11,14	
10		SS3			Sand- as above			8,9,10,7	▽
15									
20		SS4			Sand- gray, fine sand with shells			8,30,14,13	
					Boring Terminated @ 20.0'				
25									

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: U.S. Naval Station, Mayport, FL	LOG of WELL: MPT-11-MW02S	BORING NO. MPT-11-2
CLIENT: SOUTHERN DIVISION, NAVFACENGCOM		PROJECT NO: 5097-05
CONTRACTOR: MONITOR TESTING	DATE STARTED: 4/25/89	COMPLTD: 4/25/89
METHOD: H.S.A.	CASE SIZE: 2"	SCREEN INT.: 7 - 17'
TOC ELEV.: 10.42 FEET.	MONITOR INST.: PID	TOT DPTH: 17.0 FEET.
LOGGED BY: M.C. Diblin	WELL DEVELOPMENT DATE: 9/22/87	SITE: SWMU 12 (Site 11)

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					Sand- brown and tan, fine sand		SM		
							SP		
		SS1			Sand- tan, fine with inter-layered shell lenses			3,2,2,1	
5		SS2						3,2,2,4	
10		SS3						4,6,4,6	
15		SS4			Sand- gray, fine with shells				
					Boring Terminated @ 17.0'				
20									

 ABB ENVIRONMENTAL SERVICES, INC.

APPENDIX B-2

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY ANALYTICAL RESULTS

Table B-2
Summary of Quality Assurance/Quality Control Analytical Results
First Quarter Groundwater Sampling, April 25, 1989

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Parameter	Units	MCLs[1]	Florida Drinking Water Standard[2]	Laboratory Detection Limit	Concentration in Samples		
					EB	FB	TB
40 CFR 265 Appendix III Metals							
Arsenic	mg/ℓ	0.05	0.05	0.001	--	--	--
Barium	mg/ℓ	2	2	0.03	--	--	--
Cadmium	mg/ℓ	0.005	0.005	0.0005	--	--	--
Chromium	mg/ℓ	0.1	0.01	0.01	--	--	--
Lead	mg/ℓ	0.005	0.015	0.001	--	--	--
Mercury	mg/ℓ	0.002	0.002	0.0001	--	--	--
Selenium	mg/ℓ	0.05	0.05	0.01	--	--	--
Silver	mg/ℓ	0.10*	--	0.0001	--	--	--
40 CFR 265 Appendix III Non-Metals							
Endrin	mg/ℓ	0.002	0.002	0.00007	--	--	NA
Fluoride	mg/ℓ	4	4	0.01	0.03	0.03	NA
Lindane	mg/ℓ	0.0002	0.0002	0.0002	--	--	NA
Nitrate-N	mg/ℓ	10	10	0.1	--	--	NA
Methoxychlor	mg/ℓ	0.04	0.04	0.005	--	--	NA
Toxaphene	mg/ℓ	0.003	0.003	0.001	--	--	NA
2,4-D	mg/ℓ	0.07	0.07	0.02	--	--	NA
2,4,5-TP	mg/ℓ	0.05	0.01	0.002	--	--	NA
Radium	Pc/ℓ	20	--	0.0 ± 1.2	--	--	NA
Gross alpha	Pc/ℓ	15	--	1.2 ± 1.3	--	--	NA
Coliform bacteria	CTN/100 mℓ	--	1	1	--	--	NA
Turbidity	NTU	--	--	0.1	--	--	NA
40 CFR 265.92(b)(2) Parameters							
Chloride	mg/ℓ	250	250	1.0	--	--	NA
Iron	mg/ℓ	0.3	0.3	0.02	--	--	--
Manganese	mg/ℓ	0.05	0.05	0.01	--	--	--
Phenols	mg/ℓ	--	--	0.001	--	--	--
Sodium	mg/ℓ	--	160	0.20	--	--	--
Sulfate	mg/ℓ	400/500	250	1.0	2.4	2.4	--

See notes at end of table.

Table B-2 (Continued)
Summary of Quality Assurance/Quality Control Analytical Results
First Quarter Groundwater Sampling
April 25, 1989

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Parameter	Units	MCLs[1]	Florida Drinking Water Standard[2]	Laboratory Detection Limit	Concentration in Samples		
					EB	FB	TB
40 CFR 265.92(b)(3) Parameters							
pH	standard units	6.5 to 8.5	6.5 to 8.5	0.01	5.75	7.37	NA
Specific conductance	µmhos/cm	-	-	0.0	9.4	4.0	NA
Total organic carbon	mg/ℓ	-	-	0.1	-	-	NA
Total organic halogen	mg/ℓ	-	-	0.001	-	-	NA
Secondary Drinking Water Standards							
Color	Color	15	15	5	-	-	NA
Copper	mg/ℓ	1.0	1	0.02	-	-	-
Corrosivity	L.S.I.	-	-	.01	-5.85	-6.14	NA
Foaming agents	mg/ℓ	0.5	0.5	NA	-	-	NA
Odor	Threshold odor number	3	3	1.0	-	-	NA
Total dissolved solids	mg/ℓ	500	500	1	3	3	NA
Zinc	mg/ℓ	[3]5	--	0.01	-	-	-

[1] MCL, maximum contaminant levels, Safe Drinking Water Act (SDWA) 40 Code of Federal Regulation (CFR) Part 141 (May 1993).
[2] Florida Drinking Water Standards (FDWS), Monitoring and Reporting, Title 17 Chapter 17-550 Florida Administrative Code (FAC) (January 1, 1993).
[3] 40 CFR Part 143; National Secondary Drinking Water Standards (May 1993).

Notes:
dup = duplicate.
mg/ℓ = milligrams per liter.
bdl = below detection limits.
EB = equipment blank.
µg/ℓ = micrograms per liter.
µmhos/cm = micromhos per centimeter.
MCL = maximum contaminant levels.
L.S.I. = Langlier's Saturation Index.
FB = field blank.
2,4-D = 2,4-dichlorophenoxyacetic acid.
2,4,5-TP = 2(2,4,5-trichlorophenoxy)propionic acid.
Pc/ℓ = picocuries per liter.
CTN = (total) coliform count.
NTU = nephelometric turbidity units.
-- = below detection limits.
TB = trip blank.
NA = not applicable.

APPENDIX B-3

LABORATORY ANALYTICAL DATA REPORTS

First Quarter Groundwater Sampling Event

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: E.C.JORDAN
10001 2571 EXECUTIVE CENTER CIR
SUITE 100
TALLAHASSEE FL 32301-5001

Lab I.D.#: 89-1477
Order Number: P19789
Order Date: 04/27/89
Sampled By: R. GONZALEZ
Sample Date: 04/25/89
Sample Time: VARIOUS

Project Number: 1575-05
Project Name: MAYPORT - BASIN CLOSURE
Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MJ

N/S = Not Submitted

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
89-1477-1	MPT-11-01	SILVER	PPM	BDL	0.0001
89-1477-2	MPT-11-02	SILVER	PPM	BDL	0.0001
89-1477-3	DUPLICATE	SILVER	PPM	BDL	0.0001
89-1477-4	EQUIPMENT BLANK	SILVER	PPM	BDL	0.0001
89-1477-5	FIELD BLANK	SILVER	PPM	BDL	0.0001
89-1477-6	PLI TRIP BLANK	SILVER	PPM	BDL	0.0001
89-1477-1	MPT-11-01	ARSENIC	PPM	0.007	0.001
89-1477-2	MPT-11-02	ARSENIC	PPM	0.016	0.001
89-1477-3	DUPLICATE	ARSENIC	PPM	0.011	0.001
89-1477-4	EQUIPMENT BLANK	ARSENIC	PPM	BDL	0.001
89-1477-5	FIELD BLANK	ARSENIC	PPM	BDL	0.001
89-1477-6	PLI TRIP BLANK	ARSENIC	PPM	BDL	0.001
89-1477-1	MPT-11-01	BARIUM	PPM	BDL	0.03
89-1477-2	MPT-11-02	BARIUM	PPM	BDL	0.03
89-1477-3	DUPLICATE	BARIUM	PPM	BDL	0.03
89-1477-4	EQUIPMENT BLANK	BARIUM	PPM	BDL	0.03
89-1477-5	FIELD BLANK	BARIUM	PPM	BDL	0.03
89-1477-6	PLI TRIP BLANK	BARIUM	PPM	BDL	0.03
89-1477-1	MPT-11-01	CADMIUM	PPM	0.0010	0.0005*
89-1477-2	MPT-11-02	CADMIUM	PPM	0.0020	0.0005*
89-1477-3	DUPLICATE	CADMIUM	PPM	0.0010	0.0005*
89-1477-4	EQUIPMENT BLANK	CADMIUM	PPM	BDL	0.0001
89-1477-5	FIELD BLANK	CADMIUM	PPM	BDL	0.0001
89-1477-6	PLI TRIP BLANK	CADMIUM	PPM	BDL	0.0001
89-1477-1	MPT-11-01	CHLORIDE	PPM	170	1
89-1477-2	MPT-11-02	CHLORIDE	PPM	1084	1
89-1477-3	DUPLICATE	CHLORIDE	PPM	1734	1
89-1477-4	EQUIPMENT BLANK	CHLORIDE	PPM	BDL	1
89-1477-5	FIELD BLANK	CHLORIDE	PPM	BDL	1
89-1477-1	MPT-11-01	COLOR	C.U.	30	5
89-1477-2	MPT-11-02	COLOR	C.U.	30	5

Comments: PPM =Parts Per Million, mg/l.PPB =Parts Per Billion, ug/l.Method Refs: EPA 600/4-79-020, Revised 3/83 and Fed Reg 40 CFR Part 136, 7/1/88.BDL = Below Detection Limits. * Elevated Detection Limit Due to Matrix Interference.

Approved By : W. F. Bowers

CERTIFICATION NUMBERS: FL LAB ID # 91142 • EPA # FL094 • FDEP # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # E81010

Pioneer
PLI LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: E.C.JORDAN
10001

Lab I.D.#: 89-1477
Order Date: 04/27/89
Sampled By: R. GONZALEZ

Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MJ

Single Tests continued Sample Date: 04/25/89 Time: VARIOUS

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
89-1477-3	DUPLICATE	COLOR	C.U.	30	5
89-1477-4	EQUIPMENT BLANK	COLOR	C.U.	BDL	5
89-1477-5	FIELD BLANK	COLOR	C.U.	BDL	5
89-1477-1	MPT-11-01	CONDUCTIVITY	UMH/CM	1491	0.1
89-1477-2	MPT-11-02	CONDUCTIVITY	UMH/CM	5630	0.1
89-1477-3	DUPLICATE	CONDUCTIVITY	UMH/CM	4255	0.1
89-1477-4	EQUIPMENT BLANK	CONDUCTIVITY	UMH/CM	9.4	0.1
89-1477-5	FIELD BLANK	CONDUCTIVITY	UMH/CM	4.0	0.1
89-1477-1	MPT-11-01	CHROMIUM	PPM	BDL	0.01
89-1477-2	MPT-11-02	CHROMIUM	PPM	BDL	0.01
89-1477-3	DUPLICATE	CHROMIUM	PPM	0.01	0.01
89-1477-4	EQUIPMENT BLANK	CHROMIUM	PPM	BDL	0.01
89-1477-5	FIELD BLANK	CHROMIUM	PPM	BDL	0.01
89-1477-6	PLI TRIP BLANK	CHROMIUM	PPM	BDL	0.01
89-1477-1	MPT-11-01	COPPER	PPM	BDL	0.02
89-1477-2	MPT-11-02	COPPER	PPM	BDL	0.02
89-1477-3	DUPLICATE	COPPER	PPM	BDL	0.02
89-1477-4	EQUIPMENT BLANK	COPPER	PPM	BDL	0.02
89-1477-5	FIELD BLANK	COPPER	PPM	BDL	0.02
89-1477-6	PLI TRIP BLANK	COPPER	PPM	BDL	0.02
89-1477-1	MPT-11-01	FLUORIDE	PPM	0.43	0.01
89-1477-2	MPT-11-02	FLUORIDE	PPM	1.5	0.01
89-1477-3	DUPLICATE	FLUORIDE	PPM	1.5	0.01
89-1477-4	EQUIPMENT BLANK	FLUORIDE	PPM	0.03	0.01
89-1477-5	FIELD BLANK	FLUORIDE	PPM	0.03	0.01
89-1477-1	MPT-11-01	IRON	PPM	6.0	0.02
89-1477-2	MPT-11-02	IRON	PPM	4.7	0.02
89-1477-3	DUPLICATE	IRON	PPM	7.3	0.02
89-1477-4	EQUIPMENT BLANK	IRON	PPM	BDL	0.02
89-1477-5	FIELD BLANK	IRON	PPM	BDL	0.02
89-1477-6	PLI TRIP BLANK	IRON	PPM	BDL	0.02
89-1477-1	MPT-11-01	MERCURY	PPM	BDL	0.0001
89-1477-2	MPT-11-02	MERCURY	PPM	BDL	0.0001
89-1477-3	DUPLICATE	MERCURY	PPM	BDL	0.0001
89-1477-4	EQUIPMENT BLANK	MERCURY	PPM	BDL	0.0001
89-1477-5	FIELD BLANK	MERCURY	PPM	BDL	0.0001
89-1477-6	PLI TRIP BLANK	MERCURY	PPM	BDL	0.0001
89-1477-1	MPT-11-01	METHYLENE BLUE ACTIVE	PPM	0.027	0.025

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # ELC20 • AL LAB ID # 40150 • NIOSH # 32514001 • FL ENV # E81010

Pioneer
PLI LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: E.C.JORDAN
10001

Lab I.D.#: 89-1477
Order Date: 04/27/89
Sampled By: R. GONZALEZ

Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MJ

Single Tests continued Sample Date: 04/25/89 Time: VARIOUS

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
89-1477-2	MPT-11-02	METHYLENE BLUE ACTIVE	PPM	0.060	0.025
89-1477-3	DUPLICATE	METHYLENE BLUE ACTIVE	PPM	0.052	0.025
89-1477-4	EQUIPMENT BLANK	METHYLENE BLUE ACTIVE	PPM	BDL	0.025
89-1477-5	FIELD BLANK	METHYLENE BLUE ACTIVE	PPM	BDL	0.025
89-1477-1	MPT-11-01	MANGANESE	PPM	0.14	0.01
89-1477-2	MPT-11-02	MANGANESE	PPM	0.24	0.01
89-1477-3	DUPLICATE	MANGANESE	PPM	0.32	0.01
89-1477-4	EQUIPMENT BLANK	MANGANESE	PPM	BDL	0.01
89-1477-5	FIELD BLANK	MANGANESE	PPM	BDL	0.01
89-1477-6	PLI TRIP BLANK	MANGANESE	PPM	BDL	0.01
89-1477-1	MPT-11-01	NITROGEN, NITRATE	PPM	0.3	0.1
89-1477-2	MPT-11-02	NITROGEN, NITRATE	PPM	BDL	0.1
89-1477-3	DUPLICATE	NITROGEN, NITRATE	PPM	BDL	0.1
89-1477-4	EQUIPMENT BLANK	NITROGEN, NITRATE	PPM	BDL	0.1
89-1477-5	FIELD BLANK	NITROGEN, NITRATE	PPM	BDL	0.1
89-1477-1	MPT-11-01	SODIUM	PPM	144	0.20
89-1477-2	MPT-11-02	SODIUM	PPM	740	0.20
89-1477-3	DUPLICATE	SODIUM	PPM	750	0.20
89-1477-4	EQUIPMENT BLANK	SODIUM	PPM	BDL	0.20
89-1477-5	FIELD BLANK	SODIUM	PPM	BDL	0.20
89-1477-6	PLI TRIP BLANK	SODIUM	PPM	BDL	0.20
89-1477-1	MPT-11-01	ODOR	T.O.N.	1	1
89-1477-2	MPT-11-02	ODOR	T.O.N.	1	1
89-1477-3	DUPLICATE	ODOR	T.O.N.	1	1
89-1477-4	EQUIPMENT BLANK	ODOR	T.O.N.	1	1
89-1477-5	FIELD BLANK	ODOR	T.O.N.	1	1
89-1477-1	MPT-11-01	LEAD	PPM	BDL	0.010
89-1477-2	MPT-11-02	LEAD	PPM	0.005	0.005
89-1477-3	DUPLICATE	LEAD	PPM	BDL	0.010
89-1477-4	EQUIPMENT BLANK	LEAD	PPM	BDL	0.001
89-1477-5	FIELD BLANK	LEAD	PPM	BDL	0.001
89-1477-6	PLI TRIP BLANK	LEAD	PPM	BDL	0.001
89-1477-1	MPT-11-01	PHENOLS,TOTAL	PPM	BDL	0.001
89-1477-2	MPT-11-02	PHENOLS,TOTAL	PPM	BDL	0.001
89-1477-3	DUPLICATE	PHENOLS,TOTAL	PPM	BDL	0.001
89-1477-4	EQUIPMENT BLANK	PHENOLS,TOTAL	PPM	BDL	0.001
89-1477-5	FIELD BLANK	PHENOLS,TOTAL	PPM	BDL	0.001
89-1477-1	MPT-11-01	SELENIUM	PPM	BDL	0.015*

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # E1020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # E81010

Pioneer
PLI LABORATORY, INC.
11 EAST OLIVE ROAD · PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: E.C.JORDAN
10001

Lab I.D.#: 89-1477
Order Date: 04/27/89
Sampled By: R. GONZALEZ

Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MW

Single Tests continued Sample Date: 04/25/89 Time: VARIOUS

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
89-1477-2	MPT-11-02	SELENIUM	PPM	BDL	0.015*
89-1477-3	DUPLICATE	SELENIUM	PPM	BDL	0.030*
89-1477-4	EQUIPMENT BLANK	SELENIUM	PPM	BDL	0.003
89-1477-5	FIELD BLANK	SELENIUM	PPM	BDL	0.003
89-1477-6	PLI TRIP BLANK	SELENIUM	PPM	BDL	0.003
89-1477-1	MPT-11-01	SULFATE	PPM	412	1.0
89-1477-2	MPT-11-02	SULFATE	PPM	202	1.0
89-1477-3	DUPLICATE	SULFATE	PPM	242	1.0
89-1477-4	EQUIPMENT BLANK	SULFATE	PPM	2.4	1.0
89-1477-5	FIELD BLANK	SULFATE	PPM	2.4	1.0
89-1477-1	MPT-11-01	TOTAL COLIFORM	CNT/100	BDL	1
89-1477-2	MPT-11-02	TOTAL COLIFORM	CNT/100	BDL	1
89-1477-3	DUPLICATE	TOTAL COLIFORM	CNT/100	BDL	1
89-1477-4	EQUIPMENT BLANK	TOTAL COLIFORM	CNT/100	BDL	1
89-1477-5	FIELD BLANK	TOTAL COLIFORM	CNT/100	BDL	1
89-1477-1	MPT-11-01	TURBIDITY	N.T.U.	6.2	0.1
89-1477-2	MPT-11-02	TURBIDITY	N.T.U.	16	0.1
89-1477-3	DUPLICATE	TURBIDITY	N.T.U.	14	0.1
89-1477-4	EQUIPMENT BLANK	TURBIDITY	N.T.U.	0.16	0.1
89-1477-5	FIELD BLANK	TURBIDITY	N.T.U.	0.12	0.1
89-1477-1	MPT-11-01	ZINC	PPM	0.08	0.01
89-1477-2	MPT-11-02	ZINC	PPM	0.04	0.01
89-1477-3	DUPLICATE	ZINC	PPM	0.07	0.01
89-1477-4	EQUIPMENT BLANK	ZINC	PPM	BDL	0.01
89-1477-5	FIELD BLANK	ZINC	PPM	BDL	0.01
89-1477-6	PLI TRIP BLANK	ZINC	PPM	BDL	0.01
89-1477-1	MPT-11-01	TOTAL ORGANIC CARBON	PPM	4	1
89-1477-2	MPT-11-02	TOTAL ORGANIC CARBON	PPM	5	1
89-1477-3	DUPLICATE	TOTAL ORGANIC CARBON	PPM	4	1
89-1477-4	EQUIPMENT BLANK	TOTAL ORGANIC CARBON	PPM	BDL	1
89-1477-5	FIELD BLANK	TOTAL ORGANIC CARBON	PPM	BDL	1
89-1477-1	MPT-11-01	TOTAL ORGANIC HALIDES	PPB	70	10
89-1477-2	MPT-11-02	TOTAL ORGANIC HALIDES	PPB	70	10
89-1477-3	DUPLICATE	TOTAL ORGANIC HALIDES	PPB	70	10
89-1477-4	EQUIPMENT BLANK	TOTAL ORGANIC HALIDES	PPB	BDL	10
89-1477-5	FIELD BLANK	TOTAL ORGANIC HALIDES	PPB	BDL	10

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # ELC20 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # EB1010

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PHONE (904) 474-1001

Client: E.C. JORDAN
10001 2571 EXECUTIVE CENTER CIRCLE
SUITE 100
TALLAHASSEE, FLORIDA 32301-5001

Lab I.D.#: 89-1477R
Order Number: P19857
Order Date: 04/28/89
Sampled By: R. GONZALEZ
Sample Date: 04/25/89
Sample Time: VARIOUS

Project Number: 1575-05
Project Name: MAYPORT - BASIN CLOSURE
Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MJ

N/S = Not Submitted

Lab ID	Sample ID	Parameter	Units	Results
89-1477-1	MPT-11-01	GROSS ALPHA	pCi/l	11.4 ± 8.6
89-1477-1	MPT-11-01	RADIUM 226	pCi/l	0.8 ± 0.1
89-1477-1	MPT-11-01	RADIUM 228	pCi/l	1.7 ± 1.3
89-1477-2	MPT-11-02	GROSS ALPHA	pCi/l	0.0 ± 35.8
89-1477-2	MPT-11-02	RADIUM 226	pCi/l	0.9 ± 0.1
89-1477-2	MPT-11-02	RADIUM 228	pCi/l	0.0 ± 1.2
89-1477-3	DUPLICATE	GROSS ALPHA	pCi/l	9.3 ± 14.7
89-1477-3	DUPLICATE	RADIUM 226	pCi/l	0.3 ± 0.1
89-1477-3	DUPLICATE	RADIUM 228	pCi/l	1.2 ± 1.2
89-1477-4	EQUIPMENT BLANK	GROSS ALPHA	pCi/l	0.0 ± 1.2
89-1477-4	EQUIPMENT BLANK	RADIUM 226	pCi/l	0.2 ± 0.1
89-1477-4	EQUIPMENT BLANK	RADIUM 228	pCi/l	0.7 ± 1.2
89-1477-5	FIELD BLANK	GROSS ALPHA	pCi/l	1.2 ± 1.3
89-1477-5	FIELD BLANK	RADIUM 226	pCi/l	0.2 ± 0.1
89-1477-5	FIELD BLANK	RADIUM 228	pCi/l	0.0 ± 1.1

Note: This analysis was performed by Burmah Technical Services, Inc., Gulfport, Mississippi. Florida Certification Number 87240.

Approved By: John V Hawkins

CERTIFICATION NUMBERS: FL I.D. # 84142 • FDA # FL021 • EPER # FL070 • ALLABID # 40150 • NCSW # 37541 ACOL • FL DAN # E81018

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Client: E.C.JORDAN
10001

Lab I.D.#: 89-1477-1
Order Date: 04/27/89
Sampled By: R. GONZALEZ

Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MJ

Sample ID.: MPT-11-01 Sample Date: 04/25/89 Time: VARIOUS

CORROSIVITY LANGLIER'S SATURATION INDEX

Parameter	Units	Result	Detection Limit
ALKALINITY, AS CACO3	PPM	220	1
HARDNESS	PPM	587	
PH	UNIT	7.24	
TOTAL DISSOLVED SOLIDS	PPM	991	1
CORROSIVITY	L.S.I.	0.44	

Sample ID.: MPT-11-02 Lab I.D.#: 89-1477-2

CORROSIVITY LANGLIER'S SATURATION INDEX

Parameter	Units	Result	Detection Limit
ALKALINITY, AS CACO3	PPM	240	1
HARDNESS	PPM	1400	
PH	UNIT	7.31	
TOTAL DISSOLVED SOLIDS	PPM	3264	1
CORROSIVITY	L.S.I.	0.40	

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # E81010

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Client: E.C.JORDAN
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Lab I.D.#: 89-1477-3
Order Date: 04/27/89
Sampled By: R. GONZALEZ

Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MJ

Sample ID.: DUPLICATE Sample Date: 04/25/89 Time: VARIOUS

CORROSIVITY LANGLIER'S SATURATION INDEX

Parameter	Units	Result	Detection Limit
ALKALINITY, AS CACO3	PPM	235	1
HARDNESS	PPM	1467	
PH	UNIT	7.37	
TOTAL DISSOLVED SOLIDS	PPM	2343	1
CORROSIVITY	L.S.I.	0.64	

Sample ID.: EQUIPMENT BLANK Lab I.D.#: 89-1477-4

CORROSIVITY LANGLIER'S SATURATION INDEX

Parameter	Units	Result	Detection Limit
ALKALINITY, AS CACO3	PPM	1	1
HARDNESS	PPM	BDL	
PH	UNIT	5.75	
TOTAL DISSOLVED SOLIDS	PPM	3	1
CORROSIVITY	L.S.I.	-5.85	

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # E81010

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Client: E.C.JORDAN
10001

Lab I.D.#: 89-1477-5
Order Date: 04/27/89
Sampled By: R. GONZALEZ

Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MJ

Sample ID.: FIELD BLANK Sample Date: 04/25/89 Time: VARIOUS

CORROSIVITY LANGLIER'S SATURATION INDEX

Parameter	Units	Result	Detection Limit
ALKALINITY, AS CACO3	PPM	BDL	1
HARDNESS	PPM	BDL	
PH	UNIT	5.57	
TOTAL DISSOLVED SOLIDS	PPM	3	1
CORROSIVITY	L.S.I.	-6.14	

CERTIFICATION NUMBERS: FL LAB ID # 91142 • EPA # FL094 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # EB1010

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Client: E.C.JORDAN
10001

Lab I.D.#: 89-1477-1
Order Date: 04/27/89
Sampled By: R. GONZALEZ

Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MW

Sample ID.: MPT-11-01 Sample Date: 04/25/89 Time: VARIOUS

DW/PRIMARY DW ORGANICS (17.550) - PESTS/HERBS

Parameter	Units	Result	Detection Limit
ENDRIN	PPM	BDL	0.00007
LINDANE	PPM	BDL	0.0002
METHOXYCHLOR	PPM	BDL	0.005
TOXAPHENE	PPM	BDL	0.001
2,4-D	PPM	BDL	0.02
2,4,5 TP-SILVEX	PPM	BDL	0.002

Sample ID.: MPT-11-02 Lab I.D.#: 89-1477-2

DW/PRIMARY DW ORGANICS (17.550) - PESTS/HERBS

Parameter	Units	Result	Detection Limit
ENDRIN	PPM	BDL	0.00007
LINDANE	PPM	BDL	0.0002
METHOXYCHLOR	PPM	BDL	0.005
TOXAPHENE	PPM	BDL	0.001
2,4-D	PPM	BDL	0.02
2,4,5 TP-SILVEX	PPM	BDL	0.002

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514001 • FL ENV # E81010

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Client: E.C.JORDAN
10001

Lab I.D.#: 89-1477-3
Order Date: 04/27/89
Sampled By: R. GONZALEZ

Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MJ

Sample ID.: DUPLICATE Sample Date: 04/25/89 Time: VARIOUS

DW/PRIMARY DW ORGANICS (17.550) - PESTS/HERBS

Parameter	Units	Result	Detection Limit
ENDRIN	PPM	BDL	0.00007
LINDANE	PPM	BDL	0.0002
METHOXYCHLOR	PPM	BDL	0.005
TOXAPHENE	PPM	BDL	0.001
2,4-D	PPM	BDL	0.02
2,4,5 TP-SILVEX	PPM	BDL	0.002

Sample ID.: EQUIPMENT BLANK Lab I.D.#: 89-1477-4

DW/PRIMARY DW ORGANICS (17.550) - PESTS/HERBS

Parameter	Units	Result	Detection Limit
ENDRIN	PPM	BDL	0.00007
LINDANE	PPM	BDL	0.0002
METHOXYCHLOR	PPM	BDL	0.005
TOXAPHENE	PPM	BDL	0.001
2,4-D	PPM	BDL	0.02
2,4,5 TP-SILVEX	PPM	BDL	0.002

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # E81010

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Client: E.C.JORDAN
10001

Lab I.D.#: 89-1477-5
Order Date: 04/27/89
Sampled By: R. GONZALEZ

Sample Site: JACKSONVILLE
Sample Type: ~~SURFACE WATER~~ GROUNDWATER MJ

Sample ID.: FIELD BLANK Sample Date: 04/25/89 Time: VARIOUS

DW/PRIMARY DW ORGANICS (17.550) - PESTS/HERBS

Parameter	Units	Result	Detection Limit
ENDRIN	PPM	BDL	0.00007
LINDANE	PPM	BDL	0.0002
METHOXYCHLOR	PPM	BDL	0.005
TOXAPHENE	PPM	BDL	0.001
2,4-D	PPM	BDL	0.02
2,4,5 TP-SILVEX	PPM	BDL	0.002

end of report

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514001 • FL ENV # E81010

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QUALITY CONTROL

DATA

Pioneer
LABORATORY, INC.
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PHONE (904) 474-1001

CLIENT: E.C. JORDAN

PROJECT: 1575-05/MAYPORT--BASIN CLOSURE

LAB ID: 89-1477

BATCH: 25

PESTICIDES

LAB ID	CLIENT ID	DATE SAMPLED	DATE RECEIVED	EXTRACTION DATE	ANALYSIS DATE
89-1477-1	MPT-11-01	04-25-89	04-27-89	04-27-89	05-02-89
89-1477-2	MPT-11-02	04-25-89	04-27-89	04-27-89	05-02-89
89-1477-3	DUPLICATE	04-25-89	04-27-89	04-27-89	05-02-89
89-1477-4	EQUIPMT BLANK	04-25-89	04-27-89	04-27-89	05-02-89
89-1477-5	FIELD BLANK	04-25-89	04-27-89	04-27-89	05-02-89

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3E1
PESTICIDE REAGENT WATER SPIKE/SPIKE DUPLICATE RECOVERY

CLIENT: E.C. JORDAN

		EXTRACTION DATE	ANALYSIS DATE
PROJECT NO: 1575-05/MAYPORT--BASIN CLOSURE			
LAB ID: 89-1477	SPIKE	04-26-89	05-01-89
	SPKDUP	04-26-89	05-01-89

METHOD: 25

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	SPIKE CONCENTRATION (ug/L)	SPK % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	20	BDL	14	70	56-123
Heptachlor	20	BDL	13	65	40-131
Aldrin	20	BDL	15	75	40-120
Dieldrin	50	BDL	33	66	52-126
Endrin	50	BDL	40	80	56-121
4,4'-DDT	50	BDL	36	72	38-127

COMPOUND	SPIKE ADDED (ug/L)	SPIKE DUP CONCENTRATION (ug/L)	SD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
gamma-BHC (Lindane)	20	14	70	0	15	56-123
Heptachlor	20	15	75	14	20	40-131
Aldrin	20	17	85	13	22	40-120
Dieldrin	50	34	68	3	18	52-126
Endrin	50	42	84	5	21	56-121
4,4'-DDT	50	33	66	9	27	38-127

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limits
Spike Recovery: 0 out of 12 outside limits

Note: PPB = Parts per billion, ug/l.
BDL = Below detection limits.
Results reported are blank corrected.
Source for quality control is internal laboratory quality assurance program and the method below.

Reference: Federal Register, 40 CFR, Part 136, July 1, 1988.

Pioneer
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CLIENT: E. C. JORDAN

PROJECT: 1575-05/MAYPORT--BASIN CLOSURE

LAB ID: 89-1477

BATCH: 12

HERBICIDES

LAB ID	CLIENT ID	DATE SAMPLED	DATE RECEIVED	EXTRACTION DATE	ANALYSIS DATE
89-1477-1	MPT-11-01	04-25-89	04-27-89	05-01-89	05-04-89
89-1477-2	MPT-11-02	04-25-89	04-27-89	05-01-89	05-04-89
89-1477-3	DUPLICATE	04-25-89	04-27-89	05-01-89	05-04-89
89-1477-4	EQUIPMT BLANK	04-25-89	04-27-89	05-01-89	05-04-89
89-1477-5	FIELD BLANK	04-25-89	04-27-89	05-01-89	05-04-89

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E. C. JORDAN
2571 EXECUTIVE CENTER CIRCLE
SUITE 100
TALLAHASSEE, FL 32301-5001

PROJECT: 1575-05/MAYPORT--BASIN CLOSURE

METHOD: 615

QC LEVEL II

LAB ID: 89-1477

LAB ID	CLIENT ID	EXTRACTION DATE	ANALYSIS DATE
SPIKE		05-01-89	05-04-89
SPIKE DUP		05-01-89	05-04-89
DI BLANK - BDL		05-01-89	05-04-89

REAGENT WATER SPIKE/SPIKE DUPLICATE RECOVERY

PARAMETER	SPIKE RESULT	SPIKE DUPLICATE RESULT	SPIKE EXPECTED VALUE	% REC. SPIKE	% REC. SPIKE DUPLICATE	% REC. CONTROL LIMITS	SPIKE RPD	MAXIMUM RPD
2,4-DICHLOROPHENOXY-ACETIC ACID	55	54	50	110	108	34-136	2	25
2,4,5-TP; SILVEX	6.5	6	5	130	120	30-130	15	25

Note: ppb = parts per billion, ug/l
BDL = below detection limits
Results reported are blank corrected.
Source for control limits is internal laboratory quality assurance program and the reference below.

Reference: Federal Register, 40 CFR, Part 136, July 1, 1988.

CLIENT NAME: E.C. JORDAN
2571 EXECUTIVE CENTER CIRCLE
SUITE 100
TALLAHASSEE, FL 32301

PROJECT NO: 1575-05/MAYPORT--BASIN CLOSURE

QC LEVEL I (INORGANIC)

LAB ID: 89-1477

Pioneer LABORATORY, INC.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

LAB ID	CLIENT ID
89-1477-1	MPT-11-01
89-1477-2	MPT-11-02
89-1477-3	DUPLICATE
89-1477-4	EQUIPMT BLANK
89-1477-5	FIELD BLANK

PARAMETER	PREPARATION DATE	ANALYSIS DATE	BATCH #	METHOD	DETECTION LIMIT	BLANK RESULT	SPIKE SOURCE	SPIKE RECOVERED	SPIKE ADDED	% REC. MATRIX SPIKE	% REC. CONTROL LIMITS	SAMPLE RESULT	SAMPLE DUPLICATE RESULT	RPD	MAX. RPD
SILVER	04-27-89	04-28-89	89-AgS-35	272.2	0.0001	BDL	IN-HOUSE	0.0017	0.0020	85	63-141	BDL	BDL	0	27
ARSENIC	04-27-89	05-01-89	89-AsG-34	206.2	0.001	BDL	IN-HOUSE	0.020	0.022	110	64-136	0.016	0.013	21	27
BARIUM	04-27-89	04-28-89	89-LW-14	200.7	0.1	BDL	IN-HOUSE	0.49	0.50	98	68-128	BDL	BDL	0	15
CADMIUM	04-27-89	05-03-89	89-CdG-33	213.2	0.0005	BDL	IN-HOUSE	0.0020	0.0020	100	38-134	0.0003	0.0003	0	15
CHLORIDE	05-03-89	05-03-89	89-Cl-33	325.3	1	1	IN-HOUSE	54	55	98	89-107	1122	1046	7	22
COLOR	04-28-89	04-28-89	17	110.2	5	N/A	IN-HOUSE	N/A	N/A	N/A	N/A	30	30	0	20
CONDUCT.	04-28-89	04-28-89	17	120.1	0.1	N/A	IN-HOUSE	N/A	N/A	N/A	N/A	2	2	0	8
CHROMIUM	04-27-89	04-28-89	89-LW-14	200.7	0.01	BDL	IN-HOUSE	0.56	0.50	112	80-122	BDL	BDL	0	12
COPPER	04-27-89	04-28-89	89-LW-14	200.7	0.02	BDL	IN-HOUSE	0.55	0.50	110	74-116	BDL	BDL	0	12
FLUORIDE	05-02-89	05-02-89	10	340.2	0.01	0.03	IN-HOUSE	1.00	1.00	100	78-123	0.50	0.53	6	42
IRON	04-27-89	04-28-89	89-LW-14	200.7	0.02	0.03	IN-HOUSE	3.4	1.0	340**	67-121	4.7	4.9	4	12
MERCURY	04-28-89	04-30-89	89-Hg-38	245.1	0.0001	0.0006	IN-HOUSE	0.0062	0.0070	89	48-120	BDL	BDL	0	48
MBAS	04-27-89	04-27-89	89-MBAS-3	425.1	0.025	BDL	N/A	N/A	N/A	N/A	N/A	0.052	0.027	63*	20
MANGANESE	04-27-89	04-28-89	89-LW-14	200.7	0.01	BDL	IN-HOUSE	0.57	0.50	114	68-128	0.05	0.05	0	12
NITRATE	05-04-89	05-04-89	19	353.2	0.1	BDL	IN-HOUSE	1.1	1.0	110	86-115	BDL	BDL	0	8
SODIUM	04-27-89	05-01-89	89-Na-16	200.7	0.2	BDL	IN-HOUSE	5.0	5.0	100	79-116	740	730	1	14
ODOR	04-28-89	04-28-89	17	140.1	1	N/A	N/A	N/A	N/A	N/A	N/A	1	1	0	20
LEAD	04-27-89	04-28-89	89-PbG-98	239.2	0.001	0.002	IN-HOUSE	0.011	0.010	110	57-147	0.003	0.005	50*	18
PHENOLS	04-28-89	04-28-89	89-PHENOL-8	420.1	0.001	BDL	IN-HOUSE	0.116	0.100	116	64-130	BDL	BDL	0	20
SELENIUM	04-27-89	05-03-89	89-SeG-24	270.2	0.003	BDL	IN-HOUSE	0.016	0.020	80	68-134	BDL	BDL	0	24
SULFATE	04-28-89	04-28-89	89-SO_4-1-13	375.4	1	BDL	IN-HOUSE	19	20	95	74-134	BDL	BDL	0	10
TL.COLIF.	04-27-89	04-28-89	04-27-89	909-A	1	BDL	N/A	N/A	N/A	N/A	N/A	BDL	BDL	0	20
TURBIDITY	04-28-89	04-28-89	17	180.1	0.01	BDL	N/A	N/A	N/A	N/A	N/A	0.12	0.12	0	20
ZINC	04-27-89	04-28-89	89-LW-14	200.7	0.01	BDL	IN-HOUSE	0.56	0.50	112	69-117	0.04	0.05	22*	15
ALKALINITY	04-28-89	04-28-89	4	310.1	1	BDL	IN-HOUSE	12.0	12.5	96	78-138	40	36	11	8
HARDNESS	04-28-89	04-28-89	4	130.2	1	BDL	IN-HOUSE	10.5	12.5	84	81-123	17	18	6	11
pH	04-28-89	04-28-89	17	150.1	0.01	N/A	N/A	N/A	N/A	N/A	N/A	5.56	5.57	0.2	2.2
TDS	04-28-89	04-28-89	17	160.1	1	BDL	N/A	N/A	N/A	N/A	N/A	4	2	67*	30

Notes: Results reported in ppm, parts per million, mg/l.
BDL = Below Detection Limit.
Results reported are blank corrected.
Source for control limits is internal laboratory quality assurance program and references below.

* = Sample duplicated ≤ 5x the detection limit.
** = Sample spiked > 10x the detection limit.

Reference: EPA 600/4-79-020, Revised March 1983.

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CLIENT NAME: E.C. JORDAN
2571 EXECUTIVE CENTER CIR.
SUITE 100
TALLAHASSEE, FL 32301

PROJECT #: 1575-05/MAYPORT--BASIN CLOSURE

QC LEVEL I

LAB ID: 89-1477

LAB ID	CLIENT ID
89-1477-1	MPT-11-01
89-1477-2	MPT-11-02
89-1477-3	DUPLICATE
89-1477-4	EQUIPMT BLANK
89-1477-5	FIELD BLANK

PARAMETER	ANALYSIS DATE	METHOD	DETECTION LIMIT	BLANK	SPIKE RESULTS	SPIKE DUPLICATE RESULTS	EXPECTED SPIKE	% REC. SPIKE	% REC. SPIKE DUP.	% REC. CONTROL LIMITS	RPD	MAX RPD
TOH	05-02-89	450.1	10	BDL	9.9	9.3	10.0	99	93	75-125	6	20

Notes: ppm = parts per million mg/l

Source for control limits is internal laboratory quality assurance program and reference below.

References: EPA 600/4-79-020, Revised March, 1983.

89-1417

PAGE 1 OF 2

CHAIN OF CUSTODY RECORD

PROJECT NO.: 1575-05

PROJECT NAME: MAYPORT - BASIN Closure

SAMPLERS (SIGNATURE): Rick Gonzalez

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: Fl, NO_3, Turbidity	App IX. Metals	App IX, Nonmetals	Corrosivity	HBAS	Cu, Zn	Color, Odor TDS	Cl, SO_4	pH, Cond.	N2, Fe, Mn	TOH	TOC	REMARKS: INDICATE SOIL/WATER/AIR SEDIMENT/SLUD
MPT-11-01	4/25	VAR			MAYPORT NAS	12	X	X	X	X	X	X	X	X	X	X	X	X	WATER
TRIP BLANK	4/25					1		X				X				X			

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Rick Gonzalez	4/26 5PM	Federal Express			
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Federal Express		Melissa Pepe Honeywell	4-27-89 1100		
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE / TIME	REMARKS	

89-1477

CHAIN OF CUSTODY RECORD

PROJECT NO.: 1575-05

PROJECT NAME: MAYPORT - BASIN closure

SAMPLERS (SIGNATURE): Rick Gonzalez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Phenols	Radium	Coliform										REMARKS INDICATE SOIL/WATER/AIR SEDIMENT/SLUDG
MPF11-01	4/25	VAR			MAYPORT NAS	3	X	X	X										WATER
TRIP BLANK								X	X										

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATUR
Rick Gonzalez	4/26 5PM	Federal Express			
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATUR
Federal Express		Melissa Pope Honarlab	4-27-89 1100		
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE/TIME	REMARKS	

89-K-07

PAGE 1 OF 2

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
1575-05	MAYPORT-BASIN Closure

SAMPLERS (SIGNATURE): Rick Gonzalez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: FL, NO_3, TURB, DIN	App IX METAL	App IX NON METALS	CORROSIVITY	M BAS	Cu Zn	Color, Odor, TDS	Cl, SO_4	pH Cond	N_2 Fe Mn	TOH	TOC	REMARKS: INDICATE SOIL/WATER/AIR SEDIMENT/SLUDG
2 MPT-11-02	4/25	VAR					X	X	X	X	X	X	X	X	X	X	X	X	
3 DUPLICATE	4/25	VAR					X	X	X	X	X	X	X	X	X	X	X	X	

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Rick Gonzalez	4/26 5PM	Federal Express			
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Federal Express		Melissa Lopez Pioneer Lab	11-27-89 1100		
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE / TIME	REMARKS	

89-1477

PAGE 2 OF 4

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
1575-05	Mayport-Basin Closure

SAMPLERS (SIGNATURE): Rick Gonzalez

	STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: Plutonium	SAMPLE TYPE: Radium	SAMPLE TYPE: Coliform	REMARKS (INDICATE SOIL/WATER/AIR SEDIMENT/SLUDG
2	MPT-11-02	4/25	VAR.			MPT-11-02	3 ea	X	X	X	
3	DUPLICATE	4/25	VAR.			DUPLICATE	3	X	X	X	

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Rick Gonzalez	4/26 | 5PM	Federal Express			
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Federal Express		Melissa Hope Pioneer Lab	4-27-89 1100		
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE / TIME	REMARKS	

89-1477

PAGE 1 OF 2

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
1575-05	Mayport Basin Closure

SAMPLERS (SIGNATURE): Rick Bongaley

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: Fl, NO_3, Turb.	App IV Metals	App IX Non-Metals	Conventionals	H&S	Cu Zn	Color, Odor, TDS	Cl, SO_4	pH, Cond.	N_2, Fe, Mn	TPH	TOC	REMARKS (INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE)
	4/25				EQPT BLANK	11	X	X	X	X	X	X	X	X	X	X	X	X	Water
	4/25				Field BLANK	9/10	X	X	X	X	X	X	X	X	X	X	X	X	Wate

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Rick Bongaley	4/26 5PM	Federal Express			
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Federal Express		Melissa Lopez Pioneer Lab	4-27-89 1100		
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE / TIME	REMARKS	

89-1477

CHAIN OF CUSTODY RECORD

PROJECT NO.: 1575-05

PROJECT NAME: MAYPORT BASINE LOSURE

SAMPLERS (SIGNATURE): Rick Gonzaley

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Phenols	Radium	Coliform	REMARKS INDICATE SOIL/WATER/AIR SEDIMENT/SLUDG
4	4/25	VAR			EQPT. BLANK	3	X	X	X	Water
5	4/25	VAR			Field BLANK	3	X	X	X	Water

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Rick Gonzaley	4/26 5PM	Federal Express			
Federal Express		Melissa Pope Pioneer Lab	4-27-89 1100		

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE/TIME	REMARKS

Pioneer LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Client: E. C. Jordan

Method of Shipment: Federal Express

Bill of Lading/Air Bill #103723-5986

Date Received: 4-27-89 -5990 -6001

Sample Type: Surface Water

Pioneer Lab I.D.# 89-1477

Sample 1	MPT-11-01	11		21	
2	MPT-11-02	12		22	
3	Duplicate	13		23	
4	Equipment Blank	14		24	
5	Field Blank	15		25	
6	Pli Trip Blank	16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Is there a chain of custody?	Y	N
Is it a Pioneer Lab chain of custody?	Y	N
Is the chain of custody signed?	Y	N
Is chain of custody complete?	Y	N
Are sample tags present?	Y	N
Do sample tags and chain of custody agree?	Y	N
Were samples received cold?	Y	N
* Were any containers broken or leaking?	Y	N
Were samples received within holding time?	Y	N
Were all samples preserved correctly?	Y	N

Extra Information From Bottles

Project Number:

Sampled By:

Sample Site:

Sample Date:

Sample Time:

Sample Type:

Special Instructions

Special turnaround time? _____ Q.C. Level 1 2 3 4 N

Bottle Order? Y N Purchase Order #: _____

Task Order # _____

- - - - - LIMIT OF LIABILITY - - - - -

PLI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF PLI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS, TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES PLI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

CLIENT NOTIFIED YES (✓) NO

DATE/TIME: 4-27-89 John Hawkins talked with Mike Nuggent

NOTES: * Duplicate fecal was broken; 1 lamber for MPT-11-01 was broken - No trip blank for fecal or radius. Dup fecal was taken from non-preserved bottle, MPT-11-01 Phenols were spld with TOC.

INSPECTED BY: M Pope / Pioneer Lab

DATE INSPECTED: 4-27-89

Second Quarter Groundwater Sampling Event

Pioneer
PDL LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: C-E ENVIRONMENTAL, INC
10001 2571 EXECUTIVE CENTER CIR
SUITE 100
TALLAHASSEE FL 32301-5001

Lab I.D.#: 89-2472
Order Number: P21305
Order Date: 07/07/89
Sampled By: R. GONZALEZ
Sample Date: 07/06/89
Sample Time: VARIOUS

Project Number: 5097-05
Project Name: BASIN CLOSURE
Sample Site: MAYPORT, N.A.S.
Sample Type: GROUNDWATER

N/S = Not Submitted

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
89-2472-1	MPT-11-01	SILVER	PPM	0.0001	0.0001
89-2472-2	MPT-11-02	SILVER	PPM	BDL	0.0001
89-2472-3	DUP	SILVER	PPM	BDL	0.0001
89-2472-4	FB	SILVER	PPM	BDL	0.0001
89-2472-5	EB	SILVER	PPM	BDL	0.0001
89-2472-6	PLI TRIP BLANK	SILVER	PPM	BDL	0.0001
89-2472-1	MPT-11-01	ARSENIC	PPM	0.008	0.001
89-2472-2	MPT-11-02	ARSENIC	PPM	0.006	0.001
89-2472-3	DUP	ARSENIC	PPM	0.008	0.001
89-2472-4	FB	ARSENIC	PPM	BDL	0.001
89-2472-5	EB	ARSENIC	PPM	BDL	0.001
89-2472-6	PLI TRIP BLANK	ARSENIC	PPM	BDL	0.001
89-2472-1	MPT-11-01	BARIUM	PPM	BDL	0.1
89-2472-2	MPT-11-02	BARIUM	PPM	BDL	0.1
89-2472-3	DUP	BARIUM	PPM	BDL	0.1
89-2472-4	FB	BARIUM	PPM	BDL	0.1
89-2472-5	EB	BARIUM	PPM	BDL	0.1
89-2472-6	PLI TRIP BLANK	BARIUM	PPM	BDL	0.1
89-2472-1	MPT-11-01	CADMIUM	PPM	0.0011	0.0001
89-2472-2	MPT-11-02	CADMIUM	PPM	0.0002	0.0001
89-2472-3	DUP	CADMIUM	PPM	0.0004	0.0001
89-2472-4	FB	CADMIUM	PPM	BDL	0.0001
89-2472-5	EB	CADMIUM	PPM	BDL	0.0001
89-2472-6	PLI TRIP BLANK	CADMIUM	PPM	BDL	0.0001
89-2472-1	MPT-11-01	CHROMIUM	PPM	BDL	0.01
89-2472-2	MPT-11-02	CHROMIUM	PPM	BDL	0.01
89-2472-3	DUP	CHROMIUM	PPM	BDL	0.01
89-2472-4	FB	CHROMIUM	PPM	BDL	0.01
89-2472-5	EB	CHROMIUM	PPM	BDL	0.01
89-2472-6	PLI TRIP BLANK	CHROMIUM	PPM	BDL	0.01
89-2472-1	MPT-11-01	NICKEL	PPM	BDL	0.05

Comments: PPM = Parts Per Million, mg/l. Method Reference: EPA 600/4-79-020, Revised March 1983. BDL = Below Detection Limits. * Elevated Detection Limit Due Matrix Intereference.

Approved By : W. F. Bowen

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: C-E ENVIRONMENTAL, INC
10001

Lab I.D.#: 89-2472
Order Date: 07/07/89
Sampled By: R. GONZALEZ

Sample Site: MAYPORT, N.A.S.
Sample Type: GROUNDWATER

Single Tests continued Sample Date: 07/06/89 Time: VARIOUS

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
89-2472-2	MPT-11-02	NICKEL	PPM	BDL	0.05
89-2472-3	DUP	NICKEL	PPM	BDL	0.05
89-2472-4	FB	NICKEL	PPM	BDL	0.05
89-2472-5	EB	NICKEL	PPM	BDL	0.05
89-2472-6	PLI TRIP BLANK	NICKEL	PPM	BDL	0.05
89-2472-1	MPT-11-01	LEAD	PPM	0.006	0.001
89-2472-2	MPT-11-02	LEAD	PPM	BDL	0.01*
89-2472-3	DUP	LEAD	PPM	0.002	0.001
89-2472-4	FB	LEAD	PPM	BDL	0.001
89-2472-5	EB	LEAD	PPM	BDL	0.001
89-2472-6	PLI TRIP BLANK	LEAD	PPM	BDL	0.001
89-2472-1	MPT-11-01	ANTIMONY	PPM	BDL	0.10
89-2472-2	MPT-11-02	ANTIMONY	PPM	BDL	0.10
89-2472-3	DUP	ANTIMONY	PPM	BDL	0.10
89-2472-4	FB	ANTIMONY	PPM	BDL	0.10
89-2472-5	EB	ANTIMONY	PPM	BDL	0.10
89-2472-6	PLI TRIP BLANK	ANTIMONY	PPM	BDL	0.10
89-2472-1	MPT-11-01	SELENIUM	PPM	BDL	0.003
89-2472-2	MPT-11-02	SELENIUM	PPM	BDL	0.003
89-2472-3	DUP	SELENIUM	PPM	BDL	0.003
89-2472-4	FB	SELENIUM	PPM	BDL	0.003
89-2472-5	EB	SELENIUM	PPM	BDL	0.003
89-2472-6	PLI TRIP BLANK	SELENIUM	PPM	BDL	0.003

end of report

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

QUALITY CONTROL

DATA

CLIENT NAME: C-E ENVIRONMENTAL
2571 EXECUTIVE CENTER CIRCLE
SUITE 100
TALLAHASSEE, FL 32301

PROJECT NO: 5097-05/MAYPORT--BASIN CLOSURE

QC LEVEL I (INORGANIC)

LAB ID: 89-2472-

Pioneer LABORATORY, INC.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

LAB ID	CLIENT ID
89-2472-1	MPT-11-01
89-2472-2	MPT-11-02
89-2472-3	DUP
89-2472-4	FB
89-2472-5	EB
89-2472-6	TRIP BLANK

PARAMETER	PREPARATION DATE	ANALYSIS DATE	BATCH #	METHOD	DETECTION LIMIT	BLANK RESULT	SPIKE SOURCE	SPIKE RECOVERED	SPIKE ADDED	% REC. MATRIX SPIKE	% REC. CONTROL LIMITS	SAMPLE RESULT	SAMPLE DUPLICATE RESULT	RPD	MAX. RPD
SILVER	07-12-89	07-12-89	89-AgG-60	272.2	0.0001	0.0001	IN-HOUSE	0.0022	0.0020	100	63-141	0.0001	BDL	0	27
ARSENIC	07-12-89	07-12-89	89-AsS-57	206.2	0.001	0.005	IN-HOUSE	0.022	0.020	110	64-136	BDL	BDL	0	27
BARIUM	07-12-89	07-19-89	89-LW-46	200.7	0.1	BDL	IN-HOUSE	0.46	0.50	92	68-128	BDL	BDL	0	15
CADMIUM	07-12-89	07-12-89	89-CdG-64	213.2	0.0001	BDL	IN-HOUSE	0.0019	0.0020	95	68-134	BDL	BDL	0	15
CHROMIUM	07-12-89	07-19-89	89-LW-46	200.7	0.01	BDL	IN-HOUSE	0.51	0.50	102	80-122	BDL	BDL	0	12
NICKEL	07-12-89	07-19-89	89-LW-46	200.7	0.05	BDL	IN-HOUSE	1.01	1.00	101	67-127	BDL	BDL	0	17
LEAD	07-12-89	07-12-89	89-PbG-159	239.2	0.001	BDL	IN-HOUSE	0.012	0.010	120	57-147	0.001	0.001	0	18
ANTIMONY	07-12-89	07-19-89	89-LW-46	200.7	0.1	BDL	IN-HOUSE	1.4	1.0	140*	60-120	BDL	BDL	0	15
SELENIUM	07-12-89	07-12-89	89-SeG-38	270.1	0.003	BDL	IN-HOUSE	0.021	0.020	105	68-134	BDL	BDL	0	24

Notes: Results reported in ppm, parts per million, mg/l. * = MATRIX INTERFERENCE
BDL = Below Detection Limit.
Results reported are blank corrected.
Source for control limits is internal laboratory quality assurance program and references below.

Reference: EPA 600/4-79-020, Revised March 1983.

PAGE

CHAIN OF CUSTODY RECORD 89-2472

PROJECT NO. 5097-05

PROJECT NAME: MAYPORT N.A.S. - BASIN closure

SAMPLERS (SIGNATURE): Richard Gonzalez

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: APPX. III METALS	REMARKS: INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE
MPT-11-01	7-6-89	10:30		✓	NEUTRALIZATION	1	✓	1
MPT-11-02	7-6-89	11:10		✓	BASIN - MAYPORT N.A.S	1	✓	2
DUP.	7-6-89	—		✓	"	1	✓	3
FB	7-6-89	10:45		✓	"	1	✓	4
EB	7-6-89	10:45		✓	"	1	✓	5
TB	7-6-89	—		✓	"	1	✓	6

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Richard Gonzalez	7-6-89 4PM	Federal Express			
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
	5/07/89 1115	[illegible] Pioneer Lab			
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE / TIME	REMARKS	

E.C.JORDAN CO.

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Client: EC Jordan

Method of Shipment: Fed Ex

Bill of Lading/Air Bill #: 2784785275

Date Received: 07/07/89

Sample Type: gr. water

Pioneer Lab I.D.# 89-2472

Sample					
1	MPT1102	11		21	
2	MPT1102	12		22	
3	DUP	13		23	
4	FB	14		24	
5	EB	15		25	
6	pltrip	16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Is there a chain of custody? (Y) N

Is it a Pioneer Lab chain of custody? Y (N)

Is the chain of custody signed? (Y) N

Is chain of custody complete? (Y) N

Are sample tags present? (Y) N

Do sample tags and chain of custody agree? (Y) N

Were samples received cold? (Y) N

Were any containers broken or leaking? Y (N)

Were samples received within holding time? (Y) N

Were all samples preserved correctly? (Y) N

Extra Information From Bottles

Project Number:

Sampled By:

Sample Site:

Sample Date:

Sample Time:

Sample Type:

Special Instructions

Special turnaround time? 10

Q.C. Level (1) 2 3 4 N

Bottle Order? (Y) N

Purchase Order #: 6016--00

Task Order #

- - - - - LIMIT OF LIABILITY - - - - -

PLI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF PLI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS, TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES PLI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

CLIENT NOTIFIED YES ( ) NO (X)

DATE/TIME:

NOTE:

INSPECTED BY: Patricia Holston/Pioneer

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: C-E ENVIRONMENTAL, INC
10001 2571 EXECUTIVE CENTER CIR
SUITE 100
TALLAHASSEE FL 32301-5001

Lab I.D.#: 89-2472A
Order Number: P22088
Order Date: 08/07/89
Sampled By: R. GONZALEZ
Sample Date: 07/06/89
Sample Time: VARIOUS

Project Number: 5097-05
Project Name: BASIN CLOSURE
Sample Site: MAYPORT, N.A.S.
Sample Type: GROUNDWATER

N/S = Not Submitted

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
89-2472A-1	MPT-11-01	MERCURY	PPM	BDL	0.0001
89-2472A-2	MPT-11-02	MERCURY	PPM	0.0001	0.0001
89-2472A-3	DUPLICATE	MERCURY	PPM	BDL	0.0001
89-2472A-4	FIELD BLANK	MERCURY	PPM	BDL	0.0001
89-2472A-5	RINSATE BLANK	MERCURY	PPM	BDL	0.0001
89-2472A-6	TRIP BLANK	MERCURY	PPM	BDL	0.0001

Comments: PPM = Parts Per Million, mg/l; BDL = Below Detection Limit.
Method Reference: EPA 600/4-79-020, Revised March 1983.

Approved By : John J Hawkins

end of report

CHAIN OF CUSTODY RECORD

PAGE ___ OF ___

PROJECT NO. 5097-05

PROJECT NAME PANTEX N.A.S. - BASIN closure

SAMPLERS (SIGNATURE) Richard Hayley

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: APPX. III METALS	REMARKS: INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE
MFT-11-C	7-6-89	10:30		✓	NEUTRALIZATION	1	✓	
MFT-11-C2	7-6-89	11:10		✓	BASIN - MATPORT N.A.S.	1	✓	
DUP.	7-6-89	—		✓	"	1	✓	
FB	7-6-89	10:45		✓	"	1	✓	
EB	7-6-89	10:48		✓	"	1	✓	
TB	7-6-89	—		✓	"	1	✓	

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Richard Hayley	7-6-89 | 4PM	Federal Express
[illegible]ISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
[illegible]BY: (SIGNATURE)	DATE / TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)

DATE / TIME | REMARKS

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Pioneer Lab I.D.# 89-2472

ient: E.C. Jordan
thod of Shipment Fedex
ll of Lading/Air Bill # 2784785275
te Received: 07/07/89
mple Type: gr. water

Sample 1	MPT1102	11		21	
2	MPT1102	12		22	
3	DUP	13		23	
4	EB	14		24	
5	EB	15		25	
6	ditrip	16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

there a chain of custody? ..	(Y) N
it a Pioneer Lab chain of stody?	Y (N)
the chain of custody signed?	(Y) N
chain of custody complete?	(Y) N
e sample tags present?	(Y) N
sample tags and chain of stody agree?	(Y) N
re samples received cold?	(Y) N
ny containers broken or g?	Y (N)
re samples received within lding time?	(Y) N
re all samples preserved rrectly?	(Y) N

Extra Information From Bottles

Project Number: _____
Sampled By: _____
Sample Site: _____
Sample Date: _____
Sample Time: _____
Sample Type: _____

Special Instructions

Special turnaround time? no
Q.C. Level (1) 2 3 4 N
Bottle Order? (Y) N
Purchase Order #: 60016--CO
Task Order # _____

- - - - - LIMIT OF LIABILITY - - - - -

PLI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF PLI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS, TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES PLI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

LIENT NOTIFIED YES ( ) NO (X)
ATE/TIME: _____
OTES: _____

INSPECTED BY: Patricia Holston Pioneer Lab
DATE INSPECTED: 07/07/89

Third Quarter Groundwater Sampling Event

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: C-E ENVIRONMENTAL, INC
10001 2571 EXECUTIVE CENTER CIR
SUITE 100
TALLAHASSEE FL 32301-5001

Lab I.D.#: 89-4220
Order Number: P23986
Order Date: 10/16/89
Sampled By: E. BLOMBERG
Sample Date: 10/10/89
Sample Time: VARIOUS

Project Number: 5097-05
Project Name: N/S
Sample Site: VARIOUS SITES
Sample Type: WATER

N/S = Not Submitted

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
89-4220-1	MPT-11-02	SILVER	PPM	BDL	0.0001
89-4220-2	MPT-11-02D	SILVER	PPM	BDL	0.0001
89-4220-3	MPT-11-01	SILVER	PPM	BDL	0.0001
89-4220-4	TRIP BLANK	SILVER	PPM	BDL	0.0001
89-4220-1	MPT-11-02	ARSENIC	PPM	0.004	0.001
89-4220-2	MPT-11-02D	ARSENIC	PPM	0.004	0.001
89-4220-3	MPT-11-01	ARSENIC	PPM	BDL	0.001
89-4220-4	TRIP BLANK	ARSENIC	PPM	BDL	0.001
89-4220-1	MPT-11-02	BARIUM	PPM	BDL	0.1
89-4220-2	MPT-11-02D	BARIUM	PPM	BDL	0.1
89-4220-3	MPT-11-01	BARIUM	PPM	BDL	0.1
89-4220-4	TRIP BLANK	BARIUM	PPM	BDL	0.1
89-4220-1	MPT-11-02	CADMIUM	PPM	BDL	0.0001
89-4220-2	MPT-11-02D	CADMIUM	PPM	BDL	0.0001
89-4220-3	MPT-11-01	CADMIUM	PPM	0.010	0.0001
89-4220-4	TRIP BLANK	CADMIUM	PPM	BDL	0.0001
89-4220-1	MPT-11-02	CHROMIUM	PPM	BDL	0.01
89-4220-2	MPT-11-02D	CHROMIUM	PPM	BDL	0.01
89-4220-3	MPT-11-01	CHROMIUM	PPM	BDL	0.01
89-4220-4	TRIP BLANK	CHROMIUM	PPM	BDL	0.01
89-4220-1	MPT-11-02	MERCURY	PPM	0.0001	0.0001
89-4220-2	MPT-11-02D	MERCURY	PPM	BDL	0.0001
89-4220-3	MPT-11-01	MERCURY	PPM	BDL	0.0001
89-4220-4	TRIP BLANK	MERCURY	PPM	BDL	0.0001
89-4220-1	MPT-11-02	SODIUM	PPM	115	0.20
89-4220-2	MPT-11-02D	SODIUM	PPM	115	0.20
89-4220-3	MPT-11-01	SODIUM	PPM	26	0.20
89-4220-4	TRIP BLANK	SODIUM	PPM	BDL	0.20
89-4220-1	MPT-11-02	LEAD	PPM	BDL	0.001
89-4220-2	MPT-11-02D	LEAD	PPM	BDL	0.001
89-4220-3	MPT-11-01	LEAD	PPM	0.002	0.001

Comments: PPM = Parts Per Million, mg/l; BDL = Below Detection Limit.
Method Reference: EPA 600/4-79-020, Revised March 1983.

Approved By : John UHawkins

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: C-E ENVIRONMENTAL, INC
10001

Lab I.D.#: 89-4220
Order Date: 10/16/89
Sampled By: E. BLOMBERG

Sample Site: VARIOUS SITES
Sample Type: WATER

Single Tests continued Sample Date: 10/10/89 Time: VARIOUS

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
89-4220-4	TRIP BLANK	LEAD	PPM	BDL	0.001
89-4220-1	MPT-11-02	SELENIUM	PPM	BDL	0.003
89-4220-2	MPT-11-02D	SELENIUM	PPM	BDL	0.003
89-4220-3	MPT-11-01	SELENIUM	PPM	BDL	0.003
89-4220-4	TRIP BLANK	SELENIUM	PPM	BDL	0.003

end of report

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

QUALITY CONTROL DATA

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

CLIENT: C-E ENVIRONMENTAL, INC.

PROJECT: 5097-05

LAB ID: 89-4220

INORGANICS

LAB ID	CLIENT ID	DATE SAMPLED	DATE RECEIVED
89-4220-1	MPT-11-02	10-10-89	10-16-89
89-4220-2	MPT-11-02D	10-10-89	10-16-89
89-4220-3	MPT-11-01	10-10-89	10-16-89
89-4220-4	TRIP BLANK		10-16-89

Pioneer
PLI LABORATORY, INC.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

CLIENT NAME: C-E ENVIRONMENTAL, INC.

PROJECT NO: 5097-05

QC LEVEL I (INORGANIC)

LAB ID: 89-4220

PARAMETER	PREPARATION DATE	ANALYSIS DATE	BATCH #	METHOD	DETECTION LIMIT	BLANK RESULT	SPIKE SOURCE	SPIKE RECOVERED	SPIKE ADDED	% REC. MATRIX SPIKE	% REC. CONTROL LIMITS	SAMPLE RESULT	SAMPLE OUPLICATE RESULT	RPD	MAX. RPD
SILVER	10-17-89	10-18-89	89-AgG-100	272.2	0.0001	BDL	IN-HOUSE	0.0022	0.0020	110	63-141	BDL	BDL	0	27
ARSENIC	10-17-89	10-17-89	89-AsG-92	206.2	0.001	BDL	IN-HOUSE	0.023	0.020	115	64-136	BDL	0.001	NC*	27
BARIUM	10-17-89	10-23-89	89-LW-91	200.7	0.1	BDL	IN-HOUSE	0.49	0.50	99	68-128	BDL	BDL	0	15
CADMIUM	10-17-89	10-19-89	89-CdG-110	213.2	0.0001	BDL	IN-HOUSE	0.0022	0.0020	110	68-134	BDL	BDL	0	15
CHROMIUM	10-17-89	10-23-89	89-LW-91	200.7	0.01	BDL	IN-HOUSE	0.48	0.50	96	80-122	BDL	BDL	0	12
MERCURY	10-17-89	10-17-89	89-Hg-84	245.1	0.0001	0.0002	IN-HOUSE	0.0070	0.0070	100	48-120	BDL	BDL	0	48
SODIUM	10-17-89	10-23-89	89-NA-34	200.7	0.20	BDL	IN-HOUSE	8.0	10.0	80	79-116	38	37	3	14
LEAD	10-17-89	10-17-89	89-PbG-261	239.2	0.001	BDL	IN-HOUSE	0.007	0.010	70	57-147	BDL	BDL	0	18
SELENIUM	10-17-89	10-18-89	89-SeG-67	270.2	0.003	BDL	IN-HOUSE	0.014	0.020	70	68-134	BDL	BDL	0	24

NOTES: PPM = Parts Per Million, mg/l
BDL = Below Detection Limit
Results reported are blank corrected.
Source for control limits is internal laboratory quality assurance program and references below.
*NON CALCULABLE OUE TO ONE SAMPLE RESULTING IN BDL.

REFERENCE: EPA-600/4-79-020, Revised March, 1983.

Pioneer
LABORATORY, INC
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Client: C-E ENVIRON
Method of Shipment FEDEX
Bill of Lading/Air Bill # 5066351824
Date Received: 10/16/34
Sample Type: GW water

Pioneer Lab I.D.# 34-4220

Sample 1	MPT-11-02	11		21	
2	MPT-11-02D	12		22	
3	MPT-11-01	13		23	
4	trip	14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Is there a chain of custody?	(Y) N
Is it a Pioneer Lab chain of custody?	Y (N)
Is the chain of custody signed?	(Y) N
Is chain of custody complete?	(Y) N
Are sample tags present?	(Y) N
Do sample tags and chain of custody agree?	(Y) N
Were samples received cold?	(Y) N
Are any containers broken or leaking?	Y (N)
Were samples received within holding time?	(Y) N
Were all samples preserved correctly?	(Y) N

Extra Information From Bottles

Project Number: _____
Sampled By: _____
Sample Site: _____
Sample Date: _____
Sample Time: _____
Sample Type: _____

Special Instructions

Special turnaround time? 10/23
Q.C. Level (1) 2 3 4 N
Bottle Order? (Y) N
Purchase Order #: 5007-05
Task Order # _____

- - - - - LIMIT OF LIABILITY - - - - -

PLI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF PLI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS, TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES PLI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

CLIENT NOTIFIED YES ( ) NO (✓)
DATE/TIME: _____

NOTES: _____

INSPECTED BY: [signature]
DATE INSPECTED: 10/16/34

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
509705	NAVY · MAYPORT CLOSURE

SAMPLERS (SIGNATURE): [signature]

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: 5/OCTR 265 [illegible]	REMARKS: INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE
[illegible]-11-02	10-[illegible]	[illegible]		X	MPT-11-02	1	X	WATER
[illegible]-11-02	10/10	10:55		X	MPT-11-02	1	X	
[illegible]-01	10/10	10:55		X	MPT-11-01	1	X	

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
[signature]	10/OCT/25 1700	R. M. NUGENT	R MICHAEL NUGENT		
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE/TIME	REMARKS

E.C.JORDAN CO.

9940

ANALYSIS REQUEST FORM

T INFORMATION: NAME NAVY

COMPANY

MAILING ADDRESS

PURCHASE ORDER/JOB NUMBER 5097-05

WHERE TO SEND REPORT: ☐ DIRECTLY TO CLIENT

☒ ECJ - NAME R. MICHAEL NUGENT

ANALYSES REQUESTED BY: R. M. NUGENT
TECHNICAL PROJECT MANAGER

APPROVED BY: R. M. NUGENT
PROJECT MANAGER

DATE RECEIVED
LAB LOCATION
RESULTS DUE
CLIENT I.D. NO.

☐ SOLID WASTE DATA FILE
☐ DATA DOCUMENTATION REQUIRED
☐ ENTERED IN COMPUTER

TYPE OF SAMPLE GW
LIST ANY HAZARDS

☐ SPECIAL PROCEDURE

☐ FILTERED IN FIELD ☒ NON-FILTERED

ADDITIONAL INFORMATION OR SPECIAL PROCEDURES:

SAMPLE IDENTIFICATION	LAB NUMBERS	DATE SAMPLED	SAMPLED BY	ANALYSES REQUIRED
MPT-11-02		10 OCT 89	EB	40 CFR 265, APPENDIX III METALS
MPT-11-02D		10 OCT 89	EB	"
MPT-11-01		10 OCT 89	EB	"
TRIP BLANK				"

Fourth Quarter Groundwater Sampling Event

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: C-E ENVIRONMENTAL, INC
10001 2571 EXECUTIVE CENTER CIR
SUITE 100
TALLAHASSEE FL 32301-5001

Lab I.D.#: 90-0095
Order Number: P26086
Order Date: 01/08/90
Sampled By: HARRY HOOPER
Sample Date: 01/04/90
Sample Time: VARIOUS

Project Number: 5097-05
Project Name: NAVAL STATION-MAYPORT
Sample Site: MONITOR WELLS
Sample Type: GROUNDWATER

N/S = Not Submitted

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
90-0095-1	MPT-11-02	SILVER	PPM	BDL	0.0001
90-0095-2	MPT-11-01	SILVER	PPM	BDL	0.0001
90-0095-3	DUPLICATE	SILVER	PPM	BDL	0.0001
90-0095-4	EQUIP BLANK	SILVER	PPM	BDL	0.0001
90-0095-5	FIELD BLANK	SILVER	PPM	BDL	0.0001
90-0095-6	TRIP BLANK	SILVER	PPM	BDL	0.0001
90-0095-1	MPT-11-02	ARSENIC	PPM	0.012	0.001
90-0095-2	MPT-11-01	ARSENIC	PPM	0.005	0.001
90-0095-3	DUPLICATE	ARSENIC	PPM	0.007	0.001
90-0095-4	EQUIP BLANK	ARSENIC	PPM	BDL	0.001
90-0095-5	FIELD BLANK	ARSENIC	PPM	BDL	0.001
90-0095-6	TRIP BLANK	ARSENIC	PPM	BDL	0.001
90-0095-1	MPT-11-02	BARIUM	PPM	BDL	0.1
90-0095-2	MPT-11-01	BARIUM	PPM	BDL	0.1
90-0095-3	DUPLICATE	BARIUM	PPM	BDL	0.1
90-0095-4	EQUIP BLANK	BARIUM	PPM	BDL	0.1
90-0095-5	FIELD BLANK	BARIUM	PPM	BDL	0.1
90-0095-6	TRIP BLANK	BARIUM	PPM	BDL	0.1
90-0095-1	MPT-11-02	CADMIUM	PPM	0.0003	0.0001
90-0095-2	MPT-11-01	CADMIUM	PPM	0.0007	0.0001
90-0095-3	DUPLICATE	CADMIUM	PPM	0.0005	0.0001
90-0095-4	EQUIP BLANK	CADMIUM	PPM	BDL	0.0001
90-0095-5	FIELD BLANK	CADMIUM	PPM	BDL	0.0001
90-0095-6	TRIP BLANK	CADMIUM	PPM	BDL	0.0001
90-0095-1	MPT-11-02	CHROMIUM	PPM	BDL	0.01
90-0095-2	MPT-11-01	CHROMIUM	PPM	BDL	0.01
90-0095-3	DUPLICATE	CHROMIUM	PPM	BDL	0.01
90-0095-4	EQUIP BLANK	CHROMIUM	PPM	BDL	0.01
90-0095-5	FIELD BLANK	CHROMIUM	PPM	BDL	0.01
90-0095-6	TRIP BLANK	CHROMIUM	PPM	BDL	0.01
90-0095-1	MPT-11-02	NICKEL	PPM	BDL	0.05

Comments: PPM = Parts Per Million, mg/l; BDL = Below Detection Limit.
Method Reference: EPA 600/4-79-020, Revised March 1983.

Approved By : John V Hawkins

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: C-E ENVIRONMENTAL, INC
10001

Lab I.D.#: 90-0095
Order Date: 01/08/90
Sampled By: HARRY HOOPER

Sample Site: MONITOR WELLS
Sample Type: GROUNDWATER

Single Tests continued Sample Date: 01/04/90 Time: VARIOUS

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
90-0095-2	MPT-11-01	NICKEL	PPM	BDL	0.05
90-0095-3	DUPLICATE	NICKEL	PPM	BDL	0.05
90-0095-4	EQUIP BLANK	NICKEL	PPM	BDL	0.05
90-0095-5	FIELD BLANK	NICKEL	PPM	BDL	0.05
90-0095-6	TRIP BLANK	NICKEL	PPM	BDL	0.05
90-0095-1	MPT-11-02	LEAD	PPM	BDL	0.001
90-0095-2	MPT-11-01	LEAD	PPM	0.003	0.001
90-0095-3	DUPLICATE	LEAD	PPM	0.002	0.001
90-0095-4	EQUIP BLANK	LEAD	PPM	0.006	0.001
90-0095-5	FIELD BLANK	LEAD	PPM	BDL	0.001
[illegible]0095-6	TRIP BLANK	LEAD	PPM	BDL	0.001
[illegible]0095-1	MPT-11-02	ANTIMONY	PPM	BDL	0.10
90-0095-2	MPT-11-01	ANTIMONY	PPM	BDL	0.10
90-0095-3	DUPLICATE	ANTIMONY	PPM	BDL	0.10
90-0095-4	EQUIP BLANK	ANTIMONY	PPM	BDL	0.10
90-0095-5	FIELD BLANK	ANTIMONY	PPM	BDL	0.10
90-0095-6	TRIP BLANK	ANTIMONY	PPM	BDL	0.10
90-0095-1	MPT-11-02	SELENIUM	PPM	BDL	0.003
90-0095-2	MPT-11-01	SELENIUM	PPM	BDL	0.003
90-0095-3	DUPLICATE	SELENIUM	PPM	BDL	0.003
90-0095-4	EQUIP BLANK	SELENIUM	PPM	BDL	0.003
90-0095-5	FIELD BLANK	SELENIUM	PPM	BDL	0.003
90-0095-6	TRIP BLANK	SELENIUM	PPM	BDL	0.003

end of report

[illegible] • FDER • EL020 • AL LAB ID • 40150 • NIOSH • 32514-001 • FL ENV • E81010

Pioneer LABORATORY, INC.
a division of
AnalyticalTechnologies, Inc.
11 EAST OLIVE ROAD • PENSACOLA, FLORIDA 32514 • (904) 474-1001

QUALITY CONTROL

DATA

Pioneer LABORATORY, INC. a division of Analytical Technologies, Inc.
11 EAST OLIVE ROAD • PENSACOLA, FLORIDA 32514 • (904) 474-1001

CLIENT: C-E ENVIRONMENTAL, INC.

PROJECT: 5097-05

LAB ID: 90-0095

INORGANICS

LAB ID	CLIENT ID	DATE SAMPLED	DATE RECEIVED
90-0095-1	MPT-11-02	01-04-90	01-08-90
90-0095-2	MPT-11-01	01-04-90	01-08-90
90-0095-3	DUPLICATE	01-04-90	01-08-90
90-0095-4	EQUIPMENT BLANK	01-04-90	01-08-90
90-0095-5	FIELD BLANK	01-04-90	01-08-90
90-0095-6	TRIP BLANK		01-08-90

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

CLIENT NAME: C-E ENVIRONMENTAL, INC.

PROJECT NO: 5097-05

QC LEVEL I (INORGANIC)

LAB ID: 90-0095

PARAMETER	PREPARATION DATE	ANALYSIS DATE	BATCH #	METHOD	DETECTION LIMIT	BLANK RESULT	SPIKE SOURCE	SPIKE RECOVERED	SPIKE ADDED	% REC. MATRIX SPIKE	% REC. CONTROL LIMITS	SAMPLE RESULT	SAMPLE DUPLICATE RESULT	RPD	MAX. RPD
SILVER	01-09-90	01-10-90	90-AgG-7	272.2	0.0001	BDL	IN-HOUSE	0.0018	0.0020	90	63-141	BDL	BDL	0	27
ARSENIC	01-09-90	01-10-90	90-AsG-3	206.2	0.001	BDL	IN-HOUSE	0.020	0.020	100	64-136	BDL	BDL	0	27
BARIUM	01-10-90	01-18-90	90-LW-12	200.7	0.1	BDL	IN-HOUSE	0.48	0.50	96	68-128	BDL	BDL	0	15
CADMIUM	01-09-90	01-11-90	90-CdG-4	213.2	0.0001	0.0001	IN-HOUSE	0.0021	0.0020	105	68-134	BDL	BDL	0	15
CHROMIUM	01-10-90	01-18-90	90-LW-12	200.7	0.01	BDL	IN-HOUSE	0.48	0.50	96	80-122	BOL	BDL	0	12
NICKEL	01-10-90	01-18-90	90-LW-12	200.7	0.05	BDL	IN-HOUSE	0.99	1.00	99	67-127	BDL	BDL	0	17
LEAD	01-09-90	01-10-90	90-PbG-8	239.2	0.001	BDL	IN-HOUSE	0.004	0.010	40*	57-147	BDL	BDL	0	18
ANTIMONY	01-10-90	01-18-90	90-LW-12	200.7	0.10	BDL	IN-HOUSE	1.1	1.0	110	60-120	BDL	BDL	0	15
SELENIUM	01-09-90	01-10-90	90-SeG-3	270.1	0.003	BDL	IN-HOUSE	0.005	0.020	25*	68-134	BDL	BDL	0	18

NOTES: PPM = Parts Per Million, mg/l
BDL = Below Oetection Limit
Results reported are blank corrected.
Source for control limits is internal laboratory quality assurance program and references below.
*MATRIX INTERFERENCE

REFERENCE: EPA-600/4-79-020, Revised March, 1983.

Pioneer
PLI LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Client: C-E Environ.
Method of Shipment Fedex
Bill of Lading/Air Bill #
Date Received: 01/08/90
Sample Type: Water

Pioneer Lab I.D.# 90-0095

Sample 1	MPT-11-02	11		21	
2	MPH-01	12		22	
3	Dup	13		23	
4	Equip	14		24	
5	Field	15		25	
6	Blk	16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Is there a chain of custody?	(Y)	N
Is it a Pioneer Lab chain of custody?	Y	(N)
Is the chain of custody signed?	(Y)	N
Is chain of custody complete?	(Y)	N
Are sample tags present?	(Y)	N
Do sample tags and chain of custody agree?	(Y)	N
Were samples received cold?	(Y)	N
Were any containers broken or leaking?	Y	(N)
Were samples received within holding time?	(Y)	N
Were all samples preserved correctly?	(Y)	N

Extra Information From Bottles

Project Number:
Sampled By:
Sample Site:
Sample Date:
Sample Time:
Sample Type:

Special Instructions

Special turnaround time? 01/15
Bottle Order? (Y) N
Q.C. Level (1) 2 3 4 N
Purchase Order #: 5097-05
Task Order #

- - - - - LIMIT OF LIABILITY - - - - -

PLI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF PLI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS, TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES PLI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

CLIENT NOTIFIED DATE/TIME: YES ( ) NO (✓)

NOTES:

INSPECTED BY:
DATE INSPECTED: 01/08/90

P. 1 OF 1

CHAIN OF CUSTODY RECORD 90-0095

PROJECT NO. 5097-05

PROJECT NAME Naval Station, Mayport

SAMPLERS (SIGNATURE)

STA. NO.	DATE 1990	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: 250 ml P (5 ml H_2NO_3)	SAMPLE TYPE: 40 CFR 265 III Metals	REMARKS: INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE
MPT-11-02	1/4	13:22		X	Monitor Well MPT-11-02	1	1		Groundwater MPT-11-02
MPT-11-01	1/4	14:08		X	Monitor Well MPT-11-01	1	1		Ground water MPT-11-01
Dup.	1/4	14:10		X	Duplicate	1	1		Groundwater Duplicate
EB	1/4	13:32		X	Equipment Blank	1	1		Equipment Blank Water
FB	1/4	13:34		X	Field Blank	1	1		Field Blank Water
TB					Trip Blank	1	1		Trip Blank Water

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
	1/5/90 17:30			01/08/1100	
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
					Pioneer
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE / TIME	REMARKS	
					Carrier - Fideral Express Airbill # 4970485682

ECJOR[illegible]ICO

Pioneer LABORATORY, INC.
a division of Analytical Technologies, Inc.
11 EAST OLIVE ROAD • PENSACOLA, FLORIDA 32514 • (904) 474-1001

Client: C-E ENVIRONMENTAL, INC
10001 2571 EXECUTIVE CENTER CIR
SUITE 100
TALLAHASSEE FL 32301-5001

Lab I.D.#: 90-0095A
Order Number: P26711
Order Date: 01/31/90
Sampled By: HARRY HOOPER
Sample Date: 01/04/90
Sample Time: VARIOUS

Project Number: 5097-05
Project Name: N/S
Sample Site: NAVAL STATION, MAYPORT
Sample Type: GROUNDWATER

N/S = Not Submitted

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
90-0095A-1	MPT-11-02	MERCURY	PPM	BDL	0.0001
90-0095A-2	MPT-11-01	MERCURY	PPM	BDL	0.0001
90-0095A-3	DUP	MERCURY	PPM	BDL	0.0001
90-0095A-4	EQUIP BLANK	MERCURY	PPM	BDL	0.0001
90-0095A-5	FIELD BLANK	MERCURY	PPM	BDL	0.0001
90-0095A-6	TRIP BLANK	MERCURY	PPM	BDL	0.0001

Comments: PPM = Parts Per Million, mg/l; BDL = Below Detection Limit.
Method Reference: EPA 600/4-79-020, Revised March 1983.

Approved By : John U Hawkins

end of report

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QUALITY CONTROL

DATA

Pioneer LABORATORY, INC.
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11 EAST OLIVE ROAD • PENSACOLA, FLORIDA 32514 • (904) 474-1001

CLIENT: C-E ENVIRONMENTAL, INC.

PROJECT: 5097-05

LAB ID: 90-0095A

INORGANICS

LAB ID	CLIENT ID	DATE SAMPLED	DATE RECEIVED
90-0095A-1	MPT-11-02	01-04-90	01-08-90
90-0095A-2	MPT-11-01	01-04-90	01-08-90
90-0095A-3	DUPLICATE	01-04-90	01-08-90
90-0095A-4	EQUIPMENT BLANK	01-04-90	01-08-90
90-0095A-5	FIELD BLANK	01-04-90	01-08-90
90-0095A-6	TRIP BLANK		01-08-90

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

CLIENT NAME: C-E ENVIRONMENTAL, INC.

PROJECT NO: 5097-05

QC LEVEL I (INORGANIC)

LAB ID: 90-0095A

PARAMETER	PREPARATION DATE	ANALYSIS DATE	BATCH #	METHOD	DETECTION LIMIT	BLANK RESULT	SPIKE SOURCE	SPIKE RECOVERED	SPIKE ADDED	% REC. MATRIX SPIKE	% REC. CONTROL LIMITS	SAMPLE RESULT	SAMPLE DUPLICATE RESULT	RPD	MAX. RPD
MERCURY	01-31-90	01-31-90	90-Hg-9/1	245.1	0.0001	0.0001	IN-HOUSE	0.0066	0.0070	93	48-120	BDL	BDL	0	48

NOTES: PPM = Parts Per Million, mg/l
BDL = Below Detection Limit
Results reported are blank corrected.
Source for control limits is internal laboratory quality assurance program and references below.

REFERENCE: EPA-600/4-79-020, Revised March, 1983.

90-0095A

1 OF 1

CHAIN OF CUSTODY RECORD

90-0095

PROJECT NO.	PROJECT NAME
5097-05	Naval Station, Mayport

SAMPLERS (SIGNATURE): [signature]

STA. NO.	DATE 1990	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: 250ml P(5ml H2NO3) 40 CFR 265 III metals	REMARKS INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE
MPT-11-02	1/4	13:22		X	Monitor Well MPT-11-02	1	1	groundwater MPT-11-02
MPT-11-01	1/4	14:08		X	Monitor Well MPT-11-01	1	1	Ground water MPT-11-01
Dup.	1/4	14:10		X	Duplicate	1	1	Groundwater Duplicate
EB	1/4	13:32		X	Equipment Blank	1	1	Equipment Blank Water
FB	1/4	13:34		X	Field Blank	1	1	Field Blank Water
TB					Trip Blank	1	1	Trip Blank Water

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
[signature]	1/5/90 17:30			01/08/1100	[signature]
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
					[signature]
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE/TIME	REMARKS	Carrier - Federal Express Airbill # 4970485682

E.C.JORDAN CO.

Slant Soil Boring Soil Samples

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: E.C.JORDAN
10001 2571 EXECUTIVE CENTER CIR
SUITE 100
TALLAHASSEE FL 32301-5001

Lab I.D.#: 89-1671
Order Number: P20118
Order Date: 05/12/89
Sampled By: KEVIN WARNER
Sample Date: 05/10-11
Sample Time: VARIOUS

Project Number: 5097-05
Project Name: NAVAL STATION - MAYPORT
Sample Site: BLDG 1241 NEUTRALIZATION BASIN
Sample Type: SOIL

N/S = Not Submitted

RESULTS

reported on the following page(s)

Comments: PPM = Parts Per Million, mg/l. BDL = Below Detection Limits.
Method Reference: SW-846, 3rd Edition, November 1986.

Approved By : W. F. Bowen

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FCER # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # E81010

Pioneer
PL LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: E.C.JORDAN
10001

Sample Site: BLDG 1241 NEUTRALIZATION BASIN
Sample Type: SOIL

Lab I.D.#: 89-1671
Order Date: 05/12/89
Sampled By: KEVIN WARNER
Sample Date: 05/10-11
Sample Time: VARIOUS

Parameter	Units	B-1 S-1 89-1671-1	B-1 S-2 89-1671-2	B-2 S-1 89-1671-3	B-2 S-2 89-1671-4	Detection Limit
PH	UNIT	8.18	8.87	8.64	9.16	

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL094 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # E81010

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

Client: E.C.JORDAN
10001

Sample Site: BLDG 1241 NEUTRALIZATION BASIN
Sample Type: SOIL

Lab I.D.#: 89-1671
Order Date: 05/12/89
Sampled By: KEVIN WARNER
Sample Date: 05/10-11
Sample Time: VARIOUS

EPTOX/METALS

EP TOXICITY-METALS ANALYSIS

Parameter	Units	B-1 S-1 89-1671-1	B-1 S-2 89-1671-2	B-2 S-1 89-1671-3	B-2 S-2 89-1671-4	Detection Limit
SILVER,EPTOX	PPM	BDL	BDL	BDL	BDL	0.50
ARSENIC,EPTOX	PPM	BDL	BDL	BDL	BDL	0.50
BARIUM,EPTOX	PPM	BDL	BDL	BDL	BDL	1.0
CADIUM,EPTOX	PPM	BDL	BDL	BDL	BDL	0.10
CHROMIUM,EPTOX	PPM	BDL	BDL	BDL	BDL	0.50
MERCURY,EPTOX	PPM	BDL	BDL	BDL	BDL	0.01
LEAD,EPTOX	PPM	BDL	BDL	BDL	BDL	0.50
SELENIUM,EPTOX	PPM	BDL	BDL	BDL	BDL	0.20

end of report

CERTIFICATION NUMBERS: FL LAB ID # 81142 • EPA # FL004 • FDER # EL020 • AL LAB ID # 40150 • NIOSH # 32514-001 • FL ENV # E81010

Pioneer
LABORATORY, INC.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Client: E. C. Jordan

Method of Shipment: Federal express

Bill of Lading/Air Bill # 1963859365

Date Received: 5-12-89

Sample Type: Soil

Pioneer Lab I.D.# 89-1671

Sample					
1	B-1 S-1	11		21	
2	B-1 S-2	12		22	
3	B-2 S-1	13		23	
4	B-2 S-2	14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Is there a chain of custody?	(Y)	N
Is it a Pioneer Lab chain of custody?	Y	(N)
Is the chain of custody signed?	(Y)	N
Is chain of custody complete?	(Y)	N
Are sample tags present?	(Y)	N
Do sample tags and chain of custody agree?	(Y)	N
Were samples received cold?	(Y)	N
Were any containers broken or leaking?	Y	(N)
Were samples received within holding time?	(Y)	N
Were all samples preserved correctly?	(Y)	N

Extra Information From Bottles

Project Number: _____

Sampled By: _____

Sample Site: _____

Sample Date: _____

Sample Time: _____

Sample Type: _____

Special Instructions

Special turnaround time? _____ Q.C. Level 1 2 3 4 (N)

Bottle Order? (Y) N Purchase Order #: _____

Task Order # _____

- - - - - LIMIT OF LIABILITY - - - - -

PLI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF PLI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS, TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES PLI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

CLIENT NOTIFIED YES ( ) NO (✓)
DATE/TIME: _____

NOTES: No QC per John H.

INSPECTED BY: [illegible] / Pioneer Lab

DATE INSPECTED: 5-12-89

CERTIFICATION NUMBERS FL LAB ID • 81142 • EPA • FL094 • FDER • EL020 • AL LAB ID • 40150 • NIOSH • 37514001 • FL ENV • E81010

89-1671

PAGE 1 OF

CHAIN OF CUSTODY RECORD

PROJECT NO.: 5097-05

PROJECT NAME: NAVAL STATION MAYPORT BLDG 1241 NEUTRILIZATION BASIN

SAMPLERS (SIGNATURE):

	STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	SAMPLE TYPE: PH	SAMPLE TYPE: EPTOX/METALS	REMARKS: INDICATE SOIL/WATER/AIR SEDIMENT/SLUD
1-	B-1 S-1	5/10/89	15:30			BENEATH NEUTRILIZATION BASIN	1	✓	✓	
2-	B-1 S-2	5/10/89	16:20			"	1	✓	✓	
3-	B-2 S-1	5/11/89	7:20			"	1	✓	✓	
4-	B-2 S-2	5/11/89	8:00			"	1	✓	✓	

RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
Karin Warner	5/11/89 16:30				
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE) 5/12/89 1050	RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED FOR DISPOSAL BY: (SIGNATURE)	DATE / TIME	REMARKS	

APPENDIX B-4

GROUNDWATER ELEVATION DATA

Table B-4
Groundwater Elevation Data (January 1990)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

Date	Time	MW-11-1		MW-11-2	
		Depth to Water (feet)	Water Table Elevation (feet NGVD)	Depth to Water (feet)	Water Table Elevation (feet NGVD)
01/04/90	1250	11.12	0.96	9.69	0.76
	1415	11.12	0.96	9.50	0.95
	1445	11.11	0.97	9.48	0.97
	1515	11.11	0.97	9.48	0.97
	1545	11.11	0.97	9.51	0.94
	1615	11.11	0.97	9.58	0.87
	1645	11.11	0.97	9.68	0.77
	1715	11.11	0.97	9.79	0.66
	1745	11.11	0.97	9.89	0.56
	1815	11.11	0.97	9.98	0.47
	1845	11.12	0.96	10.07	0.38
	1915	11.13	0.95	10.14	0.31
	1945	11.13	0.95	10.19	0.26
	2015	11.13	0.95	10.24	0.21
	2045	11.14	0.94	10.28	0.17
	2115	11.14	0.94	10.30	0.15
	2145	11.14	0.94	10.30	0.15
	2215	11.14	0.94	10.27	0.18
	2245	11.14	0.94	10.22	0.23
	2315	11.14	0.94	10.12	0.33
	2345	11.14	0.94	10.02	0.43
01/05/90	15	11.14	0.94	9.92	0.53
	45	11.14	0.94	9.80	0.65
	115	11.14	0.94	9.73	0.72
	145	11.13	0.95	9.64	0.81
	215	11.13	0.95	9.58	0.87
	245	11.13	0.95	9.52	0.93
	315	11.13	0.95	9.49	0.96
	345	11.13	0.95	9.48	0.97
	415	11.13	0.95	9.49	0.96
	445	11.12	0.96	9.52	0.93
	515	11.12	0.96	9.57	0.88
	545	11.13	0.95	9.64	0.81
	615	11.13	0.95	9.75	0.70
	645	11.14	0.94	9.85	0.60
	715	11.14	0.94	9.95	0.50
	745	11.14	0.94	10.03	0.42
	815	11.15	0.93	10.10	0.35
	845	11.15	0.93	10.16	0.29
	915	11.15	0.93	10.20	0.25
	945	11.15	0.93	10.23	0.22
	1015	11.15	0.93	10.25	0.20
	1045	11.15	0.93	10.25	0.20
	1115	11.15	0.93	10.23	0.22
	1145	11.15	0.93	10.17	0.28
	1215	11.15	0.93	10.10	0.35

Note: NGVD = National Geodetic Vertical Datum.

APPENDIX C

TECHNICAL MEMORANDA AND ANALYTICAL DATA SUMMARIES

Appendix C-1	Well Construction and Development
Appendix C-2	Groundwater Sampling
Appendix C-3	Decontamination Procedures
Appendix C-4	Site Management Plan
Appendix C-5	Boring Log
Appendix C-6	Appendix IX, Groundwater Monitoring List

APPENDIX C-1

WELL CONSTRUCTION AND DEVELOPMENT

Technical Memorandum

PREPARED BY: Gregory M. Brown

DATE: September 23, 1991

TITLE: WELL CONSTRUCTION AND DEVELOPMENT

PURPOSE: To provide technical guidance and standard operating procedures for well construction and development at Naval Station Mayport, Florida. It presents the construction and development methods for shallow monitoring wells completed in the surficial aquifer, specific for conditions expected to be encountered at Naval Station Mayport during CCED Neutralization Investigation.

SCOPE: Construction and development of Surficial monitoring wells at Naval Station Mayport. Standard operating procedures for related activities such as drilling, subsurface soil sampling, and groundwater sampling are presented in other applicable Technical Memoranda Appendix C this document. Complete field guidance documentation is according to U.S. Environmental Protection Agency (USEPA) Region IV Environmental Compliance Branch Standard Operating Procedures & Quality Assurance Manual (EPA 1991).

Well Construction. Monitoring wells completed in the Surficial Aquifer (of the Surficial Deposits) will be constructed with 2-inch I.D. Schedule 40 PVC with flush-threaded joints. Typical well completion details are shown in Figure 2-6 of this document. No solvents or cement will be used in well fabrication.

Well installation operations will be performed by the drilling subcontractor and documented by the field geologist/engineer. The drilling subcontractor will supply materials and equipment necessary to perform drilling, construction and installation of the monitoring wells, grout boreholes, develop monitoring wells, containerize drilling by-products and related fluids, and operate a decontamination station, as specified by the Field Operations Leader.

Materials. Well materials shall be new and undamaged. Materials which are damaged or determined to be not in accordance with desired specifications will be rejected. Equipment and materials will be decontaminated as described in the

Technical Memorandum, Decontamination Procedures, Appendix C, this document prior to use and will be stored in a fashion that will adequately protect them from contamination or degradation.

Well Pipe. Well casing for the Upper Hawthorn Group monitoring wells will consist of 2-inch I.D. Schedule 40, flush-threaded PVC riser pipe. The casing for wells will extend from the top of the well screen to approximately 2 feet above ground surface. Monitoring wells in areas of vehicular traffic will be flush mounted with Christie Boxes or equivalent to minimize surface hazards. Well casing will be capped with a vented cap of same size. No solvents or cements will be used to connect sections of pipe. Teflon tape may be used as an added seal

on the riser threads. Centralizers may be used at 20 feet intervals for monitoring wells installed deeper than 50 feet.

Well Screen. Well screen for the Surficial Aquifer monitoring wells will consist of 2-inch I.D., flush-threaded, PVC pipe with slots of No. 10 (0.010-inch). Shallow (10 to 15 feet) Surficial Aquifer wells will be screened their entire saturated thickness to approximately 3 feet above the encountered groundwater table. Deep (25 to 30 feet) Surficial Aquifer Wells screen lengths will be 5 feet. Upper Hawthorn wells screen lengths will be approximately 10 feet. No solvents or cements will be used to connect sections of screen. Teflon™ tape may be used on threads to promote a tighter seal.

Sand Pack Material. The annular space between the well screen and the borehole wall will be backfilled with clean, washed, poorly-graded, silica sand compatible with the formation. Filter material shall be uniformly graded and of an appropriate size range so that no significant loss of filter material will occur during development (less than 10 percent loss).

Bentonite Seal. A 1- to 2-foot thick (approximate) bentonite layer will be placed above the sand pack. A high-solids bentonite grout with low permeability will be used. It will be used to restrict the bentonite grout from infiltrating into the sand pack placed around the screened interval.

Bentonite Grout. The bentonite grout will be mixed to manufacturer's recommendations. A mud scale will be used to verify proper grout mixture. The grout will be tremied into place.

Protective Steel Casing. A 4-inch I.D. or larger, 5-foot long, protective steel casing with hinged and lockable steel cap shall be installed over the monitoring well casing. The protective casing shall be embedded into the cement/bentonite grout prior to hardening. The protective casing shall be installed so that the well cap can be easily removed and the hinged casing top will move freely. Upon completion of the installation of each monitoring well, the well will be marked on the protective steel casing in the field by stenciling (with spray paint) well designation numbers. A drainage hole will be provided in the protective steel casing at the top of the cement surface seal (maximum 2 inches above surface seal). Casings will be equipped with common-key locks.

Concrete Pad and Protective Posts. A minimum 4-inch-thick, 3-foot by 4-foot concrete pad shall be installed at ground surface around the protective steel casing. The concrete pad will be constructed using Sakrete, Quikrete, or similar concrete mix and will not be installed for at least 24 hours after setting the protective steel casing in the cement/bentonite grout. Wells in areas with vehicular traffic will be flush mounted using Christie Boxes or equivalent. Others will be installed with protective posts painted a conspicuous color.

Monitoring Well Installation. The following procedures will be followed for installation of monitoring wells in the shallow Surficial Aquifer, deep Surficial Aquifer, and Upper Hawthorn units.

1. Depth of the completed boring will be measured with a weighted tape. Boreholes will be drilled approximately 1 to 2 feet below the intended bottom of the screened interval in order to permit placement of a layer of buffer sand in the bottom of the hole. If

the borehole has been drilled greater than 2 feet below the intended bottom of the screened interval, bentonite grout will be used to backfill the excess space in the bottom of the borehole. Depth measurements will be made with a weighted tape during placement of bentonite grout. A sufficient amount of borehole space will be retained above the backfill to permit placement of approximately a 1- to 2-foot layer of buffer sand.

2. Place approximately 1- to 2-foot layer of buffer sand in bottom of hole. If bentonite grout has been placed in the bottom of hole, remeasure depth of hole prior to placement of the buffer sand layer.

3. Well screen, casing, end plug, and centralizers (if used) will be assembled. All printed marks on the casing and screen materials should be removed during decontamination prior to use.

4. Lower the well assembly through the permanent surface casing and borehole until resting on the layer of buffer sand (taking care to verify proper depth setting of well materials). In wells greater than 50 feet deep, stainless steel centralizers may be placed above the screen and approximately every 20 feet to the surface. The well materials shall be held in a slight strain to allow t~e pipe to hang straight. The well construction contractor will assure that the upper Hawthorn wells are plumbed vertical.

5. Begin adding the filter pack sand. Repeated depth measurements of the bottom of the hole will be taken to monitor the level of the filter material and detect any bridging of sand that may occur. Sufficient time shall be allowed for the filter material to settle through the water column within the casing/borehole. A tremie pipe may be used to place filter material in wells deeper than 50 feet. The filter material will extend from the layer of buffer sand at the base of the well screen to at least 1 foot (preferably 1 to 2 feet) above the top of the well screen.

6. A bentonite layer approximately 1- to 2-feet thick will be placed above the sand pack material prior to grouting. A high-solids bentonite grout with low permeability will be used. Hydration time will be consistent with the manufacturers specifications.

7. The remaining annulus will then be grouted from the top of the bentonite seal to the ground surface with a high-solids grout. The grout will be tremied into the annulus to the ground surface.

8. A protective steel casing will be centered over the well casing and inserted into the grouted annulus prior to grout hardening.

9. No sooner than 24 hours after grouting, the concrete pad shall be installed next to the monitoring well protective casing. The concrete pad will be sloped to allow drainage away from the well. The protective casing will be painted with a rust-preventative, conspicuously colored, paint. Flush mounted Christie Boxes or equivalent will be used in areas with vehicular traffic.

10. The elevation of the top of each well riser pipe and the adjacent land surface will be surveyed to the nearest 0.01 foot by a registered professional land surveyor no sooner than 48 hours following completion of the monitoring wells.

Well Development. Following monitoring well installation, each well will be developed to increase yield and to remove fluids that may have been introduced during drilling operations. Development will be initiated no sooner than 24 hours following the completion of grouting. Development will proceed by pumping or by hand bailing. Each well will be developed by removing a minimum of 10 well volumes of water or until well is free of apparent turbidity. At well locations with very slow recharge or little water, wells will be developed dry 3 times. Water removed from the wells during the development will be contained for subsequent treatment or disposal.

The following procedures will be used for well development:

1. Approach the well from an upwind direction, obtain and record OVA, TIP or HNu readings at the well head (with cap off) and in the breathing zone. The field team may continue to work in modified Level D personnel protection if the OVA/Hnu readings do not exceed the action level set in the Site Health and Safety Plan.

2. Check the well for above-ground damage.

3. Equipment used during development will be decontaminated using the procedures in the Technical Memorandum, DECONTAMINATION PROCEDURES. Appendix C, this document.

4. Measure and record the depth from the top of the well casing to the top of static water level in the well casing. Measure the total depth of the well relative to the top of casing. Calculate the height of water column (feet) and standing volume (gallons) of water in the well based upon known well details from installation records or measured total depth of well.

5. If a submersible pump is used for development, lower the decontaminated pump into the well to a point approximately 1 foot above the bottom of the well. Begin pumping. If a bailer is used, bail the well from the bottom of the screened interval using the bailer to frequently surge the well prior to bringing the bailer to the surface.

6. Development will continue until at least 10 well volumes have been removed or until well is free of apparent turbidity. At well locations with very slow recharge or little water, wells will be developed dry 3 times. Noticeable odors, discoloration, and turbidity or suspended sediment content should also be noted and described on the field sheet or field notebook.

7. Additional surging, with approval of the Field Operations Leader, may be required to suspend sediment for removal from the wells if greater than 6 inches of sediment is measured in the bottom of the well.

8. Upon completion, record the following information on the appropriate field sheet or in the field notebook:

   - date and time of start of well development;
   - initial static water level;
   - total depth of well;
   - well development method;
   - volume of water removed;
   - date and time of well development completion; and
   - post pumping/bailing water level.

9. Decontaminate equipment used during development of well following the procedures in the Technical Memorandum, DECONTAMINATION PROCEDURES Appendix C, this document;

10. Replace well cap and lock protective casing; and

11. Store development water until appropriate arrangements can be made for proper treatment or disposal.

APPENDIX C-2

GROUNDWATER SAMPLING

C-2
Technical Memorandum

PREPARED BY: Gregory M. Brown

DATE: September 23, 1991

TITLE: GROUNDWATER SAMPLING

PURPOSE: To provide technical guidance and standard operating procedures for groundwater sampling at Naval Station Mayport, Florida. It presents the groundwater sampling methods for shallow monitoring wells completed in the surficial aquifer, specific for conditions expected to be encountered at Naval Station Mayport during CCED Investigation.

SCOPE: Groundwater sampling methods for monitoring wells at Naval Station Mayport. Standard operating procedures for related activities such as drilling, subsurface soil sampling, and monitoring well construction are presented in other applicable Technical Memoranda.

Groundwater samples will be collected from each of the newly installed monitoring wells upon completion of well development. New wells will not be sampled for at least 48 hours after development. Wells will be sampled upon significant recharge, but no later than 24 hours after purging. Prior to each sampling event, groundwater levels and total depths of the wells will be measured on the same day. The procedures to be followed for collection of these data are as follows.

1. Approach the well from an upwind direction, obtain and record OVA/Hnu readings at the well head (with cap off) and in the breathing zone.

2. Check the well for above-ground damage.

3. Equipment used during sampling will be decontaminated using the procedures outlined in the Technical Memorandum, DECONTAMINATION PROCEDURES. Appendix C, this document.

4. Measure and record the depth from the top of the well casing to the top of static water level in the well casing. Calculate the height of water column (feet) and standing volume (gallons) of water in the well based upon known well details from installation records or measured total depth of well.

Cast acrylic, Teflon™, or stainless steel bailers with nominal 0.25-inch diameter nylon (or equal material) cord or stainless-steel and Teflon™ bladder pumps will be used to sample groundwater. The purging and sampling procedures that will be used to collect groundwater samples from wells are summarized below.

1. Decontaminated bailers or pumps will be used to purge each well. Record time of initiating and stopping bailing and/or pumping activities on field sheet or in field book.

2. Purge the well by removing three well volumes of water or until the well is purged dry. Water purged from the wells will be collected and containerized. Wells purged to dryness will be allowed to recharge to static water levels or for approximately 12 hours prior to sampling. Temperature, pH, and specific conductance readings will also be collected while purging the wells. The last set of readings will be recorded as the actual readings from each well.

3. Wells will be sampled using cast acrylic, Teflon™, or stainless steel bailers, or stainless-steel and Teflon™ bladder pumps. If samples are collected from a well using a bladder pump, the pump flow rate will be turned down to a slow steady stream prior to filling the sample jars. This is especially important for filling volatile organic sample containers.

4. Fill the sample bottles in the following sequence:

   - volatile organic compounds;
   - semi-volatile and other organic analyses (as required); and
   - metals samples.

Use the first bailer of water to fill the volatile organic analyses (VOA) vials. Fill the VOA vials such that a meniscus is formed on the rim of the vial and carefully cap the bottle. Tip the bottle upside down, tap on capped end, and inspect for air bubbles. Should noticeable air bubbles appear, repeat the process until an air-free sample is obtained. Use subsequent bailers to fill the remaining sample containers.

5. Place the samples in a secure shipping container after decontamination of the outside of the sample bottles.

6. The following information will be recorded on the field sheet:

   - project name;
   - project number;
   - date;
   - well number;
   - personnel present;
   - sample number;
   - nature of any visible well damage;
   - OVA/HNu readings;
   - water level before purging (depth below top of casing);
   - time begin purge;
   - time end purge;
   - water level after purging (depth below top of casing);
   - approximate volume of water removed during purging;
   - sample time;

- temperature;
- conductivity;
- pH;
- pH meter check before and after sample analysis;
- preservation, if applicable; and
- other data as required.

7. Replace well cap and lock protective casing.

8. Complete field documentation and chain-of-custody records for each sample according to U.S. Environmental Protection Agency (USEPA) Region IV Environmental Compliance Branch Standard Operating Procedures & Quality Assurance Manual (USEPA 1991).

9. Decontaminate the outside of the sample containers.

10. Preserve the samples according to U.S. Environmental Protection Agency (USEPA) Region IV Environmental Compliance Branch Standard Operating Procedures & Quality Assurance Manual, (USEPA 1991).

11. Follow the packaging and shipping protocol described in U.S. Environmental Protection Agency (USEPA) Region IV Environmental Compliance Branch Standard Operating Procedures & Quality Assurance Manual, (USEPA 1991).

APPENDIX C-3

DECONTAMINATION PROCEDURES

C-3
Technical Memorandum

PREPARED BY: Gregory M. Brown

DATE: September 23, 1991

TITLE: DECONTAMINATION PROCEDURES

PURPOSE: The purpose of this Technical Memorandum (TM) is to provide technical guidance and standard operating procedures for decontamination procedures during field activities at Naval Station Mayport, Florida. This TM presents the decontamination procedures required for specific conditions expected to be encountered at Naval Station Mayport during the Neutralization Basin Investigation.

SCOPE: The scope of this TM covers decontamination procedures for the RFI at Naval Station Mayport. Standard operating procedures for related activities are presented in other applicable Technical Memoranda.

Decontamination of personnel and equipment will be performed to minimize the possibility of transport of contaminants off-site and between work areas, and to assure sample integrity. Sampling equipment coming in contact with soil and sediment and water will be decontaminated prior to sampling, between sampling locations, between boring intervals, and at completion of the work. This will minimize the potential for cross contamination.

Decontamination of equipment will occur at the exclusion zone of the intrusive activities and at a main decontamination station. Small sampling and field equipment (e.g., trowels, bowls, sample containers, etc.) will be cleaned at the exclusion zone. A central decontamination station will be established for cleaning of augers, drilling bits, large tools, drill rigs, monitoring well supplies, and other large items.

Teflon™ and/or glass sampling equipment used for trace organics and/or metal sample collection will be decontaminated in accordance with U.S. Environmental Protection Agency (USEPA) Region IV Environmental Compliance Branch Standard Operating Procedures & Quality Assurance Manual, (USEPA 1991) requirements using the following procedures:

1. Equipment will be washed thoroughly with laboratory detergent and water using a brush to remove any particulate matter or surface film.

2. The equipment will be rinsed thoroughly with tap water.

3. The equipment will be rinsed with at least a 10 percent nitric acid solution.

4. Equipment will be rinsed thoroughly with tap water.

5. Equipment will be rinsed thoroughly with deionized water.

6. Equipment will be rinsed twice with pesticide-grade isopropanol and allowed to air dry.

7. Equipment will be wrapped in one layer of aluminum foil. The edges of foil will be rolled into a "tab" to allow for easy removal. Seal the foil wrapped equipment will be sealed in plastic and dated.

8. The Teflon™ or glass sampling equipment will be rinsed thoroughly with tap water in the field as soon as possible after use.

When this sampling equipment is used to collect samples that contain oil, grease, or other hard to remove materials, it may be necessary to rinse the equipment several times with pesticide-grade acetone or hexane to remove the materials before proceeding with Step 1. In extreme cases, it may be necessary to steam clean the field equipment before proceeding with Step 1. If the field equipment cannot be cleaned using these procedures, it should not be used.

Small and awkward equipment such as vacuum bottle inserts and well bailers may be soaked in the nitric acid solution instead of being rinsed with it. Fresh nitric acid solution should be prepared for each cleaning session.

Stainless-steel or metal sampling equipment used for trace organics and/or metal sample collection will be decontaminated in accordance with U.S. Environmental Protection Agency (USEPA) Region IV Environmental Compliance Branch Standard Operating Procedures & Quality Assurance Manual, (USEPA 1991) requirements using the following procedures:

1. Equipment will be washed thoroughly with laboratory detergent and water using a brush to remove any particulate matter or surface film.

2. Equipment will be rinsed thoroughly with tap water.

3. Equipment will be rinsed thoroughly with deionized water.

4. Equipment will be rinsed twice with pesticide-grade isopropanol and allowed to air dry for at least 24 hours.

5. Equipment will be wrapped in one layer of aluminum foil. The edges of foil will be rolled into a "tab" to allow for easy removal. The foil wrapped equipment will be sealed in plastic and date.

6. The stainless-steel or metal sampling equipment will be rinsed thoroughly with tap water in the field as soon as possible after use.

Well sounders and tapes used to measure groundwater levels will be decontaminated in accordance with the following procedures. They will be:

1. washed with laboratory detergent and tap water,

2. rinsed with tap water,

3. rinsed with deionized water,

4. wrapped in polyethylene bags or sheeting to prevent contamination during storage or transit.

5. allowed to air dry, and

The following procedures will be used to decontaminate the Goulds Pump used for well purging. Always disconnect the pump control box will always be disconnected from the generator before cleaning.

1. Using a brush, the exterior of the contaminated hose and pump will be scrubbed with soapy water (e.g., using Alconox™).

2. The soap will be rinsed from the outside of pump and hosed with tap water.

3. The tap water residue will be rinsed from the outside of the pump and hosed with deionized water.

4. Equipment will be placed in a polyethylene bag or wrapped with polyethylene film to prevent contamination during storage or transit.

Large equipment (e.g., drill rig, augers) will be decontaminated using the procedures outlined below.

1. The equipment will be moved to the decontamination station after sampling and field activities are complete.

2. The equipment will be decontaminated using a high pressure steam cleaner with a soap cycle and water cycle. Scraping and scrubbing may be necessary to remove encrusted material. Items will be placed on sawhorses, pallets, or the equivalent to prevent contact with the ground.

3. The equipment will be rinsed with potable water.

4. The equipment will be placed on polyethylene sheeting, sawhorses, or clean pallets and allowed to dry.

Sampling and field equipment should not contact the ground surface prior to the next sampling location. Wrap appropriate equipment (i.e., monitoring well installation supplies) in polyethylene (plastic) sheeting. Decontamination fluids will be contained for subsequent treatment or disposal.

APPENDIX C-4

SITE MANAGEMENT PLAN

Site Management Plan (SMP)

This section provides general operating guidelines for access, security, and the field team organization that will be implemented during CCED activities.

2.1 SITE CONTROL

2.1.1 Site Access Access to the base in general and to any restricted areas will be with one security pass per vehicle. All information on personnel involved in the project and a copy of the contract for the project were provided to security at least 2 weeks before the field work begins.

General site layout and sample collection locations are presented in the FSP. All exploration and sampling stations are located onsite (Figure 2-2). NAVSTA Mayport will be responsible for obtaining keys to gates and locking caps of existing monitoring wells for those areas on the station.

2.1.2 Site Security It is anticipated that full security (i.e., fencing) cannot be established at any of the drilling locations. Therefore, at active boring locations, open casings will be secured overnight by fastening the rotary drive head over the upper end of the casing. Finished monitoring wells will be secured by the installation of protective steel casings over well risers. The protective steel casings will be fixed in the ground with concrete and equipped with locking caps.

2.1.3 Communications Field personnel will use telephones while on the base to communicate with off-base parties and will have a list of emergency phone numbers available at all times. Personnel conducting onsite work in one area of the NAVSTA Mayport will use two-way radios with frequencies approved by the Navy to maintain a communication link with personnel working in other areas. Daily communications for access needs and scheduling site operations will be coordinated with one representative from the Public Works Department, NAVSTA Mayport. As of this writing, the representative from the NAVSTA Mayport will be Mr. Mike Davenport.

2.1.4 Field Operations Drill rigs will either be left in a secured area or be disabled each night before personnel leave a site. Final approval for boring locations will be given by NAVSTA Mayport's representative during a site reconnaissance conducted prior to the beginning of the field work. Potable water, which is necessary for drilling and decontamination procedures, will be obtained at fire hydrant locations specified by the Public Works Department.

2.1.5 Decontamination Facilities The field work at the NAVSTA Mayport sites will require mobilization and field support of subcontractors, sampling crews, and survey crews. Staging and decontamination facilities will be needed to conduct these operations. Staging of field operations will be done from vehicles used by site investigation personnel and subcontractors. These vehicles will be parked in uncontaminated areas identified for each site and will not require decontamination.

Decontamination zones for personnel and equipment will be established during the reconnaissance for each site. All contaminated materials and protective gear

will either be disposed of or containerized in these areas before site personnel proceed to the clean zone.

A heavy equipment decontamination zone will be designated at each site. Drill rigs, casings, rods, and associated downhole equipment plus well casing and screen will be decontaminated and steam cleaned prior to setting up at each boring or monitoring well location. In addition, the drill rig and all tools will be decontaminated prior to entering and leaving NAVSTA Mayport. Sampling tools will be decontaminated more frequently as required by the sampling protocol established in the project-specific Technical Memorandum "Decontamination Procedures," his section.

2.1.6 Disposal of Wastes All borehole cuttings, development water, drill fluids, drill cuttings, and water resulting from monitoring well and piezometer installation and development will be contained in Department of Transportation (DOT) 17-C open top, 55-gallon drums, permanently labeled by well number and stored in a location designated by the NAVSTA Mayport's Environmental Coordinator.

Field monitoring of fluids and solids generated by monitoring well and piezometer installation and development will be done for field screening and health and safety monitoring using a portable OVA or PID. All drummed materials will be sampled and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) (USEPA Method 1311). Determination of the proper method of disposal for investigation derived wastes will be made upon assessment of TCLP and site field investigation analytical data.

Material found to exceed TCLP concentration limits established in 40 CFR 261.24 will be transported to a suitable disposal facility by Defense Reutilization and Marketing Organization (DRMO). Materials found not to exceed TCLP limits will be disposed onsite under the supervision of NAVSTA Mayport's Environmental Coordinator.

3.0 FIELD SAMPLING PLAN (FSP)

3.1 GENERAL SITE OPERATIONS.

3.1.2 Field Personnel Responsibilities The project staff and field team for the RFI activities will work under the direction of the TOM and RFI Task Leader and will consist of the following personnel.

Field Operations Leader. The FOL in conjunction with personnel from NAVSTA Mayport's Public Works Department, will have the prime responsibility of providing secure areas for samples, waste materials, and equipment storage. The FOL is responsible for day-to-day review of the field activities performed onsite, overall management and coordination of the field work, and supervision and scheduling of work. The FOL will maintain consistency and require that field teams follow project-specific plans and that the implementation of field investigations are in compliance with appropriate guidelines.

Field or Rig Geologist. The geologist's responsibilities include overseeing boring and monitoring well activities, including the appropriate logging and documentation; ensuring that standard and approved drilling and monitoring well

installation methods are followed; and ensuring that pertinent drilling and testing information is obtained during drilling.

Project Hydrologist. The hydrologist is responsible for planning and overseeing groundwater and surface water measurements and tests so that appropriate and valid results are obtained; determining the number of data points, sampling stations, wells, and reference measuring points needed to adequately define surface water and groundwater flow and enable groundwater contour mapping; and assessing the groundwater flow regime and identifying subsurface conditions that would affect flow.

Project Biologist. The biologist is responsible for planning and overseeing data collection and analysis related to the environmental assessment. As such, the project biologist works closely with other team members in developing the scope of work for the RFI and in data analysis throughout the RFI process.

Sampling Team Leader. The sampling team leader's responsibilities include monitoring procedures and requirements related to sampling and chain-of-custody according to appropriate guidelines.

Field Analyst(s). The field analyst's responsibilities include onsite gas chromatograph (GC) analyses including calibration, quality control, recording of results, and maintenance of the field equipment.

Sampling Personnel. The sampling personnel are responsible for the proper collection, preservation, packaging, documentation, and initial chain-of-custody of samples until released to another party for storage or transport to the analytical laboratory.

Health and Safety Officer. The HSO is responsible for monitoring activities during site work and enforcing the HASP. The HSO will have the authority to stop work if conditions exceed allowable limits and, as appropriate, will assume certain sampling responsibilities.

Site-Safety Officer. For this project, the project HSO may not be onsite at all times. Therefore, a sampling team member will be designated as Site Safety Officer to monitor procedures and report inconsistencies to the HSO. The designee will have the power to stop work should conditions exceed allowable limits.

Drilling Subcontractor. The drilling subcontractor is responsible for obtaining drilling permits and clearances; supplying all services (including labor, equipment, and materials) required to perform the drilling, testing, and well installation program; and conducting necessary maintenance and quality control of required equipment. The drilling subcontractor will be responsible for following decontamination procedures specified in the SAP and HASP. Upon completion of the work, the drilling subcontractor will be responsible for demobilizing all equipment, cleaning up any materials deposited onsite during drilling operations, and properly backfilling or grouting any borings.

Other Subcontractors. Survey subcontractors will also be onsite and will be responsible for completion of their respective activities.

It should be noted that field team members will assume the duties of several of the positions described above.

3.1.3 Personal Protection A HASP has been prepared as part of the CCED activity. The HASP provides information regarding the required levels of protection for various tasks. The HASP also details personal decontamination procedures.

3.1.4 Mobilization Activities Following SOUTHNAVFACENGCOM approval of the project's Workplan and the issuance of a written Notice to Proceed, arrangements will be made to place a command post onsite, schedule a field sampling crew, and have sampling and health and safety equipment shipped to the site. Provisions for electrical power and a telephone will also be made.

Additional mobilization activities will include familiarizing the sampling crew with this FSP and applicable field technical guidelines prior to initiating the investigation.

3.1.5 Sample Identification and Chain of Custody All samples collected during the field investigation will be labeled with a unique sample identification code that identifies the site, sample location, sample type, and series numbers for sample locations with multiple samples.

The samples at the NAVSTA Mayport (MPT) sites will be labeled using the following system.

- Site. Always MPT-XXX, where "XXX" refers to the site number, production well number, or stream sampling location.

- Sample Type.

MS - monitoring well soil
MW - monitoring well water
MG - monitoring well gas
MR - monitoring well rock core

BS - test boring soil
BW - test boring water
BG - test boring gas
BR - test boring rock core
AT - asphalt

SS - surface soil
SW - surface water
SG - soil gas
VG - landfill vent gas

QT - quality control trip blank
QS - quality control sampler blank
QF - quality control filtration blank
QM - lab quality control method blank
FB - quality control field blank

RW - raw water
RI - raw influent
FI - final effluent
SL - sludge

SD - sediment
WT - waste
WP - wipe
CT - concrete

AG - ambient air (gases), grab sample
LG - ambient air (gases), long-term sample
PS - test pit soil
PW - test pit water

DW - draining water
WY - water supply
LT - leachate
PC - primary clarifier effluent
SC - secondary clarifier effluent

- Sample Location. Sample locations will be indicated by a number that corresponds to the sample collection location and will be used in combination with the sample type. For example, sample MPT-XXX-SW-3 is a surface water sample collection at location 3 as shown on a site plan for Site XXX.

- Sample Number. For circumstances where multiple samples will be collected from the same location, each sample will be consecutively number. For example, MPT-XXX-SW-3-01 and MPT-XXX-SW-3-02 are surface water samples collected at the same location but at different times. For soil borings, the number designating the boring location will be followed by a sample depth range in parenthesis. A sample collection at MPT-XXX-BS-01 from a depth of 4 to 5 feet would be designated:

  MPT-XXX-BS-01(4-5)-1

  For duplicates, a letter designation will be used for the duplicate sample. For example, the duplicate of MPT-XXX-BS-01(4-5)-1 will be:

  MPT-XXX-BS-01(4-5)A-1

  If a duplicate is taken at that point again, the number would become:

  MPT-XXX-BS-01(4-5)A-2

  Chain-of-custody procedures as outlined in Section 7.0 of the QAPP (Appendix A) will be followed during all RFI activities. A complete listing of groundwater, soil, sediment, sludge, surface water, and quality control sample identifications is presented in the site-specific QAP (Appendix B).

3.1.6 Sample Container, Preservation, and Holding Time Requirements Sample container, preservation, and holding time requirements are specified in Section 6.0 of the Comprehensive QAPP (Appendix A). Samples requiring preservation will be preserved immediately following collection.

3.1.7 Sample Packaging, Shipping, and Tracking Samples will be packaged and shipped in accordance with procedures presented in Section 7.2 of the Comprehensive QAPP (Appendix A). The FOL will be responsible for coordinating with the Laboratory Coordinator (LC), who will contact the analytical laboratory for each shipment of samples.

The LC will be contacted at least 1 week before each sampling episode and arrangements will be made to have spikes and blanks prepared and picked up. The LC will be informed of any changes in the number and types of samples as the changes occur. The analytical laboratory will be contacted on the day of each shipment of samples and provided with the following information:

- dates the samples were shipped,
- types of samples,
- number of samples, and
- airbill number.

For purposes of scheduling, the analytical laboratory will track sample shipment, receipt, analysis, and data validation and will be responsible for forwarding this information to the LC who will then forward copies to SOUTHNAVFACENGCOM's EIC.

3.1.8 Documentation Bound, weather-proof field notebooks will be maintained by the field team. Team members shall record all information related to sampling time, weather conditions, unusual events (e.g., well tampering), field measurements, etc.

In addition to the field notebooks, a site logbook shall be maintained by the FOL. This log will contain a summary of the day's activities and will reference field notebooks when applicable. Various field reports will also be maintained. Field reports for this project shall include boring logs, monitoring well installation reports, and the various forms discussed in Section 3.2.7 of this FSP.

3.1.9 Performance of Field Audits During field activities, a Quality Assurance/Quality Control audit of procedures will be performed by the QA officer as described in Section 12.0 of the Comprehensive QAPP. The QA officer will accompany personnel into the field to verify that the site FSP is being followed. Audit findings will be documented and distributed to project team members and the project file.

3.1.10 Quality Control Samples Quality control samples generated for laboratory analyses during the NAVSTA Mayport RFI will include duplicate samples, laboratory referee replicate samples (if requested by either Florida Department of Environmental Regulation (FDER) or USEPA), spiked samples, trip blanks, field blanks, and equipment blanks. Trip blanks and spiked samples will be provided by the laboratory. Specific requirements are described in Section 11.0 of the QAPP, Appendix A.

3.1.11 Field Changes and Corrective Action The FOL or his designee is responsible for all site activities. In this role, the FOL may, at times, be required to adjust the site program to accommodate site-specific needs. When such a change is determined to be necessary, written notification will be submitted by the initiator of the change to the TOM and SOUTHNAVFACENGCOM's EIC, and a copy will be attached to the file copy of the affected document. If unacceptable, the actions during the period of deviation will be evaluated to determine the significance of the departure from established program practices.

Changes made in the field to a site program will be documented on a Field Change Request Form (Figure 3-1). This form will be signed by the initiator and the TD. Field Change Requests will be numbered sequentially, starting with the number 1.

The RFI Task Leader is responsible for the control, tracking, and implementation of the identified site program changes. Completed Field Change Request Forms will be distributed to affected parties that will include, at a minimum, SOUTHNAVFACENGCOM's EIC and the PM, TOM, QAO, and FOL.

3.1.12 Field Instruments Numerous field monitoring and screening instruments will be used during the field investigation and may include the following:

- temperature probe,
- specific conductance meter,
- pH meter,
- eH meter,
- photoionization or flame ionization meter,
- radiation meter,

- dual detector, percentage O_2/ percentage Lower Explosive Limits (LEL), and
- electronic water level meter.

Each instrument will be calibrated according to the manufacturer's operating manual prior to each day's use. Calibration will be documented on the Field Instrumentation Quality Assurance Record (Figure 3-2). During calibration, an appropriate maintenance check will be performed on each piece of equipment.

If damaged or failed parts are identified during the daily maintenance check and it is determined that the damage could impact the instrument's performance, the instrument will be removed from service until the identified parts are repaired or replaced. An equivalent piece of equipment will be substituted for the downed instrument to maintain schedule.

3.1.13 Decontamination Procedures Field sampling equipment will be decontaminated using the procedures outlined in Section 6.3 of the Comprehensive QAPP (Appendix A). Each step of the decontamination procedure will be reviewed by field team members during the mobilization phase of the project.

3.1.14 RFI Waste Management All potentially hazardous wastes generated during the RFI will be placed in Department of Transportation (DOT) approved 55-gallon drums and stored onsite in a secure area. Wastes that will be handled in this way include:

- nitric acid solution and ethanol/methanol from decontamination,
- disposable protective clothing,
- disposable sampling equipment,
- well development and purge water, and
- soil cuttings from the drilling program.

NAVSTA Mayport, through the Defense Reutilization and Marketing Office, will be responsible for the removal and disposal of these drums.

All non-contaminated waste materials generated on site will be collected and bagged for appropriate disposal as normal domestic waste.

Elevation Data (January 1990).

3.5.1 Laboratory QA/QC Samples Method blanks were analyzed for Level C samples before the field samples and during sample analysis at a frequency outlined in the appropriate analytical method (SW-846). A method blank is ASTM Type II water that is treated as a sample in that it undergoes the same analytical process as the corresponding field samples. Method blanks were used to monitor laboratory performance and contamination introduced during the analytical process.

FIELD CHANGE REQUEST

Task Order Number _____ Field Change Number _____

ABB-ES Job Number _____ FCR _____

To: _____ Location _____ Date: _____

Description: _____

_____

_____

Reason for Change: _____

_____

_____

Recommended Disposition: _____

_____

_____

_____ _____

Field Operations Leader (Signature) Date

Disposition: _____

_____

_____

_____ _____

Project Manager Date

Distribution: RI Leader Others as required: _____
Project Manager

_____ FDER Project Manager: _____
Quality Assurance Manager: _____
Field Operations Leader: _____

FIGURE 7-3

- temperature probe,
- specific conductance meter,
- pH meter,
- eH meter,
- photoionization or flame ionization meter,
- radiation meter,
- dual detector, percentage O_2/ percentage Lower Explosive Limits (LEL), and
- electronic water level meter.

Each instrument will be calibrated according to the manufacturer's operating manual prior to each day's use. Calibration will be documented on the Field Instrumentation Quality Assurance Record (Figure 3-2). During calibration, an appropriate maintenance check will be performed on each piece of equipment.

If damaged or failed parts are identified during the daily maintenance check and it is determined that the damage could impact the instrument's performance, the instrument will be removed from service until the identified parts are repaired or replaced. An equivalent piece of equipment will be substituted for the downed instrument to maintain schedule.

3.1.13 Decontamination Procedures Field sampling equipment will be decontaminated using the procedures outlined in Section 6.3 of the Comprehensive QAPP (Appendix A). Each step of the decontamination procedure will be reviewed by field team members during the mobilization phase of the project.

3.1.14 RFI Waste Management All potentially hazardous wastes generated during the RFI will be placed in Department of Transportation (DOT) approved 55-gallon drums and stored onsite in a secure area. Wastes that will be handled in this way include:

- nitric acid solution and ethanol/methanol from decontamination,
- disposable protective clothing,
- disposable sampling equipment,
- well development and purge water, and
- soil cuttings from the drilling program.

NAVSTA Mayport, through the Defense Reutilization and Marketing Office, will be responsible for the removal and disposal of these drums.

All non-contaminated waste materials generated on site will be collected and bagged for appropriate disposal as normal domestic waste.

Elevation Data (January 1990).

3.5.1 **Laboratory QA/QC Samples** Method blanks were analyzed for Level C samples before the field samples and during sample analysis at a frequency outlined in the appropriate analytical method (SW-846). A method blank is ASTM Type II water that is treated as a sample in that it undergoes the same analytical process as the corresponding field samples. Method blanks were used to monitor laboratory performance and contamination introduced during the analytical process.

FIELD INSTRUMENTATION QUALITY ASSURANCE RECORD

PAGE _____ OF _____

PROJECT _____ JOB NO. _____ DATE _____

EQUIPMENT TYPE/I.D.	BATTERY CONDITION	CALIBRATION INFORMATION
_____	_____	pH 4 _____ pH 7 _____ pH 10 _____
_____	_____	pH 4 _____ pH 7 _____ pH 10 _____
_____	_____	pH 4 _____ pH 7 _____ pH 10 _____
_____	_____	COND. STD. ____ / ____ COND. STD. ____ / ____
_____	_____	COND. STD. ____ / ____ COND. STD. ____ / ____
_____	_____	COND. STD. ____ / ____ COND. STD. ____ / ____
DISSOLVED OXYGEN		
_____	_____	AVERAGE WINKLE VALUE _____ METER VALUE ____ ppm CORR _____
REDOX		
_____	_____	ZOBELL SOLUTION VALUE _____ METER VALUE _____ CORR _____
PHOTOIONIZATION METER		
_____	_____	ZERO/ ZERO AIR? [ ]YES [ ] NO SPAN GAS VALUE _____ ppm EQUIV.
		METER VALUE _____ ppm EQUIV.
OTHER		
_____	_____	_____

FLUIDS MATERIALS RECORD

DEIONIZED WATER SOURCE: [ ] ECJ STAGING [ ] PORTABLE SYSTEM [ ] OTHER _____

TRIP BLANK WATER SOURCE: [ ] ECJ LAB, LOT NO. _____ [ ] OTHER, I.D. _____

DECONTAMINATION FLUID: [ ] METHYL HYDRATE, LOT NO. _____ [ ] OTHER _____ LOT NO. _____

SAMPLER BLANK WATER SOURCE: [ ] ECJ STAGING [ ] PORTABLE SYSTEM [ ] OTHER _____

HNO3/D.I. RINCE SOLUTION: [ ] ECJ STAGING, I.D. _____

PRESERVATION CHEMICAL LOT I.D.'s: CHEMICALS' USED: [ ] HNO3 LOT NO. _____ [ ] H2SO4 LOT NO. _____ [ ] HCL LOT NO. _____ [ ] NAOH LOT NO. _____ [ ] ZNAOC LOT NO. _____ [ ] _____

MANUF/TYPE _____ LOT NO. _____

FILTRATION PAPER I.D.: MANUF/TYPE _____ LOT NO. _____

STANDARDS: MANUF. _____ LOT NO. _____

SAMPLER SIGNATURE _____

FIGURE 8-1

FIELD INSTRUMENTATION QUALITY ASSURANCE RECORD

RCRA FACILITY INVESTIGATION QUALITY ASSURANCE PROJECT PLAN U.S. NAVAL STATION MAYPORT, FLORIDA

Level C laboratory QC samples can be categorized as either organic or inorganic QC samples. The two types of organic QC samples were as follows.

- Surrogate Spikes. Surrogate spike recoveries served to estimate accuracy and were added to every sample. Surrogate compounds are structural homologs of target compounds, often with deuterium substituted for hydrogen, and are therefore expected to behave in a similar manner during analysis. Spike recoveries were used to monitor both matrix effects and laboratory performance.

- Matrix Spike/Matrix Spike Duplicates (MS/MSDs). MS/MSDs were used to estimate the effect of the specific sample matrix on sample analyte recovery, as well as on accuracy and precision. Matrix spike compounds are found on the method target compound list (TCL). The field sample was split into thirds and two portions were spiked with known quantities of TCL compounds in order to ascertain the effects of the specific sample matrix on the recovery of these analytes of interest. One MS/MSD sample was analyzed for every 20 samples of the same matrix that were analyzed within a 14-day time period.

The two types of Level C inorganic QC samples were Laboratory Control Samples (LCS) and spiked (both pre- and post-digestion) samples.

- LCS. An LCS consists of an ideal matrix (usually ASTM Type II water) that has been spiked with a known amount of the analyte of interest; the LCS was prepared (digested) and analyzed with the field samples. The LCS is designed to monitor the efficiency of the overall analytical procedure, including sample preparation, and the resulting analyte recoveries must fall within pre-established acceptance limits.

- Spiked Samples. Pre-digestion spikes are analogous to the MS/MSD spike recovery for organic analyses in that they measure the effects of the sample matrix on the recovery of a known quantity of analyte after both sample preparation and analysis. If the pre-digestion spike recovery did not fall within the acceptance window of 75 to 125 percent, then a post-digestion spike monitors instrument performance and matrix effects. If both the pre- and post-digestion spike recoveries fell outside the acceptance limits, then the data were flagged to indicate the nonconformance.

3.5.2 Data Review and Validation Summary Before the analytical results were released by the laboratory, both the sample and QC data were carefully reviewed in order to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and spike recoveries were included in control charts, and the resulting data were reviewed to ascertain whether they were within the laboratory defined limits for accuracy and precision. Any nonconforming data were discussed in the data package cover letter and case narrative.

The Level C data packages were reviewed and validated by Heartland Environmental Services, Inc. Data validation is the technical review of a data package using

criteria established in the DQOs and the QAPP. The data were reviewed and validated using the NEESA (1988) guidance document 20.2-047B, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. The data review and validation process is independent of the laboratory's checks because it is impossible to repeat the laboratory's review as not all the raw data were included in the Level C data packages. Heartland prepared a summary of the data review and validation results and these cover letters are included in Appendix B. In the data validation process, qualifiers were added to sample results based on QA/QC problems and limitations of the data with respect to chemical identity, chemical concentration, or both.

The one-letter qualifier flags used in the data summary tables include the following.

Undetected. Analyte was analyzed for but not detected above the method detection limit. When used to qualify common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene, phthalate esters), the concentration of the common laboratory contaminant compound is qualified with a "U" if it less than 10 times the concentration detected in any of the blanks. The concentrations of other contaminants are qualified with a "U" if the contaminant concentration is less than 5 times the associated blank concentration.

J Estimated. The analyte was present, but the reported value may not be accurate or precise. Typically used for organic compound values greater than the method detection limit but less than the contract required detection limit.

B Estimated. The analyte was present, but the reported value may not be accurate or precise. Typically used for inorganic analyte concentrations greater than the instrument detection limit but less than the contract required detection limit.

R Rejected. Data was rejected by the data validator. The "R" flag indicates a significant variance in acceptable laboratory performance. Data flagged with an "R" may still be interpretable depending on the specific circumstances of the analysis and ultimate use of the data.

It is important to note that the data summary forms (included in Appendix B) also may have flags on them and the usage is the same as above with one major exception. Any organic compound that was detected in both the sample and the method blank was flagged with a B for possible laboratory contamination. However, during the data validation process all the target compounds flagged with a B were evaluated. For those compounds detected at a concentration less than 5 times the concentration (10 times the concentration for common laboratory contaminants) in any of the corresponding blanks (both laboratory and field blanks), the qualifying flag was changed to a U for undetected. The qualifying flag was removed from those compounds that were detected at a concentration greater than 5 times the concentration (10 times the concentration for common laboratory contaminants) in the environmental sample.

Once the data were reviewed and validated according to the guidance presented in NEESA 20.2-047B, the data were evaluated using the precision, accuracy, representativeness, comparability, and completeness (PARCCs) criteria included in the DQOs of the Sampling and Analysis Plan (SAP) or U.S. Navy (1991b).

3.5.3 Precision is a measure of the agreement or repeatability of a set of replicate results obtained from duplicate analyses made under the same conditions. Precision was estimated from analytical data and cannot be measured directly. Precision was evaluated using field duplicate samples and laboratory split samples (for example, MS/MSD samples).

The criteria for evaluating precision presented in the SAP was 20 relative percent difference between duplicate results. Those duplicate analytical results that were not within 20 percent were flagged with an M for duplicate precision not met. This goal may not have been realistic for soil samples because of the heterogeneity of the sample matrix; all the soil duplicate results were within a more realistic acceptance window of -50 to +100 relative percent difference.

3.5.4 Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Accuracy also can be estimated from the analytical data, but was not measured directly. For the organic analyses, each of the samples was spiked with a surrogate compound; and for inorganic analyses, each sample was spiked with a known reference material before digestion. Each of these approaches provides a measure of the matrix effects on the analytical accuracy.

Target acceptance ranges for the spike recoveries are included in the analytical method. If the spike recovery fell outside the acceptance windows, then the sample data was qualified as indicated on the data summary tables.

3.4.5 Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition. Representativeness is a subjective parameter and is used to evaluate the efficacy of the sampling plan design. This criteria was satisfied for this project by fully describing the sampling techniques and the rationale used for selecting sampling locations.

3.4.6 Comparability is a qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are: sample collection and handling techniques, sample matrix type, and analytical method. **Comparability is limited by the other PARCC parameters because only when precision and accuracy are known can data sets be compared with confidence. Data from the two rounds of groundwater sampling can be compared directly because the sampling and analysis methods were specified in the SAP, and accuracy and precision data are available.**

3.4.7 Completeness is defined as the percentage of measurements that are judged to be valid compared to the total number of measurements made. Less than **X** percent of the data were rejected during the data review and validation process; therefore, completeness is greater than **XX** percent.

3.4.8 Variances in Analytical Performance No target compounds specified for analysis were rejected by the data validator or were not reported by the laboratory.

3.4.9 Field and Laboratory Contamination This section presents an evaluation of data usability that focuses on specific samples with chemicals reported as detected and accepted during data validation, but were in fact, suspected to be due to laboratory or field sampling contamination. The suspect samples were

compared with their specific laboratory and field QA/QC samples to determine whether the reported concentrations were due to sampling and analytical bias, or were site-derived contaminants.

APPENDIX C-5

BORING LOG

TITLE: U.S. Naval Station, Mayport, FL	**LOG of WELL:** MPT-11-MW03S		**BORING NO.** MPT-11-MW3S
CLIENT: SOUTHERN DIVISION, NAVFACENGCOM			**PROJECT NO:** 7533-61
CONTRACTOR: GROUNDWATER PROTECTION, INC.		**DATE STARTED:** 1/24/92	**COMPLTD:** 1/24/92
METHOD: H.S.A.	**CASE SIZE:** 2"	**SCREEN INT.:** 7-17'	**PROTECTION LEVEL:** D
TOC ELEV.: 9.97 FEET.	**MONITOR INST.:** N/A	**TOT DPTH:** 17 FEET.	**DPTH TO ▽** 9.0 FEET.
LOGGED BY: Larry Smith	**WELL DEVELOPMENT DATE:** N/A		**SITE:** SWMU 12 (Site 11)

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
							SP		
					SAND-fine to medium, lt. gray, w/ shell fragments			Observation	
5									
10					SAND-fine to medium, lt. green, saturated			Observation	▽
15									
					Boring terminated @ 17.0'				
20									

 ABB ENVIRONMENTAL SERVICES, INC.

APPENDIX C-6

APPENDIX IX, GROUNDWATER MONITORING LIST

Table 1
Selected Volatile Organic Compounds from Appendix IX Groundwater Monitoring List (40 CFR 264)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

CAS Number	Common Name	SW-846 USEPA Method
74-87-3	Chloromethane	8240/8010
74-83-9	Bromomethane	8240/8010
75-01-4	Vinyl chloride	8240/8010
75-00-3	Chloroethane	8240/8010
75-09-2	Methylene chloride	8240/8010
67-64-1	Acetone	8240
75-15-0	Carbon disulfide	8240
75-69-4	Trichlorofluoromethane	8240/8010
75-35-4	1,1-Dichloroethylene	8240/8010
75-34-3	1,1-Dichloroethane	8240/8010
540-59-0	1,2-Dichloroethene (total)	8240
67-66-3	Chloroform	8240/8010
107-06-2	1,2-Dichloroethane	8240/8010
78-93-3	2-Butanone	8240
71-55-6	1,1,1-Trichloroethane	8240/8010
56-23-5	Carbon tetrachloride	8240/8010
108-05-4	Vinyl acetate	8240
75-27-4	Bromodichloromethane	8240/8010
78-87-5	1,2-Dichloropropane	8240/8010
10061-01-5	cis-1,3-Dichloropropene	8240/8010
79-01-6	Trichloroethene	8240/8010
124-48-1	Dibromochloromethane	8240/8010
79-00-5	1,1,2-Trichloroethane	8240/8010
71-43-2	Benzene	8240
10061-02-6	trans-1,3-Dichloropropene	8240/8010
110-75-8	2-Chloroethylvinylether	8240/8010
75-25-2	Bromoform	8240/8010
591-78-6	2-Hexanone	8240
108-10-1	4-Methyl-2-pentanone	8240
127-18-4	Tetrachloroethene	8240/8010
79-34-5	1,1,2,2-Tetrachloroethane	8240/8010
108-88-3	Toluene	8240
108-90-7	Chlorobenzene	8240/8010
100-41-4	Ethylbenzene	8240
100-42-5	Styrene	8240
1330-20-7	Xylenes (total)	8240
541-73-1	1,3-Dichlorobenzene	8240/8010

See notes at end of table.

Table 1 (Continued)
Selected Volatile Organic Compounds from Appendix IX
Groundwater Monitoring List (40 CFR 264)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

CAS Number	Common Name	SW-846 USEPA Method
106-46-7	1,4-Dichlorobenzene	8240/8010
95-50-1	1,2-Dichlorobenzene	8240/8010
107-02-8	Acrolein	8240
74-88-4	Iodomethane	8240
107-13-1	Acrylonitrile	8240
74-95-3	Dibromomethane	8240
97-63-2	Ethyl methacrylate	8240
96-18-4	1,2,3-Trichloropropane	8240
110-57-6	trans-1,4-Dichloro-2-butene	8240
75-05-8	Acetonitrile	8240
107-05-1	3-Chloropropene	8240
107-12-0	Propionitrile	8240
126-98-7	Methacrylonitrile	8240
123-91-1	1,4-Dioxane	8240
80-62-6	Methyl methacrylate	8240
106-93-4	1,2-Dibromoethane	8240
630-20-6	1,1,1,2-Tetrachloroethane	8240
96-12-8	1,2-Dibromo-3-chloropropane	8240
76-01-7	Pentachloroethane	8240
78-83-1	Isobutyl alcohol	8240
126-99-8	Chloroprene	8240

Notes: CFR = Code of Federal Regulations.
CAS = chemical abstract service.
SW-846 = U.S. Environmental Protection Agency, 1986 (Final Update 1, 1992).
USEPA = U.S. Environmental Protection Agency.

Table 2
Selected Semivolatile Organic Compounds from Appendix IX Groundwater Monitoring List (40 CFR 264)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

CAS Number	Common Name	SW-846 USEPA Method
62-75-9	N-Nitrosodimethylamine	8270
108-95-2	Phenol	8270
62-53-3	Aniline	8270
111-44-4	bis(2-Chloroethyl)ether	8270
95-57-8	2-Chlorophenol	8270
541-73-1	1,3-Dichlorobenzene	8270
106-46-7	1,4-Dichlorobenzene	8270
100-51-6	Benzyl alcohol	8270
95-50-1	1,2-Dichlorobenzene	8270
95-48-7	2-Methylphenol	8270
39638-32-9	bis(2-Chloroethyl)ether	8270
106-44-5	4-Methylphenol	8270
621-64-7	N-Nitroso-di-n-propylamine	8270
67-72-1	Hexachloroethane	8270
98-95-3	Nitrobenzene	8270
78-59-1	Isophorone	8270
88-75-5	2-Nitrophenol	8270
105-67-9	2,4-Dimethylphenol	8270
65-?5-0	Benzoic acid	8270
111-91-1	bis(2-Chloroethoxy)methane	8270
120-83-2	2,4-Dichlorophenol	8270
120-82-1	1,2,4-Trichlorobenzene	8270
91-20-3	Naphthalene	8270
106-47-8	4-Chloroaniline	8270
87-68-3	Hexachlorobutadiene	8270
59-50-7	4-Chloro-3-methylphenol	8270
91-57-6	2-Methylnaphthalene	8270
77-47-4	Hexachlorocyclopentadiene	8270
88-06-2	2,4,6-Trichlorophenol	8270
95-95-4	2,4,5-Trichlorophenol	8270
91-58-7	2-Chloronaphthalene	8270
88-74-4	2-Nitroaniline	8270
131-11-3	Dimethyl phthalate	8270
208-96-8	Acenaphthylene	8270
606-20-2	2,6-Dinitrotoluene	8270
99-09-2	3-Nitroaniline	8270
83-32-9	Acenaphthene	8270
51-28-5	2,4-Dinitrophenol	8270

See notes at end of table.

Table 2 (Continued)
Selected Semivolatile Organic Compounds from Appendix IX Groundwater Monitoring List (40 CFR 264)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

CAS Number	Common Name	SW-846 USEPA Method
100-02-7	4-Nitrophenol	8270
121-14-2	2,4-Dinitrotoluene	8270
84-66-2	Diethyl phthalate	8270
7005-72-3	4-Chlorophenyl phenyl ether	8270
86-73-7	Fluorene	8270
100-10-6	4-Nitroaniline	8270
534-52-1	4,6-Dinitro-2-methylphenol	8270
86-30-6	N-Nitrosodiphenylamine	8270
122-66-7	1,2-Diphenylhydrazine	8270
101-55-3	4-Bromophenyl phenyl ether	8270
118-74-1	Hexachlorobenzene	8270
87-86-5	Pentachlorophenol	8270
85-01-8	Phenanthrene	8270
120-12-7	Anthracene	8270
84-74-2	Di-n-butyl phthalate	8270
206-44-0	Fluoranthene	8270
129-00-0	Pyrene	8270
85-68-7	Butyl benzyl phthalate	8270
91-94-1	3,3'-Dichlorobenzidine	8270
56-55-3	Benzo[a]anthracene	8270
218-01-9	Chrysene	8270
117-81-7	bis(2-Ethylhexyl)phthalate	8270
117-84-0	Di-n-octyl phthalate	8270
205-99-2	Benzo[b]fluoranthene	8270
207-08-9	Benzo[k]fluoranthene	8270
50-32-8	Benzo[a]pyrene	8270
193-39-5	Indeno(1,2,3-cd)pyrene	8270
53-70-3	Dibenz[a,h]anthracene	8270
191-24-2	Benzo[ghi]perylene	8270
109-06-8	2-Picoline	8270
66-27-3	Methyl methanesulfonate	8270
62-50-0	Ethyl methanesulfonate	8270
98-86-2	Acetophenone	8270
100-75-4	N-Nitrosopiperidine	8270
122-09-8	Phenyl-tert-butylamine	8270
87-65-0	2,6-Dichlorophenol	8270
924-16-3	N-Nitrosodi-n-butylamine	8270
55-18-5	N-Nitrosodiethylamine	8270

See notes at end of table.

Table 2 (Continued)
Selected Semivolatile Organic Compounds from Appendix IX Groundwater Monitoring List (40 CFR 264)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

CAS Number	Common Name	SW-846 USEPA Method
930-55-2	N-Nitrosopyrrolidine	8270
92-87-5	Benzidine	8270
95-94-3	1,2,4,5-Tetrachlorobenzene	8270
608-93-5	Pentachlorobenzene	8270
134-32-7	1-Naphthylamine	8270
91-59-8	2-Naphthylamine	8270
58-90-2	2,3,4,6-Tetrachlorophenol	8270
122-39-4	Diphenylamine	8270
62-44-2	Phenacetin	8270
92-67-1	4-Aminobiphenyl	8270
82-68-8	Pentachloronitrobenzene	8270
23950-58-5	Pronamide	8270
60-11-7	p-(Dimethylamino)azobenzene	8270
57-97-6	7,12-Dimethylbenz[a]anthracene	8270
56-49-5	Methylcholanthrene	8270
110-86-1	Pyridine	8270
10595-95-6	N-Nitrosomethylethylamine	8270
59-89-2	N-Nitrosomorpholine	8270
95-53-4	o-Toluidine	8270
108-39-4	3-Methylphenol	8270
1888-71-7	Hexachloropropene	8270
106-50-3	p-Phenylenediamine	8270
94-59-7	Safrole	8270
120-58-1	Isosafrole	8270
130-15-4	1,4-Naphthoquinone	8270
99-65-0	1,3-Dinitrobenzene	8270
99-55-8	5-Nitro-o-toluidine	8270
99-35-4	1,3,5-Trinitrobenzene	8270
56-57-5	4-Nitroquinoline 1-oxide	8270
91-80-5	Methapyrilene	8270
119-93-7	3,3'-Dimethylbenzidine	8270
53-96-3	2-Acetylaminofluorene	8270
70-30-4	Hexachlorophene	8270

Notes: CFR = Code of Federal Regulations.
CAS = chemical abstract service.
SW-846 = U.S. Environmental Protection Agency, 1986 (Final Update 1, 1992).
USEPA = U.S. Environmental Protection Agency.

Table 3
Selected Organo-chlorine Pesticides and Polychlorinated Biphenyls (PCBs) From Appendix IX Groundwater Monitoring List (40 CFR 264)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

CAS Number	Common Name	SW-846 USEPA Method
319-84-6	alpha-BHC	8080
319-85-7	beta-BHC	8080
319-86-8	delta-BHC	8080
58-89-9	gamma-BHC; lindane	8080
76-44-8	Heptachlor	8080
309-00-2	Aldrin	8080
1024-57-3	Heptachlor epoxide	8080
959-98-8	Endosulfan I	8080
60-57-1	Dieldrin	8080
72-55-9	4,4'-DDE	8080
72-20-8	Endrin	8080
33213-65-9	Endosulfan II	8080
72-54-8	4,4'-DDD	8080
7421-93-4	Endrin aldehyde	8080
1031-07-8	Endosulfan sulfate	8080
50-29-3	4,4'-DDT	8080
72-43-5	Methoxychlor	8080
53494-70-5	Endrin ketone	8080
57-74-09	Chlordane	8080
8001-35-2	Toxaphene	8080
12674-11-2	Aroclor-1016	8080
11104-28-2	Aroclor-1221	8080
11141-16-5	Aroclor-1232	8080
53469-21-9	Aroclor-1242	8080
12672-29-6	Aroclor-1248	8080
11097-69-1	Aroclor-1254	8080
11096-82-5	Aroclor-1260	8080
510-15-6	Chlorobenzilate	8080
2303-16-4	Diallate	8080
465-73-6	Isodrin	8080
143-50-0	Kepone	8080

Notes: CFR = Code of Federal Regulations.
CAS = chemical abstract service.
SW-846 = U.S. Environmental Protection Agency, 1986 (Final Update, 1, 1992).
USEPA = U.S. Environmental Protection Agency.

Table 4
Selected Inorganic Analytes from Appendix IX Groundwater Monitoring List (40 CFR 264)

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

CAS Number	Common Name	SW-846 USEPA Method
7440-36-0	Antimony	7040
7440-38-2	Arsenic	7060
7440-39-3	Barium	6010
7440-41-7	Beryllium	6010
7440-43-9	Cadmium	6010
7440-70-2	Calcium	6010
7440-47-3	Chromium	6010
7440-48-4	Cobalt	6010
7440-50-8	Copper	6010
7439-89-6	Iron	6010
7440-92-1	Lead	7420
7439-95-4	Magnesium	6010
7439-96-5	Manganese	6010
7439-97-6	Mercury	7470
7440-02-0	Nickel	6010
7440-49-2	Selenium	7740
7440-22-4	Silver	6010
7440-23-5	Sodium	6010
7440-28-0	Thallium	7840
7440-31-5	Tin	7870
7440-62-2	Vanadium	6010
7440-66-6	Zinc	6010
5955-70-0	Cyanide	9010

Notes: CFR = Code of Federal Regulations.
CAS = chemical abstract service.
SW-846 = U.S. Environmental Protection Agency, 1986 (Final Update 1, 1992).
USEPA = U.S. Environmental Protection Agency.

APPENDIX C-7

DATA VALIDATION NARRATIVES

DATA ASSESSMENT AND NARRATIVE

PURGEABLE HALOCARBONS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8010/8020; and NEESA Level E requirements. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # GN01244, LAB Reference # 23885

Holding Times

The holding times for all of the samples were met. No qualifications are required.

Initial and Continuing Calibrations

No information was contained in the data package regarding initial or continuing calibrations. No qualifications were required.

Blanks

The method blanks were included along with a summary identifying association with the samples. There were no positive results reported for target analytes in the blanks. No qualifications were required.

Surrogates

All of the surrogate recoveries for the samples were good and well within the laboratory generated control limits. No qualifications are required.

Matrix Spike/Matrix Spike Duplicate

No information was provided in the data package for an MS/MSD. However, referral was made in the case narrative to compounds which were out of QC criteria in the QC spikes.

DATA ASSESSMENT AND NARRATIVE

PURGEABLE HALOCARBONS

Compound Identification/Quantitation

One positive result was reported in the samples. Chlorobenzene was identified in sample 2QS006. No qualifications were required.

System Performance and Overall Assessment

The overall system performance was apparently good. Results are accepted as reported by the laboratory.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIO

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS WERE REQUIRED

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* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846, Appendix IX, the National Functional Guidelines for Organic Data Review, and NEESA Level C. All comments made within this report should be considered when examining the analytical results (Form I's).

Case # V35071

Holding Times

The holding times for all of the samples were met per the Organic Functional Guidelines and the methodology. No qualifications are required.

Tuning

All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria of the SOW and the Organic Functional Guidelines. No qualifications are required.

Initial Calibrations

The initial calibration that was analyzed by the laboratory for these samples was acceptable for all compound %RSDs and RRFs.

Specific findings:

1. The initial calibration analyzed on 02/08/93 contained compounds with %RSDs greater than 30% RSD. Qualifications are not required because samples were not analyzed following the initial calibration.

   dichlorodifluoromethane

2. The initial calibration analyzed on 02/08/93 contained compounds with RRFs less than 0.05. Qualifications are not required because samples were not analyzed following the initial calibration.

   1,4-dioxane

Continuing calibrations

The continuing calibration that was analyzed with this data package required qualifications for non compliant %Ds and RRFs.

Specific Findings

3. For the samples listed below, the continuing calibration, 93M2V01560/61, contained compounds with %Ds greater than 25%, but less than 50%. For the compounds listed below qualify all positive results as estimated (J).

VBLKW1	chloroethane
MPT-11-1	1,2-dichloroethane (total)
11MW3	2-hexanone
11MW3D	acrolein
2FB005	
2QS006	
TRIP BLANK	
11MW3DMS	
11MW3DMSD	

4. For the samples listed below, the continuing calibration, 93M2V01560/61, contained compounds with %Ds greater than 50%, but less than 90%. For the compounds listed below qualify all positive results as estimated (J) and all non detect results as estimated (UJ).

VBLKW1	acetone
MPT-11-1	2-butanone
11MW3	
11MW3D	
2FB005	
2QS006	
TRIP BLANK	
11MW3DMS	
11MW3DMSD	

Continuing calibrations (continued)

Specific Findings:

5. For the samples listed below, the continuing calibration, 93M2V01560/61, contained compounds with RRFs less than 0.05. For the compounds listed below qualify all positive results as estimated (J) and reject (R) all non detects.

VBLKW1	1,4-dioxane
MPT-11-1	
11MW3	
11MW3D	
2FB005	
2QS006	
TRIP BLANK	
11MW3DMS	
11MW3DMSD	

Internal Standards

All internal standard EICP areas met the EICP internal standard area QA/QC criteria. No qualifications are required.

Method Blanks

The method blank that was analyzed exhibited contamination for acetone. The method blank results will be compared to their associated samples. Refer to the glossary of data qualifiers for a list and definition of the method blank qualifiers: CRQL, U and No Action.

Methods Blanks (continued)

Specific Findings:

6. The following samples have been qualified for blank contamination. The qualifications are for all the blanks.

   <u>acetone - CRQL</u>

   MPT-11-1
   11MW3
   11MW3D
   2FB005
   2QS006
   TRIP BLANK

Trip Blanks

The trip blank that was analyzed exhibited contamination for methylene chloride. The trip blank results will be compared to their associated samples. Refer to the glossary of data qualifiers for a list and definition of the method blank qualifiers: CRQL, U and No Action.

Specific findings:

7. The following samples have been qualified for trip blank contamination. The qualifications are for all the blanks.

   <u>methylene chloride - CRQL</u>

   MPT-11-1
   11MW3

Rinseate Blanks

The rinseate blank exhibited contamination for methylene chloride and chlorobenzene. The qualifications were performed per the trip blank.

Field Blanks

The field blank exhibited contamination for methylene chloride and chlorobenzene. The qualifications were performed per the trip blank.

Surrogates

All of the surrogate recoveries for the samples were within QA/QC limits. No qualification are required.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

For the MS/MSD that was analyzed, all spike recoveries and RPDs were within advisory limits. No qualifications are required.

Compound Identification/Quantitation

No qualifications are required.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL	SPECIFIC FINDINGS
VBLKW1 MPT-11-1 11MW3 11MW3D 2FB005 2QS006 TRIP BLANK 11MW3DMS 11MW3DMSD	chloroethane 1,2-dichloroethane (total) 2-hexanone acrolein	+	J	3
VBLKW1 MPT-11-1 11MW3 11MW3D 2FB005 2QS006 TRIP BLANK 11MW3DMS 11MW3DMSD	acetone 2-butanone	+/-	J/UJ	4
VBLKW1 MPT-11-1 11MW3 11MW3D 2FB005 2QS006 TRIP BLANK 11MW3DMS 11MW3DMSD	1,4-dioxane	+/-	J/R	5

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL	SPECIFIC FINDINGS
MPT-11-1 11MW3 11MW3D 2FB005 2QS006 TRIP BLANK	acetone	+BJ	CRQL 6	
MPT-11-1 11MW3	methylene chloride	+J	CRQL 7	

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QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846, Appendix IX, the National Functional Guidelines for Organic Data Review, and NEESA Level C. All comments made within this report should be considered when examining the analytical results (Form I's).

Case # V23884

Holding Times

The holding times for all of the samples were met per the Organic Functional Guidelines and the methodology. No qualifications are required.

Tuning

All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria of the SOW and the Organic Functional Guidelines. No qualifications are required.

Initial Calibrations

The initial calibration that was analyzed by the laboratory for these samples was acceptable for all compound %RSDs and RRFs.

Initial Calibrations (continued)

Specific findings:

1. The initial calibration analyzed on 11/30/92 and 01/12/93 contained compounds with %RSDs greater than 30% RSD. Qualifications are not required because samples were not analyzed following the initial calibration.

bromomethane
styrene
xylene
2-hexanone
1,3-dichlorobenzene
1,2-dichlorobenzene
1,4-dichlorobenzene
ethyl methacrylate
1,2,3-trichloropropane
1,4-dioxane

2. The initial calibration analyzed on 11/30/92 and 01/12/93 contained compounds with RRFs less than 0.05. Qualifications are not required because samples were not analyzed following the initial calibration.

1,4-dioxane
2-chloroethylvinylether
isobutyl alcohol

Continuing calibrations

The continuing calibration that was analyzed with this data package required qualifications for non compliant %Ds and RRFs.

Continuing Calibrations (continued)

Specific Findings

3. For the samples listed below, the continuing calibration, CSVO027148 and CSXI027149, contained compounds with %Ds greater than 25%, but less than 50%. For the compounds listed below qualify all positive results as estimated (J).

VBLKW1	bromomethane
MPT-11-2	1,4-dioxane
	trichlorofluoromethane
	acrolein

4. For the samples listed below, the continuing calibration, CSVO027148 and CSXI027149, contained compounds with RRFs less than 0.05. For the compounds listed below qualify all positive results as estimated (J) and reject (R) all non detects.

VBLKW1	1,4-dioxane
MPT-11-2	isobutyl alcohol
	2-chloroethylvinylether

Internal Standards

All internal standard EICP areas met the EICP internal standard area QA/QC criteria. No qualifications are required.

Method Blanks

The method blank that was analyzed exhibited contamination for methylene chloride. The method blank results will be compared to their associated samples. Refer to the glossary of data qualifiers for a list and definition of the method blank qualifiers: CRQL, U and No Action.

Method Blanks (continued)

Specific Findings:

5. The following samples have been qualified for blank contamination. The qualifications are for all the blanks.

   <u>methylene chloride - CRQL</u>
   MPT-11-2

Trip Blanks

A trip blank was not submitted with this SDG.

Rinseate Blanks

A rinseate blank was not submitted with this SDG.

Field Blanks

A field blank was not submitted with this SDG.

Surrogates

All of the surrogate recoveries for the samples were within QA/QC limits. No qualification are required.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

For the MS/MSD that was analyzed, all spike recoveries and RPDs were within advisory limits. No qualifications are required.

Compound Identification/Quantitation

No qualifications are required.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL	SPECIFIC FINDINGS
VBLKW1 MPT-11-2	bromomethane 1,4-dioxane trichlorofluoromethane acrolein	+	J	3
VBLKW1 MPT-11-2	1,4-dioxane isobutyl alcohol 2-chloroethylvinylether	+/-	J/R	4
MPT-11-2	methylene chloride	+BJ	CRQL	5

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QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA CLP, 2/88 SOW; the National Functional Guidelines for Organic Data Review, and NEESA Level C. All comments made within this report should be considered when examining the analytical results (Form I's).

Case # S23884

Holding Times

All extraction and analysis holding times were met for all samples per the SOW and the Organic Functional Guidelines. No qualifications are required.

Tuning

All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria of the SOW and the Organic Functional Guidelines. No qualifications are required.

Initial Calibrations

The initial calibration that was analyzed by the laboratory for these samples was not acceptable for all compound %RSDs. The average RRFs for all of the criteria compounds met the initial calibration criteria.

Specific Findings:

1. The initial calibration analyzed on, 01/27/93, contained compounds with %RSDs greater than 30%. No qualifications are required because no samples were analyzed following the calibration.

   7,12-dimethylbenz(a)anthracene

Continuing Calibrations

The continuing calibration that was analyzed with this data package require qualifications for non compliant %Ds for and non criteria calibration compounds. All of the criteria and non criteria compounds met RRF requirements.

Specific Findings:

2. For the samples listed below the continuing calibration ASBA01899/ ASIX018100, contained the following compounds with %Ds greater than 25% but less than 50%. For the compounds listed below qualify all positive results for these compounds as estimated (J).

MPT-11-1	pentachlorophenol
MPT-11-2	4-methylphenol
11MW3	hexachloroethane
11MW3D	benzo(g,h,i)perylene
11MW3DMS	phenol-d_5
11MW3DMSD	hexachlorocyclopentadiene
2QS006	benzoic acid
	2-naphthylamine
	n-nitrosomethylethylamine
	3,3'-dimethylbenzidine

3. For the samples listed below the continuing calibration ASBA01899/ ASIX018100, contained the following compounds with %Ds greater than 50% but less than 90%. For the compounds listed below qualify all positive results for these compounds as estimated (J) and qualify all non detects as estimated (UJ).

MPT-11-1	2,4-dinitrophenol
MPT-11-2	4,6-dinitro-2-methylphenol
11MW3	2-picoline
11MW3D	phenyl-tert-butylamine
11MW3DMS	
11MW3DMSD	
2QS006	

Internal Standards

All of the blank and sample internal standard EICP areas met the EICP internal standard area QA/QC criteria. No qualifications are required.

Method Blanks

The method blanks that were analyzed exhibited contamination for di-n-butylphthalate. The method blank results will be compared to their associated samples. Refer to the glossary of data qualifiers for a list and definition of the method blank qualifiers: CRQL, U and No Action.

Specific Finding:

4. The following samples have been qualified for blank contamination. Qualifications are for all method blanks

   di-n-butylphthalate - U

   MPT-11-1
   MPT-11-2
   11MW3D

   di-n-butylphthalate - CRQL

   11MW3
   2FB005
   2QS006

Surrogates

All of the surrogate recoveries met the QA/QC criteria. No qualifications are required.

Matrix Spike/Matrix Spike Duplicate

The MS/MSD that was analyzed for the semi-volatile samples was not acceptable for all spike recoveries and RPDs. No qualification are required.

Blank Spike/Blank Spike Duplicate

No BS/BSDs associated with this SDG.

Compound Identification/Quantitation

No qualifications are required.

System Performance and Overall Assessment

Overall performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates less than 5% of data required qualification

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL	SPECIFIC FINDINGS
MPT-11-1 MPT-11-2 11MW3 11MW3D 11MW3DMS 11MW3DMSD 2QS006	pentachlorophenol 4-methylphenol hexachloroethane benzo(g,h,i)perylene phenol-d_5 hexachlorocyclopentadiene benzoic acid 2-naphthylamine n-nitrosomethylethylamine 3,3'-dimethylbenzidine	+	J	2
MPT-11-1 MPT-11-2 11MW3 11MW3D 11MW3DMS 11MW3DMSD 2QS006	2,4-dinitrophenol 4,6-dinitro-2-methylphenol 2-picoline phenyl-tert-butylamine	+/-	J/UJ	3
MPT-11-1 MPT-11-2 11MW3D	di-n-butyl-phthalate	+	U	4
11MW3 2FB005 2QS006	di-n-butyl-phthalate	+/-	CRQL	4

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

ORGANOCHLORINE PESTICIDES AND PCBS - Appendix IX

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, GC instrument performance, initial and continuing calibration summaries, analytical sequence, blank analysis results, surrogate recoveries, MS/MSD and Blank Spike results where applicable. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; and NEESA Level C requirements. All comments made within this report should be considered when examining the analytical results (Form Is). Please refer the specific findings found in each category to the Summary of Data Qualification table. This sample delivery group consists of five (5) water samples with one (1) MS/MSD, and one (1) field blank.

LABORATORY NUMBER: 23884

Holding Times

Most extraction hold times were apparently met as indicated by the Chain-of-Custodies and Form 4s included in the package. Sample 2QS006 was extracted one (1) day outside the recommended hold time for water samples. All analytical hold times were met.

Specific Finding

1. All positive and non-detect results for sample 2QS006 are qualified as estimated, J or UJ, due to a slightly exceeded extraction hold time.

GC Instrument Performance

This GC analytical fraction was analyzed utilizing internal standards. All percent breakdowns reported were within the required QC limits. All surrogate retention times were within the required limits. Target compound resolution and potential internal standard or surrogate interferences could not be determined. No qualifications of the reported non-detect results were required based on instrument performance.

Initial Calibration

The single-component pesticides were analyzed using an initial five-point calibration. Only the relative concentrations of the standards used for these calibrations were presented in the limited Level C data package. However, it appears that the reported CRQLs are based on the lowest concentration standard analyzed.

Although it appears that a representative five-point initial calibration was performed, (based on the Form 8) for the multi-component analytes, i.e. Toxaphene, Technical Chlordane and the Aroclors, no information was included in the data package.

Quadratic curves were fit to the single-component initial calibrations. The coefficients of determination presented by the laboratory for these quadratic fits were acceptable. No additional qualification of the reported results were required based on the initial calibration reported.

Continuing Calibrations

All %Ds for all continuing calibrations associated with reported samples were within QC limits. No qualifications were required.

Blanks

The reported Form Is for the Method blanks associated with these samples indicated no confirmed positive results above the reported CRQLs. No qualifications were required.

Surrogate Recoveries

All reported sample surrogate recoveries were within the reported QC limits with the exception of the matrix spike sample, 8SL1ADMS. Recovery limits for the surrogates appear to have been established using appropriate Control Charting procedures by the laboratory. No qualification of the reported MS results was required.

Matrix Spike/Matrix Spike Duplicate

All recoveries and RPDs for the reported MS/MSD results of sample 11MW3D were within reasonable limits. No QC limits were present.

Analyte Identification/Quantitation

Many small peaks were noted in the sample chromatography. No positive results were reported in the water samples or the field blank 2FB005. All reported results for these samples are accepted with the noted qualifications based on the limited information contained in the NEESA Level C deliverables package.

QUALIFICATION CODES

U	=	Not detected
J	=	Reported result is quantitatively estimated
UJ	=	Reported quantitation limit is qualified as estimated
R	=	Result is rejected and unusable
N	=	Result is negated, do not consider result in sample
NJ	=	Presumptive evidence for the presence of the material at an estimated concentration

Validation specific findings are noted in numerical form on the Form Is in this data validation report. These specific finding footnotes reflect the conclusions found in the data validation process that resulted in the qualifications of the data.

SUMMARY OF GC DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL	SPECIFIC FINDINGS
2QS006	ALL	U	UJ	1

* DL denotes the Form I qualifier/value supplied by the laboratory
QL denotes the qualifier/value used by Validator

\+ in the DL column denotes a positive result
\+ in the QL column denotes a reviewer revised result

DATA ASSESSMENT NARRATIVE

KEPONE

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, GC instrument performance, initial and continuing calibration summaries, analytical sequence, blank analysis results, surrogate recoveries, MS/MSD and Blank Spike results where applicable. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; and NEESA Level C requirements. All comments made within this report should be considered when examining the analytical results (Form Is). Please refer the specific findings found in each category to the Summary of Data Qualification table.
This sample delivery group consisted of five (5) water samples, and one (1) field blank sample.

LABORATORY NUMBER: 23884

Holding Times

Most extraction hold times were apparently met as indicated by the Chain-of-Custodies and Form 4s included in the package. One sample, 2QS006, was extracted one day outside the recommended hold time for water samples. All analytical hold times were apparently met.

Specific Finding

1. The non-detect result for Kepone in sample 2QS006 is qualified as estimated due to a slightly exceeded hold time.

GC Instrument Performance

This GC analytical fraction was analyzed utilizing internal standards. All surrogate retention times were within the required limits. No qualifications of the reported non-detect results were required based on instrument performance.

Initial Calibration

This single-component pesticide was analyzed using an initial five-point calibration on one column only. The initial calibration was acceptably linear. No additional qualification of the reported results were required based on the initial calibration reported.

Continuing Calibrations

All %Ds for all continuing calibrations associated with reported samples were within QC limits. No additional qualification of the reported non-detect results was required.

Blanks

The reported Form I for the Method blank indicated no confirmed positive results above the reported CRQLs. No qualifications were required.

Surrogate Recoveries

All reported sample surrogate recoveries were within the reported QC limits. Recovery limits for the surrogates appear to have been established using appropriate Control Charting procedures by the laboratory.

Matrix Spike/Matrix Spike Duplicate

No MS/MSD was included in this data package. A QC chart was included in this data package for a blank spike of Kepone in water. The recovery was acceptable. No qualifications were required.

Analyte Identification/Quantitation

The field duplicate samples, 11MW3 and 11MW3D, exhibited no positive results. The field blank sample, 2FB005, was clean. No positive results were reported in the other samples. All reported non-detect results for these samples are accepted without additional qualification based on the limited information contained in the NEESA Level C deliverables package.

QUALIFICATION CODES

U	=	Not detected
J	=	Reported result is quantitatively estimated
UJ	=	Reported quantitation limit is qualified as estimated
R	=	Result is rejected and unusable
N	=	Result is negated, do not consider result in sample
NJ	=	Presumptive evidence for the presence of the material at an estimated concentration

Validation specific findings are noted in numerical form on the Form Is in this data validation report. These specific finding footnotes reflect the conclusions found in the data validation process that resulted in the qualifications of the data.

SUMMARY OF KEPONE DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL	SPECIFIC FINDINGS
2QS006	KEPONE	U	UJ	1

* DL denotes the Form I qualifier/value supplied by the laboratory
QL denotes the qualifier/value used by Validator

\+ in the DL column denotes a positive result
\+ in the QL column denotes a reviewer revised result

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations. All comments made within this report should be considered when examining the analytical results (Form Is).
This data package consisted of results from **Mayport, SDG# 23884**, the analysis of six (6) field water samples and one Matrix Spike and Duplicate pair for TAL Metals. Overall, the inorganic data quality was fair. Level C data validation reviews rely on the laboratory filling out the forms correctly. The All protocol requirements were followed.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Section 3 of the NEESA (20.2-047B) QA protocol.

Calibration

No deficiencies in this section.

Preparation and Field Blanks

1. The preparation and field blanks exhibited contamination for the following elements.

Calcium	156.0	ug/l
Iron	23.6	ug/l
Manganese	0.92	ug/l
Lead	1.38	ug/l

The USEPA requires that all sample values below five times the preparation blank contamination be qualified as non-detect, "U".

2. The preparation blank exhibited negative bias for the following element.

   Copper -20.6 ug/l

   The USEPA requires that the reviewer evaluate the negative bias. Heartland ESI's qualifies all sample values within ten times the preparation blank contamination and non-detect results are qualified as estimated, "J" or "UJ".

Interferences

No significant interferences were observed.

Spike Recovery

3. The Matrix Spike recoveries for Selenium and Tin were below the lower control limit. All non-detect and positive results are qualified as estimated, "UJ" or "J".

Duplicate

4. The Duplicate analysis for Tin was outside the control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

MSA

No deficiencies in this section.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All water samples	Ca, Fe, Mn and Pb.	+	U	1
All water samples	Cu	+/U	J/UJ	2
All water samples	Se and Sn.	+/U	J/UJ	3
All water samples	Sn.	+/U	J/UJ	4

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

1993 Field Investigation Data and Results

CLIENT SAMPLE ID

MPT-11-1

REPORT OF ANALYTICAL RESULTS
PURGEABLE HALOCARBONS

Date collected:	1/27/93	Sample Group:	GN-01244
Date extracted:	N/A	Lab Sample ID:	GN-01244001
Date analyzed:	2/1/93	Lab file 1 ID:	B01C009
Matrix:	Water	Lab file 2 ID:	B01D009
Method:	8010	Dilution Factor:	1.0000
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
75-00-3	Chloroethane	1.0	U
100-75-8	2-Chloroethyl vinyl ether	1.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
74-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-4	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
75-09-2	Methylene chloride (Dichloromethane)	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
75-01-4	Vinyl chloride	1.0	U
	SURROGATE		96 % Rec.

CLIENT SAMPLE ID

MPT-11-2

REPORT OF ANALYTICAL RESULTS
PURGEABLE HALOCARBONS

Date collected:	1/27/93	Sample Group:	GN-01244
Date extracted:	N/A	Lab Sample ID:	GN-01244002
Date analyzed:	2/4/93	Lab file 1 ID:	B03C022
Matrix:	Water	Lab file 2 ID:	B030022
Method:	8010	Dilution Factor:	1.0000
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
75-00-3	Chloroethane	1.0	U
100-75-8	2-Chloroethyl vinyl ether	1.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
74-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-4	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
75-09-2	Methylene chloride (Dichloromethane)	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
	SURROGATE		98 % Rec.

CLIENT SAMPLE ID

11MW3

REPORT OF ANALYTICAL RESULTS
PURGEABLE HALOCARBONS

Date collected:	1/27/93	Sample Group:	GN-01244
Date extracted:	N/A	Lab Sample ID:	GN-01244003
Date analyzed:	2/4/93	Lab file 1 ID:	B03C021
Matrix:	Water	Lab file 2 ID:	B03D021
Method:	8010	Dilution Factor:	1.0000
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
75-00-3	Chloroethane	1.0	U
100-75-8	2-Chloroethyl vinyl ether	1.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
74-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-4	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
75-09-2	Methylene chloride (Dichloromethane)	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
	SURROGATE		96 % Rec.

CLIENT SAMPLE ID

11MW3D

REPORT OF ANALYTICAL RESULTS
PURGEABLE HALOCARBONS

Date collected:	1/27/93	Sample Group:	GN-01244
Date extracted:	N/A	Lab Sample ID:	GN-01244004
Date analyzed:	2/2/93	Lab file 1 ID:	B01C019
Matrix:	Water	Lab file 2 ID:	B01D019
Method:	8010	Dilution Factor:	1.0000
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
75-00-3	Chloroethane	1.0	U
100-75-8	2-Chloroethyl vinyl ether	1.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
74-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-4	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
75-09-2	Methylene chloride (Dichloromethane)	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
	SURROGATE		93 % Rec.

CLIENT SAMPLE ID

2FB005

REPORT OF ANALYTICAL RESULTS
PURGEABLE HALOCARBONS

Date collected:	1/27/93	Sample Group:	GN-01244
Date extracted:	N/A	Lab Sample ID:	GN-01244005R1
Date analyzed:	2/4/93	Lab file 1 ID:	BC3C019
Matrix:	Water	Lab file 2 ID:	BC3D019
Method:	8010	Dilution Factor:	1.0000
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	1.4
75-00-3	Chloroethane	1.0	U
100-75-8	2-Chloroethyl vinyl ether	1.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
74-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-4	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
75-09-2	Methylene chloride (Dichloromethane)	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
	SURROGATE		93 % Rec.

CLIENT SAMPLE ID

2QS006

REPORT OF ANALYTICAL RESULTS
PURGEABLE HALOCARBONS

Date collected:	1/27/93	Sample Group:	GN-01244
Date extracted:	N/A	Lab Sample ID:	GN-012440026R1
Date analyzed:	2/4/93	Lab file 1 ID:	B03C020
Matrix:	Water	Lab file 2 ID:	B03D020
Method:	8010	Dilution Factor:	1.0000
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	1.0
75-00-3	Chloroethane	1.0	U
100-75-8	2-Chloroethyl vinyl ether	1.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
74-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-4	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
75-09-2	Methylene chloride (Dichloromethane)	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
	SURROGATE		99 % Rec.

FORM I GC

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET
A M E N D E D

EPA SAMPLE NO.

MPT-11-1

Lab Name: CH2M HILL/LRD Contract: V35071

Lab Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2V01571

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. ____ Date Analyzed: 02/08/93

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~~ 1	~~U~~ J	7
67-64-1	Acetone	~~10~~ 2	~~U~~ B	U 6, 4
75-15-0	Carbon disulfide	5	U	
75-69-4	Trichlorofluoromethane	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	
78-83-1	Isobutanol	200	U	
78-93-3	2-Butanone	10	U	U 4
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	
110-75-8	2-Chloroethylvinylether	10	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	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

A M E N D E D

EPA SAMPLE NO.

MPT-11-1

Lab Name: CH2M HILL/LRD Contract: V35071

Lab Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2V01571

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. _____ Date Analyzed: 02/08/93

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
1330-20-7	Xylenes (total)		5	U
541-73-1	1,3-Dichlorobenzene		5	U
106-46-7	1,4-Dichlorobenzene		5	U
95-50-1	1,2-Dichlorobenzene		5	U
75-71-8	Dichlorodifluoromethane		10	U
107-02-8	Acrolein		100	U
74-88-4	Iodomethane		10	U
107-13-1	Acrylonitrile		100	U
74-95-3	Dibromomethane		5	U
97-63-2	Ethyl methacrylate		5	U
96-18-4	1,2,3-Trichloropropane		5	U
110-57-6	trans-1,4-Dichloro-2-butene		5	U
75-05-8	Acetonitrile		100	U
107-05-1	3-Chloropropene		5	U
107-12-0	Propionitrile		100	U
126-98-7	Methacrylonitrile		5	U
123-91-1	1,4-Dioxane		~~200~~	~~U~~ R J
80-62-6	Methyl methacrylate		10	U
106-93-4	1,2-Dibromoethane		5	U
630-20-6	1,1,1,2-Tetrachloroethane		5	U
96-12-8	1,2-Dibromo-3-chloropropane		10	U
76-01-7	Pentachloroethane		10	U
126-99-8	Chloroprene		200	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

A M E N D E D

EPA SAMPLE NO.

11MW3

Lab Name: CH2M HILL/LRD Contract: V35071

Lab Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2VO1572

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. _____ Date Analyzed: 02/08/93

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	~~5.2~~	~~B~~ U 7
67-64-1	Acetone	10.2	~~BJ~~ U 6,4
75-15-0	Carbon disulfide	5	U
75-69-4	Trichlorofluoromethane	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	1	J
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-83-1	Isobutanol	200	U
78-93-3	2-Butanone	10	U 4
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
110-75-8	2-Chloroethylvinylether	10	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

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

A M E N D E D

EPA SAMPLE NO.

11MW3

Lab Name: CH2M HILL/LRD Contract: V35071

Lab Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2VO1572

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. ____ Date Analyzed: 02/08/93

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1330-20-7	Xylenes (total)	5	U
541-73-1	1,3-Dichlorobenzene	5	U
106-46-7	1,4-Dichlorobenzene	5	U
95-50-1	1,2-Dichlorobenzene	5	U
75-71-8	Dichlorodifluoromethane	10	U
107-02-8	Acrolein	100	U
74-88-4	Iodomethane	10	U
107-13-1	Acrylonitrile	100	U
74-95-3	Dibromomethane	5	U
97-63-2	Ethyl methacrylate	5	U
96-18-4	1,2,3-Trichloropropane	5	U
110-57-6	trans-1,4-Dichloro-2-butene	5	U
75-05-8	Acetonitrile	100	U
107-05-1	3-Chloropropene	5	U
107-12-0	Propionitrile	100	U
126-98-7	Methacrylonitrile	5	U
123-91-1	1,4-Dioxane	~~200~~	~~U~~ K
80-62-6	Methyl methacrylate	10	U
106-93-4	1,2-Dibromoethane	5	U
630-20-6	1,1,1,2-Tetrachloroethane	5	U
96-12-8	1,2-Dibromo-3-chloropropane	10	U
76-01-7	Pentachloroethane	10	U
126-99-8	Chloroprene	200	U

FORM I VOA 1/87 Rev.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET
A M E N D E D

EPA SAMPLE NO.: 11MW3D

Lab Name: CH2M HILL/LRD Contract: V35071

Lab Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071003

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2VO1573

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. ____ Date Analyzed: 02/08/93

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	U
67-64-1	Acetone	10.3	~~BJ~~ U E, 4
75-15-0	Carbon disulfide	5	U
75-69-4	Trichlorofluoromethane	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	1	J
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-83-1	Isobutanol	200	U
78-93-3	2-Butanone	10	U E 4
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
110-75-8	2-Chloroethylvinylether	10	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

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET
A M E N D E D

EPA SAMPLE NO.: 11MW3D

Lab Name: CH2M HILL/LRD Contract: V35071

Lab Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071003

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2VO1573

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. ____ Date Analyzed: 02/08/93

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
1330-20-7	Xylenes (total)		5	U
541-73-1	1,3-Dichlorobenzene		5	U
106-46-7	1,4-Dichlorobenzene		5	U
95-50-1	1,2-Dichlorobenzene		5	U
75-71-8	Dichlorodifluoromethane		10	U
107-02-8	Acrolein		100	U
74-88-4	Iodomethane		10	U
107-13-1	Acrylonitrile		100	U
74-95-3	Dibromomethane		5	U
97-63-2	Ethyl methacrylate		5	U
96-18-4	1,2,3-Trichloropropane		5	U
110-57-6	trans-1,4-Dichloro-2-butene		5	U
75-05-8	Acetonitrile		100	U
107-05-1	3-Chloropropene		5	U
107-12-0	Propionitrile		100	U
126-98-7	Methacrylonitrile		5	U
123-91-1	1,4-Dioxane		200	U
80-62-6	Methyl methacrylate		10	U
106-93-4	1,2-Dibromoethane		5	U
630-20-6	1,1,1,2-Tetrachloroethane		5	U
96-12-8	1,2-Dibromo-3-chloropropane		10	U
76-01-7	Pentachloroethane		10	U
126-99-8	Chloroprene		200	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET
A M E N D E D

EPA SAMPLE NO.
2FB005

Lab Name: CH2M HILL/LRD Contract: V35071

Lab Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071K04

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2V01574

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. ____ Date Analyzed: 02/08/93

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	1	J
67-64-1	Acetone	102	~~BJ~~ UJ 6, 4
75-15-0	Carbon disulfide	5	U
75-69-4	Trichlorofluoromethane	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
78-83-1	Isobutanol	200	U
78-93-3	2-Butanone	10	U UJ 4
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
110-75-8	2-Chloroethylvinylether	10	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	2	J
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET
A M E N D E D

EPA SAMPLE NO.

2FB005

Lab Name: CH2M HILL/LRD Contract: V35071

1 Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071K04

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2VO1574

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. ____ Date Analyzed: 02/08/93

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1330-20-7	Xylenes (total)	5	U
541-73-1	1,3-Dichlorobenzene	5	U
106-46-7	1,4-Dichlorobenzene	5	U
95-50-1	1,2-Dichlorobenzene	5	U
75-71-8	Dichlorodifluoromethane	10	U
107-02-8	Acrolein	100	U
74-88-4	Iodomethane	10	U
107-13-1	Acrylonitrile	100	U
74-95-3	Dibromomethane	5	U
97-63-2	Ethyl methacrylate	5	U
96-18-4	1,2,3-Trichloropropane	5	U
110-57-6	trans-1,4-Dichloro-2-butene	5	U
75-05-8	Acetonitrile	100	U
107-05-1	3-Chloropropene	5	U
107-12-0	Propionitrile	100	U
126-98-7	Methacrylonitrile	5	U
123-91-1	1,4-Dioxane	~~200~~	~~U~~ K 5
80-62-6	Methyl methacrylate	10	U
106-93-4	1,2-Dibromoethane	5	U
630-20-6	1,1,1,2-Tetrachloroethane	5	U
96-12-8	1,2-Dibromo-3-chloropropane	10	U
76-01-7	Pentachloroethane	10	U
126-99-8	Chloroprene	200	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET
A M E N D E D

EPA SAMPLE NO.

2QS006

Lab Name: CH2M HILL/LRD Contract: V35071

Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071005

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2VO1575

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. ____ Date Analyzed: 02/08/93

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	1	J
67-64-1	Acetone	10 ~~3~~	~~BJ~~ CUE, J
75-15-0	Carbon disulfide	5	U
75-69-4	Trichlorofluoromethane	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
78-83-1	Isobutanol	200	U
78-93-3	2-Butanone	10	U CUE, J
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
110-75-8	2-Chloroethylvinylether	10	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	2	J
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET
A M E N D E D

EPA SAMPLE NO.: 2QS006

Lab Name: CH2M HILL/LRD Contract: V35071

Lab Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071005

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2VO1575

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. ____ Date Analyzed: 02/08/93

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

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

CAS NO.	COMPOUND		Q
1330-20-7	Xylenes (total)	5	U
541-73-1	1,3-Dichlorobenzene	5	U
106-46-7	1,4-Dichlorobenzene	5	U
95-50-1	1,2-Dichlorobenzene	5	U
75-71-8	Dichlorodifluoromethane	10	U
107-02-8	Acrolein	100	U
74-88-4	Iodomethane	10	U
107-13-1	Acrylonitrile	100	U
74-95-3	Dibromomethane	5	U
97-63-2	Ethyl methacrylate	5	U
96-18-4	1,2,3-Trichloropropane	5	U
110-57-6	trans-1,4-Dichloro-2-butene	5	U
75-05-8	Acetonitrile	100	U
107-05-1	3-Chloropropene	5	U
107-12-0	Propionitrile	100	U
126-98-7	Methacrylonitrile	5	U
123-91-1	1,4-Dioxane	~~200~~	~~U~~ K 5
80-62-6	Methyl methacrylate	10	U
106-93-4	1,2-Dibromoethane	5	U
630-20-6	1,1,1,2-Tetrachloroethane	5	U
96-12-8	1,2-Dibromo-3-chloropropane	10	U
76-01-7	Pentachloroethane	10	U
126-99-8	Chloroprene	200	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET
A M E N D E D

EPA SAMPLE NO.

TRIP_BLANK

Lab Name: CH2M HILL/LRD Contract: V35071

Lab Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071K06

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2VO1576

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. ____ Date Analyzed: 02/08/93

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	2	J
67-64-1	Acetone	10.9	~~BJ~~ U 6,4
75-15-0	Carbon disulfide	5	U
75-69-4	Trichlorofluoromethane	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
78-83-1	Isobutanol	200	U
78-93-3	2-Butanone	10	U U 4
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
110-75-8	2-Chloroethylvinylether	10	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

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET
A M E N D E D

EPA SAMPLE NO.

TRIP_BLANK

Lab Name: CH2M HILL/LRD Contract: V35071

Lab Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix: (soil/water) WATER Lab Sample ID: 35071K06

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 93M2VO1576

Level: (low/med) LOW Date Received: 02/04/93

% Moisture: not dec. ____ Date Analyzed: 02/08/93

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1330-20-7	Xylenes (total)	5	U
541-73-1	1,3-Dichlorobenzene	5	U
106-46-7	1,4-Dichlorobenzene	5	U
95-50-1	1,2-Dichlorobenzene	5	U
75-71-8	Dichlorodifluoromethane	10	U
107-02-8	Acrolein	100	U
74-88-4	Iodomethane	10	U
107-13-1	Acrylonitrile	100	U
74-95-3	Dibromomethane	5	U
97-63-2	Ethyl methacrylate	5	U
96-18-4	1,2,3-Trichloropropane	5	U
110-57-6	trans-1,4-Dichloro-2-butene	5	U
75-05-8	Acetonitrile	100	U
107-05-1	3-Chloropropene	5	U
107-12-0	Propionitrile	100	U
126-98-7	Methacrylonitrile	5	U
123-91-1	1,4-Dioxane	~~200~~	U → R
80-62-6	Methyl methacrylate	10	U
106-93-4	1,2-Dibromoethane	5	U
630-20-6	1,1,1,2-Tetrachloroethane	5	U
96-12-8	1,2-Dibromo-3-chloropropane	10	U
76-01-7	Pentachloroethane	10	U
126-99-8	Chloroprene	200	U

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: CH2M HILL/LRD Contract: V35071

Code: _____ Case No.: V35071 SAS No.: _____ SDG No.: GC-MS

Matrix Spike - EPA Sample No.: 11MW3D

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	50.0	0	50.3	101	61-145
Trichloroethene	50.0	0	46.6	93	71-120
Benzene	50.0	0	48.5	97	76-127
Toluene	50.0	0	50.4	101	76-125
Chlorobenzene	50.0	0	49.4	99	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	50.0	47.9	96	5	14	61-145
Trichloroethene	50.0	45.7	91	2	14	71-120
Benzene	50.0	47.9	96	1	11	76-127
Toluene	50.0	48.1	96	5	13	76-125
Chlorobenzene	50.0	47.7	95	4	13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS: CLP,V35071,,11MW3D,L,W,35071003,V,EPA,
VOA DIL=1X SPG4

ORGANICS ANALYSIS DATA SHEET

La atory Name: CH2M HILL/MGM
Lab Sample ID: 23884002
Client Sample ID: MPT-11-2

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: ____

Date Extracted: ____
Date Analyzed: 02/03/93
Dilution Factor: 1.0

VOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
74-87-3	Chloromethane	10	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
74-83-9	Bromomethane	10	U	108-88-3	Toluene	5	U
75-01-4	Vinyl Chloride	10	U	108-90-7	Chlorobenzene	5	U
75-00-3	Chloroethane	10	U	100-41-4	Ethylbenzene	5	U
75-09-2	Methylene Chloride	5.2 ~~BJ~~	U	100-42-5	Styrene	5	U
67-64-1	Acetone	11		1330-20-7	Xylene (total)	5	U
75-15-0	Carbon Disulfide	5	U	541-73-1	1,3-Dichlorobenzene	5	U
75-69-4	Trichlorofluoromethane	5	U	106-46-7	1,4-Dichlorobenzene	5	U
75-35-4	1,1-Dichloroethene	5	U	95-50-1	1,2-Dichlorobenzene	5	U
75-34-3	1,1-Dichloroethane	5	U	75-71-8	Dichlorodifluoromethane	10	U
540-59-0	1,2-Dichloroethene (total)	5	U	107-02-8	Acrolein	100	U
67-66-3	Chloroform	5	U	74-88-4	Iodomethane	10	U
107-06-2	1,2-Dichloroethane	5	U	107-13-1	Acrylonitrile	100	U
78-93-3	2-Butanone	10	U	74-95-3	Dibromomethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U	97-63-2	Ethyl Methacrylate	5	U
56-23-5	Carbon Tetrachloride	5	U	96-18-4	1,2,3-Trichloropropane	5	U
108-05-4	Vinyl Acetate	10	U	110-57-6	Trans-1,4-Dichloro-2-Butene	5	U
75-27-4	Bromodichloromethane	5	U	75-05-8	Acetonitrile	100	U
78 -7-5	1,2-Dichloropropane	5	U	107-05-1	3-Chloropropene	5	U
1(.-01-5	cis-1,3-Dichloropropene	5	U	107-12-0	Propionitrile	100	U
79-01-6	Trichloroethene	5	U	126-98-7	Methacrylonitrile	5	U
124-48-1	Dibromochloromethane	5	U	123-91-1	1,4-Dioxane	~~200~~	~~U~~ R4
79-00-5	1,1,2-Trichloroethane	5	U	80-62-6	Methyl Methacrylate	10	U
71-43-2	Benzene	5	U	106-93-4	1,2-Dibromoethane	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U	630-20-6	1,1,1,2-Tetrachloroethane	5	U
110-75-8	2-Chloroethylvinylether	~~10~~	~~U~~ R4	96-12-8	1,2-Dibromo-3-Chloropropane	10	U
75-25-2	Bromoform	5	U	76-01-7	Pentachloroethane	10	U
591-78-6	2-Hexanone	10	U	78-83-1	Isobutyl alcohol	~~200~~	~~U~~ R4
108-10-1	4-Methyl-2-Pentanone	10	U	126-99-8	Chloroprene	200	U
127-18-4	Tetrachloroethene	5	U				

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.

ORGANICS ANALYSIS DATA SHEET Page 1

ratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 02/01/93
Lab Sample ID: 23884001 Sample Matrix: WATER Date Analyzed: 03/01/93
Client Sample ID: MPT-11-1 Percent Moisture: Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
62-75-9	N-Nitrosodimethylamine . .	10	U	121-14-2	2,4-Dinitrotoluene	10	U
108-95-2	Phenol	10	U	84-66-2	Diethylphthalate	10	U
62-53-3	Aniline	10	U	7005-72-3	4-Chlorophenyl-phenylether	10	U
111-44-4	bis(2-Chloroethyl)Ether .	10	U	86-73-7	Fluorene	10	U
95-57-8	2-Chlorophenol	10	U	100-01-6	4-Nitroaniline	50	U
541-73-1	1,3-Dichlorobenzene . . .	10	U	534-52-1	4,6-Dinitro-2-Methylphenol	50	~~U~~ UJ 3
106-46-7	1,4-Dichlorobenzene . . .	10	U	86-30-6	N-Nitrosodiphenylamine (1)	10	U
100-51-6	Benzyl Alcohol	10	U	122-39-4	and Diphenylamine (1) . .		
95-50-1	1,2-Dichlorobenzene . . .	10	U	122-66-7	1,2-Diphenylhydrazine . .	10	U
95-48-7	2-Methylphenol	10	U	101-55-3	4-Bromophenyl-phenylether	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U	118-74-1	Hexachlorobenzene	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U	87-86-5	Pentachlorophenol	50	U
67-72-1	Hexachloroethane	10	U	85-01-8	Phenanthrene	10	U
98-95-3	Nitrobenzene	10	U	120-12-7	Anthracene	10	U
78-59-1	Isophorone	10	U	84-74-2	Di-n-Butylphthalate . . .	11	~~U~~ U 4
88-75-5	2-Nitrophenol	10	U	206-44-0	Fluoranthene	10	U
105-67-9	2,4-Dimethylphenol	10	U	129-00-0	Pyrene	10	U
65-85-0	Benzoic Acid	50	U	85-68-7	Butylbenzylphthalate . . .	10	U
11[illegible]91-1	bis(2-Chloroethoxy)Methane	10	U	91-94-1	3,3'-Dichlorobenzidine . .	20	U
[illegible]83-2	2,4-Dichlorophenol	10	U	56-55-3	Benzo(a)Anthracene	10	U
120-82-1	1,2,4-Trichlorobenzene . .	10	U	218-01-9	Chrysene	10	U
91-20-3	Naphthalene	10	U	117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
106-47-8	4-Chloroaniline	10	U	117-84-0	Di-n-Octyl Phthalate . . .	10	U
87-68-3	Hexachlorobutadiene . . .	10	U	205-99-2	Benzo(b)Fluoranthene . . .	10	U
59-50-7	4-Chloro-3-Methylphenol .	10	U	207-08-9	Benzo(k)Fluoranthene . . .	10	U
91-57-6	2-Methylnaphthalene . . .	10	U	50-32-8	Benzo(a)Pyrene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U	193-39-5	Indeno(1,2,3-cd)Pyrene . .	10	U
88-06-2	2,4,6-Trichlorophenol . .	10	U	53-70-3	Dibenz(a,h)Anthracene . .	10	U
95-95-4	2,4,5-Trichlorophenol . .	50	U	191-24-2	Benzo(g,h,i)Perylene . . .	10	U
91-58-7	2-Chloronaphthalene . . .	10	U	109-06-8	2-Picoline	50	~~U~~ UJ 3
88-74-4	2-Nitroaniline	50	U	66-27-3	Methyl methanesulfonate .	10	U
131-11-3	Dimethylphthalate	10	U	62-50-0	Ethyl methanesulfonate . .	10	U
208-96-8	Acenaphthylene	10	U	98-86-2	Acetophenone	10	U
606-20-2	2,6-Dinitrotoluene	10	U	100-75-4	N-Nitrosopiperidine . . .	10	U
99-09-2	3-Nitroaniline	50	U	122-09-8	Phenyl-tert-butylamine . .	50	~~U~~ UJ 3
83-32-9	Acenaphthene	10	U	87-65-0	2,6-Dichlorophenol	10	U
51-28-5	2,4-Dinitrophenol	50	~~U~~ UJ 3	924-16-3	N-Nitroso-di-n-butylamine	10	U
100-02-7	4-Nitrophenol	50	U	55-18-5	N-Nitrosodiethylamine . .	10	U
132-64-9	Dibenzofuran	10	U	930-55-2	N-Nitrosopyrrolidine . . .	10	U

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
) - N-Nitrosodiphenylamine and Dipehnylamine cannot be separated.

Form I

000059
000049 MTF

Laboratory Name: CH2M HILL/MGM
Sample ID: 23884001
Client Sample ID: MPT-11-1

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: ____

Date Extracted: 02/01/93
Date Analyzed: 03/01/93
Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
92-87-5	Benzidine	50	U	94-59-7	Safrole	50	U
95-94-3	1,2,4,5-Tetrachlorobenzene	50	U	120-58-1	Isosafrole	50	U
608-93-5	Pentachlorobenzene	50	U	130-15-4	1,4-Naphthoquinone	50	U
134-32-7	1-Naphthylamine	50	U	99-65-0	1,3-Dinitrobenzene	10	U
91-59-8	2-Naphthylamine	50	U	99-55-8	5-Nitro-o-toluidine	10	U
58-90-2	2,3,4,6-Tetrachlorophenol	10	U	99-35-4	1,3,5-Trinitrobenzene	10	U
62-44-2	Phenacetin	10	U	56-57-5	4-Nitroquinoline-1-oxide	10	U
92-67-1	4-Aminobiphenyl	50	U	91-80-5	Methapyrilene	50	U
82-68-8	Pentachloronitrobenzene	50	U	140-57-8	Aramite	50	U
23950-58-5	Pronamide	10	U	119-93-7	3,3'-Dimethylbenzidine	10	U
60-11-7	p-Dimethylaminoazobenzene	10	U	53-96-3	2-Acetamidofluorene	10	U
57-97-6	7,12-Dimethylbenz(a)Anthrac	10	U	70-30-4	Hexachlorophene	50	U
56-49-5	3-Methylcholanthrene	10	U				
110-86-1	Pyridine	50	U				
10595-95-6	N-Nitrosomethylethylamine	10	U				
59-89-2	N-Nitrosomorpholine	10	U				
95-53-4	o-Toluidine	10	U				
NA	* 3- & 4- Methylphenol	20	U				
1888-71-7	Hexachloropropene	50	U				
106-50-3	p-Phenylenediamine	50	U				

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
* - 3-Methylphenol and 4-Methylphenol coelute and cannot be separated.

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 02/01/93
Sample ID: 23884002 Sample Matrix: WATER Date Analyzed: 03/01/93
Client Sample ID: MPT-11-2 Percent Moisture: Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
62-75-9	N-Nitrosodimethylamine . .	10	U	121-14-2	2,4-Dinitrotoluene	10	U
108-95-2	Phenol	22		84-66-2	Diethylphthalate	10	U
62-53-3	Aniline	10	U	7005-72-3	4-Chlorophenyl-phenylether	10	U
111-44-4	bis(2-Chloroethyl)Ether .	10	U	86-73-7	Fluorene	10	U
95-57-8	2-Chlorophenol	10	U	100-01-6	4-Nitroaniline	50	U
541-73-1	1,3-Dichlorobenzene . . .	10	U	534-52-1	4,6-Dinitro-2-Methylphenol	50	U
106-46-7	1,4-Dichlorobenzene . . .	10	U	86-30-6	N-Nitrosodiphenylamine (1)	10	U
100-51-6	Benzyl Alcohol	10	U	122-39-4	and Diphenylamine (1) . .		
95-50-1	1,2-Dichlorobenzene . . .	10	U	122-66-7	1,2-Diphenylhydrazine . .	10	U
95-48-7	2-Methylphenol	10	U	101-55-3	4-Bromophenyl-phenylether	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U	118-74-1	Hexachlorobenzene	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U	87-86-5	Pentachlorophenol	50	U
67-72-1	Hexachloroethane	10	U	85-01-8	Phenanthrene	10	U
98-95-3	Nitrobenzene	10	U	120-12-7	Anthracene	10	U
78-59-1	Isophorone	10	U	84-74-2	Di-n-Butylphthalate . . .	11	U
88-75-5	2-Nitrophenol	10	U	206-44-0	Fluoranthene	10	U
105-67-9	2,4-Dimethylphenol	10	U	129-00-0	Pyrene	10	U
65-85-0	Benzoic Acid	50	U	85-68-7	Butylbenzylphthalate . . .	10	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U	91-94-1	3,3'-Dichlorobenzidine . .	20	U
[illegible]3-2	2,4-Dichlorophenol	10	U	56-55-3	Benzo(a)Anthracene	10	U
[illegible].2-1	1,2,4-Trichlorobenzene . .	10	U	218-01-9	Chrysene	10	U
91-20-3	Naphthalene	10	U	117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
106-47-8	4-Chloroaniline	10	U	117-84-0	Di-n-Octyl Phthalate . . .	10	U
87-68-3	Hexachlorobutadiene . . .	10	U	205-99-2	Benzo(b)Fluoranthene . . .	10	U
59-50-7	4-Chloro-3-Methylphenol .	10	U	207-08-9	Benzo(k)Fluoranthene . . .	10	U
91-57-6	2-Methylnaphthalene . . .	10	U	50-32-8	Benzo(a)Pyrene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U	193-39-5	Indeno(1,2,3-cd)Pyrene . .	10	U
88-06-2	2,4,6-Trichlorophenol . .	10	U	53-70-3	Dibenz(a,h)Anthracene . .	10	U
95-95-4	2,4,5-Trichlorophenol . .	50	U	191-24-2	Benzo(g,h,i)Perylene . . .	10	U
91-58-7	2-Chloronaphthalene . . .	10	U	109-06-8	2-Picoline	50	U
88-74-4	2-Nitroaniline	50	U	66-27-3	Methyl methanesulfonate .	10	U
131-11-3	Dimethylphthalate	10	U	62-50-0	Ethyl methanesulfonate . .	10	U
208-96-8	Acenaphthylene	10	U	98-86-2	Acetophenone	10	U
606-20-2	2,6-Dinitrotoluene	10	U	100-75-4	N-Nitrosopiperidine . . .	10	U
99-09-2	3-Nitroaniline	50	U	122-09-8	Phenyl-tert-butylamine . .	50	U
83-32-9	Acenaphthene	10	U	87-65-0	2,6-Dichlorophenol	10	U
51-28-5	2,4-Dinitrophenol	50	U	924-16-3	N-Nitroso-di-n-butylamine	10	U
100-02-7	4-Nitrophenol	50	U	55-18-5	N-Nitrosodiethylamine . .	10	U
132-64-9	Dibenzofuran	10	U	930-55-2	N-Nitrosopyrrolidine . . .	10	U

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
(1) - N-Nitrosodiphenylamine and Dipehnylamine cannot be separated.

Laboratory Name: CH2M HILL/MGM
Lab Sample ID: 23884002
Client Sample ID: MPT-11-2

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: _____

Date Extracted: 02/01/93
Date Analyzed: 03/01/93
Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
92-87-5	Benzidine	50	U	94-59-7	Safrole	50	U
95-94-3	1,2,4,5-Tetrachlorobenzene	50	U	120-58-1	Isosafrole	50	U
608-93-5	Pentachlorobenzene	50	U	130-15-4	1,4-Naphthoquinone	50	U
134-32-7	1-Naphthylamine	50	U	99-65-0	1,3-Dinitrobenzene	10	U
91-59-8	2-Naphthylamine	50	U	99-55-8	5-Nitro-o-toluidine	10	U
58-90-2	2,3,4,6-Tetrachlorophenol	10	U	99-35-4	1,3,5-Trinitrobenzene	10	U
62-44-2	Phenacetin	10	U	56-57-5	4-Nitroquinoline-1-oxide	10	U
92-67-1	4-Aminobiphenyl	50	U	91-80-5	Methapyrilene	50	U
82-68-8	Pentachloronitrobenzene	50	U	140-57-8	Aramite	50	U
23950-58-5	Pronamide	10	U	119-93-7	3,3'-Dimethylbenzidine	10	U
60-11-7	p-Dimethylaminoazobenzene	10	U	53-96-3	2-Acetamidofluorene	10	U
57-97-6	7,12-Dimethylbenz(a)Anthrac	10	U	70-30-4	Hexachlorophene	50	U
56-49-5	3-Methylcholanthrene	10	U				
110-86-1	Pyridine	50	U				
10595-95-6	N-Nitrosomethylethylamine	10	U				
59-89-2	N-Nitrosomorpholine	10	U				
95-53-4	o-Toluidine	10	U				
NA	* 3- & 4- Methylphenol	20	U				
1888-71-7	Hexachloropropene	50	U				
106-50-3	p-Phenylenediamine	50	U				

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
* - 3-Methylphenol and 4-Methylphenol coelute and cannot be separated.

ORGANICS ANALYSIS DATA SHEET Page 1

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 02/01/93
Lab Sample ID: 23884003 Sample Matrix: WATER Date Analyzed: 03/01/93
Client Sample ID: 11MW3 Percent Moisture: Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
62-75-9	N-Nitrosodimethylamine . .	10	U	121-14-2	2,4-Dinitrotoluene	10	U
108-95-2	Phenol	10	U	84-66-2	Diethylphthalate	10	U
62-53-3	Aniline	10	U	7005-72-3	4-Chlorophenyl-phenylether	10	U
111-44-4	bis(2-Chloroethyl)Ether .	10	U	86-73-7	Fluorene	10	U
95-57-8	2-Chlorophenol	10	U	100-01-6	4-Nitroaniline	50	U
541-73-1	1,3-Dichlorobenzene . . .	10	U	534-52-1	4,6-Dinitro-2-Methylphenol	50	~~U~~ 053
106-46-7	1,4-Dichlorobenzene . . .	10	U	86-30-6	N-Nitrosodiphenylamine (1)	10	U
100-51-6	Benzyl Alcohol	10	U	122-39-4	and Diphenylamine (1) . .		
95-50-1	1,2-Dichlorobenzene . . .	10	U	122-66-7	1,2-Diphenylhydrazine . .	10	U
95-48-7	2-Methylphenol	10	U	101-55-3	4-Bromophenyl-phenylether	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U	118-74-1	Hexachlorobenzene	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U	87-86-5	Pentachlorophenol	50	U
67-72-1	Hexachloroethane	10	U	85-01-8	Phenanthrene	10	U
98-95-3	Nitrobenzene	10	U	120-12-7	Anthracene	10	U
78-59-1	Isophorone	10	U	84-74-2	Di-n-Butylphthalate . . .	10 ~~B~~	~~BJ~~ 04
88-75-5	2-Nitrophenol	10	U	206-44-0	Fluoranthene	10	U
105-67-9	2,4-Dimethylphenol	10	U	129-00-0	Pyrene	10	U
65-85-0	Benzoic Acid	50	U	85-68-7	Butylbenzylphthalate . . .	10	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U	91-94-1	3,3'-Dichlorobenzidine . .	20	U
120-83-2	2,4-Dichlorophenol	10	U	56-55-3	Benzo(a)Anthracene	10	U
120-82-1	1,2,4-Trichlorobenzene . .	10	U	218-01-9	Chrysene	10	U
91-20-3	Naphthalene	10	U	117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
106-47-8	4-Chloroaniline	10	U	117-84-0	Di-n-Octyl Phthalate . . .	10	U
87-68-3	Hexachlorobutadiene . . .	10	U	205-99-2	Benzo(b)Fluoranthene . . .	10	U
59-50-7	4-Chloro-3-Methylphenol .	10	U	207-08-9	Benzo(k)Fluoranthene . . .	10	U
91-57-6	2-Methylnaphthalene . . .	10	U	50-32-8	Benzo(a)Pyrene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U	193-39-5	Indeno(1,2,3-cd)Pyrene . .	10	U
88-06-2	2,4,6-Trichlorophenol . .	10	U	53-70-3	Dibenz(a,h)Anthracene . .	10	U
95-95-4	2,4,5-Trichlorophenol . .	50	U	191-24-2	Benzo(g,h,i)Perylene . . .	10	U
91-58-7	2-Chloronaphthalene . . .	10	U	109-06-8	2-Picoline	50	~~U~~ 053
88-74-4	2-Nitroaniline	50	U	66-27-3	Methyl methanesulfonate .	10	U
131-11-3	Dimethylphthalate	10	U	62-50-0	Ethyl methanesulfonate . .	10	U
208-96-8	Acenaphthylene	10	U	98-86-2	Acetophenone	10	U
606-20-2	2,6-Dinitrotoluene	10	U	100-75-4	N-Nitrosopiperidine . . .	10	U
99-09-2	3-Nitroaniline	50	U	122-09-8	Phenyl-tert-butylamine . .	50	~~U~~ 053
83-32-9	Acenaphthene	10	U	87-65-0	2,6-Dichlorophenol	10	U
51-28-5	2,4-Dinitrophenol	50	~~U~~ 053	924-16-3	N-Nitroso-di-n-butylamine	10	U
100-02-7	4-Nitrophenol	50	U	55-18-5	N-Nitrosodiethylamine . .	10	U
132-64-9	Dibenzofuran	10	U	930-55-2	N-Nitrosopyrrolidine . . .	10	U

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
(1) - N-Nitrosodiphenylamine and Dipehnylamine cannot be separated.

Form I

000068

000053 MP

Laboratory Name: CH2M HILL/MGM
Lab Sample ID: 23884003
Client Sample ID: 11MW3

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: _____

Date Extracted: 02/01/93
Date Analyzed: 03/01/93
Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
92-87-5	Benzidine	50	U	94-59-7	Safrole	50	U
95-94-3	1,2,4,5-Tetrachlorobenzene	50	U	120-58-1	Isosafrole	50	U
608-93-5	Pentachlorobenzene	50	U	130-15-4	1,4-Naphthoquinone	50	U
134-32-7	1-Naphthylamine	50	U	99-65-0	1,3-Dinitrobenzene	10	U
91-59-8	2-Naphthylamine	50	U	99-55-8	5-Nitro-o-toluidine	10	U
58-90-2	2,3,4,6-Tetrachlorophenol	10	U	99-35-4	1,3,5-Trinitrobenzene	10	U
62-44-2	Phenacetin	10	U	56-57-5	4-Nitroquinoline-1-oxide	10	U
92-67-1	4-Aminobiphenyl	50	U	91-80-5	Methapyrilene	50	U
82-68-8	Pentachloronitrobenzene	50	U	140-57-8	Aramite	50	U
23950-58-5	Pronamide	10	U	119-93-7	3,3'-Dimethylbenzidine	10	U
60-11-7	p-Dimethylaminoazobenzene	10	U	53-96-3	2-Acetamidofluorene	10	U
57-97-6	7,12-Dimethylbenz(a)Anthrac	10	U	70-30-4	Hexachlorophene	50	U
56-49-5	3-Methylcholanthrene	10	U				
110-86-1	Pyridine	50	U				
10595-95-6	N-Nitrosomethylethylamine	10	U				
59-89-2	N-Nitrosomorpholine	10	U				
95-53-4	o-Toluidine	10	U				
NA	* 3- & 4- Methylphenol	20	U				
1888-71-7	Hexachloropropene	50	U				
106-50-3	p-Phenylenediamine	50	U				

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
* - 3-Methylphenol and 4-Methylphenol coelute and cannot be separated.

Laboratory Name: CH2M HILL/MGM
Lab Sample ID: 23884004
Client Sample ID: 11MW3D

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: _____

Date Extracted: 02/01/93
Date Analyzed: 03/01/93
Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
62-75-9	N-Nitrosodimethylamine . .	10	U	121-14-2	2,4-Dinitrotoluene	10	U
108-95-2	Phenol	10	U	84-66-2	Diethylphthalate	10	U
62-53-3	Aniline	10	U	7005-72-3	4-Chlorophenyl-phenylether	10	U
111-44-4	bis(2-Chloroethyl)Ether .	10	U	86-73-7	Fluorene	10	U
95-57-8	2-Chlorophenol	10	U	100-01-6	4-Nitroaniline	50	U
541-73-1	1,3-Dichlorobenzene . . .	10	U	534-52-1	4,6-Dinitro-2-Methylphenol	50	U U53
106-46-7	1,4-Dichlorobenzene . . .	10	U	86-30-6	N-Nitrosodiphenylamine (1)	10	U
100-51-6	Benzyl Alcohol	10	U	122-39-4	and Diphenylamine (1) . .		
95-50-1	1,2-Dichlorobenzene . . .	10	U	122-66-7	1,2-Diphenylhydrazine . .	10	U
95-48-7	2-Methylphenol	10	U	101-55-3	4-Bromophenyl-phenylether	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U	118-74-1	Hexachlorobenzene	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U	87-86-5	Pentachlorophenol	50	U
67-72-1	Hexachloroethane	10	U	85-01-8	Phenanthrene	10	U
98-95-3	Nitrobenzene	10	U	120-12-7	Anthracene	10	U
78-59-1	Isophorone	10	U	84-74-2	Di-n-Butylphthalate . . .	11	B U4
88-75-5	2-Nitrophenol	10	U	206-44-0	Fluoranthene	10	U
105-67-9	2,4-Dimethylphenol	10	U	129-00-0	Pyrene	10	U
65-85-0	Benzoic Acid	50	U	85-68-7	Butylbenzylphthalate . . .	10	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U	91-94-1	3,3'-Dichlorobenzidine . .	20	U
120-83-2	2,4-Dichlorophenol	10	U	56-55-3	Benzo(a)Anthracene	10	U
120-82-1	1,2,4-Trichlorobenzene . .	10	U	218-01-9	Chrysene	10	U
91-20-3	Naphthalene	10	U	117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
106-47-8	4-Chloroaniline	10	U	117-84-0	Di-n-Octyl Phthalate . . .	10	U
87-68-3	Hexachlorobutadiene . . .	10	U	205-99-2	Benzo(b)Fluoranthene . . .	10	U
59-50-7	4-Chloro-3-Methylphenol .	10	U	207-08-9	Benzo(k)Fluoranthene . . .	10	U
91-57-6	2-Methylnaphthalene . . .	10	U	50-32-8	Benzo(a)Pyrene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U	193-39-5	Indeno(1,2,3-cd)Pyrene . .	10	U
88-06-2	2,4,6-Trichlorophenol . .	10	U	53-70-3	Dibenz(a,h)Anthracene . .	10	U
95-95-4	2,4,5-Trichlorophenol . .	50	U	191-24-2	Benzo(g,h,i)Perylene . . .	10	U
91-58-7	2-Chloronaphthalene . . .	10	U	109-06-8	2-Picoline	50	U U53
88-74-4	2-Nitroaniline	50	U	66-27-3	Methyl methanesulfonate .	10	U
131-11-3	Dimethylphthalate	10	U	62-50-0	Ethyl methanesulfonate . .	10	U
208-96-8	Acenaphthylene	10	U	98-86-2	Acetophenone	10	U
606-20-2	2,6-Dinitrotoluene	10	U	100-75-4	N-Nitrosopiperidine . . .	10	U
99-09-2	3-Nitroaniline	50	U	122-09-8	Phenyl-tert-butylamine . .	50	U U53
83-32-9	Acenaphthene	10	U	87-65-0	2,6-Dichlorophenol	10	U
51-28-5	2,4-Dinitrophenol	50	U U53	924-16-3	N-Nitroso-di-n-butylamine	10	U
100-02-7	4-Nitrophenol	50	U	55-18-5	N-Nitrosodiethylamine . .	10	U
132-64-9	Dibenzofuran	10	U	930-55-2	N-Nitrosopyrrolidine . . .	10	U

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
(1) - N-Nitrosodiphenylamine and Dipehnylamine cannot be separated.

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 02/01/93
Lab Sample ID: 23884004 Sample Matrix: WATER Date Analyzed: 03/01/93
Client Sample ID: 11MW3D Percent Moisture: Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
92-87-5	Benzidine	50	U	94-59-7	Safrole	50	U
95-94-3	1,2,4,5-Tetrachlorobenzene	50	U	120-58-1	Isosafrole	50	U
608-93-5	Pentachlorobenzene	50	U	130-15-4	1,4-Naphthoquinone	50	U
134-32-7	1-Naphthylamine	50	U	99-65-0	1,3-Dinitrobenzene	10	U
91-59-8	2-Naphthylamine	50	U	99-55-8	5-Nitro-o-toluidine	10	U
58-90-2	2,3,4,6-Tetrachlorophenol	10	U	99-35-4	1,3,5-Trinitrobenzene	10	U
62-44-2	Phenacetin	10	U	56-57-5	4-Nitroquinoline-1-oxide	10	U
92-67-1	4-Aminobiphenyl	50	U	91-80-5	Methapyrilene	50	U
82-68-8	Pentachloronitrobenzene	50	U	140-57-8	Aramite	50	U
23950-58-5	Pronamide	10	U	119-93-7	3,3'-Dimethylbenzidine	10	U
60-11-7	p-Dimethylaminoazobenzene	10	U	53-96-3	2-Acetamidofluorene	10	U
57-97-6	7,12-Dimethylbenz(a)Anthrac	10	U	70-30-4	Hexachlorophene	50	U
56-49-5	3-Methylcholanthrene	10	U				
110-86-1	Pyridine	50	U				
10595-95-6	N-Nitrosomethylethylamine	10	U				
59-89-2	N-Nitrosomorpholine	10	U				
95-53-4	o-Toluidine	10	U				
NA	* 3- & 4- Methylphenol	20	U				
1888-71-7	Hexachloropropene	50	U				
106-50-3	p-Phenylenediamine	50	U				

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
* - 3-Methylphenol and 4-Methylphenol coelute and cannot be separated.

Form I

ORGANICS ANALYSIS DATA SHEET Page 1

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 02/01/93
Lab Sample ID: 23884005 Sample Matrix: WATER Date Analyzed: 03/01/93
Client Sample ID: 2FB005 Percent Moisture: _____ Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
62-75-9	N-Nitrosodimethylamine . .	10	U	121-14-2	2,4-Dinitrotoluene	10	U
108-95-2	Phenol	10	U	84-66-2	Diethylphthalate	10	U
62-53-3	Aniline	10	U	7005-72-3	4-Chlorophenyl-phenylether	10	U
111-44-4	bis(2-Chloroethyl)Ether .	10	U	86-73-7	Fluorene	10	U
95-57-8	2-Chlorophenol	10	U	100-01-6	4-Nitroaniline	50	U
541-73-1	1,3-Dichlorobenzene . . .	10	U	534-52-1	4,6-Dinitro-2-Methylphenol	50	~~U~~ 053
106-46-7	1,4-Dichlorobenzene . . .	10	U	86-30-6	N-Nitrosodiphenylamine (1)	10	U
100-51-6	Benzyl Alcohol	10	U	122-39-4	and Diphenylamine (1) . .		
95-50-1	1,2-Dichlorobenzene . . .	10	U	122-66-7	1,2-Diphenylhydrazine . .	10	U
95-48-7	2-Methylphenol	10	U	101-55-3	4-Bromophenyl-phenylether	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U	118-74-1	Hexachlorobenzene	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U	87-86-5	Pentachlorophenol	50	U
67-72-1	Hexachloroethane	10	U	85-01-8	Phenanthrene	10	U
98-95-3	Nitrobenzene	10	U	120-12-7	Anthracene	10	U
78-59-1	Isophorone	10	U	84-74-2	Di-n-Butylphthalate . . .	10 ~~9 B~~	U 4
88-75-5	2-Nitrophenol	10	U	206-44-0	Fluoranthene	10	U
105-67-9	2,4-Dimethylphenol	10	U	129-00-0	Pyrene	10	U
65-85-0	Benzoic Acid	50	U	85-68-7	Butylbenzylphthalate . . .	10	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U	91-94-1	3,3'-Dichlorobenzidine . .	20	U
120-83-2	2,4-Dichlorophenol	10	U	56-55-3	Benzo(a)Anthracene	10	U
120-82-1	1,2,4-Trichlorobenzene . .	10	U	218-01-9	Chrysene	10	U
91-20-3	Naphthalene	10	U	117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
106-47-8	4-Chloroaniline	10	U	117-84-0	Di-n-Octyl Phthalate . . .	10	U
87-68-3	Hexachlorobutadiene . . .	10	U	205-99-2	Benzo(b)Fluoranthene . . .	10	U
59-50-7	4-Chloro-3-Methylphenol .	10	U	207-08-9	Benzo(k)Fluoranthene . . .	10	U
91-57-6	2-Methylnaphthalene . . .	10	U	50-32-8	Benzo(a)Pyrene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U	193-39-5	Indeno(1,2,3-cd)Pyrene . .	10	U
88-06-2	2,4,6-Trichlorophenol . .	10	U	53-70-3	Dibenz(a,h)Anthracene . .	10	U
95-95-4	2,4,5-Trichlorophenol . .	50	U	191-24-2	Benzo(g,h,i)Perylene . . .	10	U
91-58-7	2-Chloronaphthalene . . .	10	U	109-06-8	2-Picoline	50	~~U~~ 053
88-74-4	2-Nitroaniline	50	U	66-27-3	Methyl methanesulfonate .	10	U
131-11-3	Dimethylphthalate	10	U	62-50-0	Ethyl methanesulfonate . .	10	U
208-96-8	Acenaphthylene	10	U	98-86-2	Acetophenone	10	U
606-20-2	2,6-Dinitrotoluene	10	U	100-75-4	N-Nitrosopiperidine . . .	10	U
99-09-2	3-Nitroaniline	50	U	122-09-8	Phenyl-tert-butylamine . .	50	~~U~~ 053
83-32-9	Acenaphthene	10	U	87-65-0	2,6-Dichlorophenol	10	U
51-28-5	2,4-Dinitrophenol	50	~~U~~ 053	924-16-3	N-Nitroso-di-n-butylamine	10	U
100-02-7	4-Nitrophenol	50	U	55-18-5	N-Nitrosodiethylamine . .	10	U
132-64-9	Dibenzofuran	10	U	930-55-2	N-Nitrosopyrrolidine . . .	10	U

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
(1) - N-Nitrosodiphenylamine and Dipehnylamine cannot be separated.

Form I

Laboratory Name: CH2M HILL/MGM
Lab Sample ID: 23884005
Client Sample ID: 2FB005

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: _____

Date Extracted: 02/01/93
Date Analyzed: 03/01/93
Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
92-87-5	Benzidine	50	U	94-59-7	Safrole	50	U
95-94-3	1,2,4,5-Tetrachlorobenzene	50	U	120-58-1	Isosafrole	50	U
608-93-5	Pentachlorobenzene	50	U	130-15-4	1,4-Naphthoquinone	50	U
134-32-7	1-Naphthylamine	50	U	99-65-0	1,3-Dinitrobenzene	10	U
91-59-8	2-Naphthylamine	50	U	99-55-8	5-Nitro-o-toluidine	10	U
58-90-2	2,3,4,6-Tetrachlorophenol	10	U	99-35-4	1,3,5-Trinitrobenzene	10	U
62-44-2	Phenacetin	10	U	56-57-5	4-Nitroquinoline-1-oxide	10	U
92-67-1	4-Aminobiphenyl	50	U	91-80-5	Methapyrilene	50	U
82-68-8	Pentachloronitrobenzene	50	U	140-57-8	Aramite	50	U
23950-58-5	Pronamide	10	U	119-93-7	3,3'-Dimethylbenzidine	10	U
60-11-7	p-Dimethylaminoazobenzene	10	U	53-96-3	2-Acetamidofluorene	10	U
57-97-6	7,12-Dimethylbenz(a)Anthrac	10	U	70-30-4	Hexachlorophene	50	U
56-49-5	3-Methylcholanthrene	10	U				
110-86-1	Pyridine	50	U				
10595-95-6	N-Nitrosomethylethylamine	10	U				
59-89-2	N-Nitrosomorpholine	10	U				
95-53-4	o-Toluidine	10	U				
NA	* 3- & 4- Methylphenol	20	U				
1888-71-7	Hexachloropropene	50	U				
106-50-3	p-Phenylenediamine	50	U				

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
* - 3-Methylphenol and 4-Methylphenol coelute and cannot be separated.

Form I

ORGANICS ANALYSIS DATA SHEET Page 1

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 02/01/93
Lab Sample ID: 23884006 Sample Matrix: WATER Date Analyzed: 03/01/93
Client Sample ID: 2QS006 Percent Moisture: Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
62-75-9	N-Nitrosodimethylamine	10	U	121-14-2	2,4-Dinitrotoluene	10	U
108-95-2	Phenol	10	U	84-66-2	Diethylphthalate	10	U
62-53-3	Aniline	10	U	7005-72-3	4-Chlorophenyl-phenylether	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U	86-73-7	Fluorene	10	U
95-57-8	2-Chlorophenol	10	U	100-01-6	4-Nitroaniline	50	U
541-73-1	1,3-Dichlorobenzene	10	U	534-52-1	4,6-Dinitro-2-Methylphenol	50	~~U~~ 53
106-46-7	1,4-Dichlorobenzene	10	U	86-30-6	N-Nitrosodiphenylamine (1)	10	U
100-51-6	Benzyl Alcohol	10	U	122-39-4	and Diphenylamine (1)		
95-50-1	1,2-Dichlorobenzene	10	U	122-66-7	1,2-Diphenylhydrazine	10	U
95-48-7	2-Methylphenol	10	U	101-55-3	4-Bromophenyl-phenylether	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U	118-74-1	Hexachlorobenzene	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U	87-86-5	Pentachlorophenol	50	U
67-72-1	Hexachloroethane	10	U	85-01-8	Phenanthrene	10	U
98-95-3	Nitrobenzene	10	U	120-12-7	Anthracene	10	U
78-59-1	Isophorone	10	U	84-74-2	Di-n-Butylphthalate	10	~~U~~ 34
88-75-5	2-Nitrophenol	10	U	206-44-0	Fluoranthene	10	U
105-67-9	2,4-Dimethylphenol	10	U	129-00-0	Pyrene	10	U
65-85-0	Benzoic Acid	50	U	85-68-7	Butylbenzylphthalate	10	U
[illegible]1-1	bis(2-Chloroethoxy)Methane	10	U	91-94-1	3,3'-Dichlorobenzidine	20	U
[illegible]3-2	2,4-Dichlorophenol	10	U	56-55-3	Benzo(a)Anthracene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U	218-01-9	Chrysene	10	U
91-20-3	Naphthalene	10	U	117-81-7	bis(2-Ethylhexyl)Phthalate	3	J
106-47-8	4-Chloroaniline	10	U	117-84-0	Di-n-Octyl Phthalate	10	U
87-68-3	Hexachlorobutadiene	10	U	205-99-2	Benzo(b)Fluoranthene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U	207-08-9	Benzo(k)Fluoranthene	10	U
91-57-6	2-Methylnaphthalene	10	U	50-32-8	Benzo(a)Pyrene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U	193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U	53-70-3	Dibenz(a,h)Anthracene	10	U
95-95-4	2,4,5-Trichlorophenol	50	U	191-24-2	Benzo(g,h,i)Perylene	10	U
91-58-7	2-Chloronaphthalene	10	U	109-06-8	2-Picoline	50	~~U~~ 53
88-74-4	2-Nitroaniline	50	U	66-27-3	Methyl methanesulfonate	10	U
131-11-3	Dimethylphthalate	10	U	62-50-0	Ethyl methanesulfonate	10	U
208-96-8	Acenaphthylene	10	U	98-86-2	Acetophenone	10	U
606-20-2	2,6-Dinitrotoluene	10	U	100-75-4	N-Nitrosopiperidine	10	U
99-09-2	3-Nitroaniline	50	U	122-09-8	Phenyl-tert-butylamine	50	~~U~~ 53
83-32-9	Acenaphthene	10	U	87-65-0	2,6-Dichlorophenol	10	U
51-28-5	2,4-Dinitrophenol	50	~~U~~ 53	924-16-3	N-Nitroso-di-n-butylamine	10	U
100-02-7	4-Nitrophenol	50	U	55-18-5	N-Nitrosodiethylamine	10	U
132-64-9	Dibenzofuran	10	U	930-55-2	N-Nitrosopyrrolidine	10	U

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
- N-Nitrosodiphenylamine and Dipehnylamine cannot be separated.

Form I

L atory Name: CH2M HILL/MGM
Lab Sample ID: 23884006
Client Sample ID: 2QS006

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: ____

Date Extracted: 02/01/93
Date Analyzed: 03/01/93
Dilution Factor: 1.0

SEMIVOLATILE (App IX) COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
92-87-5	Benzidine	50	U	94-59-7	Safrole	50	U
95-94-3	1,2,4,5-Tetrachlorobenzene	50	U	120-58-1	Isosafrole	50	U
608-93-5	Pentachlorobenzene	50	U	130-15-4	1,4-Naphthoquinone	50	U
134-32-7	1-Naphthylamine	50	U	99-65-0	1,3-Dinitrobenzene	10	U
91-59-8	2-Naphthylamine	50	U	99-55-8	5-Nitro-o-toluidine	10	U
58-90-2	2,3,4,6-Tetrachlorophenol	10	U	99-35-4	1,3,5-Trinitrobenzene	10	U
62-44-2	Phenacetin	10	U	56-57-5	4-Nitroquinoline-1-oxide	10	U
92-67-1	4-Aminobiphenyl	50	U	91-80-5	Methapyrilene	50	U
82-68-8	Pentachloronitrobenzene	50	U	140-57-8	Aramite	50	U
23950-58-5	Pronamide	10	U	119-93-7	3,3'-Dimethylbenzidine	10	U
60-11-7	p-Dimethylaminoazobenzene	10	U	53-96-3	2-Acetamidofluorene	10	U
57-97-6	7,12-Dimethylbenz(a)Anthrac	10	U	70-30-4	Hexachlorophene	50	U
56-49-5	3-Methylcholanthrene	10	U				
110-86-1	Pyridine	50	U				
10595-95-6	N-Nitrosomethylethylamine	10	U				
59-89-2	N-Nitrosomorpholine	10	U				
95-53-4	o-Toluidine	10	U				
NA	* 3- & 4- Methylphenol	20	U				
1888-71-7	Hexachloropropene	50	U				
[illegible]50-3	p-Phenylenediamine	50	U				

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
* - 3-Methylphenol and 4-Methylphenol coelute and cannot be separated.

3C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: _____ Case No.: 23884 SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: 11MW3D

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
Phenol	200	0	151	76	12-110
2-Chlorophenol	200	0	148	74	27-123
1,4-Dichlorobenzene	100	0	66.0	66	36 97
N-Nitroso-di-n-prop.(1)	100	0	71.6	72	41 116
1,2,4-Trichlorobenzene	100	0	63.4	63	39 98
4-Chloro-3-methylphenol	200	0	132	66	23 97
Acenaphthene	100	0	74.8	75	46-118
4-Nitrophenol	200	0	163	82 *	10- 80
2,4-Dinitrotoluene	100	0	71.4	71	24- 96
Pentachlorophenol	200	0	206	103	9-103
Pyrene	100	0	65.2	65	26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol	200	142	71	7	42	12-110
2-Chlorophenol	200	143	72	3	40	27-123
1,4-Dichlorobenzene	100	58.2	58	13	28	36 97
N-Nitroso-di-n-prop.(1)	100	66.0	66	9	38	41 116
1,2,4-Trichlorobenzene	100	56.6	57	10	28	39 98
4-Chloro-3-methylphenol	200	129	64	3	42	23 97
Acenaphthene	100	64.6	65	14	31	46-118
4-Nitrophenol	200	170	85 *	-4	50	10- 80
2,4-Dinitrotoluene	100	63.6	64	10	38	24- 96
Pentachlorophenol	200	198	99	4	50	9-103
Pyrene	100	66.0	66	-2	31	26-127

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 11 outside limits
Spike Recovery: 2 out of 22 outside limits

COMMENTS: CLP,23884,,11MW3D,L,W,23884004,BNA,EPA,
CAP/.32,,,,,,,,30DG TO 310DG @10DG/MIN IH=4MIN

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	02/02/93
Lab Sample ID:	23884001	Sample Matrix:	WATER	Date Analyzed:	02/16/93
Client Sample ID:	MPT-11-1	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
319-84-6	alpha-BHC	0.020	U	510-15-6	Chlorobenzilate	0.50	U
319-85-7	beta-BHC	0.040	U	2303-16-4	Diallate	1.0	U
319-86-8	delta-BHC	0.020	U	465-73-6	Isodrin	0.020	U
58-89-9	gamma-BHC (Lindane)	0.020	U				
76-44-8	Heptachlor	0.020	U				
309-00-2	Aldrin	0.020	U				
1024-57-3	Heptachlor Epoxide	0.020	U				
959-98-8	Endosulfan I	0.020	U				
60-57-1	Dieldrin	0.020	U				
72-55-9	4,4'-DDE	0.020	U				
72-20-8	Endrin	0.040	U				
33213-65-9	Endosulfan II	0.040	U				
72-54-8	4,4'-DDD	0.040	U				
7421-93-4	Endrin Aldehyde	0.040	U				
1031-07-8	Endosulfan Sulfate	0.040	U				
50-29-3	4,4'-DDT	0.040	U				
72-43-5	Methoxychlor	0.080	U				
53494-70-5	Endrin Ketone	0.020	U				
-74-9	Chlordane	0.20	U				
J01-35-2	Toxaphene	1.0	U				
12674-11-2	Aroclor-1016	1.0	U				
11104-28-2	Aroclor-1221	2.0	U				
11141-16-5	Aroclor-1232	2.0	U				
53469-21-9	Aroclor-1242	1.0	U				
12672-29-6	Aroclor-1248	1.0	U				
11097-69-1	Aroclor-1254	0.50	U				
11096-82-5	Aroclor-1260	0.50	U				
	Decachlorobiphenyl - SS	74					

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

Comments:

Form I

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM
Lab Sample ID: 23884002
Client Sample ID: MPT-11-2

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: _____

Date Extracted: 02/02/93
Date Analyzed: 02/17/93
Dilution Factor: 1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
319-84-6	alpha-BHC	0.020	U	510-15-6	Chlorobenzilate	0.50	U
319-85-7	beta-BHC	0.040	U	2303-16-4	Diallate	1.0	U
319-86-8	delta-BHC	0.020	U	465-73-6	Isodrin	0.020	U
58-89-9	gamma-BHC (Lindane)	0.020	U				
76-44-8	Heptachlor	0.020	U				
309-00-2	Aldrin	0.020	U				
1024-57-3	Heptachlor Epoxide	0.020	U				
959-98-8	Endosulfan I	0.020	U				
60-57-1	Dieldrin	0.020	U				
72-55-9	4,4'-DDE	0.020	U				
72-20-8	Endrin	0.040	U				
33213-65-9	Endosulfan II	0.040	U				
72-54-8	4,4'-DDD	0.040	U				
7421-93-4	Endrin Aldehyde	0.040	U				
1031-07-8	Endosulfan Sulfate	0.040	U				
50-29-3	4,4'-DDT	0.040	U				
72-43-5	Methoxychlor	0.080	U				
53494-70-5	Endrin Ketone	0.020	U				
[illegible]-74-9	Chlordane	0.20	U				
[illegible]01-35-2	Toxaphene	1.0	U				
12674-11-2	Aroclor-1016	1.0	U				
11104-28-2	Aroclor-1221	2.0	U				
11141-16-5	Aroclor-1232	2.0	U				
53469-21-9	Aroclor-1242	1.0	U				
12672-29-6	Aroclor-1248	1.0	U				
11097-69-1	Aroclor-1254	0.50	U				
11096-82-5	Aroclor-1260	0.50	U				
	Decachlorobiphenyl - SS	80					

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

Comments:

Form I

ORGANICS ANALYSIS DATA SHEET

.boratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	02/02/9
Lab Sample ID:	23884003	Sample Matrix:	WATER	Date Analyzed:	02/17/93
Client Sample ID:	11MW3	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
319-84-6	alpha-BHC	0.020	U	510-15-6	Chlorobenzilate	0.50	U
319-85-7	beta-BHC	0.040	U	2303-16-4	Diallate	1.0	U
319-86-8	delta-BHC	0.020	U	465-73-6	Isodrin	0.020	U
58-89-9	gamma-BHC (Lindane)	0.020	U				
76-44-8	Heptachlor	0.020	U				
309-00-2	Aldrin	0.020	U				
1024-57-3	Heptachlor Epoxide	0.020	U				
959-98-8	Endosulfan I	0.020	U				
60-57-1	Dieldrin	0.020	U				
72-55-9	4,4'-DDE	0.020	U				
72-20-8	Endrin	0.040	U				
33213-65-9	Endosulfan II	0.040	U				
72-54-8	4,4'-DDD	0.040	U				
7421-93-4	Endrin Aldehyde	0.040	U				
1031-07-8	Endosulfan Sulfate	0.040	U				
50-29-3	4,4'-DDT	0.040	U				
72-43-5	Methoxychlor	0.080	U				
53494-70-5	Endrin Ketone	0.020	U				
-74-9	Chlordane	0.20	U				
001-35-2	Toxaphene	1.0	U				
12674-11-2	Aroclor-1016	1.0	U				
11104-28-2	Aroclor-1221	2.0	U				
11141-16-5	Aroclor-1232	2.0	U				
53469-21-9	Aroclor-1242	1.0	U				
12672-29-6	Aroclor-1248	1.0	U				
11097-69-1	Aroclor-1254	0.50	U				
11096-82-5	Aroclor-1260	0.50	U				
	Decachlorobiphenyl - SS	73					

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

Comments:

Form I

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM | Concentration: LOW | Date Extracted: 02/02/93
Lab Sample ID: 23884004 | Sample Matrix: WATER | Date Analyzed: 02/17/93
Client Sample ID: 11MW3D | Percent Moisture: | Dilution Factor: 1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
319-84-6	alpha-BHC	0.020	U	510-15-6	Chlorobenzilate	0.50	U
319-85-7	beta-BHC	0.040	U	2303-16-4	Diallate	1.0	U
319-86-8	delta-BHC	0.020	U	465-73-6	Isodrin	0.020	U
58-89-9	gamma-BHC (Lindane)	0.020	U				
76-44-8	Heptachlor	0.020	U				
309-00-2	Aldrin	0.020	U				
1024-57-3	Heptachlor Epoxide	0.020	U				
959-98-8	Endosulfan I	0.020	U				
60-57-1	Dieldrin	0.020	U				
72-55-9	4,4'-DDE	0.020	U				
72-20-8	Endrin	0.040	U				
33213-65-9	Endosulfan II	0.040	U				
72-54-8	4,4'-DDD	0.040	U				
7421-93-4	Endrin Aldehyde	0.040	U				
1031-07-8	Endosulfan Sulfate	0.040	U				
50-29-3	4,4'-DDT	0.040	U				
72-43-5	Methoxychlor	0.080	U				
53494-70-5	Endrin Ketone	0.020	U				
-74-9	Chlordane	0.20	U				
001-35-2	Toxaphene	1.0	U				
12674-11-2	Aroclor-1016	1.0	U				
11104-28-2	Aroclor-1221	2.0	U				
11141-16-5	Aroclor-1232	2.0	U				
53469-21-9	Aroclor-1242	1.0	U				
12672-29-6	Aroclor-1248	1.0	U				
11097-69-1	Aroclor-1254	0.50	U				
11096-82-5	Aroclor-1260	0.50	U				
	Decachlorobiphenyl - SS	83					

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

Comments:

Form I

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	02/02/9
Lab Sample ID:	23884005	Sample Matrix:	WATER	Date Analyzed:	02/17/93
Client Sample ID:	2FB005	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
319-84-6	alpha-BHC	0.020	U	510-15-6	Chlorobenzilate	0.50	U
319-85-7	beta-BHC	0.040	U	2303-16-4	Diallate	1.0	U
319-86-8	delta-BHC	0.020	U	465-73-6	Isodrin	0.020	U
58-89-9	gamma-BHC (Lindane)	0.020	U				
76-44-8	Heptachlor	0.020	U				
309-00-2	Aldrin	0.020	U				
1024-57-3	Heptachlor Epoxide	0.020	U				
959-98-8	Endosulfan I	0.020	U				
60-57-1	Dieldrin	0.020	U				
72-55-9	4,4'-DDE	0.020	U				
72-20-8	Endrin	0.040	U				
33213-65-9	Endosulfan II	0.040	U				
72-54-8	4,4'-DDD	0.040	U				
7421-93-4	Endrin Aldehyde	0.040	U				
1031-07-8	Endosulfan Sulfate	0.040	U				
50-29-3	4,4'-DDT	0.040	U				
72-43-5	Methoxychlor	0.080	U				
53494-70-5	Endrin Ketone	0.020	U				
-74-9	Chlordane	0.20	U				
8001-35-2	Toxaphene	1.0	U				
12674-11-2	Aroclor-1016	1.0	U				
11104-28-2	Aroclor-1221	2.0	U				
11141-16-5	Aroclor-1232	2.0	U				
53469-21-9	Aroclor-1242	1.0	U				
12672-29-6	Aroclor-1248	1.0	U				
11097-69-1	Aroclor-1254	0.50	U				
11096-82-5	Aroclor-1260	0.50	U				
	Decachlorobiphenyl - SS	66					

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

Comments:

Form I

CH2M HILL Quality Analytical Laboratories 2567 Fairlane Drive, P O Box 230548 Montgomery, Alabama 36116 205/271-3344

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 02/04/93
Lab Sample ID: 23884006 Sample Matrix: WATER Date Analyzed: 02/17/93
Client Sample ID: 2QS006 Percent Moisture: _____ Dilution Factor: 1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
319-84-6	alpha-BHC	0.020	U	510-15-6	Chlorobenzilate	0.50	U
319-85-7	beta-BHC	0.040	U	2303-16-4	Diallate	1.0	U
319-86-8	delta-BHC	0.020	U	465-73-6	Isodrin	0.020	U
58-89-9	gamma-BHC (Lindane)	0.020	U				
76-44-8	Heptachlor	0.020	U				
309-00-2	Aldrin	0.020	U				
1024-57-3	Heptachlor Epoxide	0.020	U				
959-98-8	Endosulfan I	0.020	U				
60-57-1	Dieldrin	0.020	U				
72-55-9	4,4'-DDE	0.020	U				
72-20-8	Endrin	0.040	U				
33213-65-9	Endosulfan II	0.040	U				
72-54-8	4,4'-DDD	0.040	U				
7421-93-4	Endrin Aldehyde	0.040	U				
1031-07-8	Endosulfan Sulfate	0.040	U				
50-29-3	4,4'-DDT	0.040	U				
72-43-5	Methoxychlor	0.080	U				
53494-70-5	Endrin Ketone	0.020	U				
-74-9	Chlordane	0.20	U				
01-35-2	Toxaphene	1.0	U				
12674-11-2	Aroclor-1016	1.0	U				
11104-28-2	Aroclor-1221	2.0	U				
11141-16-5	Aroclor-1232	2.0	U				
53469-21-9	Aroclor-1242	1.0	U				
12672-29-6	Aroclor-1248	1.0	U				
11097-69-1	Aroclor-1254	0.50	U				
11096-82-5	Aroclor-1260	0.50	U				
	Decachlorobiphenyl - SS	91					

Specific Finding is 1 JAC 3/3/93

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

Comments:

Form I

CH2M HILL Quality Analytical Laboratories 2567 Fairlane Drive, P O Box 230548, Montgomery, Alabama 36116 205 271 1444

ORGANOCHLORINE PESTICIDES
WATER MATRIX SPIKE/MATRIX SPIKE DUPLICATE SUMMARY

Lab Name: CH2M HILL/MGM Contract: _____

Lab Code: CH2M Case No.: 23884 SAS No.: _____ SDG No.: _____

Matrix Spike - Client Sample ID.: 11MW3D

COMPOUND	SPIKE ADDED (UG/L)	SAMPLE CONC (UG/L)	MS CONC (UG/L)	MS % REC
gamma-BHC (Lindane)	0.5	<0.02	0.42	83
Heptachlor	0.5	<0.02	0.32	64
Aldrin	0.5	<0.02	0.23	46
Dieldrin	1.0	<0.02	0.90	90
Endrin	1.0	<0.04	0.96	96
4,4'-DDT	1.0	<0.04	0.90	90

COMPOUND	SPIKE ADDED (UG/L)	MSD CONC (UG/L)	MSD % REC	% RPD
gamma-BHC (Lindane)	0.5	0.43	87	4
Heptachlor	0.5	0.34	67	6
Aldrin	0.5	0.27	53	16
Dieldrin	1.0	0.92	92	2
Endrin	1.0	0.98	98	2
4,4'-DDT	1.0	0.92	92	2

Comments:

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 02/02/93
Lab Sample ID: 23884001 Sample Matrix: WATER Date Analyzed: 02/17/93
Client Sample ID: MPT-11-1 Percent Moisture: _____ Dilution Factor: 1.0

PESTICIDE COMPOUND

CAS Number		ug/L		CAS Number		ug/L
143-50-0	Kepone	1.0	U			
	Decachlorobiphenyl - SS	86				

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

Comments:

Form I

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	02/02/93
Lab Sample ID:	23884002	Sample Matrix:	WATER	Date Analyzed:	02/17/93
Client Sample ID:	MPT-11-2	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE COMPOUND

CAS Number		ug/L		CAS Number		ug/L
143-50-0	Kepone	1.0	U			
	Decachlorobiphenyl - SS	86				

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

Comments:

Form I

000227

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	02/02/93
Lab Sample ID:	23884003	Sample Matrix:	WATER	Date Analyzed:	02/17/93
Client Sample ID:	11MW3	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE COMPOUND

CAS Number		ug/L	CAS Number		ug/L
143-50-0	Kepone	1.0 U			
	Decachlorobiphenyl - SS	86			

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

Comments:

Form I

000229

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	02/02/93
Lab Sample ID:	23884004	Sample Matrix:	WATER	Date Analyzed:	02/17/93
Client Sample ID:	11MW3D	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE COMPOUND

CAS Number		ug/L		CAS Number		ug/L
143-50-0	Kepone	1.0	U			
	Decachlorobiphenyl - SS	86				

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

Comments:

Form I

000231

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 02/02/93
Lab Sample ID: 23884005 Sample Matrix: WATER Date Analyzed: 02/17/93
Client Sample ID: 2FB005 Percent Moisture: _____ Dilution Factor: 1.0

PESTICIDE COMPOUND

CAS Number		ug/L	CAS Number		ug/L
143-50-0	Kepone	1.0 U			
	Decachlorobiphenyl - SS	86			

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

Comments:

Form I

000233

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL/MGM	Concentration:	LOW	Date Extracted:	02/04/9
Lab Sample ID:	23884006	Sample Matrix:	WATER	Date Analyzed:	02/17/93
Client Sample ID:	2QS006	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE COMPOUND

CAS Number		ug/L	CAS Number		ug/L
143-50-0	Kepone	1.0			

Decachlorobiphenyl - SS	86

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

Comments:

Form I

000235

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MPT-11-1

Lab Name: CH2M_HILL_MGM Contract: 23884

Lab Code: NA Case No.: 23884 SAS No.: 23884 SDG No.: 23884

Matrix (soil/water): WATER Lab Sample ID: 23884001

Level (low/med): LOW Date Received: 01/29/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-22-4	Silver	2.0	U		P	
7440-38-2	Arsenic	14.1			F	
7440-39-3	Barium	37.2	B		P	
7440-41-7	Beryllium	1.4	B		P	
7440-70-2	Calcium	115000			P	
7440-43-9	Cadmium	2.8	U		P	
7440-48-4	Cobalt	5.1	B		P	
7440-47-3	Chromium	27.0			P	
7440-50-8	Copper	14.5	B		P	J 2
7439-89-6	Iron	14200			P	
7439-97-6	Mercury	0.07	U		CV	
7439-95-4	Magnesium	8720			P	
7439-96-5	Manganese	324			P	
7440-02-0	Nickel	9.4	U		P	
7439-92-1	Lead	10.5			F	
7440-36-0	Antimony	16.4	U		P	
7782-49-2	Selenium	1.8	U	N	F	UJ 3
7440-31-5	Tin	12.7	U	N*	P	UJ 3, 4
7440-28-0	Thallium	2.3	U		F	
7440-62-2	Vanadium	28.7	B		P	
7440-66-6	Zinc	105			P	

Color Before: TAN Clarity Before: CLOUDY Texture: N/A

Color After: CLEAR Clarity After: CLOUDY Artifacts:

Comments:

THE "N" QUALIFIER INDICATES POOR PRESPIKE RECOVERY. THE "*" QUALIFIER INDICATE POOR DUPLICATE PRECISION.

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MPT-11-2

Lab Name: CH2M_HILL_MGM_____ Contract: 23884_____

Lab Code: NA____ Case No.: 23884_ SAS No.: 23884_ SDG No.: 23884_

Matrix (soil/water): WATER Lab Sample ID: 23884002__

Level (low/med): LOW__ Date Received: 01/29/93

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7440-22-4	Silver	2.0	U		P	
7440-38-2	Arsenic	34.3			F	
7440-39-3	Barium	4.3	B		P	
7440-41-7	Beryllium	0.26	U		P	
7440-70-2	Calcium	15200			P	
7440-43-9	Cadmium	2.8	U		P	
7440-48-4	Cobalt	2.6	U		P	
7440-47-3	Chromium	6.3	B		P	
7440-50-8	Copper	6.3	B		P	J 2
7439-89-6	Iron	888			P	
7439-97-6	Mercury	0.07	U		CV	
7439-95-4	Magnesium	9440			P	
7439-96-5	Manganese	62.6			P	
7440-02-0	Nickel	10.8	B		P	
7439-92-1	Lead	6.1			F	U 1
7440-36-0	Antimony	16.4	U		P	
7782-49-2	Selenium	1.8	U	N	F	UJ 3
7440-31-5	Tin	12.7	U	N*	P	UJ 3, 4
7440-28-0	Thallium	2.3	U		F	
7440-62-2	Vanadium	79.2			P	
7440-66-6	Zinc	98.8			P	

Color Before: BROWN____ Clarity Before: CLOUDY Texture: N/A___

Color After: CLEAR____ Clarity After: CLOUDY Artifacts: _____

Comments:

FORM I - IN

ILM02.1

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11MW3

Lab Name: CH2M_HILL_MGM_____ Contract: 23884_____

Lab Code: NA____ Case No.: 23884_ SAS No.: 23884_ SDG No.: 23884_

Matrix (soil/water): WATER Lab Sample ID: 23884003__

Level (low/med): LOW__ Date Received: 01/29/93

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7440-22-4	Silver	2.0	U		P	
7440-38-2	Arsenic	2.7	B		F	
7440-39-3	Barium	8.8	B		P	
7440-41-7	Beryllium	0.26	U		P	
7440-70-2	Calcium	191000			P	
7440-43-9	Cadmium	2.8	U		P	
7440-48-4	Cobalt	2.6	U		P	
7440-47-3	Chromium	4.6	B		P	
7440-50-8	Copper	9.0	B		P	T2
7439-89-6	Iron	2510			P	
7439-97-6	Mercury	0.07	U		CV	
7439-95-4	Magnesium	44300			P	
7439-96-5	Manganese	86.8			P	
7440-02-0	Nickel	9.4	U		P	
7439-92-1	Lead	1.8	B	PBH	F	U1
7440-36-0	Antimony	16.4	U		P	
7782-49-2	Selenium	1.8	U	N	F	UJ3
7440-31-5	Tin	12.7	U	N*	P	UJ3,4
7440-28-0	Thallium	2.3	U		F	
7440-62-2	Vanadium	8.1	B		P	
7440-66-6	Zinc	33.2			P	

Color Before: CLEAR____ Clarity Before: CLEAR_ Texture: N/A___

Color After: CLEAR____ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11MW3D

Lab Name: CH2M_HILL_MGM_____ Contract: 23884_____

Lab Code: NA____ Case No.: 23884_ SAS No.: 23884_ SDG No.: 23884_

Matrix (soil/water): WATER Lab Sample ID: 23884004__

Level (low/med): LOW__ Date Received: 01/29/93

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7440-22-4	Silver	2.0	U		P	
7440-38-2	Arsenic	3.2	B		F	
7440-39-3	Barium	9.5	B		P	
7440-41-7	Beryllium	0.26	U		P	
7440-70-2	Calcium	189000			P	
7440-43-9	Cadmium	2.8	U		P	
7440-48-4	Cobalt	2.6	U		P	
7440-47-3	Chromium	5.2	B		P	J 2
7440-50-8	Copper	12.9	B		P	
7439-89-6	Iron	3070			P	
7439-97-6	Mercury	0.07	U		CV	
7439-95-4	Magnesium	43500			P	
7439-96-5	Manganese	88.7			P	
7440-02-0	Nickel	9.4	U		P	
7439-92-1	Lead	2.3	B	YBH	F	U 1
7440-36-0	Antimony	16.4	U		P	
7782-49-2	Selenium	1.8	U	NW	F	UJ 3
7440-31-5	Tin	2950		N*	P	UJ 3, 4
7440-28-0	Thallium	2.3	U		F	
7440-62-2	Vanadium	8.3	B		P	
7440-66-6	Zinc	19.3	B		P	

Color Before: CLEAR____ Clarity Before: CLEAR_ Texture: N/A___

Color After: CLEAR____ Clarity After: CLEAR_ Artifacts: _____

Comments:

THE "W" QUALIFIER INDICATES POOR POSTSPIKE RECOVERY._____

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

2FB005

Lab Name: CH2M_HILL_MGM_____ Contract: 23884_____

Lab Code: NA____ Case No.: 23884_ SAS No.: 23884_ SDG No.: 23884_

Matrix (soil/water): WATER Lab Sample ID: 23884005__

Level (low/med): LOW__ Date Received: 01/29/93

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7440-22-4	Silver	2.0	U		P	
7440-38-2	Arsenic	0.69	B		F	
7440-39-3	Barium	3.4	B		P	
7440-41-7	Beryllium	0.26	U		P	
7440-70-2	Calcium	488	~~B~~	VBH	P	UJ
7440-43-9	Cadmium	2.8	U		P	
7440-48-4	Cobalt	2.6	U		P	
7440-47-3	Chromium	2.8	U		P	
7440-50-8	Copper	1.2	U		P	UJ2
7439-89-6	Iron	33.4	~~B~~	VBH	P	UJ
7439-97-6	Mercury	0.07	U		CV	
7439-95-4	Magnesium	34.0	B		P	
7439-96-5	Manganese	1.6	~~B~~	VBH	P	UJ
7440-02-0	Nickel	9.4	U		P	
7439-92-1	Lead	0.93	U		F	
7440-36-0	Antimony	16.4	U		P	
7782-49-2	Selenium	1.8	U	N	F	UJ3
7440-31-5	Tin	14.5	B	N*	P	UJ3,V
7440-28-0	Thallium	2.3	U		F	
7440-62-2	Vanadium	2.6	U		P	
7440-66-6	Zinc	9.0	U		P	

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.

2QS006

Lab Name: CH2M_HILL_MGM Contract: 23884

Lab Code: NA Case No.: 23884 SAS No.: 23884 SDG No.: 23884

Matrix (soil/water): WATER Lab Sample ID: 23884006

Level (low/med): LOW Date Received: 01/29/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-22-4	Silver	2.0	U		P	
7440-38-2	Arsenic	0.68	U		F	
7440-39-3	Barium	3.0	B		P	
7440-41-7	Beryllium	0.26	U		P	
7440-70-2	Calcium	537	~~B~~	PBH	P	UJ
7440-43-9	Cadmium	2.8	U		P	
7440-48-4	Cobalt	2.6	U		P	
7440-47-3	Chromium	3.3	B		P	
7440-50-8	Copper	1.2	U		P	UJ2
7439-89-6	Iron	32.6	~~B~~	PBH	P	UJ
7439-97-6	Mercury	0.07	U		CV	
7439-95-4	Magnesium	18.1	B		P	
7439-96-5	Manganese	1.5	~~B~~	PBH	P	UJ
7440-02-0	Nickel	9.4	U		P	
7439-92-1	Lead	0.93	U		F	
7440-36-0	Antimony	16.4	U		P	
7782-49-2	Selenium	1.8	U	N	F	UJ3
7440-31-5	Tin	12.7	U	N*	P	UJ3,4
7440-28-0	Thallium	2.3	U		F	
7440-62-2	Vanadium	2.6	U		P	
7440-66-6	Zinc	9.0	U		P	

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ILMO2.1

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

11MW3DS

Lab Name: CH2M_HILL_MGM_____ Contract: 23884_____

Lab Code: NA____ Case No.: 23884_ SAS No.: 23884_ SDG No.: 23884_

Matrix (soil/water): WATER_ Level (low/med): LOW___

% Solids for Sample: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	46.3500		2.0000	U	50.00	92.7		P
Arsenic	75-125	42.6100		3.2300	B	40.00	98.4		F
Barium	75-125	1873.4600		9.5000	B	2000.00	93.2		P
Beryllium	75-125	48.8700		0.2600	U	50.00	97.7		P
Calcium									NR
Cadmium	75-125	48.2200		2.7700	U	50.00	96.4		P
Cobalt	75-125	460.1100		2.6500	U	500.00	92.0		P
Chromium	75-125	188.4100		5.1900	B	200.00	91.6		P
Copper	75-125	234.7900		12.8900	B	250.00	88.8		P
[illegible]on	75-125	4280.7700		3073.8300		1000.00	120.7		P
[illegible]ercury	75-125	1.6790		0.0710	U	2.00	84.0		CV
Magnesium									NR
Manganese	75-125	544.0800		88.6600		500.00	91.1		P
Nickel	75-125	424.7200		9.4000	U	500.00	84.9		P
Lead	75-125	21.3900		2.3200	B	20.00	95.4		F
Antimony	75-125	475.5500		16.4000	U	500.00	95.1		P
Selenium	75-125	6.7700		1.8380	U	10.00	67.7	N	F
Tin	75-125	9112.5000		2950.6500		10000.00	61.6	N	P
Thallium	75-125	38.1900		2.3220	U	50.00	76.4		F
Vanadium	75-125	473.1900		8.2700	B	500.00	93.0		P
Zinc	75-125	487.7100		19.3100	B	500.00	93.7		P

Comments:
THE SELENIUM AND TIN PRESPIKES DID NOT RECOVER WITHIN THE 75-125%_____
CRITERIA._____

U.S. EPA - CLP

5B

POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

11MW3DA

Lab Name: CH2M_HILL_MGM_____ Contract: 23884_____

Lab Code: NA____ Case No.: 23884_ SAS No.: 23884_ SDG No.: 23884_

Matrix (soil/water) : WATER_ Level (low/med): LOW___

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Added (SA)	%R	Q	M
Silver									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Calcium									NR
Cadmium									NR
Cobalt									NR
Chromium									NR
Copper									NR
Iron									NR
Mercury									NR
Magnesium									NR
Manganese									NR
Nickel									NR
Lead									NR
Antimony									NR
Selenium									NR
Tin		7342.40		2950.65		5000.0	87.8		P
Thallium									NR
Vanadium									NR
Zinc									NR

Comments:

FORM V (Part 2) - IN ILMO2.

000082

000020

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

11MW3D

Lab Name: CH2M_HILL_MGM_____ Contract: 23884_____

Lab Code: NA____ Case No.: 23884_ SAS No.: 23884_ SDG No.: 23884_

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Silver		2.0000	U	2.0000	U			P
Arsenic		3.2300	B	3.5500	B	9.4		F
Barium		9.5000	B	9.3700	B	1.4		P
Beryllium		0.2600	U	0.2600	U			P
Calcium		189015.0000		190812.0000		0.9		P
Cadmium		2.7700	U	2.7700	U			P
Cobalt		2.6500	U	2.6500	U			P
Chromium		5.1900	B	5.5400	B	6.5		P
Copper		12.8900	B	9.3200	B	32.1		P
Iron		3073.8300		3276.3800		6.4		P
Mercury		0.0710	U	0.0710	U			CV
Magnesium		43528.8200		43736.7700		0.5		P
Manganese		88.6600		88.6800		0.0		P
Nickel		9.4000	U	9.4000	U			P
Lead	3.0	2.3200	B	3.7000		45.8		F
Antimony		16.4000	U	16.4000	U			P
Selenium		1.8380	U	1.8380	U			F
Tin	500.0	2950.6500		12.7000	U	200.0	*	P
Thallium		2.3220	U	2.3220	U			F
Vanadium		8.2700	B	7.6400	B	7.9		P
Zinc	20.0	19.3100	B	21.0800		8.8		P

Field Trailer Ph # (904) 246-0265

PO Norton (904) 868-8721

CH2M HILL
QUALITY ANALYTICAL LABORATORIES

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M HILL Project #: 000000000.00.00

Purchase Order #:

Project Name: NS Mayport (Neutralization basin)

Company Name/CH2M HILL Office: ABB-ES - Tallahassee

Project Manager & Phone #: Mr. [ ] Ricky Layne Ms. [X] (904) 656-1293 Dr. [ ]

Report Copy to: Greg Brown

Requested Completion Date: 3wk. std. turnaround

Sampling Requirements: SDWA [ ] NPDES [ ] RCRA [X] OTHER [ ]

Sample Disposal: Dispose [X] Return [ ]

OF CONTAINERS

LAB TEST CODES

SHADED AREA – FOR LAB USE ONLY

Lab 1 #: Lab 2 #:

Quote #: Kit Request #:

Project #:

No. of Samples: Page: of:

COC Rev: Login: LIMS Ver: Ack Gen:

ANALYSES REQUESTED

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	CLIENT SAMPLE ID (9 CHARACTERS)	# OF CONTAINERS	8240 VOAs	8010 VOAs	7 METALS Cd Pb Ni Se Tl Zn Hg	8270 SVOAs	8250 PEST/PCB	REMARKS	LAB 1 ID	LAB 2 ID
1/27	1210		X	X		NLLT-11-1	2	3	3	1	1	1			
1/27	1300					NPT-11-2	2	3	3	1	1	1			
1/27	1055					11 MW33	3	3	3	1	1	1			
1/27	1055					11 MW33D	3	3	3	1	1	1	Dup		
1/27	1055					11 MW33MS	3	3	3	1	1	1	Matrix Spike		
1/27	1055					11 MW33SD	3	3	3	1	1	1	Matrix Spike Dup		
1/27	12:00					2 FB00056	3	3	3	1	1	1			
1/27	12:10					2 QJ0056	3	3	3	1	1	1			
1/--						--	--	--	--	--	--	--			

Change to different Job

Need level 2

Sampled By & Title (Please sign and print name)	Date/Time	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Shipped Via: UPS BUS Fed-Ex Hand Other	Shipping # FedEx 192412331135
Work Authorized By (Please sign and print name)		Remarks: Bill to Tasks Order 11 Job # 7551-40	

HAZWRAP/NESSA: Y N

QC Level: 1 2 3 Other:

COC Rec: ICE:

Ana Req: TEMP:

Cust Seal: Ph:

DISTRIBUTION: ORIGINAL - LAB, Yello[illegible]B, Pink - Client

Instructions and Agreement Provisions on Reverse Side

1994 Data Validation Narratives

Environmental Data Services, Inc.

Specializing in Laboratory Data Validation

Summary of Organic Data Validation
Volatile Organic Compounds

Client:	ABB Environmental Services, Inc.
Project Name:	U.S. Naval Station Mayport, Mayport, Florida
Project Number:	CTO 028
Contract Laboratory:	Quality Analytical Laboratory
SDG Number:	002W
Analytical Batch ID:	M7366,M7383,M7399,M7410,M7424,M7457,M7472
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Linda Harding
Secondary Reviewer:	Nancy Weaver
Date Review Completed:	October 3, 1994

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
02R002	M7366001	Water
22MW001S	M7366002	Water
02MW012I	M7366003	Water
02MW012IMS	M7366003MS	Water
02MW012IMSD	M7366003MSD	Water
02MW012ID	M7366004	Water
02MW012S	M7366005	Water
02MW001S	M7366006	Water
02T005	M7366007	Water
13MW002S	M7383001	Water
13MW003S	M7383002	Water
02T007	M7383003	Water
02MW015IR	M7399001	Water
02MW015SR	M7399002	Water
02MW002S	M7399003	Water
02T008	M7399004	Water
02MW008S	M7410001	Water
02MW008SD	M7410002	Water
16MW002S	M7410003	Water
16MW003S	M7410004	Water

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16T009 ✓	M7410005	Water
16MW001I ✓	M7424001	Water
16T010 ✓	M7424002	Water
11MW003S ✓	M7457001	Water
11MW002S ✓	M7457002	Water
11T012 ✓	M7457003	Water
11MW001S ✓	M7472001	Water
16MW004S ✓	M7472002	Water
02T013 ✓	M7472003	Water

I. Validation Procedure Summary

Data review and validation were performed in accordance with Naval Energy and Environmental Support Activity (NEESA) 20.2-047B (June 1988) using the USEPA National Functional Guidelines for Organic Data Review, (12/90, Revised 6/91) and criteria specified in the USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition (1986).

II. Data Deliverables

1. All required deliverables including QA/QC summary forms and all necessary raw data were present in legible form in the data package.

   Yes: X No: ____

III. Technical Holding Times

Technical holding times for all samples were verified from raw data and chain of custody forms.

1. Technical holding times were within the allowable limits shown below:

   a. Preserved water samples analyzed $\leq$14 days from date of sample collection.

   Yes: X No: ____ N/A: ____

   b. Unpreserved water samples, aromatic VOCs analyzed $\leq$7 days from date of sample collection; non-aromatic VOCs analyzed $\leq$14 days from date of sample collection.

   Yes: ____ No: ____ N/A: X

   c. Soil samples analyzed $\leq$14 days from date of sample collection.

   Yes: ____ No: ____ N/A: X

   Comment: Holding time criteria have been met and no action has been taken.

IV. GC/MS Instrument Performance Check

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. The BFB instrument performance check solution was analyzed at the beginning of each 12 hour period during sample analysis. All standards, samples, blanks and samples were analyzed within 12 hours of the injection of the tuning compound.

   Yes: __X__ No: _____

2. BFB ion abundance criteria for all instrument performance checks were within the quality control limits specified below.

   Yes: __X__ No: _____

Bromofluorobezene (BFB)

m/z	Ion Abundance Criteria
50	15 - 40.0% of m/z 95
75	30.0 - 60.0 of m/z 95
95	Base peak, 100% relative abundance
96	5.0 - 9.0% of m/z 95
173	Less than 2.0% of m/z 174
174	Greater than 50.0% of m/z 95
175	5.0 - 9.0% of m/z 174
176	95.0 - 101.0% of m/z 174
177	5.0 - 9.0% of m/z 176

Summary of Tuning

Date of Injection	Instrument ID	Matrix	Level (low or medium)	File/Batch No.
6/20/94	HP1	Water	Low	EV02301023.D
7/05/94	HP1	Water	Low	EV03501036.D
7/07/94	HP1	Water	Low	EV07801078.D
7/08/94	HP1	Water	Low	EV00201002.D
7/12/94	HP1	Water	Low	EV04601046.D
7/14/94	HP1	Water	Low	EV09101091.D
7/13/94	HP1	Water	Low	EV06801068.D
6/30/94	HP1	Water	Low	EV09301093.D
7/01/94	HP1	Water	Low	EV01401014.D
6/28/94 -	HP1	Water	Low	EV04901049.D

Comment: Tuning criteria have been met and no action has been taken.

V. Initial Calibration (ICAL)

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. An initial 5-point calibration was run for each compound at concentrations of 10, 20, 50, 100, and 200 ug/L (or, if a 25-mL purge volume was used, at concentrations of 4, 10, 20, 30 and 40 ug/L).

   Yes: X No: ____

2. The initial calibration mean relative response factor (RRF) was greater than or equal to 0.05 for each compound.

   Yes: ____ No: X

3. The RRF percent relative standard deviation (% RSD) results from the initial calibration were less than or equal to 30% for all compounds.

   Yes: X No: ____

   Initial calibration results which did not meet RRF or %RSD criteria are listed below:

ICAL Date and File/Batch Numbers of Stds.	Affected Analyte	%RSD	RRF	Affected Sample	Lab Conc ug/L	Lab Qual	EDS Conc ug/L	EDS Qual
EV02401024.D-26D.28D.29D,30D	1,4-Dioxane	8.4	0.004	16T009 16MW003S 16MW002S 02MW008S 02MW008SD 11MW003S 11MW002S 11T012 16MW001I 16T010 02MW015IR 02MW015SR 02MW002S 02T008 02MW012S 02R002 22MW001S 02MW012I 02MW012ID 02MW001S 02T005 11MW001S 16MW004S 02T013	200	U	200	R

VI. Continuing Calibration

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. A continuing calibration standard containing all target compounds was analyzed at the beginning of each 12-hour analysis period following the analysis of the instrument performance check and prior to the analysis of any blanks or samples.

   Yes: X No: ____

2. The relative response factor (RRF) for each compound was greater than or equal to 0.05.

   Yes: ____ No: X

3. The percent difference (%D) between the mean initial calibration RRF and the continuing calibration RRF for each compound was within ±25%.

   Yes: ____ No: X

Continuing calibration results which did not meet RRF or %RSD criteria are listed below:

CCAL Date and File/Batch Numbers of Stds.	Affected Analyte	%D	RRF	Affected Sample	Lab Conc ug/L	Lab Qual	EDS Conc ug/L	EDS Qual
7/05/94 EV03601037.D	1,4-Dioxane	10.7	0.003	16MW001I 16T010 16T009	200	U	200	R
7/05/94 EV03601037.D	Chloromethane	36.0	1.132	16MW001I 16T010 16T009	10	U	10	UJ
7/05/94 EV03601037.D	Bromomethane	33.0	1.001	16MW001I 16T010 16T009	10	U	10	UJ
7/05/94 EV03601037.D	Dichlorodifluoro methane	32.3	1.557	16MW001I 16T010 16T009	10	U	10	UJ
7/05/94 EV03601037.D	Iodomethane	46.9	3.567	16MW001I 16T010 16T009	10	U	10	UJ
7/07/94 EV08001080.D	1,4-Dioxane	6.9	0.004	16MW003S	200	U	200	R
7/07/94 EV08001080.D	Dichlorodifluoro methane	42.3	3.273	16MW003S	10	U	10	UJ

7/07/94 EV08001080.D	Iodomethane	46.0	3.545	16MW003S	10	U	10	UJ
7/08/94 EV00301003.D	1,4-Dioxane	2.6	0.004	11MW002S 02MW008S 02MW008SD 16MW002S	200	U	200	R
7/08/94 EV00301003.D	Bromomethane	27.2	1.089	11MW002S 02MW008S 02MW008SD 16MW002S	10	U	10	UJ
7/08/94 EV00301003.D	Dichlorodifluoro methane	43.8	3.307	11MW002S 02MW008S 02MW008SD 16MW002S	10	U	10	UJ
7/08/94 EV00301003.D	Iodomethane	43.0	3.471	11MW002S 02MW008S 02MW008SD 16MW002S	10	U	10	UJ
7/12/94 EV04701047.D	1,4-Dioxane	3.3	0.004	11MW003S	200	U	200	R
7/12/94 EV04701047.D	Chloromethane	30.1	1.236	11MW003S	10	U	10	UJ
7/12/94 EV04701047.D	Bromomethane	32.8	1.005	11MW003S	10	U	10	UJ
7/12/94 EV04701047.D	Dichlorodifluoro methane	38.9	1.405	11MW003S	10	U	10	UJ
7/12/94 EV04701047.D	Iodomethane	47.5	3.581	11MW003S	10	U	10	UJ
7/13/94 EV06901069.D	1,4-Dioxane	1.0	0.004	11T012	200	U	200	R
7/13/94 EV06901069.D	Chloromethane	26.2	1.306	11T012	10	U	10	UJ
7/13/94 EV06901069.D	Bromomethane	38.2	0.923	11T012	10	U	10	UJ
7/13/94 EV06901069.D	Dichlorodifluoro methane	36.8	1.453	11T012	10	U	10	UJ
7/13/94 EV06901069.D	Iodomethane	38.4	3.361	11T012	10	U	10	UJ
6/30/94 EV09401094.D	1,4-Dioxane	9.8	0.003	02MW015IR 02MW015SR 02MW002S 02T008 13MW002S ✓ 02T007 ✓	200	U	200	R
6/30/94 EV09401094.D	Dichlorodifluoro methane	40.9	3.240	02MW015IR 02MW015SR 02MW002S 02T008 13MW002S 02T007	10	U	10	UJ

7/01/94 EV01501015.D	1,4-Dioxane	1.2	0.004	13MW003S	200	U	200	R ✓
7/01/94 EV01501015.D	Bromomethane	27.2	1.088	13MW003S	10	U	10	UJ ✓
7/01/94 EV01501015.D	Dichlorodifluoro methane	35.1	3.107	13MW003S	10	U	10	UJ ✓
7/01/94 EV01501015.D	Iodomethane	29.1	3.133	13MW003S	10	U	10	UJ ✓
6/28/94 EV05001050.D	1,4-Dioxane	0.5	0.004	02MW012S 02R002 22MW001S 02MW012I 02MW012ID 02MW001S 02T005	200	U	200	R ✓
6/28/94 EV05001050.D	Dichlorofluoro methane	42.6	3.281	02MW012S 02R002 22MW001S 02MW012I 02MW012ID 02MW001S 02T005	10	U	10	UJ ✓
7/14/94 EV09201092.D	Bromomethane	36.4	0.950	11MW001S 16MW004S 02T013	10	U	10	UJ
7/14/94 EV09201092.D	Dichlorodifluoro methane	36.7	1.457	11MW001S 16MW004S 02T013	10	U	10	UJ
7/14/94 EV09201092.D	Iodomethane	37.2	3.330	11MW001S 16MW004S 02T013	10	U	10	UJ
7/14/94 EV09201092.D	Methylmethacrylate	57.4	0.146	11MW001S 16MW004S 02T013	10	U	10	UJ

M7410 - Mean RRF Check Isobutyl Alcohol 6/20/94 Inst. HP1 Mean RRF = 0.061 (0.058 + 0.070 + 0.055 + 0.060 + 0.060)/5= 0.061	M7410 - %RSD Check-Inst.HP1 2-Chloroethylvinylether 6/20/94 %RSD=(std.dev/mean RRF)*100 Mean RRF = 0.203 (0.222 + 0.227 + 0.228 + 0.116 + 0.222)/5 = 0.203 std. dev = 0.0487 %RSD=(0.0487/0.203)*100=23.9%	M7410 - CCAL %D Check Chloromethane 7/05/94 Inst. HP1 (Mean RRF-RRF50/Mean RRF) * 100 = % Difference (1.769-1.132/1.769) * 100 = 36 %

VII. Blanks

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

7/01/94 EV01501015.D	1.4-Dioxane	1.2	0.004	13MW003S	200	U	200	R
7/01/94 EV01501015.D	Bromomethane	27.2	1.088	13MW003S	10	U	10	UJ
7/01/94 EV01501015.D	Dichlorodifluoro methane	35.1	3.107	13MW003S	10	U	10	UJ
7/01/94 EV01501015.D	Iodomethane	29.1	3.133	13MW003S	10	U	10	UJ
6/28/94 EV05001050.D	1.4-Dioxane	0.5	0.004	02MW012S 02R002 22MW001S 02MW012I 02MW012ID 02MW001S 02T005	200	U	200	R
6/28/94 EV05001050.D	Dichlorofluoro methane	42.6	3.281	02MW012S 02R002 22MW001S 02MW012I 02MW012ID 02MW001S 02T005	10	U	10	UJ
6/28/94 EV05001050.D	Acetone	30.2	0.151	02MW012S 02R002 22MW001S 02MW012I 02MW012ID 02MW001S 02T005	10	U	10	UJ
7/14/94 EV09201092.D	Bromomethane	36.4	0.950	11MW001S 16MW004S 02T013	10	U	10	UJ
7/14/94 EV09201092.D	Dichlorodifluoro methane	36.7	1.457	11MW001S 16MW004S 02T013	10	U	10	UJ
7/14/94 EV09201092.D	Iodomethane	37.2	3.330	11MW001S 16MW004S 02T013	10	U	10	UJ
7/14/94 EV09201092.D	Methylmethacrylate	57.4	0.146	11MW001S 16MW004S 02T013	10	U	10	UJ

A. Laboratory Blanks

1. Laboratory method blanks were analyzed for each matrix type, concentration level, and for each 12 hour time period on each GC/MS system used to analyze samples.

   Yes: X No: ____

2. All laboratory blanks were found to be free of contaminant target compounds at detectable concentrations.

   Yes: ____ No: X

   Comment: Target compounds were identified atdetectable concentrations in one or more of the following metod blanks:

Blank ID/Date	Affected Analyte	Conc(ug/L)	Action Level **	Affected Sample	Lab Conc ug/L	Lab Qual	EDS Conc ug/L	EDS Qual
VBLK79 7/05/94	Methylene Chloride	6	60	16T009 ✓	2	JB	5	U
VBLK79 7/05/94	Acetone	14	140	16T009 ✓	8	JB	10	U
VBLK7B 7/07/94	Acetone	7	70	16MW003S ✓	3	JB	10	U
VBLK7C 7/08/94	Acetone	8	80	11MW002S	10	B	10	U
VBLK7F 7/12/94	Acetone	6	60	11MW003S	6	JB	10	U
VBLK7G 7/13/94	Acetone	6	60	11T012	10	B	10	U
VBLK79 7/05/94	Methylene Chloride	6	60	16MW001I 16T010	4 4	JB JB	5 5	U U
VBLK79 7/05/94	Acetone	14	140	16MW001I 16T010	5 10	JB B	10 10	U U
VBLK74 6/30/94	Methylene Chloride	1	10	02T008 13MW002S 02T007 ~~02T008~~	2 1 1 ~~7~~	JB JB JB ~~JB~~	5 5 5 ~~10~~	U U U ~~U~~
VBLK74 6/30/94	Acetone	9	90	02MW015SR 13MW002S 02T007 02T008	6 4 9 7	JB JB JB JB	10 10 10 10	U U U U

25 already listed correctly and qualified.

VBLK76 7/01/94	Methylene Chloride	No Samples Affected						
VBLK76 7/01/94	Acetone	No Samples Affected						
VBLK6Z 6/28/94	Acetone	10 ✓	100	02R002 22MW001S 02MW012I 02MW012ID 02MW001S 02T005	5 4 10 10 5 9	JB JB B B JB JB	10 10 10 10 10 10	U U ~~U~~ UJ ~~U~~ UJ U U
VBLK7J	No compounds Detected							

RS 1/12/94

** The "action level" is 10X the blank concentration for compounds defined to be common lab contaminants (i.e. methylene chloride, acetone, 2-butanone), and the 5X the blank concentration for other target compound contaminants. A conversion factor of 33.3 X ug/L will be used to account for the difference of QC blank contamination reported in micrograms per liter for soil and sediment matrix samples.

3. All laboratory blanks were found to be clean of tentatively identified compound (TIC) contamination.

   Yes: X No: ____ N/A: ____

4. If TICs were detected in the laboratory blanks, the associated samples were found to be free of those analytes at detectable concentrations.

   Yes: ____ No: ____ N/A: X

   Comment: Blank criteria for TICs have been met and no action has been taken.

B. Field Blanks

1. The field blanks associated with samples in the SDG met the following conditions:

   a. All field blanks were found to be free of target analytes at detectable concentrations.

   Yes: ____ No: X N/A: ____

   Target compounds were identified at detectable concentrations in one or more of the following field blanks:

Blank ID/Date	Affected Analyte	Conc (ug/L)	Action Level	Affected Sample	Lab Conc (ug/L)	Lab Qual	EDS Conc (ug/L)	EDS Qual
16T009 7/05/94	Methylene Chloride	Also found in laboratory blanks and has been previously qualified						
11T012 7/13/94	Acetone	Also found in laboratory blanks and has been previously qualified						
16T010 7/05/94	Methylene Chloride, Acetone	Also found in laboratory blanks and has been previously qualified						
02T008 6/30/94	Methylene Chloride, Acetone	Also found in laboratory blanks and has been previously qualified						
02T007 6/30/94	Methylene Chloride, Acetone	Also found in laboratory blanks and has been previously qualified						
02T005 6/23/94	Methylene Chloride	4	40	02R002 22MW001S	1 1	J J	5 5	U U
02T005 6/23/94	Methylene Chloride	4	40	02MW012I 02MW012S	1 1	J J	5 5	U U
02T013 7/14/94	Methylene Chloride	1	10	11MW001S	1	J	5	U
02T013 7/14/94	Acetone	18	180	11MW001S 16MW004S	7 4	J J	10 10	U U
02R002 6/28/94	Carbon Disulfide	2	10	None-all samples were undetected				
02R002 6/28/94	Tetrachloroe thene	1	5	None-all samples were undetected				

2. All field blanks were found to be clean of tentatively identified compound (TIC) contamination.

   Yes: _____ No: _____ N/A: __X__

3. If TICs were detected in the field blanks, the associated samples were found to be free of those analytes at detectable concentrations.

   Yes: _____ No: _____ N/A: __X__

   Comment: Field blanks were not analyzed for TICs.

VIII. System Monitoring Compounds (Surrogates)

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. System monitoring compound recovery results met the criteria specified below in all samples.

   Yes: __X__ No: _____

System Monitoring Compound Criteria

	Water %R	Soil/Sediment %R
Toluene-d_8 (TOL)	88-110	84-138
Bromofluorobenzene (BFB)	86-115	59-113
1,2-Dichloroethane-d_4 (DCE)	76-114	70-121

2. Sample reanalysis was performed if system monitoring results were outside of criteria.

   Yes: _____ No: _____ N/A: __X__

   Comment: Surrogate criteria have been met and no action has been taken.

IX. Matrix Spikes/Matrix Spike Duplicates

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. For every 20 samples in an SDG, one field sample of each type was spiked for MS/MSD analysis.

   Yes: __X__ No: _____

2. MS/MSD sample I.D.: 02MW012I

3. MS/MSD sample results met the criteria specified below.

   Yes: __X__ No: _____ NA: _____

MS/MSD Criteria

	Water		Soil/Sediment	
	%R	RPD	%R	RPD
1,1-Dichloroethene	61-145	14	59-172	22
Trichloroethene	71-120	14	62-137	24
Benzene	76-127	11	66-142	21
Toluene	76-125	13	59-139	21
Chlorobenzene	75-130	13	60-133	21

4. _0_ of 10 %R results were out of QC limits.
_0_ of 5 RPD results were out of QC limits.

Comment:

1. A MS/MSD for sample 16MW001I was included in batch M7457, however, according to the client tracking form, sample 02MW012I is the correct MS/MSD sample. Sample 16MW001IMS/MSD had acceptable %R and RPD values within QC limits, therefore, no action was taken.

2. Sample 16MW001I was included in batch M7424. This sample was not a designated MS/MSD sample on the client tracking form.

3. In batch M7472, it is stated that the MS/MSD is 16MW001I however, the tracking form lists this as 02MW012I. All %R and RPD values for MS/MSD sample 02MW012I were within acceptable QC limits, therefore, no action is taken.

X. Laboratory Control Samples (LCS)

Laboratory control charts were included in the data packages.

1. Laboratory control charts were provided for each surrogate for reagent blank analyses per batch.

Yes: __X__ No: _____ N/A: _____

2. The percent recoveries were within acceptable QC limits.

Yes: __X__ No: _____ N/A: _____

Comment: LCS criteria have been met and no action has been taken.

XI. Field Duplicates

1. The following duplicate set was analyzed with this SDG:

   a. 02MW008S and 02MW008SD
   b. 02MW012I and 02MW012ID

2. Comment: Benzene was reported in sample 02MW008S and 02MW008SD as 2J and 2J, respectively, therefore, the RPD is 0%. There were no positive results reported for either 02MW012I or 02MW012ID.

XII. Internal Standards

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. All sample IS area counts were within a -50% to +100% control limit window from the associated calibration standard.

   Yes: __X__ No: _____

2. All sample IS retention times were within a ±30 sec. control limit window of the associated calibration standard IS retention times.

   Yes: __X__ No: _____

   Comment: IS criteria have been met and no action has been taken.

XIII. Target Compound Identification

Target compound identification results are not verified for Level C data validation.

1. Sample results were not verified for the following identification criteria:

   a. Compound relative retention times (RRT) were within ±0.06 RRT units of the standard relative retention time.

   b. All ions present in the standard mass spectrum at a relative intensity greater than 10% were present in the sample spectrum, and the relative intensities of these ions were within ±20%.

   c. All ions present at greater than 10% in the sample mass spectrum but not present in the standard mass spectrum were accounted for.

   Yes: _____ No: _____ N/A: __X__

XIV. Compound Quantitation and Reported CRQLS

Compound quantitation and reported CRQLs are not verified for Level C data validation.

1. All Form I sample results which were verified were correctly calculated and reported.

   Yes: _____ No: _____ N/A: __X__

2. All sample compounds had on-column concentrations within the upper calibration range of the method.

   Yes: __X__ No: _____ N/A: _____

3. All samples were analyzed only once (i.e., no samples required re-analysis or dilution).

   Yes: __X__ No: _____ N/A: _____

XV. Tentatively Identified Compounds

One hundred percent of the results on the summary forms were checked to ensure that TIC results met required quality control criteria.

1. A mass spectral search of the NIST library was conducted for the 10 largest volatile fraction peaks which were not target compounds, ISs, or system monitoring compounds, and the spectra for the three TIC candidates were included.

   Yes: _____ No: _____ N/A: __X__

2. Reported TICs met the following criteria:

   a. Ions present at greater than 10% abundance in the referenced spectrum were also present in the sample spectrum, and relative intensities were within ±20%.

   b. Ions present in the sample spectrum at greater than 10% abundance were also present in the reference spectra, or could be accounted for.

   Yes: _____ No: _____ N/A: __X__

3. TIC concentrations were calculated assuming an RRF value of 1.0.

Yes: _____ No _____ N/A: __X__

Comment: In accordance with the Functional Guidelines, all TIC results were qualified "NJ", tentatively identified w/approximated concentrations.

XVI. System Performance

1. The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance.

Yes: __X__ No: _____

XVII. Overall Assessment of Data

The final validated results represent the compilation of all quality control qualification. With the exception of the quality control anomalies presented in Sections V, VI, VII, and XV (Initial calibration, Continuing calibration, Blanks, and TICs) of this report and the resulting qualifiers, the analyses of environmental samples and quality control samples are valid within the constraints identified with the data quality flags, with the exception of 1,4-dioxane which was rejected due to initial and continuing calibration problems.

Summary of Organic Data Validation
Semivolatile Organic Compounds

Client:	ABB Environmental Services, Inc.
Project Name:	U.S. Naval Station Mayport, Mayport, Florida
Project Number:	CTO 028
Contract Laboratory:	Quality Analytical Laboratory
SDG Number:	002W
Analytical Batch ID:	M7366,M7383,M7399,M7410,M7424,M7457,M7472
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Linda Harding
Secondary Reviewer:	Nancy Weaver
Date Review Completed:	October 3, 1994

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
02R002	M7366001	Water
22MW001S	M7366002	Water
02MW012I	M7366003	Water
02MW012IMS	M7366003MS	Water
02MW012IMSD	M7366003MSD	Water
02MW012ID	M7366004	Water
02MW012S	M7366005	Water
02MW001S	M7366006	Water
13MW002S	M7383001	Water
13MW003S	M7383002	Water
02MW015IR	M7399001	Water
02MW015SR	M7399002	Water
02MW002S	M7399003	Water
02MW008S	M7410001	Water
02MW008SD	M7410002	Water
16MW002S	M7410003	Water
16MW003S	M7410004	Water
16MW001I	M7424001	Water
11MW003S	M7457001	Water
11MW002S	M7457002	Water
11MW001S	M7472001	Water
16MW004S	M7472002	Water

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I. Validation Procedure Summary

Data review and validation were performed in accordance with Naval Energy and Environmental Support Activity (NEESA) 20.2-047B (June 1988) using the USEPA National Functional Guidelines for Organic Data Review, (12/90, Revised 6/91) and criteria specified in the USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition (1986).

II. Data Deliverables

1. All required deliverables including QA/QC summary forms and all necessary raw data were present in legible form in the data package.

   Yes: __X__ No: _____

III. Technical Holding Times

Technical holding times for all samples were verified from raw data and chain of custody forms.

1. Technical holding times were within the allowable limits shown below:

   a. Water samples extracted $\leq$7 days from date of sample collection; analyzed $\leq$40 days from date of extraction.

   Yes: __X__ No: _____ N/A: _____

   b. Soil/sediment samples extracted $\leq$14 days from date of sample collection; analyzed $\leq$40 days from date of extraction.

   Yes: _____ No: _____ N/A: __X__

   Comment: Holding time criteria have been met and no action has been taken.

IV. GC/MS Instrument Performance Check

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. The DFTPP instrument performance check solution was analyzed at the beginning of each 12 hour period during sample analysis. All standards, samples, blanks and samples were analyzed within 12 hours of the injection of the tuning compound.

   Yes: X No: ____

2. DFTPP ion abundance criteria for all instrument performance checks were within the quality control limits specified below.

   Yes: X No: ____

Decafluorotriphenylphosphine (DFTPP)

m/z	Ion Abundance Criteria
51	30.0-60.0% of m/z 198
68	Less than 2.0% of m/z 69
69	Present, Mass 69 relative abundance
70	Less than 2.0% of m/z 69
127	40.0 - 60.0 of m/z 198
197	Less than 1.0% of m/z 198
198	Base peak, 100% relative abundance
199	5.0 - 9.0 of m/z 198
275	10.0 - 30.0% of m/z 198
365	Greater than 1.00% of m/z 198
441	Present, but less than m/z 443
442	Greater than 40.0% of m/z 198
443	17.0 - 23.0% of m/z 442

Summary of Tuning

Date of Injection	Instrument ID	Matrix	Level (low or medium)	File/Batch No.
ICAL 7/01/94	4600	Water	Low	94M1BN2147
ICAL 7/06/94	4600	Water	Low	94M1DF2180
ICAL 7/08/94	4600	Water	Low	94M1BN2218
CCAL 7/22/94	4600	Water	Low	94M1DF2415
CCAL 7/14/94	4600	Water	Low	94M1DF2289
CCAL 7/16/94	4600	Water	Low	94M1DF2321
CCAL 7/18/94	4600	Water	Low	94MIDF2353
CCAL 7/20/94	4600	Water	Low	94M1DF2384

Comment: Tuning criteria have been met and no action has been taken.

V. Initial Calibration (ICAL)

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. An initial 5-point calibration was run for each compound at concentrations of 20, 50, 80, 120, and 160 ng per 2 ul injections.

   Yes: X No: _____

2. The initial calibration mean relative response factor (RRF) results were greater than or equal to 0.05 for each compound.

   Yes: X No: _____

3. The RRF percent relative standard deviation (% RSD) results from the initial calibration were less than or equal to 30% for all compounds.

   Yes: _____ No: X

   Comment: Several compounds exceeded the 30% RSD criteria, however, there were no positive results reported for these compounds therefore, no qualifications were made.

VI. Continuing Calibration (CCAL)

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. A 50 ug/L continuing calibration standard containing all target compounds ~~was~~ were analyzed at the beginning of each 12-hour analysis period following the analysis of the instrument performance check and prior to the analysis of any blanks or samples.

   Yes: X No: _____

2. The relative response factors (RRFs) were greater than or equal to 0.05 for each compound.

   Yes: _____ No: X

3. The percent difference (%D) between the mean initial calibration RRF and the continuing calibration RRF were within ±25%.

Yes: _____ No: X

Comment: The following summarizes continuing calibration RRF/%D exceedences:

CCAL Date and File/ Batch Number of Stds.	Affected Analyte	%RSD	RRF	Affected Samples	Lab Value ug/L	Lab Qual	EDS Value ug/L	EDS Qual
7/22/94 94M1BN 2415	Aniline	31.0	1.510	11MW003S 11MW002S 11MW001S 16MW004S	10	U	10	UJ
7/22/94 94M1BN 2415	4-Chloro-aniline	26.9	0.312	11MW003S 11MW002S 11MW001S 16MW004S	10	U	10	UJ
7/22/94 94M1BN 2415	3-Nitroaniline	26.5	0.236	11MW003S 11MW002S 11MW001S 16MW004S	50	U	50	UJ
7/22/94 94M1BN 2415	2,4-Dinitrophenol	49.6	0.112	11MW003S 11MW002S 11MW001S 16MW004S	50	U	50	UJ
7/22/94 94M1BN 2415	4,6-Dinitro-2-methylphenol	43.3	0.110	11MW003S 11MW002S 11MW001S 16MW004S	50	U	50	UJ
7/22/94 94M1BN 2415	Benzidine	99.9	0.350	11MW003S 11MW002S 11MW001S 16MW004S	50	U	50	UJ
7/22/94 94M1BN 2416	N-Nitrosopiperidine	35.7	0.227	11MW003S 11MW002S 11MW001S 16MW004S	10	U	10	UJ
7/22/94 94M1BN 2416	Phenecetin	27.8	0.306	11MW003S 11MW002S 11MW001S 16MW004S	10	U	10	UJ

7/22/94 94M1BN 2416	1,4- Napthoquinone	99.9	0.178	11MW003S 11MW002S 11MW001S 16MW004S	1000	U	1000	UJ
7/22/94 94M1BN 2416	4-Nitroquinoline- 1-oxide	48.2	0.072	11MW003S 11MW002S 11MW001S 16MW004S	500	U	500	UJ
7/22/94 94M1BN 2416	Methapyriline	30.2	0.393	11MW003S 11MW002S 11MW001S 16MW004S	50	U	50	UJ
7/22/94 94M1BN 2416	Hexachlorophene	41.7	0.102	11MW003S 11MW002S 11MW001S 16MW004S	500	U	500	UJ
7/14/94 94M1BN 2289	4-Chloroaniline	38.9	0.261	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	10	U	10	~~R~~ UJ 1/12/94
7/14/94 94M1BN 2289	2,4-Dinitrophenol	26.6	0.163	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	50	U	50	UJ
7/14/94 94M1BN 2289	Benzidine	81.2	0.270	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	50	U	50	UJ
7/14/94 94M1BN 2290	Hexachlorophene	88.0	0.021	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	500	U	500	UJ
7/14/94 94M1BN 2290	N- Nitrosopiperidine	29.5	0.249	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	10	U	10	UJ

7/22/94 94M1BN2416	1.4-Napthoquinone	99.9	0.178	11MW003S 11MW002S 11MW001S 16MW004S	1000	U	1000	UJ
7/22/94 94M1BN2416	4-Nitroquinoline-1-oxide	48.2	0.072	11MW003S 11MW002S 11MW001S 16MW004S	500	U	500	UJ
7/22/94 94M1BN2416	Methapyriline	30.2	0.393	11MW003S 11MW002S 11MW001S 16MW004S	50	U	50	UJ
7/22/94 94M1BN2416	1,3,5-Trinitrobenzene	25.3	0.177	11MW003S 11MW002S 11MW001S 16MW004S	10	U	10	UJ
7/22/94 94M1BN2416	Hexachlorophene	41.7	0.102	11MW003S 11MW002S 11MW001S 16MW004S	500	U	500	UJ
7/14/94 94M1BN2289	4-Chloroaniline	38.9	0.261	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	10	U	10	UJ
7/14/94 94M1BN2289	2,4-Dinitrophenol	26.6	0.163	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	50	U	50	UJ
7/14/94 94M1BN2289	Benzidine	81.2	0.270	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	50	U	50	UJ
7/14/94 94M1BN2290	Hexachlorophene	88.0	0.021	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	500	U	500	UJ
7/14/94 94M1BN2290	N-Nitrosopiperidine	29.5	0.249	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	10	U	10	UJ

7/14/94 94M1BN 2290	2-Napthylamine	54.7	0.213	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	50	U	50	UJ
7/14/94 94M1BN 2290	Phencetin	25.9	0.314	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	10	U	10	UJ
7/14/94 94M1BN 2290	1,3,5-Trinitrobenzene	25.7	0.176	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	10	U	10	UJ
7/14/94 94M1BN 2290	4-Nitroquinoline-1-oxide	49.6	0.070	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	500	U	500	UJ
7/14/94 94M1BN 2290	Methapyriline	37.7	0.351	02MW012ID 02MW001S 02MW012I 02MW012S 02R002 22MW001S	50	U	50	UJ
7/16/94 94M1BN 2321	Benzidine	41.6	0.211	13MW002S 13MW003S	50	U	50	UJ
7/16/94 94M1BN 2321	4-Nitroquinoline-1-oxide	44.6	0.077	13MW002S 13MW003S	500	U	500	UJ
7/16/94 94M1BN 2321	3,3-Dimethyl benzidine	26.9	0.228	13MW002S 13MW003S	10	U	10	UJ
7/16/94 94M1BN 2321	Hexachlorophene	70.3	0.052	13MW002S 13MW003S	500	U	500	UJ
7/16/94 94M1BN 2321	p-Phenylenediamine	27.9	0.142	13MW002S 13MW003S	500	U	500	UJ

7/18/94 94M1BN 2353	4-Chloroaniline	31.4	0.293	02MW002S 02MW015SR 02MW015IR 02MW008S 02MW008SD 16MW002S 16MW003S	10	U	10	UJ
7/18/94 94M1BN 2353	Benzidine	99.9	0.308	02MW002S 02MW015SR 02MW015IR 02MW008S 02MW008SD 16MW002S 16MW003S	50	U	50	UJ
7/18/94 94M1BN 2353/4 RS	4-Nitroquinoline-1-oxide	43.2	0.079	02MW002S 02MW015SR 02MW015IR 02MW008S 02MW008SD 16MW002S 16MW003S	500	U	500	UJ
7/18/94 94M1BN 2353/4 RS	Methapyriline	32.0	0.383	02MW002S 02MW015SR 02MW015IR 02MW008S 02MW008SD 16MW002S 16MW003S	50	U	50	UJ
7/18/94 94M1BN 2353/4 RS	Hexachlorophene	69.1	0.054	02MW002S 02MW015SR 02MW015IR 02MW008S 02MW008SD 16MW002S 16MW003S	500	U	500	UJ
7/18/94 94M1BN 2353/5 RS	p-Phenylenediamine	29.4	0.144	02MW002S 02MW015SR 02MW015IR 02MW008S 02MW008SD 16MW002S 16MW003S	500	U	500	UJ
7/20/94 94M1BN 2384	Aniline	26.4	1.610	16MW001I	10	U	10	UJ
7/20/94 94M1BN 2384	4-Chloroaniline	30.4	0.297	16MW001I	10	U	10	UJ

7/20/94 94M1BN 2384	3-Nitroaniline	28.7	0.229	16MW001I	50	U	50	UJ
7/20/94 94M1BN 2384	2,4-Dinitrophenol	37.4	0.139	16MW001I	50	U	50	UJ
7/20/94 94M1BN 2384	4,6-Dinitro-2-methylphenol	28.4	0.139	16MW001I	50	U	50	UJ
7/20/94 94M1BN 2384	Benzidine	99.9	0.308	16MW001I	50	U	50	UJ
7/20/94 94M1BN 2384	N-Nitrosopiperidine	31.7	0.241	16MW001I	10	U	10	UJ
7/20/94 94M1BN 2384	1,3,5-Trinitrobenzene	36.7	0.150	16MW001I	10	U	10	UJ
7/20/94 94M1BN 2384	4-Nitroquinoline-1-oxide	41.0	0.082	16MW001I	500	U	500	UJ
7/20/94 94M1BN 2384	Hexachlorophene	87.4	0.022	16MW001I	500	U	500	UJ
7/20/94 94M1BN 2384	p-Phenylenediamine	32.8	0.137	16MW001I	500	U	500	UJ

M7383 - Mean RRF Check 2-Naphthylamine 7/06/94 Inst. 4600 Mean RRF = 0.470 (0.434 + 0.351 + 0.405 + 0.549 + 0.612)/5= 0.470	M7383 - %RSD Check-Inst.4600 2-Naphthylamine 7/06/94 %RSD=(std.dev/mean RRF)*100 Mean RRF = 0.470 (0.434 + 0.351 + 0.405 + 0.549 + 0.612)/5 = 0.4702 std. dev = 0.10733 %RSD=(0.10733/0.4702)*100=22.8	M7383 - CCAL %D Check N-nitrosopiperidine 7/16/94 Inst. 4600 (Mean RRF-RRF50/Mean RRF) * 100 = % Difference (0.353-0.278/0.353) * 100 = 21.2%

VII. Blanks

A. Laboratory Blanks

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. Laboratory method blanks were analyzed for each matrix type, concentration level, extraction batch, and for each 12 hour time period on each GC/MS system used to analyze samples.

   Yes: X No: ____

2. All laboratory blanks were found to be free of contaminant target compounds at detectable concentrations.

   Yes: ____ No: X

   Target compounds were identified at detectable concentrations in one or more of the following method blanks.

Blank ID/ Date	Affected Analyte	Conc. ug/L	Action Level** ug/L	Affected Sample	Lab Conc ug/L	Lab Qual	EDS Conc ug/L	EDS Qual
B0711WA2-BLK 7/22/94	N-nitrosodiphenyl amine	4	20	11MW001S 16MW004S	4 3	BJ BJ	10 10	U U
B0627WA2-BLK 7/14/94	N-nitrosodiphenyl amine	3	15	02R002 22MW001S	3 3	BJ BJ	10 10	U U
B0711WA2-BLK 7/22/94	Bis(2-ethylhexyl) phthalate	7	70	02MW012S 02MW001S	4 2	BJ BJ	10 10	U U
B0627WA2-BLK 7/14/94	N-nitrosodiphenyl amine	3	15	02MW001S	2	BJ	10	U
B0629WA1-BLK 7/16/94	N-nitrosodiphenyl amine	3	15	13MW002S 13MW003S	3 3	BJ BJ	10 10	U U
B0630WA1-BLK 7/18/94	N-nitrosodiphenyl amine	3	15	02MW015SR 02MW002S	2 3	BJ BJ	10 10	U U
B0705WA2-BLK 7/20/94	N-nitrosodiphenyl amine	3	15	16MW001I	4	BJ	10	U
B0708WA1-BLK 7/22/94	N-nitrosodiphenyl amine	4	20	11MW003S 11MW002S	4 4	BJ BJ	10 10	U U
B0705WA1-BLK 7/18/94	2,4-Dimethylphenol	9	45	02MW008SD	9	BJ	10	U

B0705WA1-BLK 7/18/94	N-nitrosodiphenyl amine	3	15	02MW008S	3	BJ	10	U
				02MW008SD	3	BJ	10	U
				16MW002S	3	BJ	10	U
				16MW003S	3	BJ	10	U

** The "action level" is 10X the blank concentration for compounds defined to be common phthalate lab contaminants, and 5X the blank concentration for other target compound contaminants. A conversion factor of 33.3 X ug/L will be used to account for the difference of QC blank contamination reported in micrograms per liter for soil and sediment matrix samples.

3. All laboratory blanks were free of tentatively identified compound (TIC) contamination.

   Yes: _____ No: __X__

   Comment: The TICs detected in the blanks did not appear to affect any of the samples.

4. If TICs were detected in the laboratory blanks, the associated samples were found to be free of those analytes at detectable concentrations.

   Yes: _____ No: _____ N/A: __X__

B. Field Blanks

1. The field blanks associated with samples in the SDG met the following conditions:

   a. All field blanks were found to be free of target analytes at detectable concentrations.

   Yes: __X__ No: _____ N/A: _____

   Comment: N-Nitrosodiphenylamine was detected in rinsate blank 02R002, however, this compound was qualified as undetected "U" due to laboratory blank contamination, therefore, the rinsate blank had no affect on the samples.

2. All field blanks were free of tentatively identified compound (TIC) contamination.

   Yes: _____ No: _____ N/A: __X__

3. If TICs were detected in the field blanks, the associated samples were found to be free of those analytes at detectable concentrations.

Yes: _____ No: _____ N/A: __X__

Comment: Field blanks were not analyzed for TICs.

VIII. Surrogate Spike Compounds

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. Surrogate compound recovery (%R) results met the criteria specified below in all samples.

Yes: __X__ No: _____

	Surrogate Recovery Limits	
	Water	Soil
	%R	%R
NBZ (Nitrobenzene-d5)	35-114	23-120
FBP (2-Fluorobiphenyl)	43-116	30-115
TPH (Terphenyl-d14)	33-141	18-137
PHL (Phenol-d5)	10-94	24-113
2FP (2-Fluorophenol)	21-100	25-121
TBP (2,4,6-Tribromophenol)	10-123	19-122

2. Sample reanalysis was performed if surrogate results were outside of criteria.

Yes: _____ No: _____ N/A: __X__

Comment: Surrogate criteria have been met and no action has been taken.

IX. Matrix Spikes/Matrix Spike Duplicates

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. For every 20 samples in an SDG, one field sample of each type was spiked for MS/MSD analysis.

Yes: __X__ No: _____

2. MS/MSD Sample I.D.: 02MW012I

3. MS/MSD sample results met with the criteria specified below.

Yes: _____ No: __X__ N/A: _____

MS/MSD CRITERIA

	Water		Soil/Sediment	
	%R	RPD	%R	RPD
Phenol	12-110	42	26-90	35
2-Chlorophenol	27-123	40	25-102	50
1,4-Dichlorobenzene	36-97	28	28-104	27
N-Nitroso-Di-n-propylamine	41-116	38	41-126	38
1,2,4-Trichlorobenzene	39-98	28	38-107	23
4-Chloro-3-menthylphenol	23-97	42	26-103	33
Acenaphthene	46-118	31	31-137	19
4-Nitrophenol	10-80	50	11-114	50
2-4-Dinitrotoluene	24-96	38	28-89	47
Pentachlorophenol	9-103	50	17-109	47
Pyrene	26-127	31	35-142	36

4. 2 of 22 MS/MSD %R results were out of required quality control limits.
1 of 11 MS/MSD RPD results were out of required quality control limits.

Comment: MS/MSD criteria have been met and no action has been taken.
See Appendix A for Matrix Interference Summary Table.

X. Laboratory Control Samples (LCS)

Laboratory control charts were included in the data packages.

1. Laboratory control charts were provided for each surrogate for reagent blank analyses per batch.

Yes: __X__ No: _____ N/A: _____

2. The percent recoveries were within acceptable QC limits.

Yes: __X__ No: _____ N/A: _____

Comment: LCS criteria have been met and no action has been taken.

XI. Field Duplicates

1. The following duplicate set was analyzed with this SDG:

   a. 02MW008S AND 02MW008SD
   02MW012I and 02MW012ID

2. Comment: Field duplicate criteria have been met and no action has been taken. There were no positive results reported in either 02MW012I or 02MW012ID. Any positive results detected in 02MW008S or 02MW008SD were previously qualified as undetected "U" due to lab blank contamination, therefore, no further qualifications were required.

XII. Internal Standards (IS)

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. All sample IS area counts were within a -50% to +100% control limit window from the associated calibration standard.

   Yes: __X__ No: _____

2. All sample IS retention times were within a ±30 sec. control limit window of the associated calibration standard IS retention times.

   Yes: __X__ No: _____

   Comment: IS criteria have been met and no action has been taken.

XIII. Target Compound Identification

Target compound identification results are not verified for Level C data validation.

1. Sample results were not verified for the following identification criteria:

   a. Compound relative retention times (RRT) were within ±0.06 RRT units of the standard relative retention time.

   b. All ions present in the standard mass spectrum at a relative intensity greater than 10% were present in the sample spectrum, and the relative intensities of these ions were within ±20%.

c. All ions present at greater than 10% in the sample mass spectrum but not present in the standard mass spectrum were accounted for.

Yes: _____ No: _____ N/A: __X__

XIV. Compound Quantitation and Reported CRQLS

Compound quantitation and reported CRQLs are not verified for Level C data validation.

1. All Form I sample results which were verified were correctly calculated and reported.

   Yes: _____ No: _____ N/A: __X__

2. All sample compounds had on-column concentrations within the upper calibration range of the method.

   Yes: __X__ No: _____ N/A: _____

3. All samples were analyzed only once (i.e., no samples required re-analysis or dilution).

   Yes: __X__ No: _____ N/A: _____

XV. Tentatively Identified Compounds

One hundred percent of the results on the summary forms were checked to ensure that TIC results met required quality control criteria.

1. A mass spectral search of the NIST library was conducted for the 20 largest semivolatile fraction peaks which were not target compounds, ISs, or surrogate compounds, and the spectra for the three TIC candidates were included.

   Yes: _____ No: _____ N/A: __X__

2. Reported TICs met the following criteria:

   a. Ions present at greater than 10% abundance in the referenced spectrum were also present in the sample spectrum, and relative intensities were within ±20%.

b. Ions present in the sample spectrum at greater than 10% abundance were also present in the reference spectra, or could be accounted for.

Yes: _____ No: _____ N/A: __X__

3. TIC concentrations were calculated assuming an RRF value of 1.0.

Yes: _____ No _____ N/A: __X__

Comment: In accordance with the Functional Guidelines, all TIC results were qualified "NJ", tentatively identified w/approximated concentrations.

XVI. System Performance

1. The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance.

Yes: __X__ No _____

XVII. Overall Assessment of Data

The final validated results represent the compilation of all quality control qualification. With the exception of the quality control anomalies presented in Sections VI,VII, and XV (Continuing calibration, Blanks, and TICs) of this report and the resulting qualifiers, the analyses of environmental samples and quality control samples are valid within the constraints identified with the data quality flags, with the exception of 4-chloroaniline which was rejected due to continuing calibration problems.

Organic Data Qualifiers

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."

NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Summary of Organic Data Validation
Pesticides/PCBs, Including Kepone

Client:	ABB Environmental Services, Inc.
Project Name:	U.S. Naval Station Mayport, Mayport, Florida
Project Number:	CTO 028
Contract Laboratory:	Quality Analytical Laboratory - Montgomery
SDG Number:	002W
Laboratory Batch Number:	(M7366,M7383,M7399,M7410,M7424,M7457,M7472)
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	October 28, 1994

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
02R002	M7366001	Water
22MW001S	M7366002	Water
02MW012I	M7366003	Water
02MW012IMS	M7366003MS	Water
02MW012IMSD	M7366003MSD	Water
02MW012ID	M7366004	Water
02MW012S	M7366005	Water
02MW001S	M7366006	Water
13MW002S	M7383001	Water
13MW003S	M7383002	Water
02MW015IR	M7399001	Water
02MW015SR	M7399002	Water
02MW002S	M7399003	Water
02MW008S	M7410001	Water
02MW008SD	M7410002	Water
16MW002S	M7410003	Water
16MW003S	M7410004	Water
16MW001I	M7424001	Water
11MW003S	M7457001	Water
11MW002S	M7457002	Water
11MW001S	M7472001	Water
16MW004S	M7472002	Water

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I. Validation Procedure Summary

Data review and validation were performed in accordance with Naval Energy and Environmental Support Activity (NEESA) 20.2-047B (June 1988) using the USEPA National Functional Guidelines for Organic Data Review, (12/90, Revised 6/91) and criteria specified in the USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition (1986).

II. Data Deliverables

1. All required deliverables including QA/QC summary forms and all necessary raw data were present in legible form in the data package.

   Yes: __X__ No: _____

III. Technical Holding Times

Technical holding times for all samples were verified from raw data and chain of custody forms.

1. Technical holding times were within the allowable limits shown below:

   a. Water samples extracted <7 days from date of sample collection; analyzed <40 days from date of extraction.

   Yes: __X__ No: _____ N/A: _____

   b. Soil samples extracted <14 days from date of sample collection; analyzed <40 days from date of extraction.

   Yes: _____ No: _____ N/A: __X__

   Comment: Holding time criteria have been met and no action has been taken.

IV. Calibration

One hundred percent of the results on summary forms were checked to ensure that reported results met required quality control criteria.

1. Were initial calibration data reviewed and found to meet all method requirements?

   Yes: __X__ No: _____

The following calculations were verified for this data package:

M7366 - Pest/PCB - V6000A Mean RT Check 4,4'-DDE 6/21/94 Mean RT = 21.56 (21.56 + 21.56 + 21.56 + 21.56 + 21.57)/5= 21.56	M7366 - Pest/PCB - V6000A ICAL Area Ratio Check Delta-BHC 6/28/94 Component Area/Standard area = Area Ratio at 0.5X: 43731/232961=0.18772	M7366 - Pest/PCB - V6000A CCAL %D Check Endosulfan I 7/20/94 (ICAL mass-CCAL mass/ICAL mass) * 100 = % Difference (29.80-29.39/29.80) * 100 = 1.4 %
M7366 - Kepone - V6000B Mean RT Check 6/21/94 Mean RT = 20.52 (20.51 + 20.52 + 20.52 + 20.52 + 20.52)/5= 20.52	M7366 - Kepone - V6000B ICAL Area Ratio Check 6/28/94 Component Area/Standard area = Area Ratio at 0.1X: 7418/300117=0.0247	M7366 - Kepone - V6000B CCAL %D Check 7/21/94 (ICAL mass-CCAL mass/ICAL mass) * 100 = % Difference (97.50-93.22/97.50) * 100 = 4.4 %

2. Did the pesticide standard compounds show a percent difference of the calibration factor of less than 15% of the quantitation runs and 20% for confirmation runs?

   Yes: __X__ No: _____

   Comment: Calibration criteria have been met and no action has been taken. All %D values were less than 15.0%.

3. Did the laboratory meet the pesticide linearity check criteria?

   Yes: __X__ No: _____

   Comment: Linearity check criteria have been met and no action has been taken. The coefficient of determination for each calibration curve was greater than 0.995.

4. Were the breakdowns of both 4,4-DDT and endrin less than 20%?

   Yes: __X__ No: _____

   Comment: Breakdown criteria have been met and no action has been taken.

5. Were the surrogate retention time shifts within specified limits?

   Yes: __X__ No: _____

   Comment: Retention time criteria have been met and no action has been taken.

V. Blanks

A. Laboratory Blanks

One hundred percent of the results on summary forms were checked to ensure that reported results met required quality control criteria.

1. A method blank analysis was performed for every 20 samples of a similar matrix type in each SDG.

   Yes: __X__ No: _____

2. Laboratory method blanks were found to be clean of target compound contamination at detectable concentrations.

   Yes: __X__ No: _____

3. If analytes were detected in the blanks, the associated samples were found to be free of those analytes at detectable concentrations.

   Yes: _____ No: _____ NA: __X__

   Comment: Blank criteria have been met and no action has been taken. Pesticide blanks PBlk24, PBlk27, PBlk29, PBlk30, PBlk07, PBlk11, and kepone blank KBlk24, KBlk27, KBlk29, KBlk30, KBlk07, KBlk11 were free of contamination.

B. Field Blanks

1. Field blanks were found to be clean of target compound contamination at detectable concentrations.

   Yes: __X__ No: _____ N/A: _____

2. If analytes were detected in the blanks, the associated samples were found to be free of those analytes at detectable concentrations.

   Yes: _____ No: _____ N/A: __X__

   Comment: Rinsate blank 02R002 was free of contamination.

VI. Surrogate Spike Compounds

One hundred percent of the results on summary forms were checked to ensure that reported results met required quality control criteria.

1. The surrogate spike %R values were within the QC advisory limits for TCX and DCB.

Yes: _____ No: __X__

Comment:

1. For batch M7366, kepone samples 02R002, 02MW012I, 02MW001S, and KBlk 24 all had high surrogate recoveries. In the case of high surrogate recoveries, positive results are qualified as estimated "J", however, since there were no positive results reported for these samples, no qualifications were required.

2. For batch M7383, kepone sample 13MW003S had a high surrogate recovery of 114%. In the case of high surrogate recoveries, positive results are qualified as estimated "J", however, since there were no positive results reported for this sample, no qualifications were required.

3. For batch M7457, kepone blank KBlk07 had a high surrogate recovery of 116%. In the case of high surrogate recoveries, positive results are qualified as estimated "J", however, since there were no positive results reported for this sample, no qualifications were required.

VII. Matrix Spikes/Matrix Spike Duplicates (MS/MSD)

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. For every 20 samples in an SDG, one field sample of each type was spiked for MS/MSD analysis.

Yes: __X__ No: _____

2. MS/MSD sample I.D.: 02MW012I

3. MS/MSD sample results met the criteria specified below.

Yes: _____ No: __X__

MS/MSD Criteria

	Water		Soil/Sediment	
	%R	RPD	%R	RPD
gamma-BHC (Lindane)	56-123	15	46-127	50

Heptachlor	40-131	20	35-130	31
Aldrin	40-120	22	34-132	43
Dieldrin	52-126	18	31-134	38
Endrin	56-121	21	42-139	45
4,4'-DDT	38-127	27	23-134	50

4. 4 of 12 %R results were out of QC limits.
2 of 6 RPD results were out of QC limits.

Comment:

1. Gamma-BHC and heptachlor were not recovered during the MS/MSD analysis, indicating a possible matrix interference. The matrix interference problem was further supported by the blank spike analysis, whereas all of the recoveries were acceptable. Therefore, gamma-BHC and heptachlor were qualified as estimated "UJ" in all samples.

2. MS/MSD analysis is not required for kepone analysis.

3. The %Recovery for 4,4'-DDT was slightly below the QC limits for the MS and MSD at 20% and 36%, respectively. No action was taken on this basis alone.

VIII. Blank Spikes

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

1. For every 20 samples in an SDG, one blank sample of each type was spiked for BS analysis.

   Yes: __X__ No: _____

2. Blank Spike sample I.D.: BW062441

3. Blank spike sample results were within acceptable QC limits.

   Yes: __X__ No: _____

   Comment: BS criteria have been met and no action has been taken.

IX. Laboratory Control Samples (LCS)

Laboratory control charts were provided for each analysis.

1. For every batch, one LCS of each type was analyzed.

   Yes: X No: _____ N/A: _____

2. LCS sample I.D.: BW062441

3. The percent recoveries for the LCS compounds were within acceptable limits.

   Yes: X No: _____ N/A: _____

Comment: The LCS' performed on 7/12/94, 7/20/94, 7/21/94, 7/27/94, and 7/29/94 were acceptable.

X. Field Duplicates

1. The following duplicate set was analyzed with this SDG:

   a. 02MW012I and 02MW012ID
   b. 02MW008S and 02MW008SD

2. Comment: There were no positive results reported for either set of samples.

XI. Target Compound Identification

Target compound identification is not reviewed for Level C validation.

1. Sample analysis met the following criteria:

   a. The retention times of single component pesticides were within the required retention time windows on both columns.

   Yes: _____ No: _____ N/A: X

   Comment: There were no positive results reported for any of the samples.

XII. Compound Quantitation and Reported CRQLS

Compound quanititation and reported CRQLS are not reviewed for Level C validation.

1. The lower of the two concentrations calculated from each single component pesticide is reported on Form I.

Yes: _____ No: _____ N/A: __X__

2. CRQL values were adjusted to reflect all sample volumes, sample dilutions, concentrations, cleanup activities, and dry weight factors not accounted for by the method.

Yes: _____ No: _____ N/A: __X__

3. Was second column confirmation performed when compounds were detected above reporting limits?

Yes: _____ No: _____ N/A: __X__

Comment: There were no positive results reported for any of the samples. The reporting limits were raised for samples 11MW003S (M7457001) and 16MW004S (M7472002) due to interferences noted during the analysis.

XIII. Overall Assessment of Data

The final validated results represent the compilation of all quality control qualification. With the exception of the quality control anomalies presented in Section VII (MS/MSD) and the resulting qualifiers, the analyses of environmental samples and quality control samples are valid within the constraints identified with the data quality flags.

Organic Data Qualifiers

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."

NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Environmental Data Services, Inc.

Specializing in Laboratory Data Validation

Summary of Inorganic Data Validation
Metals/Cyanide

Client:	ABB Environmental Services, Inc.
Project Name:	U.S. Naval Station Mayport, Mayport, Florida
Project Number:	CTO 028
Contract Laboratory:	Quality Analytical Laboratory
SDG Number:	002W
Batch Number:	M7365,M7382,M7400,M7411,M7425,M7458,M7473
Purchase Order Number:	SE4-21-017
NEESA Level:	D
Data Reviewer:	Sue Dalla
Secondary Reviewer:	Nancy Weaver
Date Review Completed:	November 4, 1994

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
02R002	M7365001	Water
22MW001S	M7365002	Water
02MW012I	M7365003	Water
02MW012ID	M7365004	Water
02MW012S	M7365005	Water
02MW001S	M7365006	Water
13MW002S	M7382001	Water
13MW003S	M7382002	Water
02MW015IR	M7400001	Water
02MW015SR	M7400002	Water
02MW002S	M7400003	Water
02MW008S	M7411001	Water
02MW008SD	M7411002	Water
16MW002S	M7411003	Water
16MW003S	M7411004	Water
16MW001I	M7425001	Water
11MW003S	M7458001	Water
11MW003SF	M7458002	Water
11MW002S	M7458003	Water
11MW002SF	M7458004	Water
11MW001S	M7473001	Water

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I. Validation Procedure Summary

Data review and validation were performed in accordance with Naval Energy and Environmental Support Activity (NEESA) 20.2-047B (June 1988) using the USEPA Functional Guidelines for Inorganic Analyses (7/88) and criteria specified in the USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition (1986).

II. Data Deliverables

1. All required deliverables including QA/QC summary forms and all necessary raw data are present and in legible form in the data package.

   Yes: __X__ No: _____

2. Lab control charts were received and data points were within the control limit windows.

   Yes: __X__ No: _____ N/A: _____

   Note: If data points are outside of control limit windows, refer to the Laboratory Control Sample section VIII for any effect on data quality.

III. Technical Holding Times

Chain of custody records and raw data were checked for all samples to verify that technical holding time, and preservation criteria were met.

1. Technical holding times were within the allowable limits shown below:

   a. Analysis for all metals was completed within 180 days of sample collection; mercury was completed within 28 days; cyanide was completed within 14 days.

   Yes: __X__ No: _____

   Comment: Holding time criteria have been met and no action has been taken.

IV. Instrument Calibration and Calibration Verification

One hundred percent of the calibration results on the quality control summary forms were checked to ensure that reported results were within required quality control limits; 10% of these summary results were verified from raw data.

1. Instrument calibration for metals determined by inductively coupled plasma spectroscopy (ICP) was performed using a blank and one standard for each analyte.

   Yes: __X__ No: _____

2. Instrument calibration for metals determined by graphite furnace atomic absorption spectroscopy (GFAA) was performed using a blank and three standards (one of which was at the CRDL).

   Yes: __X__ No: _____

3. Instrument calibration for mercury was performed using a blank and four standards.

   Yes: __X__ No: _____ N/A: _____

4. Instrument calibration for cyanide was performed using a blank and three standards (one of which was at the CRDL).

   Yes: __X__ No: _____ N/A: _____

5. Calibration verification was performed for each analyte at a frequency of 10%.

   Yes: __X__ No: _____

6. A continuing calibration verification (CCV) was performed after the last analytical sample in each run.

   Yes: __X__ No: _____

7. Initial calibration verification (ICV) and CCV percent recovery (%R) values met the criteria specified below:

   a. For all metals except cyanide and mercury, %R results were between 90% and 110%.

Note: Due to possible rounding errors, allow results to fall within 1% of the contract windows (e.g. 89-111%).

Yes: X No: _____

8. Correlation coefficients for GFAA analytes, mercury, and cyanide calibration curves were greater than or equal to 0.995.

Yes: X No: _____

9. Comments: The following calibration calculations were verified during the validation process.

ICV or CCV	Analyte	Calculation %R=(Found/True)*100	%R
ICV	Antimony	(25.16/24.5)*100	102.7
CCV	Antimony	(23.55/24.5)*100	96.1
ICV	Arsenic	(41.22/40.3)*100	102.3
CCV	Arsenic	(36.41/40.3)*100	90.3
ICV	Mercury	(4.97/5.0)*100	99.4
CCV	Mercury	(4.73/5.0)*100	94.6
ICV	Cyanide	(88.56/94.0)*100	94.2
CCV	Cyanide	(89.30/94.0)*100	95.0

V. Blanks

A. Laboratory Blanks

One hundred percent of the laboratory blank results on the summary forms were checked to ensure that reported results were within required quality control limits; 10% of these summary results were verified from raw data.

1. Preparation blank analyses results have been reported for each matrix type for every extraction batch.

Yes: X No: _____

2. Calibration blanks were run at a frequency of 10%, and were analyzed after each sample found to contain analytes at high concentrations.

Yes: X No: ____

3. A calibration blank was analyzed immediately after every ICV and CCV, and after the last sample.

Yes: X No: ____

4. All reported blank analyte results had absolute values less than the corresponding IDL values.

Yes: ____ No: X

The following sample results were qualified due to laboratory blanks that had target analytes where the absolute value of the reported results was greater than or equal to the corresponding IDL value; sample results were less than 5X the absolute value of the blank result (not considered to be a positive value, as requested by the client).

Blank ID/ Date	Affected Analyte	Absolute Conc. ug/L	Action Level ug/L	Affected Sample	Lab Conc ug/L	Lab Qual	EDS Conc ug/L	EDS Qual
PBW 062794	Arsenic	0.97	4.85	02MW001S	2.1	B	~~0.97~~ 2.1	UJ
PBW 062794	Sodium	61.19	306.0	02R002	185	B	~~61.19~~ 185	UJ
PBW 062794	Zinc	2.54	12.7	02R002	10.7	B	~~2.54~~ 10	UJ
PBW 062794	Zinc	2.54	12.7	22MW001S	4.9	B	~~2.54~~ 4.9	UJ
PBW 062794	Zinc	2.54	12.7	02MW012I	5.8	B	~~2.54~~ 5.8	UJ
PBW 062794	Zinc	2.54	12.7	02MW012ID	7.0	B	~~2.54~~ 7.0	UJ
PBW 062794	Zinc	2.54	12.7	02MW001S	7.9	B	~~2.54~~ 7.9	UJ
PBW 062794	Zinc	2.54	12.7	13MW002S	7.7	B	~~2.54~~ 7.7	UJ

PBW 062794	Zinc	2.54	12.7	13MW003S	11.9	B	~~2.54~~ 11.9	UJ SC
PBW 063094	Iron	27.34	136.7	02MW015IR	126	--	~~27.34~~ 126	UJ SC
PBW 063094	Iron	27.34	136.7	02MW002S	91.0	B	~~27.34~~ 91.0	UJ SC
PBW 063094	Iron	27.34	136.7	02MW008S	10.4	B	27.34	UJ SC
PBW 063094	Iron	27.34	136.7	02MW008SD	11.2	B	27.34	UJ SC
PBW 063094	Iron	27.34	136.7	16MW003S	41.3	B	~~27.34~~ 41.3	UJ SC
PBW 070694	Cyanide	0.875	4.38	02MW008S	1.90	B	~~0.875~~ 1.9	UJ SC
PBW 070694	Cyanide	0.875	4.38	02MW008SD	1.10	B	~~0.875~~ 1.1	UJ SC
PBW 070594	Arsenic	1.36	6.80	16MW001I	1.20	B	1.36	UJ SC
PBW 070594	Barium	0.70	3.50	16MW001I	1.40	B	~~0.70~~ 1.4	UJ SC
PBW 070594	Zinc	2.10	10.5	16MW001I	8.70	B	~~2.10~~ 8.7	UJ SC
PBW 071494	Barium	0.47	2.35	11MW002S	1.50	B	~~0.47~~ 1.5	UJ SC
PBW 071494	Barium	0.47	2.35	11M002SF	1.80	B	~~0.47~~ 1.8	UJ SC
PBW 071494	Manganese	0.44	2.20	11MW002S	2.6	B	~~0.44~~ 2.6	UJ SC
PBW 071494	Manganese	0.44	2.20	11MW002SF	1.80	B	~~0.44~~ 1.8	UJ SC
PBW 071494	Zinc	2.15	10.75	11MW003S	2.40	B	~~2.15~~ 2.4	UJ SC
PBW 071494	Zinc	2.15	10.75	11MW003SF	5.20	B	~~2.15~~ 5.2	UJ SC
PBW 071494	Iron	9.17	45.85	11MW001S	26.2	B	~~9.17~~ 26.2	UJ SC

PBW 071494	Iron	9.17	45.85	11MW001SF	11.1	B	~~9.17~~ 11.1	UJ
PBW 071494	Zinc	2.15	10.75	11MW001S	3.70	B	~~2.15~~ 3.7	UJ
PBW 071494	Zinc	2.15	10.75	11MW001SF	4.90	B	~~2.15~~ 4.9	UJ
PBW 071494	Zinc	2.15	10.75	16MW004S	7.90	B	~~2.15~~ 7.9	UJ

~~A conversion factor of 33.3 X ug/L will be used to account for the difference of QC blank contamination reported in micrograms per liter for soil and sediment matrix samples. Low level detects may be biased low due to the negative results found in the associated blanks, therefore, the results are considered estimated "J".~~

These statements do not apply to this Data Package.

Comment: Arsenic, zinc, sodium, iron, cyanide, barium, and manganese values listed above are qualified as "UJ" because they are less than 5 times the amounts found in the preparation blanks and are not considered to be positive values, as requested by the client.

The Data Validators misinterpreted the language in the Contract concerning this subject. Functional Guidlines are followed and changes have been made.

5. All reported blank analyte results had absolute values less than or equal to the corresponding CRDL values.

Yes: X No: ____

B. Field Blanks

a. If analytes were detected in the blanks, the associated samples were found t o be free of those analytes at detectable concentrations.

Yes: ____ No: X N/A: ____

b. Analytes were detected, but associated sample aliquot concentrations were greater than 5X the blank concentration.

Yes: ____ No: X N/A: ____

The following sample results were qualified due to field blanks that had target analytes where the absolute value of the reported results was greater than or equal to the corresponding IDL value; sample results were less than 5X the ab solute value of the blank result.

Blank ID	Affected Analyte	Conc. ug/L	Action Level **	Affected Sample	Lab Conc ug/L	Lab Qual	EDS Conc ug/L	EDS Qual
02R002	Barium	0.76	3.80	02R002	0.76	B	0.76	UJ
02R002	Calcium	81.7	408	02R002	81.7	B	81.7	UJ
02R002	Copper	6.50	32.5	02R002	6.50	B	6.50	UJ
02R002	Manganese	0.66	3.30	02R002	0.66	B	0.66	UJ
02R002	Zinc	10.7	53.5	02MW012S	13.4	B	10.7	UJ

Comment: Lead, sodium, and zinc were detected in the rinsate blank 02R002. Affected samples have already been qualified due to laboratory preparation contamination or matrix spike recovery problems. No further action is taken by the reviewer.

Note: A conversion factor of 33.3 X ug/L will be used to account for the difference of QC blank contamination reported in micrograms per liter for soil and sediment matrix samples. Low level detects may be biased low due to the negative results found in the associated blanks, therefore, the results are considered estimated "J".

VI. Matrix Spike Sample Recovery

One hundred percent of the matrix spike (MS) sample results on the quality control summary forms were checked to ensure that reported results were within required quality control limits; 10% of these summary results were verified from raw data.

1. For SDG 002W, one field sample from each group of samples of a similar matrix and concentration level was spiked with each target analyte (except: Ca, Mg, K, Na on water samples and Al, Ca, Mg, K, and Na on soil/sediment samples) by the laboratory.

   Yes: _____ No: __X__

2. MS sample ID:

MS SAMPLE	LAB BATCH(S)	ANALYTE
02MW012I	M7365, M7382	Metals, Mercury, Cyanide
02MW015SR	M7400	Metals
02MW012I	M7400	Mercury, Cyanide
02MW015SR	M7411	Metals

02MW008SD	M7411, M7425	Mercury
16MW003S	M7411, M7425	Cyanide
16MW001I	M7425	Metals
11MW001S	M7458	Metals
0SMW001RF	M7458	Mercury
0SMW001R	M7458	Cyanide
11MW001S	M7473	Metals
0SMW001R	M7473	Mercury, Cyanide

3. For all target analytes, percent recovery (%R) results were within the limits of 75% - 125% (Note: MS %R limits do not apply when the sample concentration exceeded the spike concentration by a factor of 4 or more).

Yes: _____ No: __X__

Comment: The following samples and analytes have been qualified "UJ" or "J" because spike recoveries did not meet acceptance criteria.

Sample	Analyte	% Recovery	Qualifier
22MW001S	Antimony	138.5	J
02MW001S	Antimony	138.5	J
13MW002S	Antimony	138.5	J
02R002	Beryllium	74.6	UJ
22MW001S	Beryllium	74.6	UJ
02MW012I	Beryllium	74.6	UJ
02MW012ID	Beryllium	74.6	UJ
02MW012S	Beryllium	74.6	UJ
02MW001S	Beryllium	74.6	UJ
13MW002S	Beryllium	74.6	UJ
13MW003S	Beryllium	74.6	UJ
02R002	Nickel	74.7	UJ
22MW001S	Nickel	74.7	UJ
02MW012I	Nickel	74.7	UJ
02MW012ID	Nickel	74.7	UJ
02MW012S	Nickel	74.7	UJ

02MW001S	Nickel	74.7	UJ
13MW002S	Nickel	74.7	UJ
13MW003S	Nickel	74.7	UJ
02R002	Cyanide	13.9	R
22MW001S	Cyanide	13.9	R
02MW012I	Cyanide	13.9	R
02MW012ID	Cyanide	13.9	R
02MW012S	Cyanide	13.9	R
02MW001S	Cyanide	13.9	J
13MW002S	Cyanide	13.9	R
13MW003S	Cyanide	13.9	R
02MW015IR	Cyanide	13.9	R
02MW015SR	Cyanide	13.9	R
02MW002S	Cyanide	13.9	R
16MW001I	Selenium	61.4	UJ
11MW003S	Selenium	42.9	UJ
11MW003SF	Selenium	42.9	UJ
11MW002S	Selenium	42.9	UJ
11MW002SF	Selenium	42.9	UJ
11MW001S	Selenium	42.9	UJ
11MW001SF	Selenium	42.9	UJ
16MW004S	Selenium	42.9	UJ

Comment:

1. The matrix spike recovery of lead for sample 02MW012I (lab batches M7365 and M7382) was reported on Form 5 as 611.5%. It should have been reported as 61.2%. The spike was diluted out during analysis and no qualifiers have been applied due to low matrix spike recovery.

2. The matrix spike recovery of cyanide for sample 02MW012I (lab batch M7382) was reported on Form 5 as 2.80%. It should have been reported as 13.9%. Undetected sample results associated with this matrix spike (see table above) have been qualified as R, rejected and unusable. It is likely that very high sulfide content in these samples interfered with the analysis.

3. The following spike calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation %R=(SSR-SR/SA)*100	%R
ICP	Barium	(1627.72-33.45)/2000*100	79.7
GFAA	Arsenic	(65.6-27.2/40)*100	96.0
C	Mercury	(1.616-0.0/1.97)*100	82.0
CV	Cyanide	(13.691-0.0/98.6)*100	13.9

VII. Interference Check Samples

One hundred percent of the ICS results on the quality control summary forms were checked to ensure that reported results were within required quality control limits; 10% of these summary results were verified from raw data.

1. ICP ICSs (solutions A and AB) were analyzed at the beginning and end of each sample analysis run (or a minimum of twice per 8-hour shift, whichever was more frequent).

   Yes: __X__ No: _____

2. Solution AB analyte recovery results were within the control limits of 80%-120%.

   Yes: __X__ No: _____

3. Concentrations of Ca, Fe, and Mg in the samples are less than or equal to their respective concentration in ICS solution A or AB.

   Yes: __X__ No: _____ N/A: _____

4. Cr, Cu, Mn, Ni, and V are present in a sample(s) at concentrations less than 10,000 ug/L.

Yes: X No: _____ N/A: _____

5. Comments: ICP ICSs criteria have been met and no action has been taken. The following ICS calculations were verified during the validation process.

Analyte	Calculation %R=(Found Soln AB/True Soln AB)*100	%R
Barium	(477.0/500)*100	95.4

VIII. Laboratory Control Sample (LCS)

One hundred percent of the LCS results on the quality control summary forms were checked to ensure that reported results were within required quality control limits; 10% of these summary results were verified from raw data.

1. A laboratory control sample was analyzed for each SDG for each matrix type.

Yes: X No: _____

2. Aqueous LCS recovery results were within the control limits of 80% to 120% (except for Sb and Ag which have no required limits).

Yes: X No: _____

3. Soil LCS recovery results were within the required control limits specified on the laboratory Form VII-IN and control charts.

Yes: _____ No: _____ N/A: X

Comment: LCS criteria have been met and no action has been taken.

4. The following LCS calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation %R=(Found/True)*100	%R
ICP	Barium	(2546.6/2500)*100	101.9
GFAA	Arsenic	(44.87/40.3)*100	111.3
CV	Mercury	(4.92/5.00)*100	98.5
C	Cyanide	(88.56/94.0)*100	94.2

IX. Duplicate Sample Analysis

One hundred percent of the duplicate results on the quality control summary forms were checked to ensure that reported results were within required quality control limits; 10% of these summary results were verified from raw data.

A. Laboratory Duplicates

1. For each SDG, one duplicate sample was analyzed from each group of samples of a similar matrix type and concentration level.

Yes: _____ No: __X__

Duplicate Sample	Lab Batch(es)	Analyte(s)
02MW012I	M7365, M7382	Metals, Hg, CN
02MW015SR	M7400	Metals
02MW012I	M7400	Hg, CN
02MW015SR	M7411	Metals
02MW008SD	M7411, M7425	Hg
16MW003S	M7411, M7425	CN
16MW001I	M7425	Metals
11MW001S	M7458	Metals
0SMW001RF	M7458	Hg
0SMW001R	M7458	CN
01MW001S	M7473	Metals
0SMW001R	M7473	Hg, CN

2. For duplicate analyte concentrations greater than 5X the CRDL, the relative percent difference (RPD) between the two reported results was less than 20% for aqueous samples (35% for soil samples).

   Yes: __X__ No: _____

3. For duplicate analyte concentrations less than 5X the CRDL, the relative percent difference (RPD) between the two reported results was less than the CRDL value for aqueous samples, or less than 2X the CRDL value for soil samples. RPDs for samples with values less than the CRDL are not calculated.

   Yes: __X__ No: _____

4. Comment: Laboratory duplicate criteria have been met and no action has been taken.

5. The following duplicate calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation RPD=[S-D/(S+D/2)]*100	RPD
ICP	Manganese	(227.11-225.52)/(227.11+225.52/2)*100	0.7
GFAA	Arsenic	(27.2-23.1)/(27.2+23.1/2)*100	16.3 (NA)
CV	Mercury	(0.08-0.08)/(0.08+0.08/2)*100	NC
C	Cyanide	(0.81-0.899)/(0.81+0.899/2)*100	200.0 (NA)

B. Field Duplicates

1. The following duplicate sets were analyzed with this SDG:

   a. 02MW012I, 02MW012ID (lab batch M7365)
   b. 02MW008S, 02MW008SD (lab batch M7411)

2. Comment: Field duplicate criteria have been met and no action has been taken.

X. Furnace Atomic Absorption QC

One hundred percent of the AA summary data was checked to ensure that reported results were within required quality control limits; 10% of these summary results were verified from raw data.

1. Duplicate injections for AA analytes with concentrations greater than the CRDL had RSD results < 20%.

   Yes: __X__ No: _____

2. For each sample, all AA analytical spike recovery results were between 85% and 115%.

   Yes: _____ No: __X__

   Comment: The following summarizes analytical spike recovery results:

Sample	Analyte	%R	Reanalysis %R	Lab Qual	EDS Qual
02MW008S	Antimony	79.0	NA	W	J, X.2
11MW003SF	Antimony	116.0	NA	W	UJ, X.2
22MW001S	Arsenic	119.0	NA	W	UJ, X.2
11MW002S	Lead	80.0	NA	W	J, X.2
11MW001SF	Lead	80.0	NA	W	J, X.2
16MW004S	Lead	84.0	NA	W	J, X.2
22MW001S	Selenium	59.0	NA	W	UJ, X.2
02MW001S	Selenium	73.0	NA	W	J, X.2
13MW003S	Selenium	41.0	NA	W	UJ, X.2
02MW008SD	Selenium	70.0	NA	W	J, X.2
16MW002S	Selenium	50.0	NA	W	UJ, X.2
16MW003S	Selenium	56.0	NA	W	J, X.2
16MW001I	Selenium	82.0	NA	W	UJ, VI.3
11MW003S	Selenium	62.0	NA	W	UJ, VI.3
11MW003SF	Selenium	56.0	NA	W	UJ, VI.3

11MW001S	Selenium	49.0	NA	W	UJ, VI.3
16MW004S	Selenium	44.0	NA	W	UJ, VI.3
02MW002S	Selenium	45.0	NA	W	UJ, X.2
02MW001S	Thallium	69.0	NA	W	UJ, X.2
13MW002S	Thallium	81.0	NA	W	UJ, X.2
13MW003S	Thallium	80.0	NA	W	UJ, X.2
02MW015IR	Thallium	42.0	NA	W	J, X.2
02MW015SR	Thallium	79.0	NA	W	UJ, X.2
02MW008S	Thallium	84.0	NA	W	UJ, X.2
02MW008SD	Thallium	80.0	NA	W	UJ, X.2
11MW003S	Thallium	80.0	NA	W	UJ, X.2
11MW003SF	Thallium	84.0	NA	W	UJ, X.2
11MW002S	Thallium	72.0	NA	W	UJ, X.2
11MW002SF	Thallium	73.0	NA	W	UJ, X.2
11MW001S	Thallium	84.0	NA	W	UJ, X.2
11MW001SF	Thallium	80.0	NA	W	UJ, X.2
16MW004S	Thallium	83.0	NA	W	UJ, X.2

3. For each sample, all AA results were within the appropriate calibration range, or were diluted to meet this criteria.

   Yes: __X__ No: _____

4. Sample analyte results where the analytical spike recovery was <40% were diluted once and reanalyzed.

   Yes: __X__ No: _____ N/A: _____

5. Samples having analyte concentrations greater than or equal to 50% of the spike concentrations, and spike %R results <85% or >115% were quantitated by MSA.

   Yes: __X__ No: _____ N/A: _____

6. MSA analyses with correlation coefficients less than 0.995 were rerun once.

Yes: _____ No: _____ N/A: __X__

7. MSA spike values met the criteria specified below:

a. Spike 1 was approximately 50% of the sample concentration.
b. Spike 2 was approximately 100% of the sample concentration.
c. Spike 3 was approximately 150% of the sample concentration.

Yes: __X__ No: _____ N/A: _____

8. Comment: The following table lists samples/analytes which have been qualified due to dilutions or MSA made necessary by high levels of interferents in GFAA analyses.

Sample	Analyte	Dilution	Qualifier
02MW012I	Antimony	1:10	UJ, X.8
02MW012ID	Antimony	1:10	UJ, X.8
02MW012S	Antimony	1:10	UJ, X.8
02MW015IR	Antimony	1:10	UJ, X.8
02MW012I	Arsenic	1:10	J, X.8
26MW012ID	Arsenic	1:10	J, X.8
02MW012S	Arsenic	1:10	J, X.8
02MW015IR	Arsenic	MSA	J, X.8
02MW015SR	Arsenic	MSA	J, X.8
02MW012I	Lead	1:10	UJ, X.8
02MW012ID	Lead	1:10	UJ, X.8
02MW012S	Lead	1:10	UJ, X.8
02MW012I	Selenium	1:10	J, X.8
02MW012ID	Selenium	1:10	J, X.8
02MW012S	Selenium	1:10	UJ, X.8
13MW002S	Selenium	1:10	UJ, X.8
02MW015IR	Selenium	1:10	J, X.8

02MW015SR	Selenium	1:10	UJ, X.8
02MW008S	Selenium	1:10	UJ, X.8
11MW002S	Selenium	1:10	UJ, VI.3
11MW002SF	Selenium	1:10	UJ, VI.3
11MW001SF	Selenium	1:10	UJ, VI.3
02MW012I	Thallium	1:10	UJ, X.8
02MW012ID	Thallium	1:10	UJ, X.8
02MW012S	Thallium	1:10	UJ, X.8

XI. ICP Serial Dilution

One hundred percent of the ICP serial dilution results on quality control summary forms were checked to ensure that reported results were within required quality control limits; 10% of these summary results were verified from raw data.

1. ICP serial dilution analysis was performed on one sample from each SDG of a similar matrix type and concentration level.

   Yes: __X__ No: _____

2. For each analyte in the serial dilution sample which was minimally a factor of 50 above the IDL in the original sample, the serial dilution result agreed within 10% of the original determination after correction for dilution.

   Yes: _____ No: __X__

3. Comments: The following tables summarizes ICP Serial Dilution results:

Sample	Analyte	%D	Qualifier
13MW002S	Iron	11.4	J, XI.2
13MW003S	Iron	11.4	J, XI.2
02MW008S	Sodium	28.6	J, XI.2
02MW008SD	Sodium	28.6	J, XI.2
16MW002S	Sodium	28.6	J, XI.2
16MW003S	Sodium	28.6	J, XI.2

11MW0015F should also be included

16MW001I	Sodium	20.7	J, XI.2
11MW001S	Sodium	13.0	J, XI.2
16MW004S	Sodium	13.0	J, XI.2

4. Comment: The following serial dilution calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation %D=(I-S/I)*100	%D
ICP	Iron	(553.4-616.5/553.4)*100	11.4

XII. Sample Result Verification

Ten percent of all reported sample results were verified from raw data, except for GFAA raw data, which was verified 100%

1. All sample results which were verified were correctly calculated and reported.

   Yes: X No: _____

2. All sample results fall within the linear range of the ICP (Form XIII) and within the calibrated range of the instrument for AA and cyanide.

   Yes: _____ No: X

   Comment: The following samples and analytes were diluted to bring them within the calibration range of the instrument.

Sample	Analyte	Dilution
02MW015IR	Sodium	1:20
02MW015SR	Sodium	1:20
02MW008S	Sodium	1:20
02MW008SD	Sodium	1:20
02MW015IR	Magnesium	1:10

3. All reported concentrations were above the CRDL.

   Yes: _____ No: X

Comment: The "B" qualifier applied by the laboratory for results between the CRDL and the IDL were amended with a "J" qualifier.

4. Sample results on Form 1 were reported down to the IDL not CRDL for all analytes.

   Yes: __X__ No: _____

5. Reported sample results that were analyzed by ICP for As, Pb, Se, and Tl were at least 5X the ICP IDL.

   Yes: _____ No: _____ N/A: __X__

6. Sample weights, volumes and dilutions were taken into account when reporting detection limits on Form 1.

   Yes: __X__ No: _____

7. IDLs were present and found to be less than CRDL.

   Yes: __X__ No: _____

8. All CRDLs and IDLs were included on Form X.

   Yes: __X__ No: _____

9. Raw data were free of anomalies (e.g. baseline shifts, negative absorbances/emissions, omissions, etc.). If no, please describe anomalies in the comments section below.

   Yes: __X__ No: _____

10. Comment: Sample result verification criteria have been met and no action was taken.

XIII. Additional Comments/Professional Judgment

The final validated results represent the compilation of all quality control qualification. With the exception of the quality control anomalies presented in Sections V.A.4, VI.3, X.2, X.8, XI.2, and XII.3 (Blanks, Matrix Spike Sample Recovery, GFAA, ICP Serial Dilution, and Sample Result Verification) and the resulting qualifiers, the analyses of environmental samples and quality control samples are valid within the constraints identified with the data quality flags, with the exception of cyanide which was rejected due to matrix spike problems. All false positive/negative results are summarized on Table A-1.

Additional Comments:

1. The following table lists matrix spikes and analytes which were diluted out during analysis, resulting in low matrix spike recovery. No qualifiers have been applied to samples associated with these matrix spikes due to low recoveries.

Sample	Lab Batch	Analyte
02MW012I	M7365, M7382	Lead
02MW012I	M7365, M7382	Selenium
02MW012I	M7365, M7382	Thallium
02MW015SR	M7400, M7411	Selenium

2. The raw data for SDG 002W contained many cross-outs which were not initialed or dated.

1994 Field Investigation Data and Results

AM 10/7/94

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW003S

Lab Name: CH2M HILL/LMG Contract:

Lab Code: Case No.: M7457 SAS No.: SDG No.: M7457

Matrix: (soil/water) WATER Lab Sample ID: M7457001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: EVO6601066.D

Level: (low/med) LOW Date Received: 07/07/94

% Moisture: not dec. _____ Data Analyzed: 07/12/94

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	UJ VI.3
74-83-9	Bromomethane	10	U	UJ VI.3
75-01-4	Vinyl Chloride	10	U	
75-00-3	Chloroethane	10	U	
75-09-2	Methylene Chloride	1	J	
67-64-1	Acetone	~~6~~	~~JB~~	104 VII.A
75-15-0	Carbon Disulfide	5	U	
75-69-4	Trichlorofluoromethane	5	U	
75-35-4	1,1-Dichloroethene	5	U	
75-34-3	1,1-Dichloroethane	1	J	
540-59-0	1,2-Dichloroethene (total)	2	J	
67-66-3	Chloroform	5	U	
107-06-2	1,2-Dichloroethane	5	U	
78-83-1	Isobutyl alcohol	200	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	
110-75-8	2-Chloroethyl vinyl ether	10	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	

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7/21/94

AM 101242

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW003S

Lab Name: CH2M HILL/LMG Contract:

Lab Code: Case No.: M7457 SAS No.: SDG No.: M7457

Matrix: (soil/water) WATER Lab Sample ID: M7457001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: EVO6601066.D

Level: (low/med) LOW Date Received: 07/07/94

% Moisture: not dec. _____ Data Analyzed: 07/12/94

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
100-41-4	Ethylbenzene	5	U	
100-42-5	Styrene	5	U	
1330-20-7	Xylene (total)	5	U	
541-73-1	1,3-Dichlorobenzene	5	U	
106-46-7	1,4-Dichlorobenzene	5	U	
95-50-1	1,2-Dichlorobenzene	1	J	
75-71-8	Dichlorodifluoromethane	10	U	UJ VI.3
107-02-8	Acrolein	100	U	
74-88-4	Iodomethane	10	U	UJ VI.3
107-13-1	Acrylonitrile	100	U	
74-95-3	Dibromomethane	5	U	
97-63-2	Ethyl methacrylate	5	U	
96-18-4	1,2,3-Trichloropropane	5	U	
110-57-6	trans-1,4-Dichloro-2-butene	5	U	
75-05-8	Acetonitrile	100	U	
107-05-1	3-Chloropropene	5	U	
107-12-0	Propionitrile	100	U	
126-98-7	Methacrylonitrile	5	U	
123-91-1	1,4-Dioxane	200	U	R V.2
80-62-6	Methyl methacrylate	10	U	
106-93-4	1,2-Dibromoethane	5	U	
630-20-6	1,1,1,2-Tetrachloroethane	5	U	
96-12-8	1,2-Dibromo-3-chloropropane	10	U	
76-01-7	Pentachloroethane	10	U	
126-99-8	Chloroprene	200	U	

RAD
7/21/94

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW002S

Lab Name: CH2M HILL/LMG Contract:

Lab Code: Case No.: M7457 SAS No.: SDG No.: M7457

Matrix: (soil/water) WATER Lab Sample ID: M7457002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: EVO1601016.D

Level: (low/med) LOW Date Received: 07/07/94

% Moisture: not dec. _____ Data Analyzed: 07/08/94

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	US VI.3
75-01-4	Vinyl Chloride	10	U	
75-00-3	Chloroethane	10	U	
75-09-2	Methylene Chloride	5	U	
67-64-1	Acetone	10	B U	VII.A
75-15-0	Carbon Disulfide	5	U	
75-69-4	Trichlorofluoromethane	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	
78-83-1	Isobutyl alcohol	200	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	
110-75-8	2-Chloroethyl vinyl ether	10	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	

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7/21/94

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW002S

Lab Name: CH2M HILL/LMG Contract:

Lab Code: Case No.: M7457 SAS No.: SDG No.: M7457

Matrix: (soil/water) WATER Lab Sample ID: M7457002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: EVO1601016.D

Level: (low/med) LOW Date Received: 07/07/94

% Moisture: not dec. _____ Data Analyzed: 07/08/94

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
100-41-4	Ethylbenzene	5	U	
100-42-5	Styrene	5	U	
1330-20-7	Xylene (total)	5	U	
541-73-1	1,3-Dichlorobenzene	5	U	
106-46-7	1,4-Dichlorobenzene	5	U	
95-50-1	1,2-Dichlorobenzene	2	J	
75-71-8	Dichlorodifluoromethane	10	U	UJ VI.3
107-02-8	Acrolein	100	U	
74-88-4	Iodomethane	10	U	UJ VI.3
107-13-1	Acrylonitrile	100	U	
74-95-3	Dibromomethane	5	U	
97-63-2	Ethyl methacrylate	5	U	
96-18-4	1,2,3-Trichloropropane	5	U	
110-57-6	trans-1,4-Dichloro-2-butene	5	U	
75-05-8	Acetonitrile	100	U	
107-05-1	3-Chloropropene	5	U	
107-12-0	Propionitrile	100	U	
126-98-7	Methacrylonitrile	5	U	
123-91-1	1,4-Dioxane	200	U	R V.2
80-62-6	Methyl methacrylate	10	U	
106-93-4	1,2-Dibromoethane	5	U	
630-20-6	1,1,1,2-Tetrachloroethane	5	U	
96-12-8	1,2-Dibromo-3-chloropropane	10	U	
76-01-7	Pentachloroethane	10	U	
126-99-8	Chloroprene	200	U	

RaO
7/21/94

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

11MW002S

Lab Name: CH2M HILL/LMG Contract:

Lab Code: Case No.: M7457 SAS No.: SDG No.: M7457

Matrix: (soil/water) WATER Lab Sample ID: M7457002

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: EVO1601016.D

Level: (low/med) LOW Date Received: 07/07/94

% Moisture: not dec. _____ Data Analyzed: 07/08/94

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

Number TICs found: 0

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

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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FORM I VOA-TIC 1/87 Rev.

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7/21/94

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW001S

Lab Name: CH2M HILL/LMG Contract:

Lab Code: Case No.: M7472 SAS No.: SDG No.: M7472

Matrix: (soil/water) WATER Lab Sample ID: M7472001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: EVO9901099.D

Level: (low/med) LOW Date Received: 07/08/94

% Moisture: not dec. _____ Data Analyzed: 07/14/94

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	UJ ~~VII~~ VI.3
75-01-4	Vinyl Chloride	10	U	
75-00-3	Chloroethane	10	U	
75-09-2	Methylene Chloride	~~1~~	~~J~~	5U VII.B
67-64-1	Acetone	~~7~~	~~J~~	10U VII.B
75-15-0	Carbon Disulfide	5	U	
75-69-4	Trichlorofluoromethane	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	
78-83-1	Isobutyl alcohol	200	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	
110-75-8	2-Chloroethyl vinyl ether	10	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	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW001S

Lab Name: CH2M HILL/LMG Contract:

Lab Code: Case No.: M7472 SAS No.: SDG No.: M7472

Matrix: (soil/water) WATER Lab Sample ID: M7472001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: EVO9901099.D

Level: (low/med) LOW Date Received: 07/08/94

% Moisture: not dec. _____ Data Analyzed: 07/14/94

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
100-41-4	Ethylbenzene	5	U	
100-42-5	Styrene	5	U	
1330-20-7	Xylene (total)	5	U	
541-73-1	1,3-Dichlorobenzene	5	U	
106-46-7	1,4-Dichlorobenzene	5	U	
95-50-1	1,2-Dichlorobenzene	5	U	
75-71-8	Dichlorodifluoromethane	10	U	UJ VI 3
107-02-8	Acrolein	100	U	
74-88-4	Iodomethane	10	U	UJ VI 3
107-13-1	Acrylonitrile	100	U	
74-95-3	Dibromomethane	5	U	
97-63-2	Ethyl methacrylate	5	U	
96-18-4	1,2,3-Trichloropropane	5	U	
110-57-6	trans-1,4-Dichloro-2-butene	5	U	
75-05-8	Acetonitrile	100	U	
107-05-1	3-Chloropropene	5	U	
107-12-0	Propionitrile	100	U	
126-98-7	Methacrylonitrile	5	U	
123-91-1	1,4-Dioxane	200	U	R V.2
80-62-6	Methyl methacrylate	10	U	UJ VI 3
106-93-4	1,2-Dibromoethane	5	U	
630-20-6	1,1,1,2-Tetrachloroethane	5	U	
96-12-8	1,2-Dibromo-3-chloropropane	10	U	
76-01-7	Pentachloroethane	10	U	
126-99-8	Chloroprene	200	U	

7/19/94

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

11MW001S

Lab Name: CH2M HILL/LMG Contract:

Lab Code: Case No.: M7472 SAS No.: SDG No.: M7472

Matrix: (soil/water) WATER Lab Sample ID: M7472001

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: EVO9901099.D

Level: (low/med) LOW Date Received: 07/08/94

% Moisture: not dec. _____ Data Analyzed: 07/14/94

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

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

Number TICs found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW003S

Lab Name: QAL/LRD Contract: M7457

Lab Code: _____ Case No.: M7457 SAS No.: _____ SDG No.: M7457

Matrix: (soil/water) WATER Lab Sample ID: M7457001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2427

Level: (low/med) LOW Date Received: 07/08/94

% Moisture: not dec. _____ dec. _____ Date Extracted: 07/08/94

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

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	
95-50-1	1,2-Dichlorobenzene	10	U	
95-48-7	2-Methylphenol	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	
88-75-5	2-Nitrophenol	10	U	
105-67-9	2,4-Dimethylphenol	10	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 UJ	VI.3
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	
99-09-2	3-Nitroaniline	50	U UJ	VI.3
83-32-9	Acenaphthene	10	U	
51-28-5	2,4-Dinitrophenol	50	U UJ	VI.3
100-02-7	4-Nitrophenol	13	J	
132-64-9	Dibenzofuran	10	U	
121-14-2	2,4-Dinitrotoluene	10	U	
84-66-2	Diethylphthalate	10	U	

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW003S

b Name: QAL/LRD Contract: M7457

b Code: _____ Case No.: M7457 SAS No.: _____ SDG No.: M7457

trix: (soil/water) WATER Lab Sample ID: M7457001

mple wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2427

vel: (low/med) LOW Date Received: 07/08/94

Moisture: not dec. ____ dec. ____ Date Extracted: 07/08/94

traction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

C Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
7005-72-3	4-Chlorophenyl-phenylether	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 UJ	VI.3
86-30-6	N-Nitrosodiphenylamine (1)	4	BJ UJ	VII.A
101-55-3	4-Bromophenyl-phenylether	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	
62-75-9	N-Nitrosodimethylamine	10	U	
110-86-1	Pyridine	50	U	
109-06-8	2-Picoline	50	U	
10595-95-6	N-Nitrosomethylethylamine	10	U	
66-27-3	Methyl methanesulfonate	10	U	
55-18-5	N-Nitrosodiethylamine	10	U	
62-50-0	Ethyl Methanesulfonate	10	U	
62-53-3	Aniline	10	U UJ	VI.3
100-51-6	Benzyl alcohol	10	U	
98-86-2	Acetophenone	10	U	
930-55-2	N-Nitrosopyrrolidine	10	U	
59-89-2	N-Nitrosomorpholine	10	U	

(1) - Cannot be separated from Diphenylamine

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW003S

Lab Name: QAL/LRD Contract: M7457

Lab Code: _____ Case No.: M7457 SAS No.: _____ SDG No.: M7457

Matrix: (soil/water) WATER Lab Sample ID: M7457001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2427

Level: (low/med) LOW Date Received: 07/08/94

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/08/94

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
95-53-4	o-Toluidine	10	U	
100-75-4	N-Nitrosopiperidine	10	U UJ	VI.3
65-85-0	Benzoic acid	50	U	
122-09-8	Phenyl-tert-butylamine	50	U	
87-65-0	2,6-Dichlorophenol	10	U	
1888-71-7	Hexachloropropene	50	U	
924-16-3	N-Nitroso-di-n-butylamine	10	U	
106-50-3	p-Phenylenediamine	500	U	
94-59-7	Safrole	50	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	50	U	
120-58-1	Isosafrole	50	U	
130-15-4	1,4-Napthoquinone	1000	U UJ	VI.3
99-65-0	1,3-Dinitrobenzene	10	U	
608-93-5	Pentachlorobenzene	50	U	
134-32-7	1-Naphthylamine	50	U	
58-90-2	2,3,4,6-Tetrachlorophenol	10	U	
91-59-8	2-Naphthylamine	50	U	
99-55-8	5-Nitro-o-toluidine	10	U	
99-35-4	1,3,5-Trinitrobenzene	10	~~U~~ UJ	RS 1/12/94
62-44-2	Phenacetin	10	U UJ	VI.3
92-67-1	4-Aminobiphenyl	50	U	
23950-58-5	Pronamide	10	U	
82-68-8	Pentachloronitrobenzene	50	U	
56-57-5	4-Nitroquinoline-1-oxide	500	U UJ	VI.3
91-80-5	Methapyrilene	50	U UJ	VI.3
140-57-8	Aramite	50	U	
60-11-7	p-Dimethylaminoazobenzene	10	U	
119-93-7	3,3'-Dimethylbenzidine	10	U	
53-96-3	2-Acetylaminofluorene	10	U	
57-97-6	7,12-Dimethylbenz(a)anthracen	10	U	
70-30-4	Hexachlorophene	500	U UJ	VI.3
56-49-5	3-Methylcholanthrene	10	U	
122-66-7	1,2-Diphenylhydrazine	10	U	
N/A	3 & 4-Methylphenol (2)	10	U	
92-87-5	Benzidine	50	U UJ	VI.3

(2) - 3-Methylphenol & 4-Methylphenol coelute and are reported as a total of the individual isomers.

AV 10/5/94

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW002S

Lab Name: QAL/LRD Contract: M7457

Lab Code: _____ Case No.: M7457 SAS No.: _____ SDG No.: M7457

Matrix: (soil/water) WATER Lab Sample ID: M7457002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2428

Level: (low/med) LOW Date Received: 07/08/94

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/08/94

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

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	43		
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	
95-50-1	1,2-Dichlorobenzene	2	J	
95-48-7	2-Methylphenol	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	
88-75-5	2-Nitrophenol	10	U	
105-67-9	2,4-Dimethylphenol	10	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 UJ	VI.3
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	
99-09-2	3-Nitroaniline	50	U UJ	VI.3
83-32-9	Acenaphthene	10	U	
51-28-5	2,4-Dinitrophenol	50	U UJ	VI.3
100-02-7	4-Nitrophenol	11	J	
132-64-9	Dibenzofuran	10	U	
121-14-2	2,4-Dinitrotoluene	10	U	
84-66-2	Diethylphthalate	10	U	

000069 BL

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW002S

Lab Name: QAL/LRD Contract: M7457

Lab Code: _____ Case No.: M7457 SAS No.: _____ SDG No.: M7457

Matrix: (soil/water) WATER Lab Sample ID: M7457002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2428

Level: (low/med) LOW Date Received: 07/08/94

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/08/94

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
7005-72-3	4-Chlorophenyl-phenylether	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 UJ	VI.3
86-30-6	N-Nitrosodiphenylamine (1)	~~4~~ BJ 10U		VII.A
101-55-3	4-Bromophenyl-phenylether	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	
62-75-9	N-Nitrosodimethylamine	10	U	
110-86-1	Pyridine	50	U	
109-06-8	2-Picoline	50	U	
10595-95-6	N-Nitrosomethylethylamine	10	U	
66-27-3	Methyl methanesulfonate	10	U	
55-18-5	N-Nitrosodiethylamine	10	U	
62-50-0	Ethyl Methanesulfonate	10	U	
62-53-3	Aniline	10	U UJ	VI.3
100-51-6	Benzyl alcohol	10	U	
98-86-2	Acetophenone	10	U	
930-55-2	N-Nitrosopyrrolidine	10	U	
59-89-2	N-Nitrosomorpholine	10	U	

(1) - Cannot be separated from Diphenylamine

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

JN 11/3/94

EPA SAMPLE NO.

11MW002S

b Name: QAL/LRD Contract: M7457

b Code: _____ Case No.: M7457 SAS No.: _____ SDG No.: M7457

trix: (soil/water) WATER Lab Sample ID: M7457002

mple wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2428

vel: (low/med) LOW Date Received: 07/08/94

Moisture: not dec. ____ dec. ____ Date Extracted: 07/08/94

traction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

C Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

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

CAS NO.	COMPOUND		Q	
95-53-4	o-Toluidine	10	U	
100-75-4	N-Nitrosopiperidine	10	U UJ	VI.3
65-85-0	Benzoic acid	50	U	
122-09-8	Phenyl-tert-butylamine	50	U	
87-65-0	2,6-Dichlorophenol	10	U	
1888-71-7	Hexachloropropene	50	U	
924-16-3	N-Nitroso-di-n-butylamine	10	U	
106-50-3	p-Phenylenediamine	500	U	
94-59-7	Safrole	50	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	50	U	
120-58-1	Isosafrole	50	U	
130-15-4	1,4-Napthoquinone	1000	U UJ	VI.3
99-65-0	1,3-Dinitrobenzene	10	U	
608-93-5	Pentachlorobenzene	50	U	
134-32-7	1-Naphthylamine	50	U	
58-90-2	2,3,4,6-Tetrachlorophenol	10	U	
91-59-8	2-Naphthylamine	50	U	
99-55-8	5-Nitro-o-toluidine	10	U	
99-35-4	1,3,5-Trinitrobenzene	10	~~U~~ UJ	as 1/12/94
62-44-2	Phenacetin	10	U UJ	VI.3
92-67-1	4-Aminobiphenyl	50	U	
23950-58-5	Pronamide	10	U	
82-68-8	Pentachloronitrobenzene	50	U	
56-57-5	4-Nitroquinoline-1-oxide	500	U UJ	VI.3
91-80-5	Methapyrilene	50	U UJ	VI.3
140-57-8	Aramite	50	U	
60-11-7	p-Dimethylaminoazobenzene	10	U	
119-93-7	3,3'-Dimethylbenzidine	10	U	
53-96-3	2-Acetylaminofluorene	10	U	
57-97-6	7,12-Dimethylbenz(a)anthracen	10	U	
70-30-4	Hexachlorophene	500	U UJ	VI.3
56-49-5	3-Methylcholanthrene	10	U	
122-66-7	1,2-Diphenylhydrazine	10	U	
N/A	3 & 4-Methylphenol (2)	10	U	
92-87-5	Benzidine	50	U UJ	VI.3

(2) - 3-Methylphenol & 4-Methylphenol coelute and are reported as a total of the individual isomers.

0000708 BB

1F

EPA SAMPLE NO.

11MW002S

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: QAL/LRD Contract: M7457

ab Code: _____ Case No.: M7457 SAS No.: _____ SDG No.: M7457

atrix: (soil/water) WATER Lab Sample ID: M7457002

ample wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2428

evel: (low/med) LOW Date Received: 07/08/94

Moisture: not dec. ____ dec. ____ Date Extracted: 07/08/94

xtraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

PC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

umber TICs found: 8 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN HYDROCARBON	5.02	15	J NJ
2.		UNKNOWN HYDROCARBON	5.97	14	J
3.		UNKNOWN HYDROCARBON	6.08	8.3	J
4.		UNKNOWN ORGANIC ACID	6.58	46	J
5.		UNKNOWN ALDEHYDE	6.70	18	J
6.		UNKNOWN ALDEHYDE	7.37	16	J
7.		UNKNOWN SILOXANE	9.49	8.5	J
8.	540-97-6	CYCLOHEXASILOXANE, DODECAMET	14.77	8.0	J

10/21/94

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW001S

Name: QAL/LRD Contract: M7472

Code: _____ Case No.: M7472 SAS No.: _____ SDG No.: M7472

Matrix: (soil/water) WATER Lab Sample ID: M7472001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2424

Level: (low/med) LOW Date Received: 07/09/94

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/11/94

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

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		
95-50-1	1,2-Dichlorobenzene	10	U		
95-48-7	2-Methylphenol	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		
88-75-5	2-Nitrophenol	10	U		
105-67-9	2,4-Dimethylphenol	10	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	UJ	VI.3
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		
99-09-2	3-Nitroaniline	50	U	UJ	VI.3
83-32-9	Acenaphthene	10	U		
51-28-5	2,4-Dinitrophenol	50	U	UJ	VI.3
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		

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW001S

b me: QAL/LRD Contract: M7472

b Code: _____ Case No.: M7472 SAS No.: _____ SDG No.: M7472

trix: (soil/water) WATER Lab Sample ID: M7472001

mple wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2424

vel: (low/med) LOW Date Received: 07/09/94

Moisture: not dec. _____ dec. _____ Date Extracted: 07/11/94

traction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

C Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
7005-72-3	4-Chlorophenyl-phenylether	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 UJ	VI 3
86-30-6	N-Nitrosodiphenylamine (1)	~~4~~ BJ 10u		VII. A
101-55-3	4-Bromophenyl-phenylether	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	
62-75-9	N-Nitrosodimethylamine	10	U	
110-86-1	Pyridine	50	U	
109-06-8	2-Picoline	50	U	
10595-95-6	N-Nitrosomethylethylamine	10	U	
66-27-3	Methyl methanesulfonate	10	U	
55-18-5	N-Nitrosodiethylamine	10	U	
62-50-0	Ethyl Methanesulfonate	10	U	
62-53-3	Aniline	10	U UJ	VI.3
100-51-6	Benzyl alcohol	10	U	
98-86-2	Acetophenone	10	U	
930-55-2	N-Nitrosopyrrolidine	10	U	
59-89-2	N-Nitrosomorpholine	10	U	

(1) - Cannot be separated from Diphenylamine

AM 10/31/94

1D

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

11MW001S

Name: QAL/LRD Contract: M7472

Code: _____ Case No.: M7472 SAS No.: _____ SDG No.: M7472

Matrix: (soil/water) WATER Lab Sample ID: M7472001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2424

Level: (low/med) LOW Date Received: 07/09/94

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/11/94

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q	
95-53-4	o-Toluidine	10	U		
100-75-4	N-Nitrosopiperidine	10	U	UJ	VI.3
65-85-0	Benzoic acid	50	U		
122-09-8	Phenyl-tert-butylamine	50	U		
87-65-0	2,6-Dichlorophenol	10	U		
1888-71-7	Hexachloropropene	50	U		
924-16-3	N-Nitroso-di-n-butylamine	10	U		
106-50-3	p-Phenylenediamine	500	U		
94-59-7	Safrole	50	U		
95-94-3	1,2,4,5-Tetrachlorobenzene	50	U		
120-58-1	Isosafrole	50	U		
130-15-4	1,4-Napthoquinone	1000	U	UJ	VI.3
99-65-0	1,3-Dinitrobenzene	10	U		
608-93-5	Pentachlorobenzene	50	U		
134-32-7	1-Naphthylamine	50	U		
58-90-2	2,3,4,6-Tetrachlorophenol	10	U		
91-59-8	2-Naphthylamine	50	U		
99-55-8	5-Nitro-o-toluidine	10	U		RS 11/2/94
99-35-4	1,3,5-Trinitrobenzene	10	U	UJ	
62-44-2	Phenacetin	10	U	UJ	VI.3
92-67-1	4-Aminobiphenyl	50	U		
23950-58-5	Pronamide	10	U		
82-68-8	Pentachloronitrobenzene	50	U		
56-57-5	4-Nitroquinoline-1-oxide	500	U	UJ	VI.3
91-80-5	Methapyrilene	50	U	UJ	VI.3
140-57-8	Aramite	50	U		
60-11-7	p-Dimethylaminoazobenzene	10	U		
119-93-7	3,3'-Dimethylbenzidine	10	U		
53-96-3	2-Acetylaminofluorene	10	U		
57-97-6	7,12-Dimethylbenz(a)anthracen	10	U		
70-30-4	Hexachlorophene	500	U	UJ	VI.3
56-49-5	3-Methylcholanthrene	10	U		
122-66-7	1,2-Diphenylhydrazine	10	U		
N/A	3 & 4-Methylphenol (2)	10	U		
92-87-5	Benzidine	50	U	UJ	VI.3

(2) - 3-Methylphenol & 4-Methylphenol coelute and are reported as a total of the individual isomers.

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

11MW001S

b[illegible]me: QAL/LRD Contract: M7472

b Code: _____ Case No.: M7472 SAS No.: _____ SDG No.: M7472

trix: (soil/water) WATER Lab Sample ID: M7472001

mple wt/vol: 1000 (g/mL) ML Lab File ID: 94M1BN2424

vel: (low/med) LOW Date Received: 07/09/94

Moisture: not dec. ____ dec. ____ Date Extracted: 07/11/94

traction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/22/94

C Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

mber TICs found: 5 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q	
1.		UNKNOWN HYDROCARBON	5.03	20	J	J
2.		UNKNOWN HYDROCARBON	5.85	11	J	J
3.		UNKNOWN HYDROCARBON	6.35	14	J	J
4.		UNKNOWN ALDEHYDE	6.72	16	J	J
5.		UNKNOWN HYDROCARBON	9.42	11	J	J

XV

000006

10-28-94 MJ

ORGANICS ANALYSIS DATA SHEET

aboratory Name: QAL MONTGOMERY | Concentration: LOW | Date Extracted: 07/07/94
ab Sample ID: M7457001 | Sample Matrix: WATER | Date Analyzed: 07/26/94
lient Sample ID: 11MW003S | Percent Moisture: | Dilution Factor: 1.0

PESTICIDE / PCB COMPOUNDS

AS Number		ug/L		CAS Number		ug/L	
19-84-6	alpha-BHC	0.040	U	510-15-6	Chlorobenzilate	0.50	U
19-85-7	beta-BHC	0.080	U	2303-16-4	Diallate	1.0	U
19-86-8	delta-BHC	0.040	U	465-73-6	Isodrin	0.020	U
3-89-9	gamma-BHC (Lindane)	0.040	U	UJ VII.3			
5-44-8	Heptachlor	0.040	U	UJ VII.3			
09-00-2	Aldrin	0.040	U				
024-57-3	Heptachlor Epoxide	0.040	U				
59-98-8	Endosulfan I	0.040	U				
0-57-1	Dieldrin	0.040	U				
2-55-9	4,4'-DDE	0.040	U				
2-20-8	Endrin	0.040	U				
3213-65-9	Endosulfan II	0.040	U				
2-54-8	4,4'-DDD	0.040	U				
421-93-4	Endrin Aldehyde	0.040	U				
031-07-8	Endosulfan Sulfate	0.040	U				
0-29-3	4,4'-DDT	0.040	U				
2-43-5	Methoxychlor	0.080	U				
3494-70-5	Endrin Ketone	0.040	U				
7-74-9	Chlordane	0.20	U				
001-35-2	Toxaphene	1.0	U				
2674-11-2	Aroclor-1016	2.0	U				
1104-28-2	Aroclor-1221	4.0	U				
1141-16-5	Aroclor-1232	4.0	U				
3469-21-9	Aroclor-1242	2.0	U				
2672-29-6	Aroclor-1248	2.0	U				
1097-69-1	Aroclor-1254	0.50	U				
1096-82-5	Aroclor-1260	0.50	U				
	Tetrachloro-m-xylene - SS	84					
	Decachlorobiphenyl - SS	106					

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

omments: Some report limits were raised due to chemical interferences observed during sample analysis.

Form I

Quality Analytical Laboratories Inc.
2567 Fairlane Drive, Montgomery, AL 36116-1622
P.O. Box 231148, Montgomery, AL 36123-0148
205 271-2440
Fax No. 205 271-3428

TLC

10/4/94
JMJ

ORGANICS ANALYSIS DATA SHEET

ab[illegible]tory Name:	OAL MONTGOMERY	Concentration:	LOW	Date Extracted:	07/07/94
ab Sample ID:	M7457002	Sample Matrix:	WATER	Date Analyzed:	07/26/94
lient Sample ID:	11MW002S	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

AS Number		ug/L		CAS Number		ug/L	
19-84-6	alpha-BHC	0.020	U	510-15-6	Chlorobenzilate	0.50	U
19-85-7	beta-BHC	0.040	U	2303-16-4	Diallate	1.0	U
19-86-8	delta-BHC	0.020	U	465-73-6	Isodrin	0.020	U
8-89-9	gamma-BHC (Lindane)	0.020	U UJ VII 3				
6-44-8	Heptachlor	0.020	U UJ VII.3				
09-00-2	Aldrin	0.020	U				
024-57-3	Heptachlor Epoxide	0.020	U				
59-98-8	Endosulfan I	0.020	U				
0-57-1	Dieldrin	0.020	U				
2-55-9	4,4'-DDE	0.020	U				
2-20-8	Endrin	0.040	U				
3213-65-9	Endosulfan II	0.040	U				
2-54-8	4,4'-DDD	0.040	U				
421-93-4	Endrin Aldehyde	0.040	U				
031-07-8	Endosulfan Sulfate	0.040	U				
0-29-3	4,4'-DDT	0.040	U				
2-43-5	Methoxychlor	0.080	U				
34[illegible]70-5	Endrin Ketone	0.040	U				
7-[illegible]9	Chlordane	0.20	U				
001-35-2	Toxaphene	1.0	U				
2674-11-2	Aroclor-1016	1.0	U				
1104-28-2	Aroclor-1221	2.0	U				
1141-16-5	Aroclor-1232	2.0	U				
3469-21-9	Aroclor-1242	1.0	U				
2672-29-6	Aroclor-1248	1.0	U				
1097-69-1	Aroclor-1254	0.50	U				
1096-82-5	Aroclor-1260	0.50	U				

Tetrachloro-m-xylene - SS	46
Decachlorobiphenyl - SS	50

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

omments:

Form I

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205 271-2440
Fax No. 205 271-3428

ORGANICS ANALYSIS DATA SHEET

boratory Name:	OAL MONTGOMERY	Concentration:	LOW	Date Extracted:	07/07/94
b Sample ID:	M7457001	Sample Matrix:	WATER	Date Analyzed:	07/28/94
ient Sample ID:	11MW003S	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE COMPOUND

S Number		ug/L	CAS Number	ug/L
3-50-0	Kepone	1.0 U		

Tetrachloro-m-xylene - SS	95
Decachlorobiphenyl - SS	119

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

mments:

Form I

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P.O. Box 231148, Montgomery, AL 36123-0148
205 271-2440
Fax No. 205 271-3428

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	QAL MONTGOMERY	Concentration:	LOW	Date Extracted:	07/07/94
Lab Sample ID:	M7457002	Sample Matrix:	WATER	Date Analyzed:	07/28/94
Client Sample ID:	11MW002S	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE COMPOUND

CAS Number		ug/L		CAS Number		ug/L
143-50-0	Kepone	1.0	U			

Tetrachloro-m-xylene - SS	76
Decachlorobiphenyl - SS	64

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

Comments:

Form I

Quality Analytical Laboratories Inc.
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Fax No. 205 271-3428

10-28 JW

ORGANICS ANALYSIS DATA SHEET

boratory Name:	OAL MONTGOMERY	Concentration:	LOW	Date Extracted:	07/11/94
b Sample ID:	M7472001	Sample Matrix:	WATER	Date Analyzed:	07/27/94
ient Sample ID:	11MW001S	Percent Moisture:		Dilution Factor:	1.0

PESTICIDE / PCB COMPOUNDS

S Number		ug/L		CAS Number		ug/L	
9-84-6	alpha-BHC	0.020	U	510-15-6	Chlorobenzilate	0.50	U
9-85-7	beta-BHC	0.040	U	2303-16-4	Diallate	1.0	U
9-86-8	delta-BHC	0.020	U	465-73-6	Isodrin	0.020	U
-89-9	gamma-BHC (Lindane)	0.020	U UJ VII.3				
-44-8	Heptachlor	0.020	U UJ VII 3				
9-00-2	Aldrin	0.020	U				
24-57-3	Heptachlor Epoxide	0.020	U				
9-98-8	Endosulfan I	0.020	U				
-57-1	Dieldrin	0.020	U				
-55-9	4,4'-DDE	0.020	U				
-20-8	Endrin	0.040	U				
213-65-9	Endosulfan II	0.040	U				
-54-8	4,4'-DDD	0.040	U				
21-93-4	Endrin Aldehyde	0.040	U				
31-07-8	Endosulfan Sulfate	0.040	U				
-29-3	4,4'-DDT	0.040	U				
-43-5	Methoxychlor	0.080	U				
494-70-5	Endrin Ketone	0.040	U				
-74-9	Chlordane	0.20	U				
01-35-2	Toxaphene	1.0	U				
674-11-2	Aroclor-1016	1.0	U				
104-28-2	Aroclor-1221	2.0	U				
141-16-5	Aroclor-1232	2.0	U				
469-21-9	Aroclor-1242	1.0	U				
672-29-6	Aroclor-1248	1.0	U				
097-69-1	Aroclor-1254	0.50	U				
096-82-5	Aroclor-1260	0.50	U				
	Tetrachloro-m-xylene - SS	63					
	Decachlorobiphenyl - SS	80					

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

omments:

TLC
Quality Analytical Laboratories Inc.
2567 Fairlane Drive, Montgomery, AL 36116-1622
P.O. Box 231148, Montgomery, AL 36123-0148
205 271-2440
Fax No. 205 271-3428

ORGANICS ANALYSIS DATA SHEET

aboratory Name: QAL MONTGOMERY Concentration: LOW Date Extracted: 07/11/94
ab Sample ID: M7472001 Sample Matrix: WATER Date Analyzed: 07/28/94
lient Sample ID: 11MW001S Percent Moisture: _____ Dilution Factor: 1.0

PESTICIDE COMPOUND

AS Number		ug/L		CAS Number		ug/L
43-50-0	Kepone	1.0	U			

Tetrachloro-m-xylene - SS	84
Decachlorobiphenyl - SS	101

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

omments:

Form I

Quality Analytical Laboratories Inc.
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P.O. Box 231148, Montgomery, AL 36123-0148
205 271-2440
Fax No. 205 271-3428

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11MW003S

) Name: QAL_MONTGOMERY_____ Contract: ABB_MAYPOR

) Code: LMG___ Case No.: _____ SAS No.: _____ SDG No.: M7458_

trix (soil/water): WATER Lab Sample ID: M7458001__

vel (low/med): LOW__ Date Received: 07/07/94

Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.2	U		F	
7440-38-2	Arsenic	1.7	B		F	J X11.3
7440-39-3	Barium	5.6	B		P	J X11.3
7440-41-7	Beryllium	0.15	U		P	
7440-43-9	Cadmium	2.7	U		P	
7440-70-2	Calcium	173000			P	
7440-47-3	Chromium	2.8	U		P	
7440-48-4	Cobalt	3.6	U		P	
7440-50-8	Copper	3.2	U		P	
7439-89-6	Iron	915			P	
7439-92-1	Lead	1.0	B	W	F	J X11.3
7439-95-4	Magnesium	30700			P	
7439-96-5	Manganese	87.2			P	
7439-97-6	Mercury	0.08	U		CV	
7440-02-0	Nickel	9.7	U		P	
7782-49-2	Selenium	1.3	U	WN	F	UJ V1.3
7440-22-4	Silver	2.7	U		P	
7440-23-5	Sodium	223000			P	
7440-28-0	Thallium	1.3	U	W	F	UJ X.2
7440-31-5	Tin	9.5	U		P	
7440-62-2	Vanadium	2.1	U		P	
7440-66-6	Zinc	~~2.4~~ 2.15 UJ	B		P	V.A.4 2.4u
5955-70-0	Cyanide	0.94	B		CA	J X11.3

lor Before: CLEAR____ Clarity Before: CLEAR_ Texture: N/A___

lor After: CLEAR____ Clarity After: CLEAR_ Artifacts: _____

mments:

THE_"N"_QUALIFIER_DENOTES_POOR_PRESPIKE_RECOVERY.__THE_"W"_QUALIFIER__
REFLECTS_POOR_POSTSPIKE_RECOVERY._____

FORM I - IN

ILM02.1

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 11MW003SF

Name: QAL_MONTGOMERY Contract: ABB_MAYPOR

Code: LMG Case No.: _____ SAS No.: _____ SDG No.: M7458_

rix (soil/water): WATER Lab Sample ID: M7458002

el (low/med): LOW Date Received: 07/07/94

olids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.2	U	W	F	UJ X.2
7440-38-2	Arsenic	1.3	B		F	J X11.3
7440-39-3	Barium	5.6	B		P	J X11.3
7440-41-7	Beryllium	0.15	U		P	
7440-43-9	Cadmium	2.7	U		P	
7440-70-2	Calcium	178000			P	
7440-47-3	Chromium	2.8	U		P	
7440-48-4	Cobalt	3.6	U		P	
7440-50-8	Copper	3.2	U		P	
7439-89-6	Iron	390			P	
7439-92-1	Lead	1.9	B		F	J X11.3
7439-95-4	Magnesium	31600			P	
7439-96-5	Manganese	89.9			P	
7439-97-6	Mercury	0.08	U		CV	
7440-02-0	Nickel	9.7	U		P	
7782-49-2	Selenium	1.3	U	WN	F	UJ V1.3
7440-22-4	Silver	2.7	U		P	
7440-23-5	Sodium	232000			P	
7440-28-0	Thallium	1.3	U	W	F	UJ X.2
7440-31-5	Tin	9.5	U		P	
7440-62-2	Vanadium	2.1	U		P	
7440-66-6	Zinc	~~5.2~~	~~B~~		P	~~2.1 U~~ V.A.4 5.24
5955-70-0	Cyanide				NR	

or Before: CLEAR Clarity Before: CLEAR Texture: N/A

or After: CLEAR Clarity After: CLEAR Artifacts: _____

ments:

FORM I - IN

ILMO2.1

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11MW002S

Name: QAL_MONTGOMERY Contract: ABB_MAYPOR

Code: LMG Case No.: _____ SAS No.: _____ SDG No.: M7458_

rix (soil/water): WATER Lab Sample ID: M7458003

el (low/med): LOW Date Received: 07/07/94

olids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.2	U		F	
7440-38-2	Arsenic	42.5			F	
7440-39-3	Barium	~~1.5~~	~~B~~		P	~~0.44 DS~~ V.A.4 1.5u
7440-41-7	Beryllium	0.15	U		P	
7440-43-9	Cadmium	2.7	U		P	
7440-70-2	Calcium	1770	~~B~~		P	J X11.3
7440-47-3	Chromium	5.1	~~B~~		P	J X11.3
7440-48-4	Cobalt	3.6	U		P	
7440-50-8	Copper	19.7	~~B~~		P	J X11.3
7439-89-6	Iron	180			P	
7439-92-1	Lead	5.7		W	F	J X.2
7439-95-4	Magnesium	98.3	~~B~~		P	J X11.3
7439-96-5	Manganese	~~2.6~~	~~B~~		P	~~0.44 DS~~ V.A.4 2.6u
7439-97-6	Mercury	0.12	~~B~~		CV	J X11.3
7440-02-0	Nickel	20.4	~~B~~		P	J X11.3
7782-49-2	Selenium	13.2	U	N	F	UJ V1.3
7440-22-4	Silver	2.7	U		P	
7440-23-5	Sodium	831000			P	
7440-28-0	Thallium	1.3	U	W	F	UJ X.2
7440-31-5	Tin	9.5	U		P	
7440-62-2	Vanadium	110			P	
7440-66-6	Zinc	14.1	~~B~~		P	J X11.3
5955-70-0	Cyanide	0.81	U		CA	

.or Before: CLEAR Clarity Before: CLEAR Texture: N/A

.or After: CLEAR Clarity After: CLEAR Artifacts: _____

mments:

FORM I - IN

ILMO2.1

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 11MW002SF

Name: QAL_MONTGOMERY Contract: ABB_MAYPOR

Code: LMG Case No.: _____ SAS No.: _____ SDG No.: M7458_

Matrix (soil/water): WATER Lab Sample ID: M7458004

Level (low/med): LOW Date Received: 07/07/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	6.3			P	
7440-38-2	Arsenic	40.8			P	
7440-39-3	Barium	1.8	B		P	~~0.44 uJ~~ V.A.4 1.8 u
7440-41-7	Beryllium	0.15	U		P	
7440-43-9	Cadmium	2.7	U		P	
7440-70-2	Calcium	1370	B		P	J x11.3
7440-47-3	Chromium	4.5	B		P	J x11.3
7440-48-4	Cobalt	3.6	U		P	
7440-50-8	Copper	15.0	B		P	J x11.3
7439-89-6	Iron	62.9	B		P	J x11.3
7439-92-1	Lead	9.8			F	
7439-95-4	Magnesium	40.5	B		P	J x11.3
7439-96-5	Manganese	1.8	B		P	0.44 uJ V.A.4
7439-97-6	Mercury	0.11	B		CV	J x11.3
7440-02-0	Nickel	17.1	B		P	J x11.3
7782-49-2	Selenium	13.2	U	WN	F	uJ V1.3
7440-22-4	Silver	2.7	U		P	
7440-23-5	Sodium	797000			P	
7440-28-0	Thallium	1.3	U	W	F	uJ x.2
7440-31-5	Tin	9.5	U		P	
7440-62-2	Vanadium	98.2			P	
7440-66-6	Zinc	12.9	B		P	J x11.3
5955-70-0	Cyanide				NR	

Color Before: BROWN Clarity Before: CLEAR Texture: N/A

Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

FORM I - IN

ILMO2.1

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 11MW001S

11.4.94

Name: QAL_MONTGOMERY Contract: ABB_MAYPOR

Code: LMG Case No.: SAS No.: SDG No.: M7473

ix (soil/water): WATER Lab Sample ID: M7473001

l (low/med): LOW Date Received: 07/08/94

lids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.2	U		F	
7440-38-2	Arsenic	3.2	B		F	J x11.3
7440-39-3	Barium	3.9	B		P	J x11.3
7440-41-7	Beryllium	0.15	U		P	
7440-43-9	Cadmium	2.7	U		P	
7440-70-2	Calcium	90300			P	
7440-47-3	Chromium	2.8	U		P	
7440-48-4	Cobalt	3.6	U		P	
7440-50-8	Copper	7.4	B		P	J x11.3
7439-89-6	Iron	~~26.2~~	B		P	~~9.77 UJ~~ V.A.426.2 u
7439-92-1	Lead	0.97	U		F	
7439-95-4	Magnesium	7300			P	
7439-96-5	Manganese	7.5	B		P	J x11.3
7439-97-6	Mercury	0.08	U		CV	
7440-02-0	Nickel	9.7	U		P	
7782-49-2	Selenium	1.3	U	WN	F	UJ V1.3
7440-22-4	Silver	2.7	U		P	
7440-23-5	Sodium	15300		E	P	J x1.2
7440-28-0	Thallium	1.3	U	W	F	UJ x.2
7440-31-5	Tin	9.5	U		P	
7440-62-2	Vanadium	5.0	B		P	J x11.3
7440-66-6	Zinc	~~3.7~~	B		P	~~6.15 UJ~~ V.A.427u
5955-70-0	Cyanide	0.69	B		CA	J x11.3

r Before: CLEAR Clarity Before: CLEAR Texture: N/A

r After: CLEAR Clarity After: CLEAR Artifacts:

ents:
HE "N" QUALIFIER DENOTES POOR PRESPIKE RECOVERY. THE "W" QUALIFER
EFLECTS POOR POSTSPIKE RECOVERY. THE "E" QUALIFIER INDICATES GREATER
HAN 10% DIFFERENCE BETWEEN THE NATIVE CONCENTRATION AND THE SERIAL
ILUTION RESULT.

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11MW001SF

Name: QAL_MONTGOMERY Contract: ABB_MAYPOR

Code: LMG Case No.: _____ SAS No.: _____ SDG No.: M7473

Matrix (soil/water): WATER Lab Sample ID: M7473002

Level (low/med): LOW Date Received: 07/08/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	5.4	U		P	
7440-38-2	Arsenic	4.2	B		P	J X11.3
7440-39-3	Barium	4.9	B		P	J X11.3
7440-41-7	Beryllium	0.15	U		P	
7440-43-9	Cadmium	2.7	U		P	
7440-70-2	Calcium	96400			P	
7440-47-3	Chromium	2.8	U		P	
7440-48-4	Cobalt	3.6	U		P	
7440-50-8	Copper	3.2	U		P	
7439-89-6	Iron	~~11.1~~ SC	B		P	~~4.1 J~~ V.A.4 11.1 u
7439-92-1	Lead	2.1	B	W	P	J X.2
7439-95-4	Magnesium	8150			P	
7439-96-5	Manganese	10	B		P	J X11.3
7439-97-6	Mercury	0.08	U		CV	
7440-02-0	Nickel	9.7	U		P	
7782-49-2	Selenium	13.2	U	N	P	UJ V1.3
7440-22-4	Silver	2.7	U		P	
7440-23-5	Sodium	17500		~~E~~ SC	P	~~J~~ X11.3
7440-28-0	Thallium	1.3	U	W	P	UJ X.2
7440-31-5	Tin	9.5	U		P	
7440-62-2	Vanadium	3.4	B		P	J X11.3
7440-66-6	Zinc	~~4.9~~ SC	B		P	~~2.15 J~~ V.A.4 4.9 u
5955-70-0	Cyanide		U		NR	
			U			

Color Before: CLEAR Clarity Before: CLEAR Texture: N/A

Color After: CLEAR Clarity After: CLEAR Artifacts: _____

Comments:

FORM I - IN

ILMO2.1

1995 Data Validation Narratives

Environmental Data Services, Inc.

Specializing in Laboratory Data Validation

Summary of Inorganic Data Validation
Metals/Cyanide

Client:	ABB Environmental Services, Inc.
Project Name:	U.S. Naval Station Mayport, Mayport, Florida
Project Number:	CTO 028
Contract Laboratory:	Quality Analytical Laboratory
SDG Number:	MN001
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Susan Dalla
Secondary Reviewer:	Nancy Weaver
Date Review Completed:	December 11, 1995

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
11Y001	RA636001	Water
11Y001MS	RA636001S	Water
11Y001MSD	RA636001D	Water
11R001	RA636002	Water
11S00101	RA636003	Soil
11S00201	RA636004	Soil
11S00201MS	RA636004S	Soil
11S00201MSD	RA636004D	Soil
11S00201D	RA636005	Soil
11S00301	RA636006	Soil

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I. Validation Procedure Summary

Data review and validation were performed in accordance with Naval Energy and Environmental Support Activity (NEESA) 20.2-047B (June 1988) using the USEPA Functional Guidelines for Inorganic Analyses (7/88) and criteria specified in the USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition (1986).

II. Data Deliverables

1. All required deliverables including QA/QC summary forms are present and in legible form in the data package.

   Yes: __X__ No: _____

2. Lab control charts were received and data points were within the control limit windows.

   Yes: __X__ No: _____ N/A: _____

   Note: If data points are outside of control limit windows, refer to the Laboratory Control Sample section VIII for any effect on data quality.

III. Technical Holding Times

Chain of custody records and sample preparation logs (Form 13) were checked for all samples to verify that technical holding time, and preservation criteria were met.

1. Technical holding times were within the allowable limits shown below:

   a. Analysis for all metals was completed within 180 days of sample collection; mercury was completed within 28 days; cyanide was completed within 14 days.

   Yes: __X__ No: _____

   Comment: Holding time criteria have been met and no action has been taken.

IV. Instrument Calibration and Calibration Verification

One hundred percent of the calibration results on the quality control summary forms were checked to ensure that reported results were within required quality control limits.

1. Instrument calibration for metals determined by inductively coupled plasma spectroscopy (ICP) was performed using a blank and one standard for each analyte.

   Yes: __X__ No: _____

2. Instrument calibration for metals determined by graphite furnace atomic absorption spectroscopy (GFAA) was performed using a blank and three standards (one of which was at the CRDL).

   Yes: __X__ No: _____

3. Instrument calibration for mercury was performed using a blank and four standards.

   Yes: __X__ No: _____ N/A: _____

4. Instrument calibration for cyanide was performed using a blank and three standards (one of which was at the CRDL).

   Yes: __X__ No: _____ N/A: _____

5. Calibration verification was performed for each analyte at a frequency of 10%.

   Yes: __X__ No: _____

6. A continuing calibration verification (CCV) was performed after the last analytical sample in each run.

   Yes: __X__ No: _____

7. Initial calibration verification (ICV) and CCV percent recovery (%R) values met the criteria specified below:

   a. For all metals except cyanide and mercury, %R results were between 90% and 110%.

Note: Due to possible rounding errors, allow results to fall within 1% of the contract windows (e.g. 89-111%).

Yes: X No: _____

8. Correlation coefficients for GFAA analytes, mercury, and cyanide calibration curves were greater than or equal to 0.995.

Yes: _____ No: _____ N/A: X

Comment: Raw data was not provided for this Level C SDG; therefore, calibration curves were not available.

9. Comments: The following calibration calculations were verified during the validation process.

ICV or CCV	Analyte	Calculation %R=(Found/True)*100	%R
ICV	Barium	2020/1891 x 100	106.8
CCV	Barium	2002/1891 x 100	105.9
ICV	Arsenic	62.9/60.0 x 100	104.8
CCV	Arsenic	58.6/60.0 x 100	97.7
ICV	Mercury	4.67/5.0 x 100	93.4
CCV	Mercury	3.97/4.0 x 100	99.2
ICV	Cyanide	100/94.0 x 100	106.4
CCV	Cyanide	49.8/50.0 x 100	99.6

V. Blanks

A. Laboratory Blanks

One hundred percent of the laboratory blank results on the summary forms were checked to ensure that reported results were within required quality control limits.

1. Preparation blank analyses results have been reported for each matrix type for every extraction batch.

Yes: X No: _____

2. Calibration blanks were run at a frequency of 10%.

Yes: X No: ____

3. A calibration blank was analyzed immediately after every ICV and CCV, and after the last sample.

Yes: X No: ____

4. All reported blank analyte results had absolute values less than the corresponding IDL values.

Yes: ____ No: X

The following sample results were qualified due to laboratory blanks that had target analytes where the absolute value of the reported results was greater than or equal to the corresponding IDL value; sample results were less than 5X the absolute value of the blank result.

Inorganic Laboratory Blank Summary Table
SDG No. MN001

Blank ID/ Date	Affected Analyte	Absolute Conc. ug/l or mg/kg	Action Level ug/l or mg/kg	Affected Sample	Lab Conc ug/l or mg/kg	Lab Qual	EDS Conc ug/l or mg/kg	EDS Qual
WTIC 1117-1	Chromium	2.34	11.7	11Y001 11R001	2.3 2.0	B B	2.3 2.3	UJ UJ
WTIC 1117-1	Zinc	4.38	21.9	11Y001 11R001	4.8 10.9	B B	4.8 10.9	UJ UJ
SOIC 1121-1	Thallium	0.12	0.6	11S00101 11S00201 11S00201D 11S00301	0.13 0.12 0.12 0.13	U U U U	0.13 0.12 0.12 0.13	UJ UJ UJ UJ

Comment: QC blank contamination values reported in ug/l for soil and sediment matrix samples were converted to mg/kg for comparison purposes.

5. All reported blank analyte results had absolute values less than or equal to the corresponding CRDL values.

Yes: __X__ No: _____

B. Field Blanks

1. If analytes were detected in the blanks, the associated samples were found to be free of those analytes at detectable concentrations.

Yes: _____ No: __X__ N/A: _____

2. Analytes were detected, but associated sample aliquot concentrations were greater than 5X the blank concentration.

Yes: _____ No: __X__ N/A: _____

The following sample results were qualified due to field blanks that had target analytes where the absolute value of the reported results was greater than or equal to the corresponding IDL value; sample results were less than 5X the absolute value of the blank result.

Inorganic Field Blank Summary Table
SDG No. MN001

Blank ID	Affected Analyte	Absolute Conc. mg/kg	Action Level mg/kg	Affected Sample	Lab Conc mg/kg	Lab Qual	EDS Conc mg/kg	EDS Qual
11R001	Antimony	0.22	1.1	11S00101	0.38	B	0.38	UJ

Comment: QC blank contamination values reported in ug/l for soil and sediment matrix samples were converted to mg/kg for comparison purposes.

VI. Matrix Spike Sample Recovery

One hundred percent of the matrix spike (MS) sample results on the quality control summary forms were checked to ensure that reported results were within required quality control limits.

1. For SDG MN001, one field sample from each group of samples of a similar matrix and concentration level was spiked with each target analyte (except: Ca, Mg, K, Na on water samples and Al, Ca, Mg, K, and Na on soil/sediment samples) by the laboratory.

   Yes: X No: ____

2. MS sample ID: 11S00201, 11Y001

3. For all target analytes, percent recovery (%R) results were within the limits of 75% - 125% (Note: MS %R limits do not apply when the sample concentration exceeded the spike concentration by a factor of 4 or more).

   Yes: ____ No: X

Sample	Analyte	% Recovery	Qualifier
11S00101	Lead	143	J
11S00201	Lead	143	J
11S00201D	Lead	143	J
11S00301	Lead	143	J

4. The following spike calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation %R=(SSR-SR/SA)*100	%R
ICP	Barium	(403-5.32)/412 x 100	96.5
GFAA	Lead	(15.6-9.7)/4.12 x 100	143.0
CV	Mercury	(1.05-0.0)/1.03 x 100	101.9
CA	Cyanide	(5.71-0.11)/5.15 x 100	108.7

VII. Interference Check Samples

One hundred percent of the ICS results on the quality control summary forms were checked to ensure that reported results were within required quality control limits.

1. ICP ICSs (solutions A and AB) were analyzed at the beginning and end of each sample analysis run (or a minimum of twice per 8-hour shift, whichever was more frequent).

   Yes: __X__ No: _____

2. Solution AB analyte recovery results were within the control limits of 80%-120%.

   Yes: __X__ No: _____

3. Concentrations of Ca, Fe, and Mg in the samples are less than or equal to their respective concentration in ICS solution A or AB.

   Yes: _____ No: _____ N/A: __X__

   Comment: Ca, Fe and Mg were not requested analytes.

4. Cr, Cu, Ni, and V are present in a sample(s) at concentrations less than 10,000 ug/L.

   Yes: __X__ No: _____ N/A: _____

5. Comments: ICP ICSs criteria have been met and no action has been taken. The following ICS calculations were verified during the validation process.

Analyte	Calculation %R=(Found Soln AB/True Soln AB)*100	%R
Barium	501/499 x 100	100.4

VIII. Laboratory Control Sample (LCS)

One hundred percent of the LCS results on the quality control summary forms were checked to ensure that reported results were within required quality control limits.

1. A laboratory control sample was analyzed for each SDG for each matrix type.

   Yes: __X__ No: _____

2. Aqueous LCS recovery results were within the control limits of 80% to 120% (except for Sb and Ag which have no required limits).

Yes: __X__ No: _____ N/A: _____

3. Soil LCS recovery results were within the required control limits specified on the laboratory Form VII-IN and control charts.

Yes: __X__ No: _____ N/A: _____

Comment: LCS criteria have been met and no action has been taken.

4. The following LCS calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation %R=(Found/True)*100	%R
ICP	Barium	1002/1000 x 100	100.2
GFAA	Arsenic	52.2/50.0 x 100	104.4
CV	Mercury	4.85/4.9 x 100	99.0
CA	Cyanide	5.0/5.6 x 100	89.3

IX. Duplicate Sample Analysis

One hundred percent of the duplicate results on the quality control summary forms were checked to ensure that reported results were within required quality control limits.

A. Laboratory Duplicates

1. For each SDG, one duplicate sample was analyzed from each group of samples of a similar matrix type and concentration level.

Yes: __X__ No: _____

MSD ID: 11S00201 (soil), 11Y001 (water)

2. For duplicate analyte concentrations greater than 5X the CRDL, the relative percent difference (RPD) between the two reported results was less than 20% for aqueous samples (35% for soil samples).

   Yes: __X__ No: _____

3. For duplicate analyte concentrations less than 5X the CRDL, the difference between the two reported results was less than the CRDL value for aqueous samples, or less than 2X the CRDL value for soil samples. RPDs for samples with values less than the CRDL are not calculated.

   Yes: __X__ No: _____

4. Comment: Laboratory duplicate criteria have been met and no action has been taken.

5. The following duplicate calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation RPD=[S-D/(S+D/2)]*100 D = S - Dup	RPD or Difference
ICP	Chromium	3.31-2.85	0.46 (±4.2)
GFAA	Lead	[(9.70-8.82)/(9.70+8.82)]/2 x 100	9.5
CV	Mercury	0.0-0.0	NC
CA	Cyanide	0.11-0.11	0.0

B. Field Duplicates

1. The following duplicate sets were analyzed with this SDG:

   a. 11S00201 and 11S00201D (soil)
   b. 11Y001 and 11Y001 (water)

2. Comment: Field duplicate criteria for lead have not been met. The RPD for duplicate lead analyses was 36.3. The reported lead results for soil samples have been qualified for exceeding matrix spike criteria and no further action has been taken by the reviewer.

X. Furnace Atomic Absorption QC

One hundred percent of the AA summary data was checked to ensure that reported results were within required quality control limits.

1. Duplicate injections for AA analytes with concentrations greater than the CRDL had RSD results < 20%.

   Yes: _____ No: _____ N/A: __X__

   Comment: RSD results are contained in the raw data which is not provided for Level C review.

2. For each sample, all AA analytical spike recovery results were between 85% and 115%.

   Yes: _____ No: __X__

   Comment: The following table summarizes samples and analytes which have been qualified for exceeding analytical spike recovery criteria.

Sample	Analyte	% Recovery	Qualifier
11S00101	Selenium	74.3	UJ
11S00201	Selenium	78.5	UJ
11S00201D	Selenium	74.8	UJ

3. For each sample, all AA results were within the appropriate calibration range, or were diluted to meet this criteria.

   Yes: __X__ No: _____ N/A: _____

4. Sample analyte results where the analytical spike recovery was <40% were diluted once and reanalyzed.

   Yes: _____ No: _____ N/A: __X__

5. Samples having analyte concentrations greater than or equal to 50% of the spike concentrations, and spike %R results <85% or >115% were quantitated by MSA.

Yes: _____ No: _____ N/A: __X__

6. MSA analyses with correlation coefficients less than 0.995 were rerun once.

Yes: _____ No: _____ N/A: __X__

7. MSA spike values met the criteria specified below:

a. Spike 1 was approximately 50% of the sample concentration.
b. Spike 2 was approximately 100% of the sample concentration.
c. Spike 3 was approximately 150% of the sample concentration.

Yes: _____ No: _____ N/A: __X__

XI. ICP Serial Dilution

ICP serial dilution results were provided by the laboratory.

1. ICP serial dilution analysis was performed on one sample from each SDG of a similar matrix type and concentration level.

Yes: __X__ No: _____ N/A: _____

2. For each analyte in the serial dilution sample which was minimally a factor of 50 above the IDL in the original sample, the serial dilution result agreed within 10% of the original determination after correction for dilution.

Yes: _____ No: __X__ N/A: _____

Comment: The following exceeded ICP serial dilution %D criteria.

Sample	Analyte	% Difference	Most Appropriate Result
11S00101	Zinc	20.7	23.3J
11S00201	Zinc	20.7	16.8J
11S00201D	Zinc	20.7	17.4J
11S00301	Zinc	20.7	16.7J

XII. Sample Result Verification

Ten percent of all reported sample results were not verified since the raw data is not provided for a Level C data package.

1. All sample results which were verified were correctly calculated and reported.

   Yes: _____ No: _____ N/A: __X__

   Comment: Calculations and transcriptions can not be verified without the raw data.

2. All sample results fall within the linear range of the ICP (Form XIII) and within the calibrated range of the instrument for AA and cyanide.

   Yes: __X__ No: _____ N/A: _____

3. All reported concentrations were above the CRDL.

   Yes: _____ No: __X__ N/A: _____

   Comment: The "B" qualifier applied by the laboratory for results between the CRDL and the IDL were amended with a "J" qualifier.

4. Sample results on Form 1 were reported down to the IDL not CRDL for all analytes.

   Yes: __X__ No: _____ N/A: _____

5. Reported sample results that were analyzed by ICP for As, Pb, Se, and Tl were at least 5X the ICP IDL.

   Yes: _____ No: _____ N/A: __X__

6. Sample weights, volumes and dilutions were taken into account when reporting detection limits on Form 1.

   Yes: __X__ No: _____ N/A: _____

7. IDLs were present and found to be less than CRDL.

   Yes: __X__ No: _____ N/A: _____

8. All CRDLs and IDLs were included on Form X.

Yes: __X__ No: _____ N/A: _____

9. Raw data were free of anomalies (e.g. baseline shifts, negative absorbances/emissions, omissions, etc.). If no, please describe anomalies in the comments section below.

Yes: _____ No: _____ N/A: __X__

Comment: Raw data is not provided for Level C review.

XIII. Additional Comments/Professional Judgment

The final validated results represent the compilation of all quality control qualification. With the exception of the quality control anomalies presented in Sections V.A.4. V.B.2. VI.3. X.2. XI.2. and XII.3 and the resulting qualifiers, the analyses of environmental samples and quality control samples are valid within the constraints identified with the data quality flags. All false positive/negative results are summarized on Table A-1.

Inorganic Data Qualifiers

U - The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

J - The associated value is an estimated quantity.

R - The data are unusable. (Note: Analyte may or may not be present.)

UJ - The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

APPENDIX A

Summary Tables and Work Sheets

Table A-1
Review of False Positive/Negative Results

Sample	Parameter	False Positive or Negative	Rationale	Reported		Validated	
				Conc. (ug/l or mg/kg)	Qual	Conc. (ug/l or mg/kg)	Qual
11Y001	Chromium	P	2	2.3	B	2.3	UJ
11R001	Chromium	P	2	2.0	B	2.3	UJ
11Y001	Zinc	P	2	4.8	B	4.8	UJ
11R001	Zinc	P	2	10.9	B	10.9	UJ
11S00101	Thallium	N	3	0.13	B	0.13	UJ
11S00201	Thallium	N	3	0.12	B	0.12	UJ
11S00201D	Thallium	N	3	0.12	B	0.12	UJ
11S00301	Thallium	N	3	0.13	B	0.13	UJ
11S00101	Antimony	P	2	0.38	B	.0.38	UJ

Rationale
1 = Professional judgement
2 = Blank contamination (laboratory or field)
3 = Prep Blank - negative value > IDL

Table A-3
Matrix Interferences (Inorganics)

Sample	Parameter	Initial	Re-analysis ID	Final	Was the Re-analysis Needed?	Most Appropriate Result	Comment
11S00101	Lead	%R=143	NA	NA	NO	13.7 J	VI.3
11S00201	Lead	%R=143	NA	NA	NO	9.7 J	VI.3
11S00201D	Lead	%R=143	NA	NA	NO	14.0 J	VI.3
11S00301	Lead	%R=143	NA	NA	NO	8.1 J	VI.3
11S00101	Selenium	%R=74.3	NA	NA	NO	0.13 UJ	X.2
11S00201	Selenium	%R=78.5	NA	NA	NO	0.12 UJ	X.2
11S00201D	Selenium	%R=74.8	NA	NA	NO	0.12 UJ	X.2
11S00101	Zinc	%D=20.7	NA	NA	NO	23.3 J	XI.2
11S00201	Zinc	%D=20.7	NA	NA	NO	16.8 J	XI.2
11S00201D	Zinc	%D=20.7	NA	NA	NO	17.4 J	XI.2
11S00301	Zinc	%D=20.7	NA	NA	NO	16.7 J	XI.2

1995 Field Investigation Data and Results

MODIFIED U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11Y001

12-11-95

Name: QAL Contract: ABB_MAYPOR

Code: LRD Case No.: _____ SAS No.: _____ SDG No.: MN001

Matrix (soil/water): WATER Lab Sample ID: RA636001

Level (low/med): LOW Date Received: 11/15/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	1.0	U		F	
7440-38-2	Arsenic	0.80	B		F	J x11.3
7440-39-3	Barium	0.40	U		P	
7440-41-7	Beryllium	0.20	U		P	
7440-43-9	Cadmium	0.90	U		P	
7440-47-3	Chromium	2.3	B		P	UJ V.A.4
7440-48-4	Cobalt	3.0	U		P	
7440-50-8	Copper	1.4	U		P	
7439-92-1	Lead	0.60	B		F	J x11.3
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	8.7	U		P	
7782-49-2	Selenium	0.60	U		F	
7440-22-4	Silver	2.2	U		P	
7440-28-0	Thallium	0.60	U		F	
7440-62-2	Vanadium	1.4	U		P	
7440-66-6	Zinc	4.8	B		P	UJ V.A.4
5955-70-0	Cyanide	2.1	B		C	J x11.3
7440-31-5	Tin	13.3	U		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture: _____

Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

FORM I - IN ILM02.1(MOD-9a)

MODIFIED U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 11R001

12-11-95

Name: QAL Contract: ABB_MAYPOR

Code: LRD Case No.: _____ SAS No.: _____ SDG No.: MN001

rix (soil/water): WATER Lab Sample ID: RA636002

el (low/med): LOW Date Received: 11/15/95

olids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	1.1	~~B~~		F	J X11.3
7440-38-2	Arsenic	0.60	U		F	
7440-39-3	Barium	0.40	U		P	
7440-41-7	Beryllium	0.20	U		P	
7440-43-9	Cadmium	0.90	U		P	
7440-47-3	Chromium	~~2.0~~	~~B~~		P	2,3 UJ V.A.4
7440-48-4	Cobalt	3.0	U		P	
7440-50-8	Copper	1.4	U		P	
7439-92-1	Lead	0.60	U		F	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	8.7	U		P	
7782-49-2	Selenium	0.60	U		F	
7440-22-4	Silver	2.2	U		P	
7440-28-0	Thallium	0.60	U		F	
7440-62-2	Vanadium	1.4	U		P	
7440-66-6	Zinc	10.9	~~B~~		P	UJ V.A.4
5955-70-0	Cyanide	1.5	U		C	
7440-31-5	Tin	13.3	U		P	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 11S00101

SD 12-11-95

Name: QAL Contract: ABB_MAYPOR

Code: LRD Case No.: _____ SAS No.: _____ SDG No.: MN001

rix (soil/water): SOIL Lab Sample ID: RA636003

el (low/med): LOW Date Received: 11/15/95

olids: 95.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.38	~~B~~		F	UJ V.B.2
7440-38-2	Arsenic	0.96	~~B~~		F	J X11.3
7440-39-3	Barium	8.0	~~B~~		P	J
7440-41-7	Beryllium	0.05	~~B~~		P	J
7440-43-9	Cadmium	1.2			P	
7440-47-3	Chromium	1.7	~~B~~		P	~~UJ V.B.2~~ J X11.3
7440-48-4	Cobalt	0.63	U		P	
7440-50-8	Copper	3.8	~~B~~		P	J X11.3
7439-92-1	Lead	13.7		~~N~~	F	J V1.3
7439-97-6	Mercury	0.03	U		CV	
7440-02-0	Nickel	2.6	~~B~~		P	J X11.3
7782-49-2	Selenium	0.13	U	~~W~~	F	UJ X.2
7440-22-4	Silver	0.46	U		P	
7440-28-0	Thallium	0.13	U		F	UJ V.A.4
7440-62-2	Vanadium	10.3	~~B~~		P	J X11.3
7440-66-6	Zinc	23.3		~~E~~	P	J X1.2
5955-70-0	Cyanide	0.14	~~B~~		C	J X11.3
7440-31-5	Tin	2.8	U		P	

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 11S00201

12-11-95

Name: QAL Contract: ABB_MAYPOR

Code: LRD Case No.: SAS No.: SDG No.: MN001

Matrix (soil/water): SOIL Lab Sample ID: RA636004

Level (low/med): LOW Date Received: 11/15/95

% Solids: 97.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.21	U		F	J X11.3
7440-38-2	Arsenic	1.1	B		F	J
7440-39-3	Barium	5.3	B		P	J
7440-41-7	Beryllium	0.08	B		P	J
7440-43-9	Cadmium	0.25	B		P	J
7440-47-3	Chromium	3.3			P	
7440-48-4	Cobalt	0.65	B		P	J X11.3
7440-50-8	Copper	1.9	B		P	J X11.3
7439-92-1	Lead	9.7		N	F	J V1.3
7439-97-6	Mercury	0.03	U		CV	
7440-02-0	Nickel	1.8	U		P	
7782-49-2	Selenium	0.12	U	W	F	UJ X.2
7440-22-4	Silver	0.45	U		P	
7440-28-0	Thallium	0.12	U		F	UJ V.A.4
7440-62-2	Vanadium	5.8	B		P	J X11.3
7440-66-6	Zinc	16.8		E	P	J X1.2
5955-70-0	Cyanide	0.11	B		C	J X11.3
7440-31-5	Tin	2.7	U		P	

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Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 11S00201D

JN 12-11-95

Name: QAL Contract: ABB_MAYPOR

Code: LRD Case No.: _____ SAS No.: _____ SDG No.: MN001

Matrix (soil/water): SOIL Lab Sample ID: RA636005

Level (low/med): LOW Date Received: 11/15/95

% Solids: 97.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.21	U		F	
7440-38-2	Arsenic	1.3	B		F	J X11.3
7440-39-3	Barium	5.3	B		P	J
7440-41-7	Beryllium	0.06	B		P	J
7440-43-9	Cadmium	0.19	U		P	
7440-47-3	Chromium	3.1			P	
7440-48-4	Cobalt	0.62	U		P	
7440-50-8	Copper	2.0	B		P	J X11.3
7439-92-1	Lead	14.0		N	F	J V1.3
7439-97-6	Mercury	0.03	U		CV	
7440-02-0	Nickel	1.8	U		P	
7782-49-2	Selenium	0.12	U	W	F	UJ X.2
7440-22-4	Silver	0.45	U		P	
7440-28-0	Thallium	0.12	U		F	UJ V.A.4
7440-62-2	Vanadium	6.2	B		P	J X11.3
7440-66-6	Zinc	17.4		E	P	J X1.2
5955-70-0	Cyanide	0.17	B		C	J X11.3
7440-31-5	Tin	2.7	U		P	

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Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11S00301

SD 12-11-95

Name: QAL Contract: ABB_MAYPOR

Code: LRD Case No.: SAS No.: SDG No.: MN001

Matrix (soil/water): SOIL Lab Sample ID: RA636006

Level (low/med): LOW Date Received: 11/15/95

% Solids: 92.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.22	U		F	
7440-38-2	Arsenic	1.0	B		F	J X11.3
7440-39-3	Barium	5.9	B		P	J
7440-41-7	Beryllium	0.06	B		P	J
7440-43-9	Cadmium	0.19	U		P	
7440-47-3	Chromium	3.4			P	
7440-48-4	Cobalt	0.65	U		P	
7440-50-8	Copper	2.6	B		P	J X11.3
7439-92-1	Lead	8.1		N	F	J V1.3
7439-97-6	Mercury	0.05	B		CV	J X11.3
7440-02-0	Nickel	1.9	U		P	
7782-49-2	Selenium	0.13	U		F	
7440-22-4	Silver	0.47	U		P	
7440-28-0	Thallium	0.13	U		F	UJ V.A.4
7440-62-2	Vanadium	5.4	B		P	J X11.3
7440-66-6	Zinc	16.7		E	P	J X1.2
5955-70-0	Cyanide	0.08	U		C	
7440-31-5	Tin	2.9	U		P	

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Comments:

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APPENDIX D

RESPONSE TO REGULATORY COMMENTS DATED OCTOBER 16, 1995

RESPONSE TO REGULATORY COMMENTS

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

1.0 INTRODUCTION

Harding Lawson Associates has prepared a Clean Closure Equivalency Demonstration Petition for the Neutralization Basin (Solid Waste Management Unit [SWMU] 12) at U.S. Naval Station (NAVSTA) Mayport under the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract, No. N62467-89-D-0317. The petition also incorporates information developed during a Resource Conservation and Recovery Act (RCRA) Correction Action Program that is being conducted under the Station's Hazardous and Solid Waste Amendment (HSWA) permit No. FL9-170-024-260. The HSWA permit was issued by the U.S. Environmental Protection Agency (USEPA) on March 25, 1988, and revised and reissued June 15, 1993.

The purpose of this document is to respond to comments made in correspondence dated October 16, 1995, by the Florida Department of Environmental Protection (FDEP) to Harold McGill Department of the Navy Southern Division Naval Facilities Engineering Command, concerning the Draft Equivalency Demonstration Neutralization Basin Petition dated March 15, 1995. The following sections of this response to comments provide point-by-point responses to FDEP comments.

1.1 FDEP Comment Number 1 1-1/1: *It would be appropriate to identify SWMU 12 as the "Neutralization Basin" that is identified on Figure 1-2. This is not done until 1-1/2.*

Response. Comment noted, the figure will be amended.

1.2 FDEP Comment Number 2 Figure 1-2: *Neutralization Basin Site Location Map (Figure 1-2), is nearly illegible, and has no legend.*

Response. Comment noted, the figure will be made legible.

1.3 FDEP Comment Number 3 1-4/3: *The last sentence on page 1-4 paragraph 3 must be revised since Florida was authorized to process the equivalency demonstrations on December 27, 1994.*

Response. Comment noted, the text will be modified to include the authorization date.

1.4 FDEP Comment Number 4 1-4/6: *We presume that the reference here should be 40 CFR Part 264.*

Response. The reference was made to 40 CFR Part 265, which were the applicable interim status standards when the monitoring wells were installed and sampled in the original equivalency demonstration (ABB Environmental Services, Inc. [ABB-ES], 1994). The monitoring wells also meet the general intent of final closure standards under 40 CFR Part 264. This will be clarified in the text.

1.5 FDEP Comment Number 5 1-5/3: *This paragraph will need to be changed to reflect that the previous work was done pursuant to a QAPP approved in August 1988 for The Neutralization Basin at Building 1241. The subsequent sampling was done pursuant to the RFI Workplan.*

Response. Comment noted, the appropriate workplans and QAPPs will be referenced (E.C. Jordan, 1988a, 1988b, and 1989; and ABB-ES, 1991).

1.6 FDEP Comment Number 6 2-1/2: *It might be appropriate to clarify that the topographic elevation of 11' NGVD is at the top of the basin, and the basin was build below grade as shown on Figure 2-3.*

Response. Figures 1-4 through 1-7 in the revised Clean Closure Equivalency Demonstration illustrate the elevation of the features of the second and existing Neutralization Basins.

1.7 FDEP Comment Number 7 2-5/1 and /2: *The discussion about the initial basin, second basin, and The Neutralization Basin are confusing. What are the relationships of the initial basin to the second basin and the second basin to the neutralization basin? On 2-5/2 there is reference to the initial basin which we presume is the first basin which began operation in early 1971, but this should be verified. It appears that there is enough historical information here by suggest that this section be clarified.*

Response. The text describing the three neutralization basins will be modified to clearly identify which basin is being discussed.

1.8 FDEP Comment Number 8 *Section 2.3, and Figures 2-8 and 2-9 should use the same nomenclature for the soil samples since there are 3 listed: "B1S1, B1S2...", "First Sample" and "Second sample", or "S1 and S2". We suggest the first identifiers be used.*

Response. Comment noted, the samples identifications will be modified in the text and tables to clearly identify the sampling location and associated samples.

1.9 FDEP Comment Number 9 *The table on page 2-12 presents the detection limit for total metals in the soil analysis, and the text mentions a toxicity analysis. It is not clear if both total metals and toxicity were performed. To meet current Department requirements to demonstrate that no remaining hazardous waste or constituents are present, the Department request that facility to take a surface soil sample (0 - 1 feet) for total metals analysis for the constituents listed in the table. The sample should be collected adjacent to the low point along the edge of the impoundment liner where overtopping of the liner*

could have occurred. Total metal concentrations will be compared with state cleanup goals for the constituents.

Response. Analysis of the soil samples collected in 1989 was by the Extraction Procedure (E.P.) Toxicity testing method, the toxicity test result for a particular analyte is a total value for metals leached from a solid matrix, such as soil. The word "Total" on the second table shown on page 2-12 (draft equivalency demonstration document [ABB-ES, 1994]) may be misleading and will be deleted. Extraction and analysis of metals (total) by USEPA methods 6000, 7000 and 9000 was not performed. Three surface soil samples will be collected at the site, one will be a reference (background) sample and two will be collected adjacent to the basin. The samples will be analyzed for the constituents listed in Table 2-12 of the revised Clean Closure Equivalency Demonstration Petition and the results compared with the Florida soil cleanup goals for residential and industrial land use (FDEP, 1996).

1.10 FDEP Comment Number 10 2-17: *The Quality Assurance Project Plan (QAPP) approved in August 1988 stated that Analytical Technologies would be doing the laboratory work. However, the raw data in this report shows that CH2MHill did the Appendix IX work for the January 1993 sampling event. This discrepancy must be clarified.*

Response. The 1988 QAPP stated that Pioneer Laboratory Inc. would conduct analysis of the quarterly groundwater samples, this data is reported in Chapter 2 of the draft equivalency demonstration report. Data collected in 1993 provided in the draft equivalency demonstration was to respond to comments concerning The Neutralization Basin in correspondence from USEPA dated October 21, 1991. Because the RCRA Facility Investigation (RFI) program was in progress at the time it did not seem reasonable to duplicate the analytical efforts. CH2MHILL was contracted to analyze groundwater samples and the data used for both the equivalency demonstration and the RFI. Field and Laboratory QA/QC requirements followed during the RFI activities are defined in the RFI workplan (ABB-ES, 1991) approved by FDEP and comply with USEPA Region IV Standard Operating Procedures. The QA/QC procedures utilized for the NAVSTA Mayport RFI assure that the data collected will be acceptable for site characterization, risk assessment and corrective measures.

1.11 FDEP Comment Number 12 2-20/2: *In the last sentence, the MCL for mercury should be 0.002 mg/ℓ instead of 0.001 mg/ℓ.*

Response. Comment noted, the text will be amended.

1.12 FDEP Comment Number 13 3-14/3: *The location of, and construction details for monitoring wells S-3 must be provided. Installation details need not be provided.*

Response. Construction diagrams for this well are not available. The text referencing this well is not essential to the discussions and will be deleted.

1.13 FDEP Comment Number 14 3-19:

a. Beryllium has an MCL of 4 µg/ℓ (FAC 62-550.310)

b. Copper has an MCL of 1,000 µg/ℓ (FAC 62-550.310)

c. *Lead has an MCL of 15 µg/ℓ (FAC 62-550.310)*

d. *Nickel has an MCL of 100 µg/ℓ (FAC 62-550.310)*

e. *Zinc has an MCL of 5,000 µg/ℓ (FAC 62-550.310)*

Response. With exception of lead, the MCLs stated in the draft equivalency demonstration were the correct value in milligrams per liter (mg/ℓ). The value stated for lead will be revised to the current value, 15 micrograms per liter (µg/ℓ) or 0.015 (mg/ℓ).

1.14 FDEP Comment Number 15 Appendix A

a. *Section 1. There is no brief discussion or list of all units (Solid Waste Management Units and/or regulated units) which are or have been at the Facility.*

Response. A list of the SWMUs will be provided in the revised equivalency demonstration report.

b. *Figure 3: From which wells did this figure come?*

Response. It is assumed that this comment references Figure 3 in the Groundwater Monitoring Plan prepared in 1988 by E.C. Jordan Co. The Figure references an open file report by the U.S. Geological Survey: The Surficial Aquifer at the U.S. Naval Station Near Mayport, Florida, U.S. Geological survey open file report 80-765, 1980.

d. *DEP Rules 17-XXX were changed to Rules FAC 62-XXX in 1994.*

Response. Comment noted, the references to FDEP rules will be amended.

e. *Was there ever any overtopping of the basins? Were there inspection records to verify this? Was the area ever flooded during the operation of any of the 3 basins?*

Response. The Navy does not have any documentation or anecdotal evidence of such an event.

f. *A Waste analysis from the facility operations is not found in this Clean Closure Equivalency Demonstration.*

Response. There are no available records for analysis of the effluent treated at The Neutralization Basin.

1.15 FDEP Comment Number 16

a. *Appendix B of the Groundwater Monitoring Plan: Why were the boring logs from Monitoring wells MPT-9-1, MPT-9-2, and MPT-9-3 included when these wells are not associated with The Neutralization Basin.*

Response. They were provided in the work plan as examples.

b. *In Table B-3, the t-test is performed. However, Appendix C-6 (Statistics) discusses using different statistical analyses on different parameters based on the number of non-detects. In discussion with USEPA Region IV, this cannot be done because valid comparison cannot be made especially if statistical methods for the same parameter change from quarter to quarter. Finally, the monitoring wells and numerical values for the various parameters in Appendix C-6 do not match that in Table B-3. If Appendix C-6 is not germane to the equivalency demonstration it should be deleted.*

Response. Appendix C-6 is not required to provide evidence that a release to the environment has not occurred from The Neutralization Basin and will be deleted from the revised equivalency demonstration report.

1.16 FDEP Comment Number 17

a. *Appendix C-8, Table C-8: The Appendix IX analysis missed several parameters. This table does not include all of the Appendix IX sampling was conducted. The table should either be revised to include all Appendix IX parameters of deleted. In either case, a summary table with detected Appendix IX parameters must be included.*

Response. The target analytes for RCRA Corrective Action investigatives at NAVSTA Mayport are a subset of the Appendix IX list and also include analytes from the USEPA Contract Laboratory Program (CLP) target compound list (TCL) and target analyte list (TAL) based on known activities at the sites. The table will be revised.

b. *Also, the chain of custody for the Appendix IX is too light (the actual analytical methods at the top of the page cannot be read).*

Response. Comment noted, the quality of the copy will be improved, if possible.

1.17 FDEP Comment Number 18 *No details (i.e., inventory depth; construction details; cones of depression; where applicable; etc.) were submitted on all wells (withdrawal, injection, etc.) within one mile of The Neutralization Basin, if any exist.*

Response. An inventory of water supply wells within a mile of the site is provided in the RCRA Corrective Action Program General Information Report for NAVSTA Mayport (ABB-ES, 1995b).

REFERENCES

ABB-ES. 1991. *Interim Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan, Volume I (Workplan), II (Sampling Plan), and III (Health and Safety Plan), U. S. Naval Station Mayport, Florida*. Prepared for Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina (October).

ABB-ES. 1994. *Draft RCRA Clean Closure Equivalency Demonstration Petition, Neutralization Basin, Solid Waste Management Unit 12, U.S. Naval Station, Mayport, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (May).

E.C. Jordan Company, Inc. 1988a. *Closure Plan Neutralization Basin at Building 1241, EPA ID No. FL9170024260, U.S. Naval Station, Mayport, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (December).

E.C. Jordan Company, Inc. 1988b. *Groundwater Monitoring Plan Neutralization Basin at Building 1241, EPA ID No. FL9170024260, U.S. Naval Station, Mayport, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (December).

E.C. Jordan Company, Inc. 1989. *Addendum A to the Closure Plan Neutralization Basin at Building 1241, EPA ID No. FL9170024260, U.S. Naval Station, Mayport, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (April).

Florida Department of Environmental Protection (FDEP). 1996. Memorandum from John M. Ruddell, Director, to District Directors, Waste Management Program Administrators. Subject: Applicability of Soil Cleanup Goals for Florida. Division of Waste Management. Tallahassee, Florida (January 19).

Franks, B.J. 1980. *The Surficial Aquifer at the U.S. Naval Station Near Mayport, Florida*. U.S. Geological Survey Open-File Report 80-765.

APPENDIX E

RESPONSE TO REGULATORY COMMENTS DATED JUNE 16, 1998

RESPONSE TO REGULATORY COMMENTS

Resource Conservation and Recovery Act
Clean Closure Equivalency Demonstration Petition
Neutralization Basin, Solid Waste Management Unit 12
U.S. Naval Station
Mayport, Florida

1.0 INTRODUCTION

Harding Lawson Associates, under the Navy's Comprehensive Long-term Environmental Action Navy (CLEAN) Contract, No. N62467-89-D-0317, has prepared a Clean Closure Equivalency Demonstration (CCED) petition for the Neutralization Basin (Solid Waste Management Unit [SWMU] 12) at U.S. Naval Station (NAVSTA) Mayport, Florida.

The purpose of this document is to respond to comments and provide additional information requested by the Florida Department of Environmental Protection (FDEP) concerning the final draft report entitled *Resource Conservation and Recovery Act (RCRA) Clean Closure Equivalency Demonstration, Neutralization Basin SWMU 12*, NAVSTA Mayport, Florida (ABB Environmental Services, Inc. [ABB-ES], 1998).

The following is correspondence received from the FDEP.

- June 16, 1998, Correspondence from Satish Kasturay, Administrator, Hazardous Waste Regulations, FDEP, to Ms. Cheryl Mitchell, Environmental Division, NAVSTA Mayport, Florida. Subject: Naval Station Mayport; FL9; 024 260; Closure Permit HF16-061098; Final Draft Resource Conservation and Recovery Act Clean Closure Equivalency Demonstration Petition dated February 1998.

Below is a point-by-point responses to FDEP's comments.

1.1 FDEP Comment Number 1 *Page III/1: It does not seem that this petition was submitted in accordance with the Hazardous and Solid Waste Amendment Act (HSWA) permit issued by EPA since the requirement for submitting this document is in accordance with the RCRA permit issued by the State.*

Response The paragraph will be modified to state that the petition incorporates information developed during an ongoing RCRA Corrective Action Program that is being conducted under the Station's HSWA permit.

1.2 FDEP Comment Number 2 *Page III/4: It is important to know that there were no reported leaks but the schedule of inspections and reporting requirements really need to be known to evaluate the significance of the statement. Such information would be very appropriate for this demonstration.*

Response The statement "During the brief period of operation, no leaks were reported by the Navy to have occurred from the Neutralization Basin structure" was based on anecdotal evidence. There are no available records corroborating this statement. The sentence will be deleted.

1.3 FDEP Comment Number 3 *Figure 1-2 does not show the actual southern border of the facility, nor is there anywhere a discussion of the actual size of NS Mayport.*

Response The installation encompasses 3,401 acres, of which approximately half (1,667 acres) is brackish marsh, sand spits beach (vegetated and nonvegetated, and dredge material uplands) Other land-use types on NAVSTA Mayport include regularly mowed lawns, roadsides, and a golf course (527 acres); irregularly mowed road and runway shoulders (420 acres); buildings and pavement (387 acres) and managed forest (285 acres). The station also has one 20-acre fresh water lake, Lake Wonderwood.

Figure 1-2 will be amended to include the Station's southern boundary.

1.4 FDEP Comment Number 4 *Page 1-12, paragraph 8: It would be appropriate to include the thickness of the liner if the information is available.*

Response The Navy measured the thickness of the liner with a micrometer. The liner is 0.04 inches thick.

1.5 FDEP Comment Number 5 *Page 2-7/6: This paragraph discusses pH values in the soil and provides an "average pH". Since pH is a logarithmic value, how was the "average pH" determined?*

Response The average is the arithmetic mean of the four results.

The aforementioned paragraph is a summary of the results from the slant boring program that was conducted on May 10 and 11, 1989 and submitted in a report dated June 8, 1989, entitled "Results of Closure Plan Implementation, Neutralization Basin U.S. Naval Station Mayport, Florida (E.C. Jordan Company, Inc., 1989). This report also contained the raw laboratory data for the results described in the CCED petition.

1.6 FDEP Comment Number 6 *Page 2-15, fourth bullet under section 2.2: Why were only selected target analytes from 40 CFR Part 264 Appendix IX run on the groundwater samples during the 1992 - 1994 sampling periods?*

Response The Neutralization Basin (SWMU 12) was listed as a site requiring an RCRA Facility Investigation (RFI) mandated under the authority of a HSWA permit. Analytical results from the RFI were used in the CCED to avoid redundancy and augment the CCED data with additional analytical results.

The RCRA Appendix IX groundwater monitoring list were stipulated by the Station's HSWA permit. Analytes from the USEPA Contract Laboratory Program (CLP) target analyte and target compound list were also analyzed because of the potential for NAVSTA Mayport to become listed under the Comprehensive Environmental Restoration Compensation and Liability Act.

1.7 FDEP Comment Number 7 *Table 2-9: Arsenic concentrations exceed the current residential cleanup levels which is 0.8 mg/kg. However, the upgradient concentration is location MPT-12-SS01 of 0.96 mg/kg (an estimated value) is very close to the concentration of the downgradient locations (1.0 mg/kg, 1.1 mg/kg and 1.3 mg/kg, also estimated values). Using 1.3 mg/kg as the maximum detected concentration, the navy calculated a human risk for arsenic at 1.6×10^{6} for a residential scenario, and a lower risk for an industrial setting. Clean closures for regulated units require a walk away, i.e. residential scenario based upon a human cancer risk of 1×10^{6} or less.*

The navy provided additional information via FAX on June 8, 1998 showing arsenic concentrations at various location on the site. Although the background locations was below detection limits for arsenic, the information does show that arsenic levels are pervasive throughout the site. This information is acceptable to demonstrate that arsenic is not associated with a release from the neutralization basin. Please include this information, as well as a map showing the sample locations, in the Final equivalency demonstration document.

Response A statistical summary of the concentrations of arsenic and beryllium detected in surface soil samples at sites investigated under the RCRA Corrective Action Program at NAVSTA Mayport is provided in Tables 1 and 2, respectively (Attachment A). The surface soil analytical results were compiled from the following reports.

- Resource Conservation and Recovery Act (RCRA) General Information Report for U.S. Naval Station Mayport Florida (ABB-ES, 1995a).
- RCRA Facility Investigation for Group I SWMUs (ABB-ES, 1996a).
- RCRA Facility Investigation for Group II SWMUs (ABB-ES, 1996b).
- RCRA Facility Investigation for Group III SWMUs (ABB-ES, 1996c).
- RCRA Facility Assessment Sampling Visit Report for Group I and II SWMUS (ABB-ES, 1995b).
- RCRA Facility Assessment Sampling Visit Report for Group III SWMUS (ABB-ES, 1997)
- Surface and subsurface soil sampling and analytical results for the Aircraft Display Area (ABB-ES, 1996d).
- Surface soil sampling and analytical results for the Original Pesticide Handling Area (ABB-ES, 1996e).

Attachment B contains figures from the above reports that illustrate the sampling locations.

The statistical summary includes the frequency of detection, the minimum and maximum detected concentrations, the arithmetic mean, the variance (population), the standard deviation (population), and the distribution of samples within standard deviations intervals. The standard deviation intervals are -2 to 4 for arsenic and -3 to 4 for beryllium. The overall trend of standard deviations for the sites is shown by the total at the bottom of the standard deviation from the mean column. The sites are ranked in Tables 1 and 2 in order of increasing variance.

The background surface soil samples (ABB-ES, 1995a) are shown on the first row of each table. Arsenic was not detected in the background surface soil samples. Beryllium was detected in 2 of the 6 background surface soil samples, therefore, the frequency of occurrence is insufficient to calculate the variance and standard deviation. The comparison of the surface soil sample analytical results for background and SWMU specific samples suggest that the background sampling locations do not reflect any relict concentrations of arsenic and beryllium that may have been present when the dredge material was placed and that the locations represent minimal anthropogenic influence. The background sampling locations therefore could be considered a conservative screening criteria.

A statistical summary of sediment sample data from SWMU 50, the Dredge Material Holding Area is also included in the tables. The SWMU 50 sediment sample data was included with the data set because it represents materials (sand, silt and clay) dredged from Mayport Turning Basin that were used to construct the landmass at NAVSTA Mayport (See Figure 1-4 in the NAVSTA Mayport General Information Report (GIR) (ABB-ES, 1995b). It is assumed that the analytical results from the SWMU 50 sediment samples are representative of the chemical concentrations for the materials used to construct the NAVSTA Mayport landmass.

The distribution of standard deviations suggest that arsenic and beryllium have a bimodal distribution in the SWMU 50 sediment samples. It is not known if this bimodal distribution is a function of particle size distribution (i.e., percentage of sand silt and clay). The distribution of standard deviations for the other samples in Tables 1 and 2 suggest a skewed distribution with most of the samples occurring in the interval between the mean and one standard deviation less than the mean. Also, there is some uncertainty associated with the analytical methods detection limit. It is possible that the analytical methods detection limit precludes detecting the lowest concentrations of the chemicals and the data could have a "bell shaped" normal distribution.

The largest variance for the arsenic analytical results was for the SWMU 50 sediment samples. The largest variance for the beryllium analytical results was for SWMU 24.

Three interpretations of the data presented in Tables 1 and 2 are possible including:

(1) the chemical concentrations are a result of industrial activities,

(2) the chemical concentrations may be a relic from the dredge material, or

(3) the chemical concentrations may be a combination of industrial activities and a relic from the dredge material.

Below is a discussion of the three interpretations.

Industrial Activities. Two of the sites that were reported by the Navy to have been used for pesticide handling, SWMU 15 and the Original Pesticide Handling Area, have larger variances for arsenic than beryllium. Arsenic is used in formulations for both pesticides and herbicides (Table 1). Beryllium is used in an alloy with copper in springs, electrical contacts, spot-welding electrodes and nonsparking tools. SWMUs 1 and 23, and SWMU 24 where shipyard repair activities are conducted had the highest variances for beryllium (Table 2).

SWMUs 14 and 18, SWMU 28, SWMU 5, and SWMUs 1 and 23, have measurements (outliers) that exceed 4 standard deviations from the mean for arsenic (Table 1) and SWMU 28 and SWMUs 1 and 23, have outliers for beryllium (Table 2). The outlier is based on the Empirical Rule for a normal distribution that predicts the mean ± 3 standard deviations would include all measurements (Mendenhall, 1975). An uncertainty associated with this observation is that the data set is skewed and the Empirical Rule may not accurately describe the measurements.

Dredge Material. The basis for the interpretation that the chemical concentrations are a relic from the dredge material is the assumption that SWMU 50 sediment is representative of materials used to construct the NAVSTA Mayport landmass. This is suggested by the background data, SWMU 2, SWMU 28, and SWMU 48. The background data represents areas at NAVSTA Mayport where industrial activities have not occurred and the inorganic chemicals have been leached out over time.

The other sites, SWMUs 2, 28 and 48 represent industrial use sites that have been paved for a substantial amount of time. The pavement would prevent infiltration of precipitation and therefore limit the amount of leaching that could occur and also prevent the introduction of inorganic chemicals to the subsurface. An uncertainty associated with this interpretation is as the pavement becomes distressed (cracked) inorganic chemicals could be introduced from industrial activities and/or some leaching of chemicals present could occur.

Combination of Industrial Activities and Dredge Material. The landfill SWMUs 3, 4 and 5 represent influences from a mixture of industrial activities and dredge material. SWMU 3 has the lowest variance for the three sites. SWMU 3 is a wooded area that has not been used for industrial activities since landfill activities ceased in 1965. Next in the ranking of variance for the three landfill sites is SWMU 4, landfill activities at SWMU 4 ceased in 1980. Part of SWMU 4 is used as a laydown yard by contractors at NAVSTA Mayport and the other part is an overgrown field with numerous mounds left from landfill activities. SWMU 5 has the highest variance for the three landfill sites, landfilling activities at SWMU 5 ceased in 1985. SWMU 5 is currently used by Navy personnel to store vehicles. Most of SWMU 5 is heavily vegetated and has wetland areas that are affected by overland flow from recent dredging activities. The distribution of standard deviations for SWMU 3 appears to be skewed and for SWMUs 4 and 5 is relatively symmetrical (even distributions for ± 1 standard deviations from the mean). This could be a relict of the distribution of standard deviations observed for SWMU 50.

These three landfill sites are examples of areas where the chemical concentrations are likely from the combined effect of the mixing of landfill material, dredge material, and industrial activities. The industrial activities are minimal at SWMU 3 to moderate at SWMUs 4 and 5 since use of these sites as landfills.

The statistical summaries presented in Tables 1 and 2 support a conclusion that industrial activities have contributed inorganic chemicals to the environment (surface soil) at some of the SWMUs. Based on the ranking of variance for arsenic and beryllium, sites with a high industrial use have a greater potential for inorganic chemicals to be attributed to the industrial activities.

Because arsenic was not detected in the background surface soil samples and beryllium was not detected at a frequency sufficient to conduct a statistical evaluation, a statistical comparison can not be made between background samples and SWMU specific samples. However, site cultural features (i.e., pavement) may limit the leaching of inorganic chemicals. Therefore it is possible that inorganics could be present at residual concentrations that can not be differentiated from industrial activities. A relationship between leaching and relict concentrations may also be illustrated by the variance and standard deviations for landfill SWMUs 3, 4 and 5.

The data in Tables 1 and 2 also suggest that the background surface soil samples were collected at locations where minimal industrial activities have occurred and leaching of inorganic chemicals has occurred, therefore, the background data is conservative. The conservative background surface soil data may result in overstating risk to human and ecological receptors because anthropogenic concentrations of inorganic chemicals are not being eliminated during the screening of human health and ecological chemicals of potential concern.

1.8 FDEP Comment Number 8 *Table 2-9: pH values are missing from the raw data for the November 1995 sampling event.*

Response The results are provided in Attachment C.

1.9 FDEP Comment Number 9 *Table 2-14: The raw data sheet is missing for monitor well MPT-11-MW-1 for the January 27, 1993 sampling event.*

Response The sample identifier is MPT-11-1 (Please refer to Table 2-15). The raw data sheets were provided in Appendix C. The sample was collected on January 27, 1993, and sent to the CH2MHill Gainesville, Florida. Aliquots for Methods 8010 and metals were analyzed by CH2MHill at their Gainesville, Florida laboratory, and Methods 8240, 8270, and 8080 were analyzed by their Montgomery, Alabama laboratory. The date received on the Form 1 is January 29, 1993 for the Gainsville laboratory and February 4, 1993 for the Montgomery laboratory.

Organic analytes were not detected in the sample, therefore, this sample was not included on Table 2-14.

1.10 FDEP Comment Number 10 *This section is extremely difficult to understand. Firstly, the raw data sheets from the work performed by CH2MHill are marked up with hand-written notes and no explanation as to what the notes mean. Secondly, the raw data for pH are missing from the January 1993 groundwater sampling event and the 1995 soil sampling event. Thirdly, chains-of-custody are missing from the 1994 and 1995 sampling events.*

Response The notes on the margins of the raw data sheets correspond to the validators review in accordance with:

- Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (USEPA, 1988).
- National Functional Guidelines for Organic Data Review (USEPA, 1990).

The notes correspond to the numerical heading for the analytes specific finding in the Data Assessment and Narrative that precede the Form 1.

The pH results for the 1993 groundwater sampling event (field measurements) are provided in Attachment D.

The pH results for the 1995 soil sampling event is provided in Attachment C.

Chain-of-custody sheets for the 1993, 1994 and 1995 sampling events are provided in Attachment E.

Attachment A
Tables

Table 1
Statistical Evaluation of Arsenic Detected in Surface Soil Samples

Response to FDEP and USEPA Comments
U.S. Naval Station
Mayport, Florida

Site	Frequency	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	VarP.	Std. DevP.	Standard Deviations From the Mean					
							-2	-1	1	2	3	4
[1]Background	0/4	--	--	nc	nc	nc	nc	nc	nc	nc	nc	nc
[2]SWMU 22	0/4	--	--	nc	nc	nc	nc	nc	nc	nc	nc	nc
[3]ACDA	2/2	1.5	2.5	2	nc	nc	nc	nc	nc	nc	nc	nc
[4]SWMU 12	4/4	0.96	1.3	1.1	0.01	0.1	0	2	0	1	0	0
[1]SWMU 13	3/3	0.33	0.69	0.48	0.02	0.2	0	2	0	1	0	0
[5]SWMU 48	5/5	0.23	0.7	0.41	0.03	0.2	1	2	1	1	0	0
[1]SWMU 3	3/3	0.27	0.77	0.51	0.04	0.2	1	1	0	1	0	0
[6]SWMU 56	8/8	0.62	1.2	0.93	0.04	0.2	2	1	3	2	0	0
[1]SWMU 2	4/4	0.75	1.3	0.99	0.04	0.2	1	2	0	1	0	0
[6]SWMU 25	9/9	0.53	1.3	0.8	0.05	0.2	3	3	3	0	1	0
[6]SWMU 19	5/5	0.74	1.2	0.07	0.08	0.3	1	2	1	1	0	0
[6]SWMU 17	14/15	0.33	1.8	0.76	0.1	0.4	3	5	5	0	1	0
[6]SWMU 26	4/4	0.63	1.6	0.96	0.2	0.4	0	2	0	1	0	0
[6]SWMUs 44 and 45	19/19	0.28	2	1.02	0.2	0.4	1	11	3	3	1	0
[6]SWMUs 14 and 18	30/33	0.36	2.2	0.78	0.2	0.4	2	17	5	4	0	1
[6]SWMU 28	35/35	0.49	3.2	0.97	0.2	0.5	0	21	10	3	0	1
[1]SWMUs 20 and 21	8/8	0.3	2.2	0.92	0.3	0.6	2	2	3	0	1	0
[2]SWMU 4	12/12	0.62	2.6	1.23	0.4	0.6	1	8	2	1	1	0
[6]SWMU 24	4/7	0.69	2.75	1.8	0.5	0.7	1	1	1	1	0	0
[1]OPHA	6/6	0.27	2.67	1.09	0.7	0.8	1	3	1	1	0	0
[4]SWMU 15	8/8	1.2	5	2.4	1.6	1.3	0	4	3	0	1	0
[2]SWMU 5	18/21	0.36	6.9	1.92	2	1.5	1	11	4	1	0	1
[6]SWMUs 1 and 23	37/38	0.02	13.9	2.1	7.2	2.7	0	27	5	2	1	1
[6]SWMU 50	18/18	0.6	16.4	7.2	42	6.47	4	7	2	5	0	0
						Total	25	134	52	30	7	4

See notes on following page.

Table 1 (Continued)
Statistical Evaluation of Arsenic Detected in Surface Soil Samples

Response to FDEP and USEPA Comments
U.S. Naval Station
Mayport, Florida

[1] Resource Conservation and Recovery Act (RCRA) General Information Report for U.S. Naval Station Mayport Florida (ABB-ES, 1995a).
[2] RCRA Facility Investigation for Group I SWMUs (ABB-ES, 1996a).
[3] Surface and subsurface soil sampling and analytical results for the Aircraft Display Area (ABB-ES, 1996d).
[4] RCRA Facility Investigation for Group II SWMUs (ABB-ES, 1996b).
[5] RCRA Facility Assessment Sampling Visit Report for Group I and II SWMUS (ABB-ES, 1995b).
[6] RCRA Facility Investigation for Group III SWMUs (ABB-ES, 1996c).
[7] RCRA Facility Assessment Sampling Visit Report for Group III SWMUS (ABB-ES, 1997)
[8] Surface soil sampling and analytical results for the Original Pesticide Handling Area (ABB-ES, 1996e).

Notes: FDEP = Florida Department of Environmental Protection.
USEPA = United States Environmental Protection Agency.
SWMU = solid waste management unit.
ACDA = Aircraft Display Area.
OPHA = Original Pesticide Handling Area.
Frequency = Frequency of detection is the number of samples in which the analyte was detected, divided by the total number of samples analyzed (excluding rejected samples).
Min. = Minimum concentration detected.
mg/kg = milligrams kilogram (mg/kg).
Max. = Maximum concentration detected.
Mean = Arithmetic mean of detected concentrations (mg/kg); including the average of a sample and a duplicate and not including samples in which the analyte was not detected.
VarP. = Average of the square of the deviations of the measurements for the sample population.
Std. DevP. = Positive square root of the variance for the sample population.
-- = Concentration of analyte, if present, was less than the detection limit.
nc = Calculation not conducted, because of nondetection or insufficient sample size for a site.

Table 2
Statistical Evaluation of Beryllium Detected in Surface Soil Samples

Response to FDEP and USEPA Comments
U.S. Naval Station
Mayport, Florida

Site	Frequency	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	VarP.	Std. DevP.	Standard Deviations From the Mean						
							-3	-2	-1	1	2	3	4
[1]Background	2/6	0.06	0.09	0.08	nc	nc	nc	nc	nc	nc	nc	nc	nc
[2]OPHA	0/6	–	–	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
[3]SWMU 13	0/3	–	–	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
[4]SWMU 48	0/5	–	–	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
[5]ACDA	1/2	0.24	0.24	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
[5]SWMU 12	4/4	0.05	0.08	0.06	0.0001	0.01	0	1	2	0	0	0	0
[5]SWMU 3	3/3	0.08	0.1	0.09	0.0001	0.01	0	0	1	0	2	0	0
[5]SWMUs 20 and 21	6/8	0.06	0.11	0.09	0.0003	0.02	0	2	1	3	0	0	0
[6]SWMU 15	8/8	0.07	0.17	0.12	0.001	0.03	0	1	4	1	2	0	0
[4]SWMU 56	4/8	0.11	0.19	0.14	0.001	0.03	0	1	2	0	1	0	0
[3]SWMU 2	4/4	0.11	0.21	0.15	0.001	0.04	0	1	2	0	1	0	0
[6]SWMUs 44 and 45	19/19	0.06	0.24	0.11	0.002	0.05	0	1	13	2	2	1	0
[5]SWMU 17	10/15	0.04	0.17	0.1	0.003	0.05	0	3	2	3	2	0	0
[6]SWMUs 14 and 18	32/33	0.05	0.27	0.11	0.004	0.06	0	2	21	4	3	2	0
[5]SWMU 22	3/4	0.08	0.27	0.15	0.008	0.09	0	0	2	0	1	0	0
[3]SWMU 4	9/12	0.08	0.35	0.18	0.01	0.08	0	2	3	3	1	1	0
[4]SWMU 19	4/5	0.07	0.26	0.16	0.01	0.09	0	1	1	1	1	0	0
[4]SWMU 26	4/4	0.11	0.33	0.17	0.01	0.1	0	0	2	0	1	0	0
[5]SWMU 25	8/9	0.09	0.3	0.16	0.01	0.1	0	1	4	1	1	1	0
[3]SWMU 5	8/21	0.07	0.54	0.23	0.02	0.14	0	1	3	3	0	1	0
[4]SWMU 28	29/35	0.05	0.2	0.1	0.02	0.15	0	0	24	3	0	1	1
[4]SWMU 50	9/18	0.59	1.6	1.3	0.1	0.31	1	1	0	6	1	0	0
[6]SWMUs 1 and 23	37/38	0.05	1.9	0.25	0.1	0.33	0	0	29	5	3	0	1
[5]SWMU 24	7/9	0.06	1.25	0.33	0.2	0.4	0	0	5	1	0	1	0
						Total	1	18	121	36	22	8	2

See notes on following page.

Table 2 (Continued)
Statistical Evaluation of Beryllium Detected in Surface Soil Samples

Response to FDEP and USEPA Comments
U.S. Naval Station
Mayport, Florida

[1] Resource Conservation and Recovery Act (RCRA) General Information Report for U.S. Naval Station Mayport Florida (ABB-ES, 1995a).
[2] RCRA Facility Investigation for Group I SWMUs (ABB-ES, 1996a).
[3] Surface and subsurface soil sampling and analytical results for the Aircraft Display Area (ABB-ES, 1996d).
[4] RCRA Facility Investigation for Group II SWMUs (ABB-ES, 1996b).
[5] RCRA Facility Assessment Sampling Visit Report for Group I and II SWMUS (ABB-ES, 1995b).
[6] RCRA Facility Investigation for Group III SWMUs (ABB-ES, 1996c).
[7] RCRA Facility Assessment Sampling Visit Report for Group III SWMUS (ABB-ES, 1997)
[8] Surface soil sampling and analytical results for the Original Pesticide Handling Area (ABB-ES, 1996e).

Notes: FDEP = Florida Department of Environmental Protection.
USEPA = United States Environmental Protection Agency.
SWMU = solid waste management unit.
ACDA = Aircraft Display Area.
OPHA = Original Pesticide Handling Area.
Frequency = Frequency of detection is the number of samples in which the analyte was detected, divided by the total number of samples analyzed (excluding rejected samples).
Minimum = Minimum concentration detected.
mg/kg = milligram per kilogram [mg/kg]].
Maximum = Maximum concentration detected.
Mean = Arithmetic mean of detected concentrations (mg/kg); including the average of a sample and a duplicate and not including samples in which the analyte was not detected.
VarP. = Average of the square of the deviations of the measurements for the sample population.
Std. DevP. = Positive square root of the variance for the sample population.
-- = Concentration of analyte, if present, was less than the detection limit.
nc = Calculation not conducted, because of nondetection or insufficient sample size for a site.

Attachment B
Figures

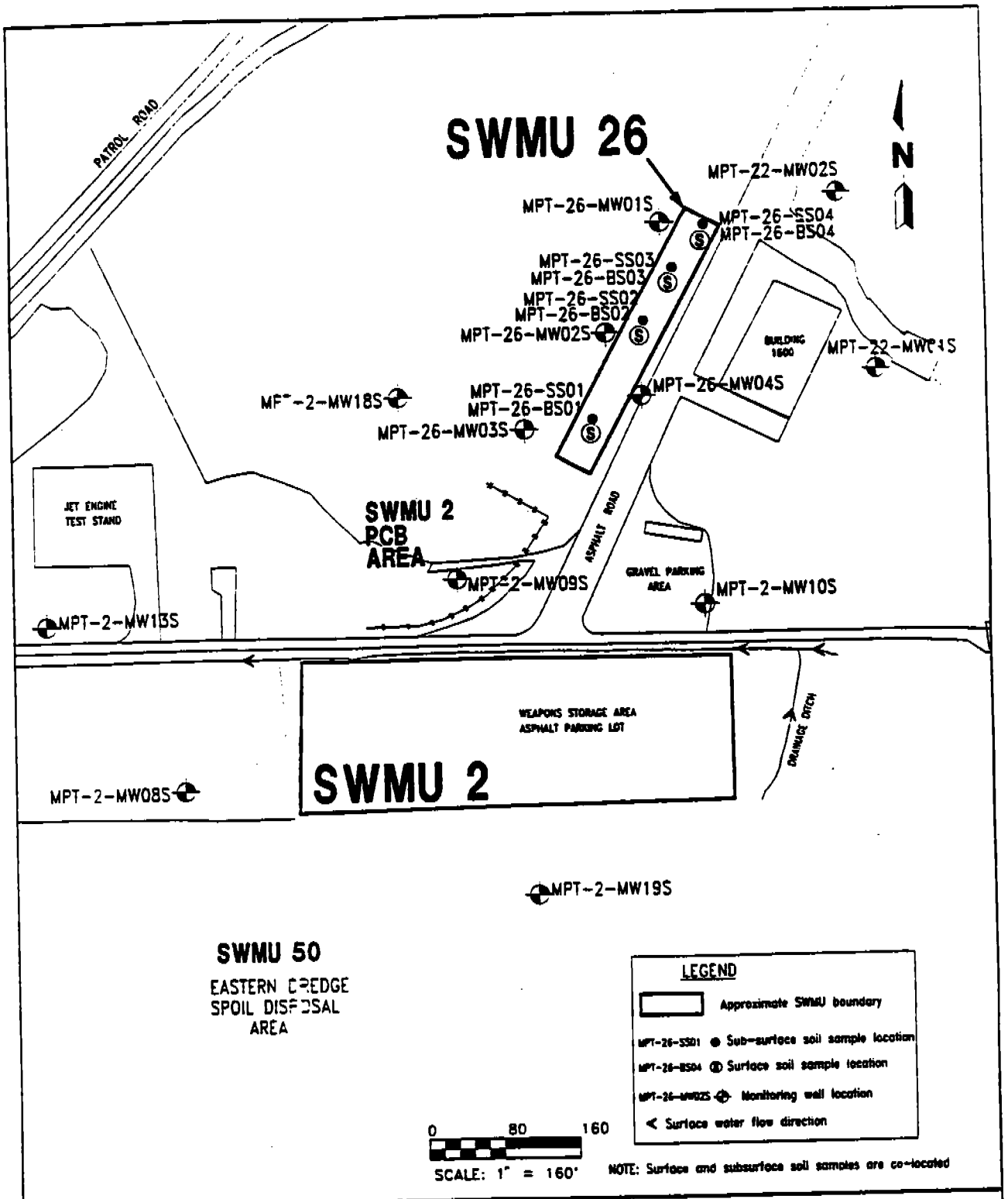

FIGURE 2-1
SAMPLING LOCATIONS AT SWMU 26, LANDFILL C

RCRA FACILITY ASSESSMENT REPORT, GROUP I AND II SWMUs

U.S. NAVAL STATION MAYPORT, FLORIDA

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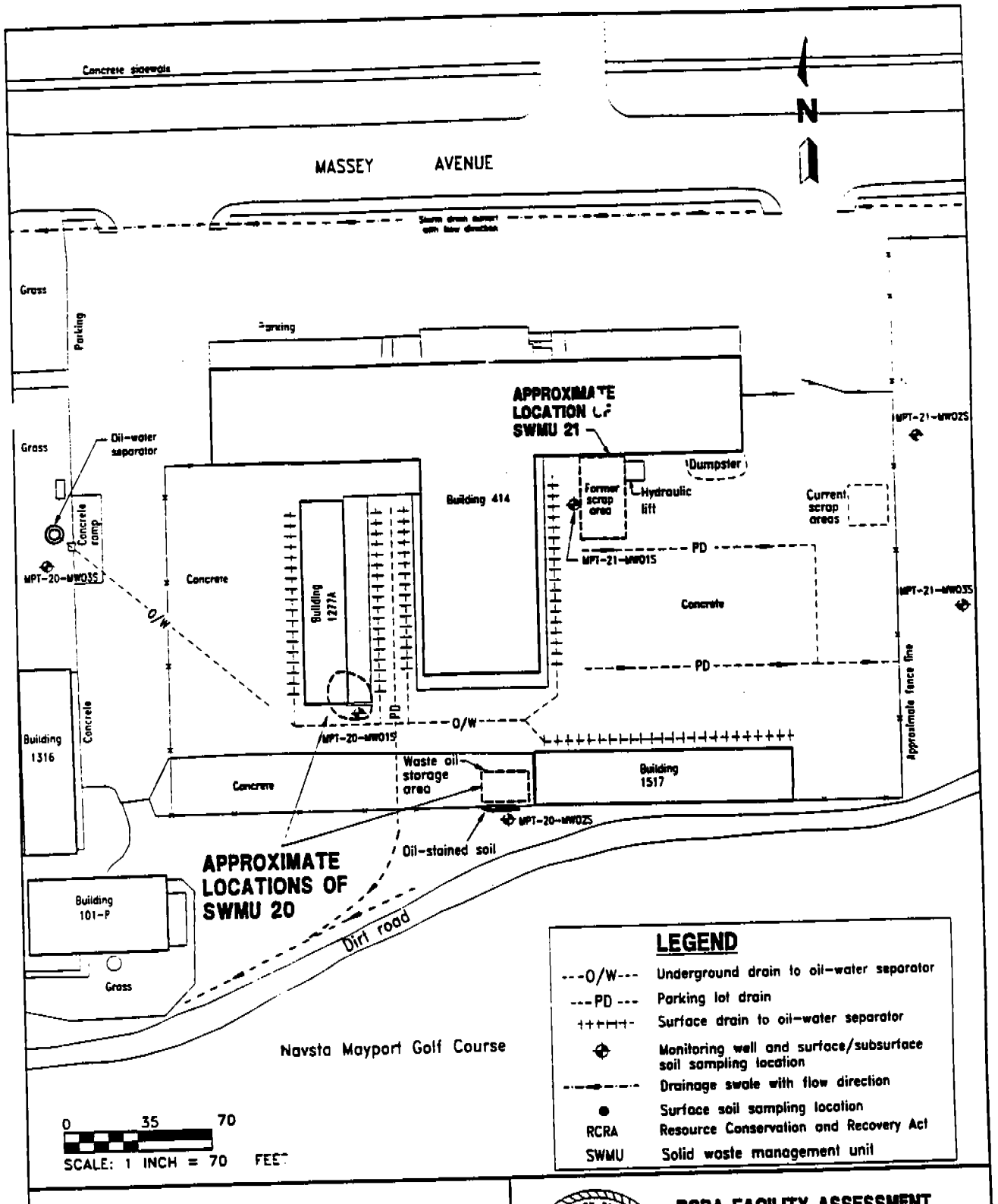


FIGURE 2-2
SOIL AND GROUNDWATER SAMPLING LOCATIONS AT SWMUs 20 AND 21

SWMU201.DWG, NAB-NAB 07/30/97 09:37:55 AutoCAD R12

RCRA FACILITY ASSESSMENT SAMPLING VISIT REPORT, GROUP III SWMUs

U.S. NAVAL STATION MAYPORT, FLORIDA

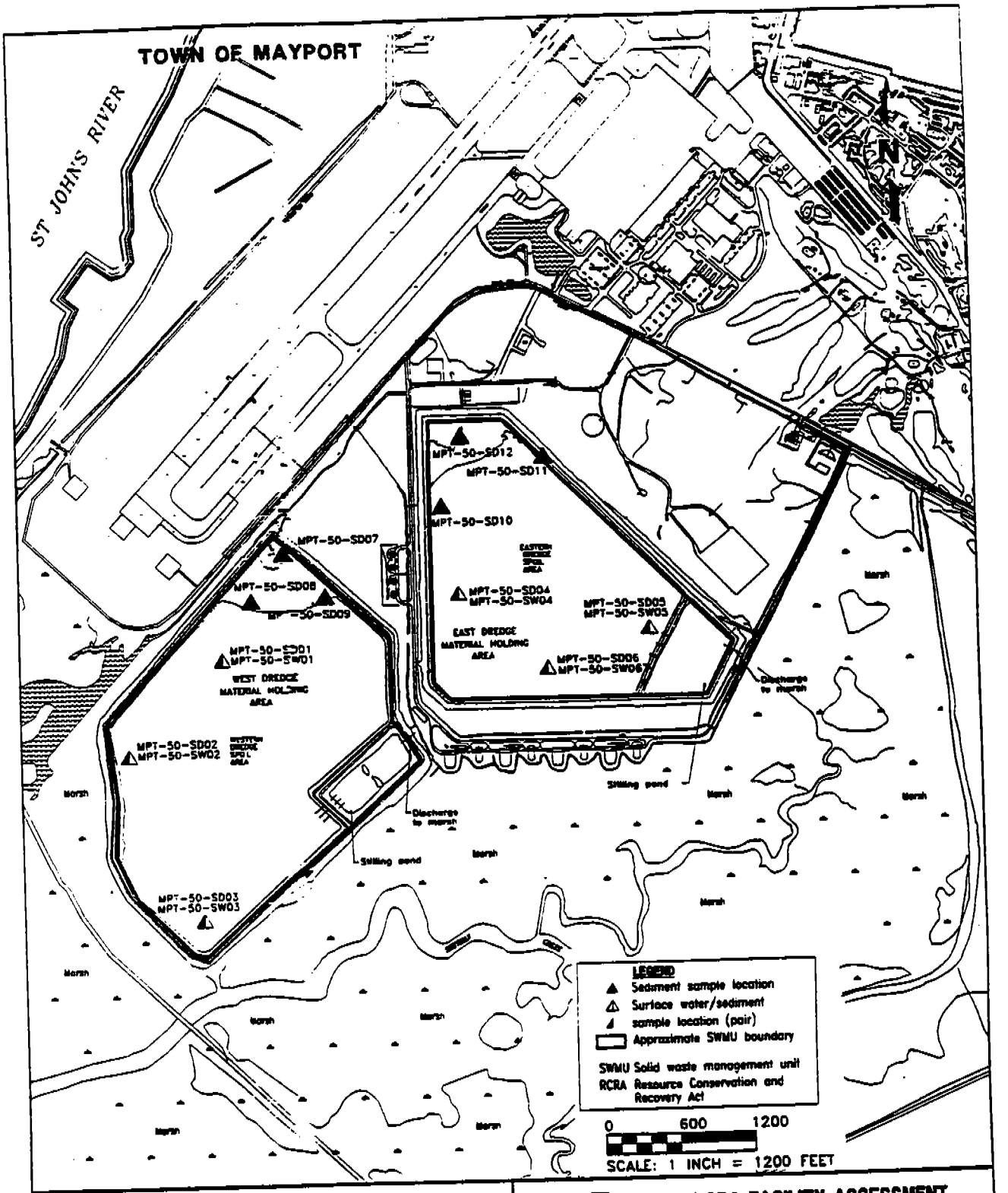


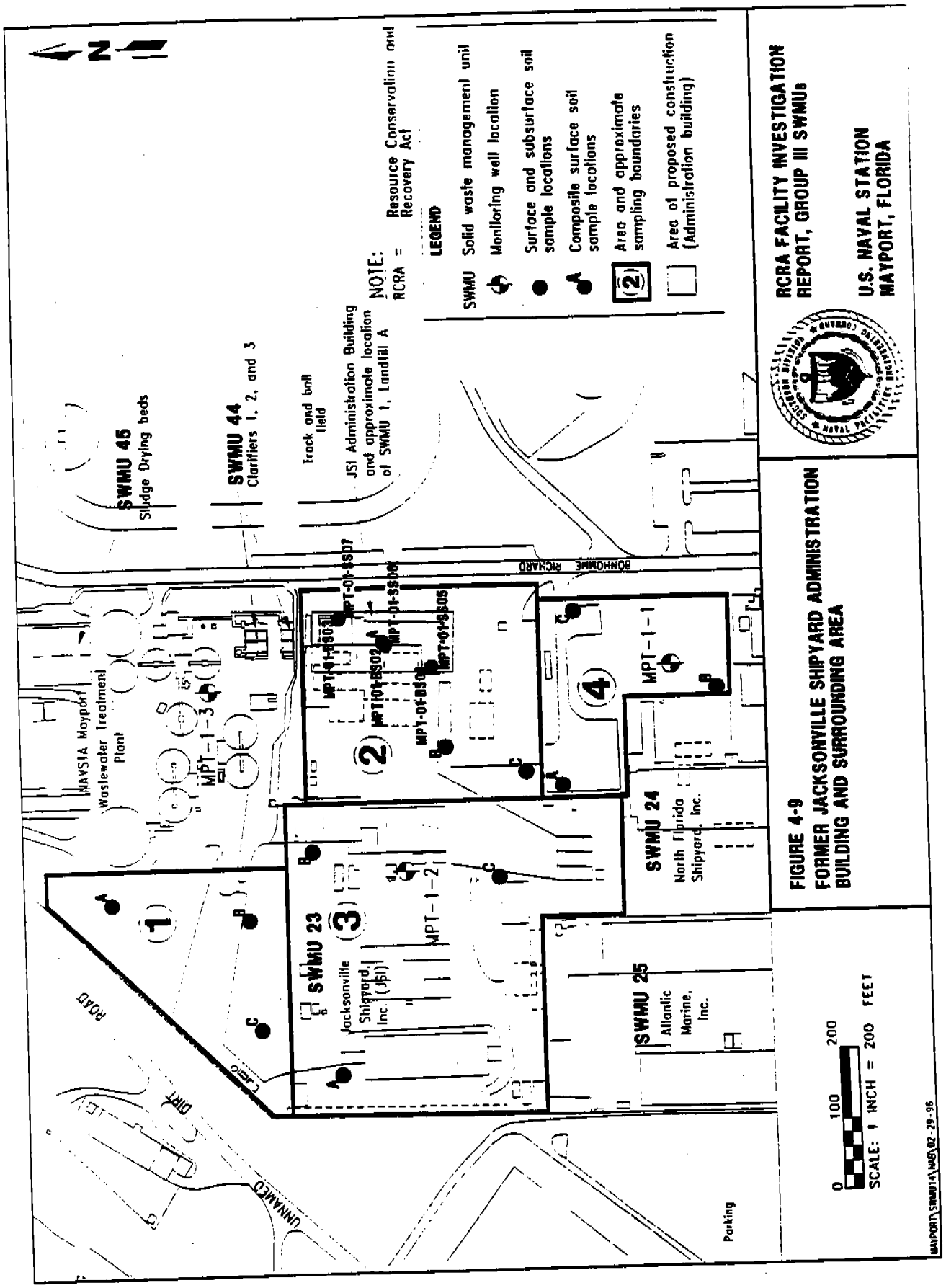
FIGURE 4-1

1992 SEDIMENT AND SURFACE WATER SAMPLING LOCATIONS AT SWMU 50, EASTERN AND WESTERN DREDGE SPOIL DISPOSAL AREA

H:\9500\000300\GLC-NAB-JC\11-28-95

RCRA FACILITY ASSESSMENT REPORT, GROUP I AND II SWMUs

U.S. NAVAL STATION MAYPORT, FLORIDA


N
SWMU 45
Sludge Drying beds
SWMU 44
Clarifiers 1, 2, and 3
Track and ball field
JSI Administration Building and approximate location of SWMU 1, Landfill A
NOTE:
RCRA = Resource Conservation and Recovery Act
LEGEND
SWMU Solid waste management unit
Monitoring well location
Surface and subsurface soil sample locations
Composite surface soil sample locations
Area and approximate sampling boundaries
Area of proposed construction (Administration building)
RCRA FACILITY INVESTIGATION
REPORT, GROUP III SWMUs
U.S. NAVAL STATION
MAYPORT, FLORIDA
FIGURE 4-9
FORMER JACKSONVILLE SHIPYARD ADMINISTRATION
BUILDING AND SURROUNDING AREA
SCALE: 1 INCH = 200 FEET
0 100 200
MAYPORT\SWMU14\MAP\02-29-96
MAYSTA Mayport Wastewater Treatment Plant
MPT-1-3
MPT-01-BS01
MPT-01-BS02
MPT-01-BS03
MPT-01-BS04
MPT-01-BS05
MPT-01-BS06
MPT-01-BS07
BONHOMME RICHARD
MPT-1-1
SWMU 24
North Florida Shipyard, Inc.
MPT-1-2
SWMU 23
Jacksonville Shipyard, Inc. (JSI)
SWMU 25
Atlantic Marine, Inc.
ROAD
DIRT
PAVED
UNNAMED
Parking

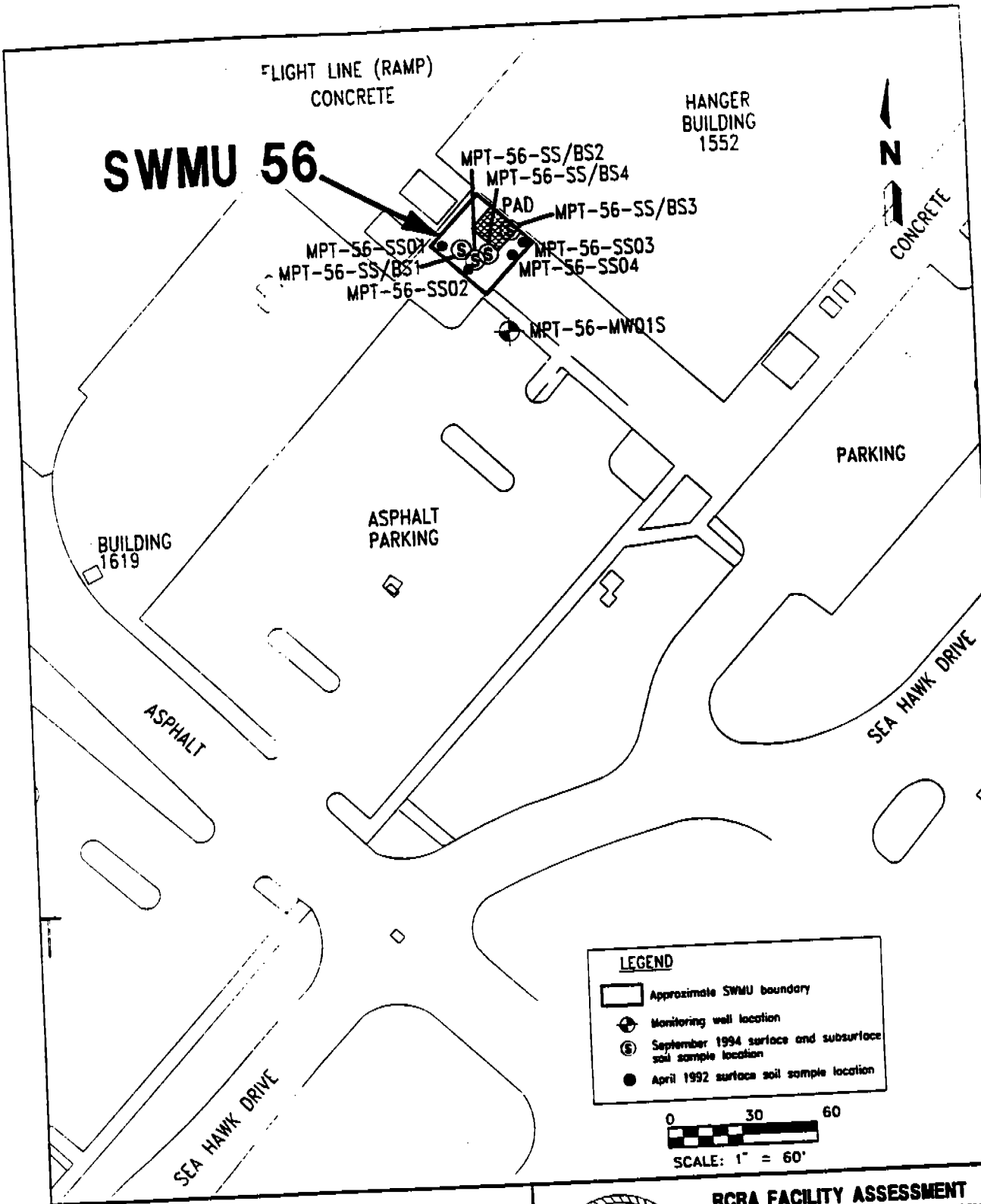


FIGURE 5-1
1992 AND 1994 SAMPLING LOCATIONS AT SWMU 56, BUILDING 1552 ACCUMULATION AREA

RCRA FACILITY ASSESSMENT REPORT, GROUP I AND II SWMUs

U.S. NAVAL STATION MAYPORT, FLORIDA

H:\9500\000300\GLC\4-5-95

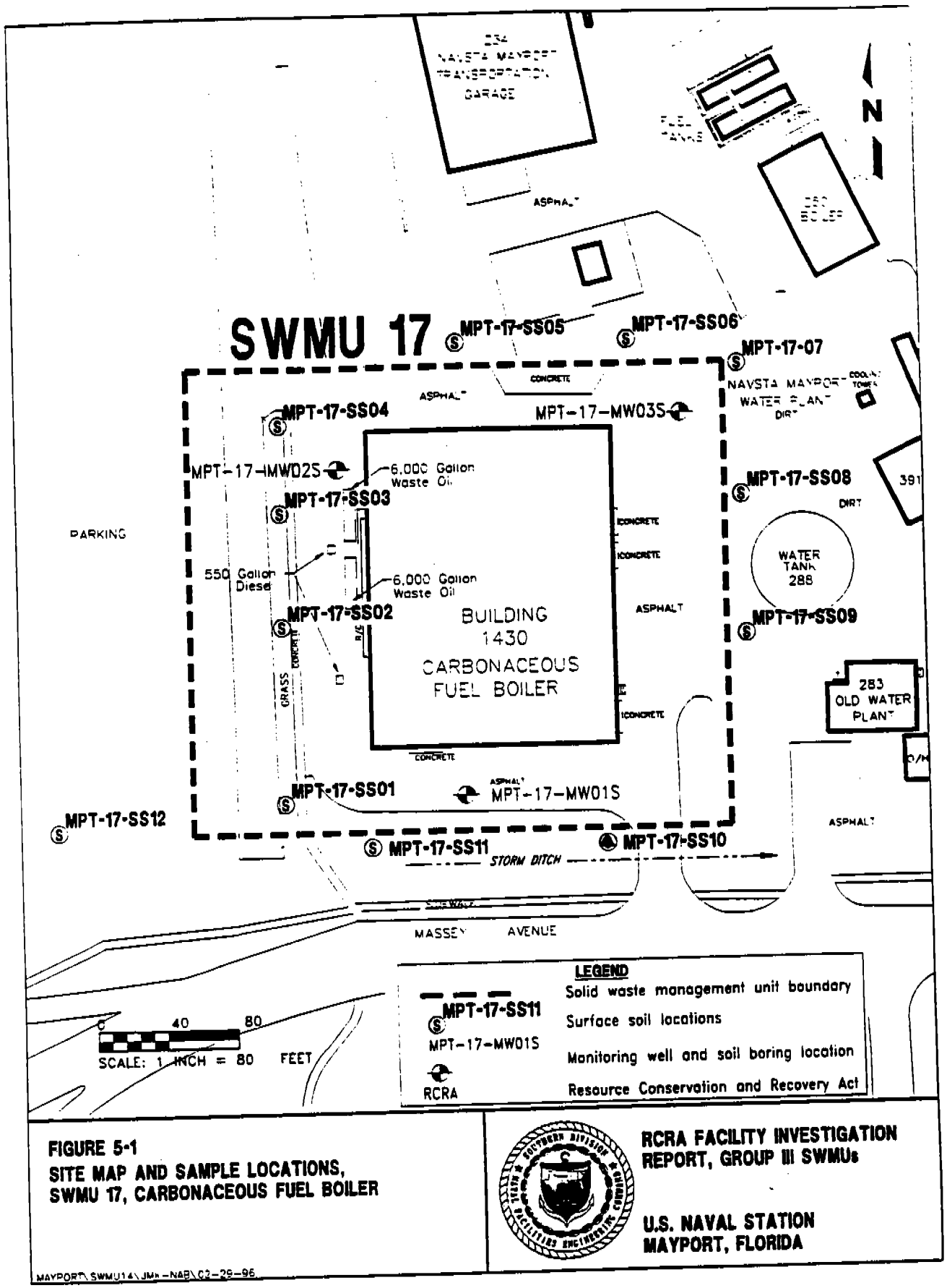


FIGURE 5-1
SITE MAP AND SAMPLE LOCATIONS, SWMU 17, CARBONACEOUS FUEL BOILER

RCRA FACILITY INVESTIGATION REPORT, GROUP III SWMUs

U.S. NAVAL STATION MAYPORT, FLORIDA

MAYPORT\SWMU14\JMH-NAB\02-29-96

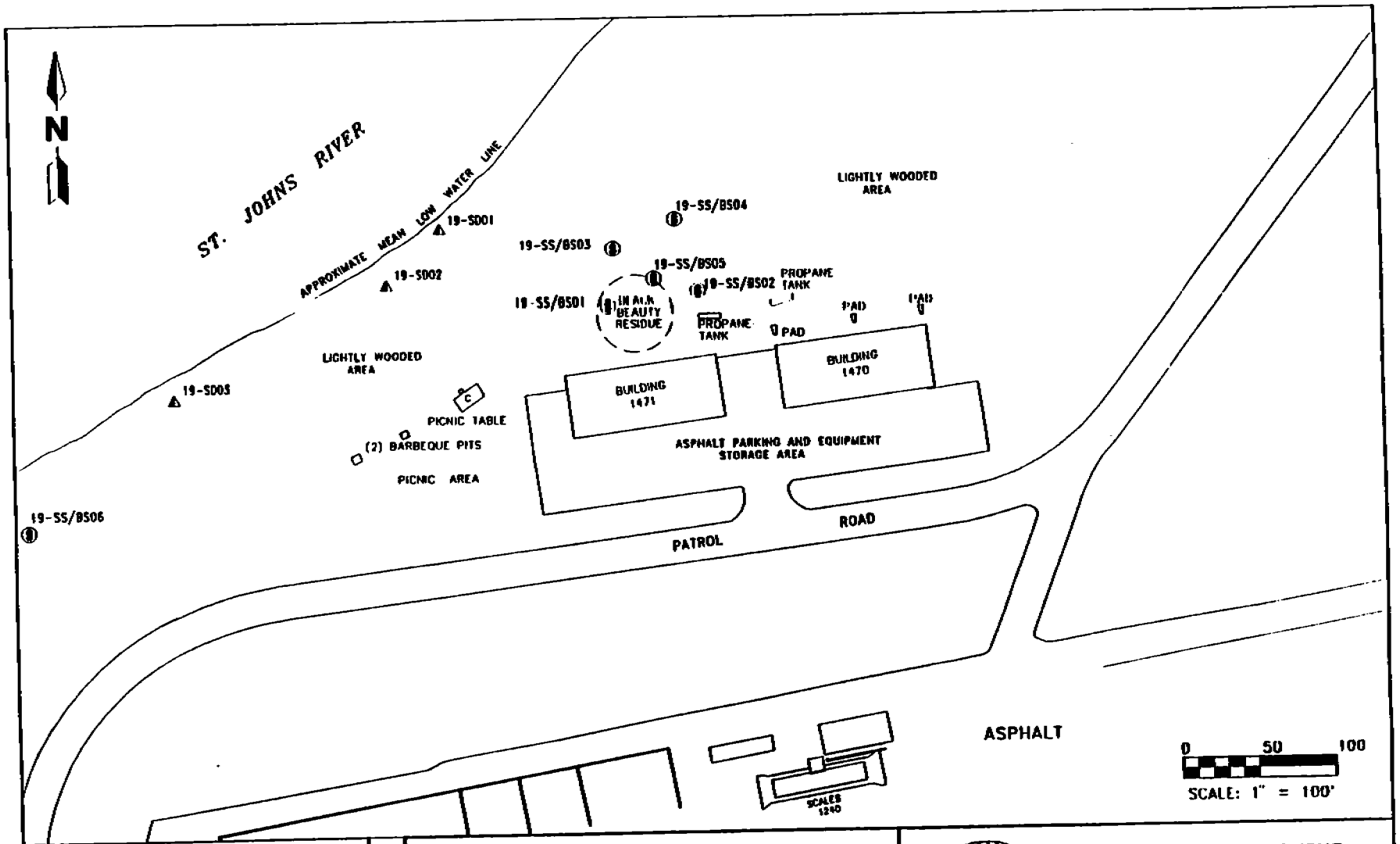


FIGURE 6-2
1994 SOIL AND SEDIMENT SAMPLING LOCATIONS
SWMU 19, NADEP BLASTING AREA

RCRA FACILITY ASSESMENT REPORT, GROUP I AND II SWMUs

U.S. NAVAL STATION MAYPORT, FLORIDA

001000/WJ-GLC/1-5-95

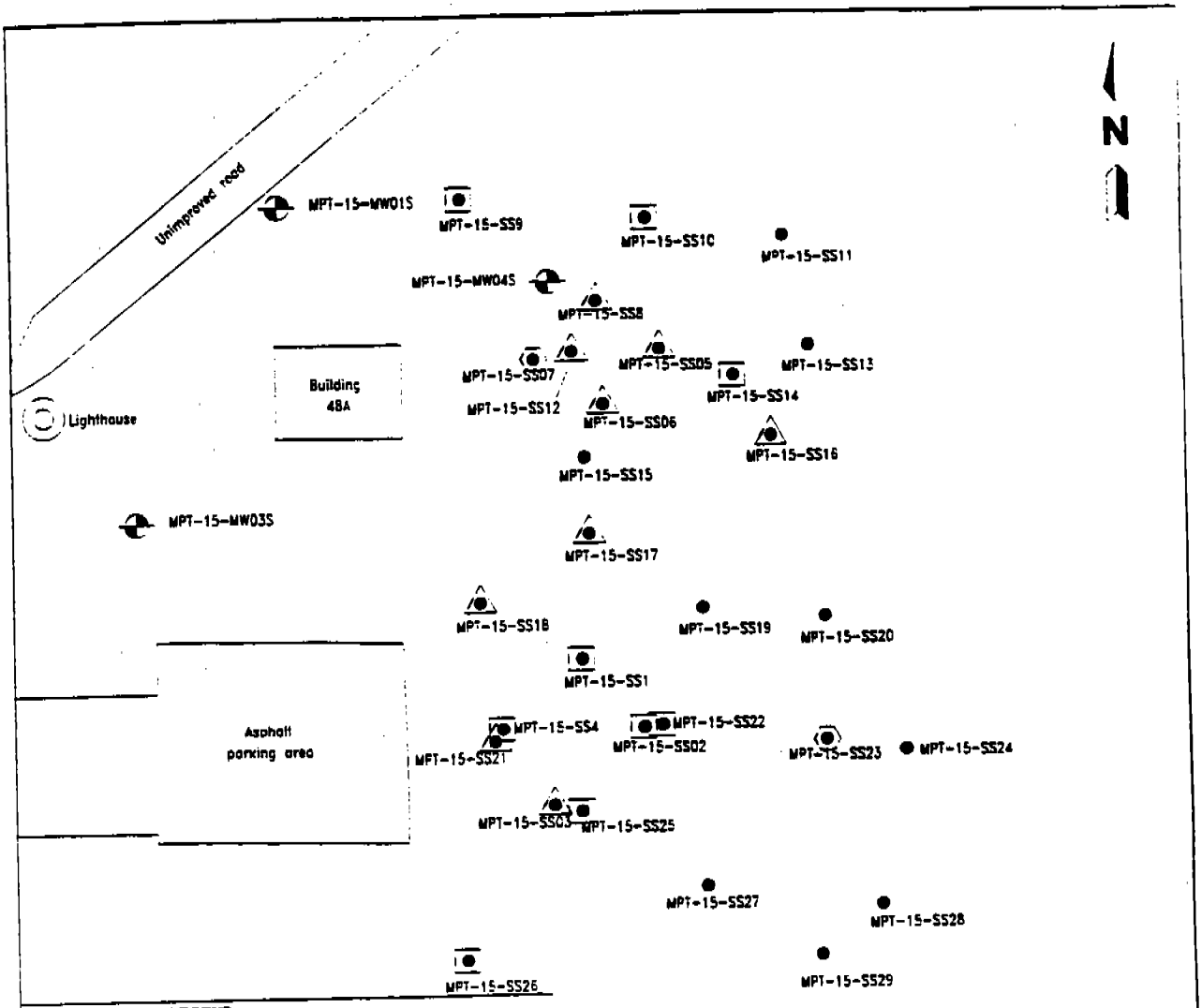


FIGURE 6-3

TOTAL 4,4-DDT AND 4,4-DDE CONCENTRATIONS DETECTED IN SURFACE SOIL SAMPLES AT SOLID WASTE MANAGEMENT UNIT (SWMU) 15

H:\9500\000400\GLC-JC\11-16-95

RCRA FACILITY INVESTIGATION REPORT, GROUP II SWMUs

U.S. NAVAL STATION MAYPORT, FLORIDA

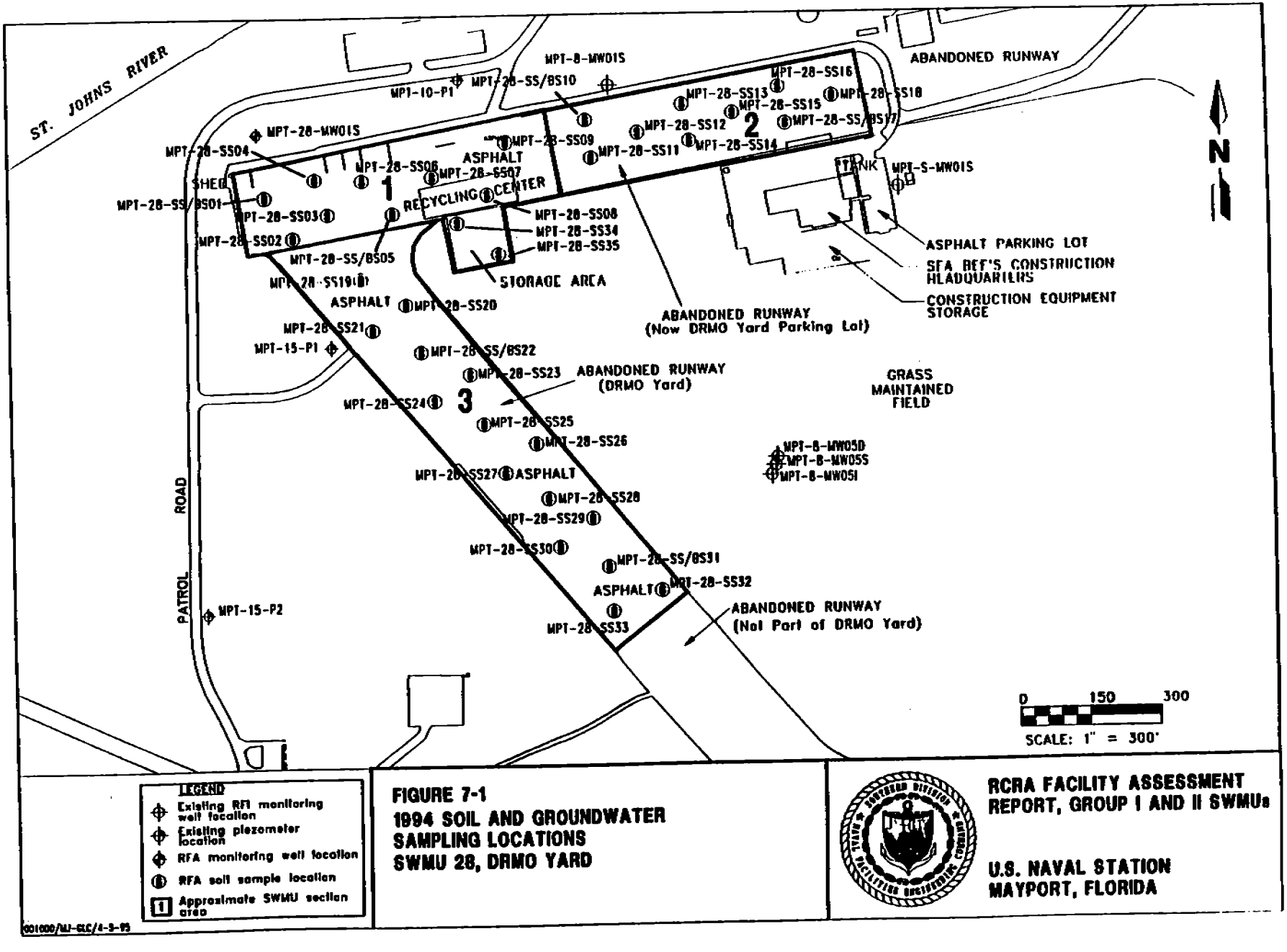


FIGURE 7-1
1994 SOIL AND GROUNDWATER SAMPLING LOCATIONS
SWMU 28, DRMO YARD

RCRA FACILITY ASSESSMENT REPORT, GROUP I AND II SWMUs

U.S. NAVAL STATION
MAYPORT, FLORIDA

001000/MJ-GLC/4-5-95

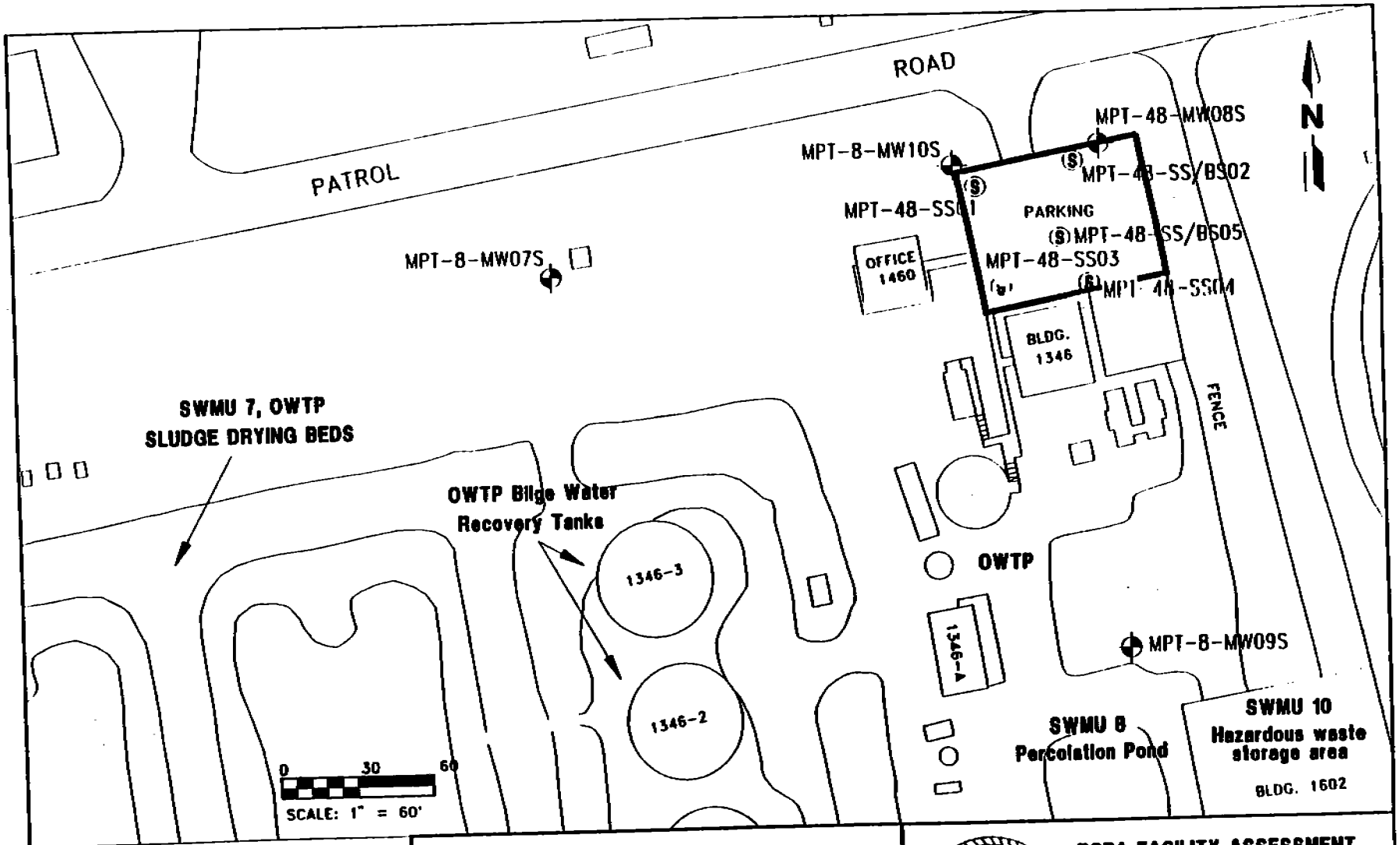


FIGURE 8-1
1994 SOIL AND GROUNDWATER SAMPLING LOCATIONS
SWMU 48, FORMER CHEMISTRY LABORATORY ACCUMULATION AREA

RCRA FACILITY ASSESSMENT REPORT, GROUP I AND II SWMUs

U.S. NAVAL STATION MAYPORT, FLORIDA

H:\8500\000300\MI-GLC-MAP\7-17-95

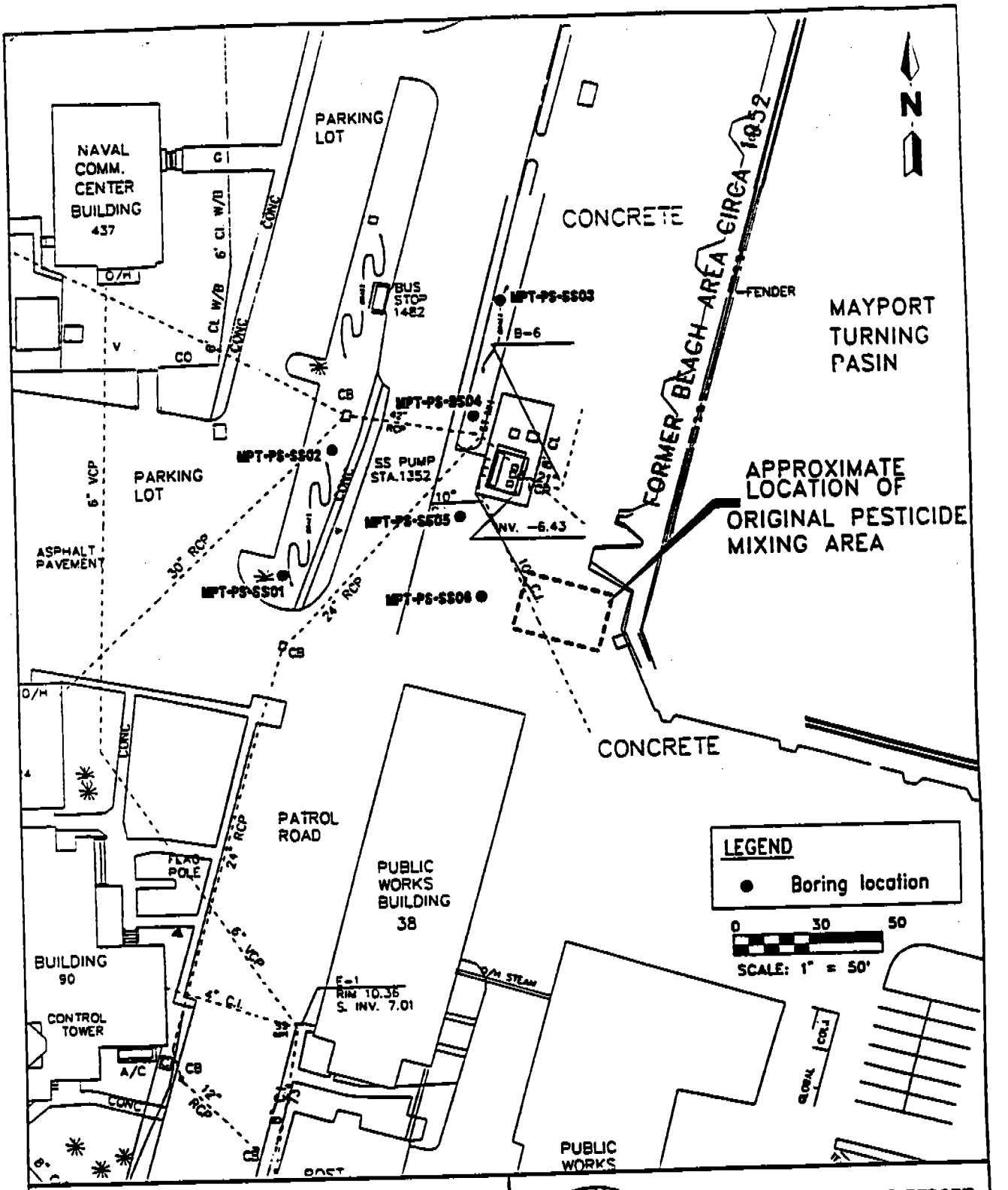


FIGURE 2
SURFACE SOIL SAMPLING LOCATIONS AT ORIGINAL PESTICIDE HANDLING AREA

SAMPLING AND ANALYSIS REPORT ORIGINAL PESTICIDE HANDLING AREA

U.S. NAVAL STATION MAYPORT, FLORIDA

H:\MAYPORT\PESTWKPL\JMK\09-06-95

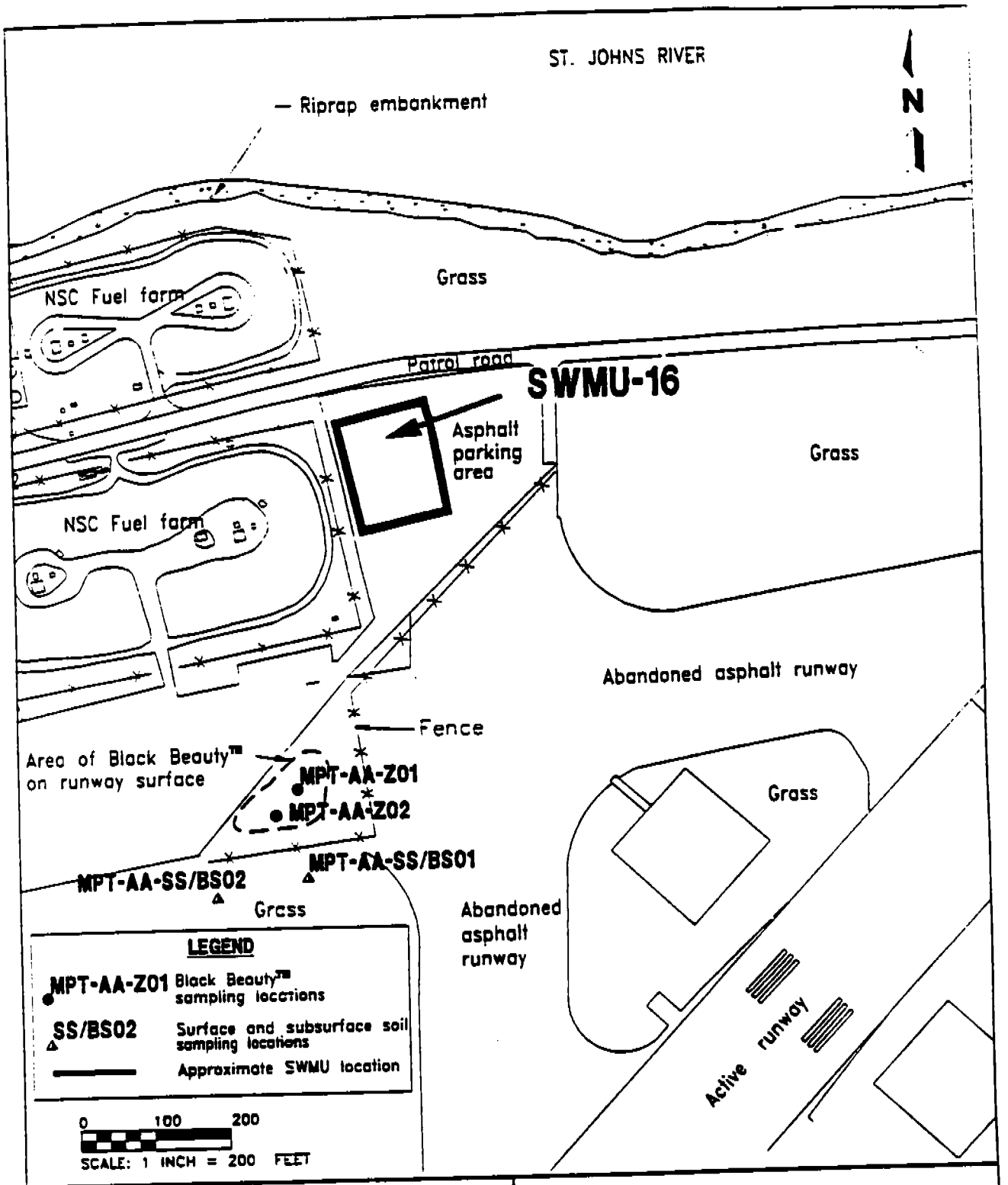
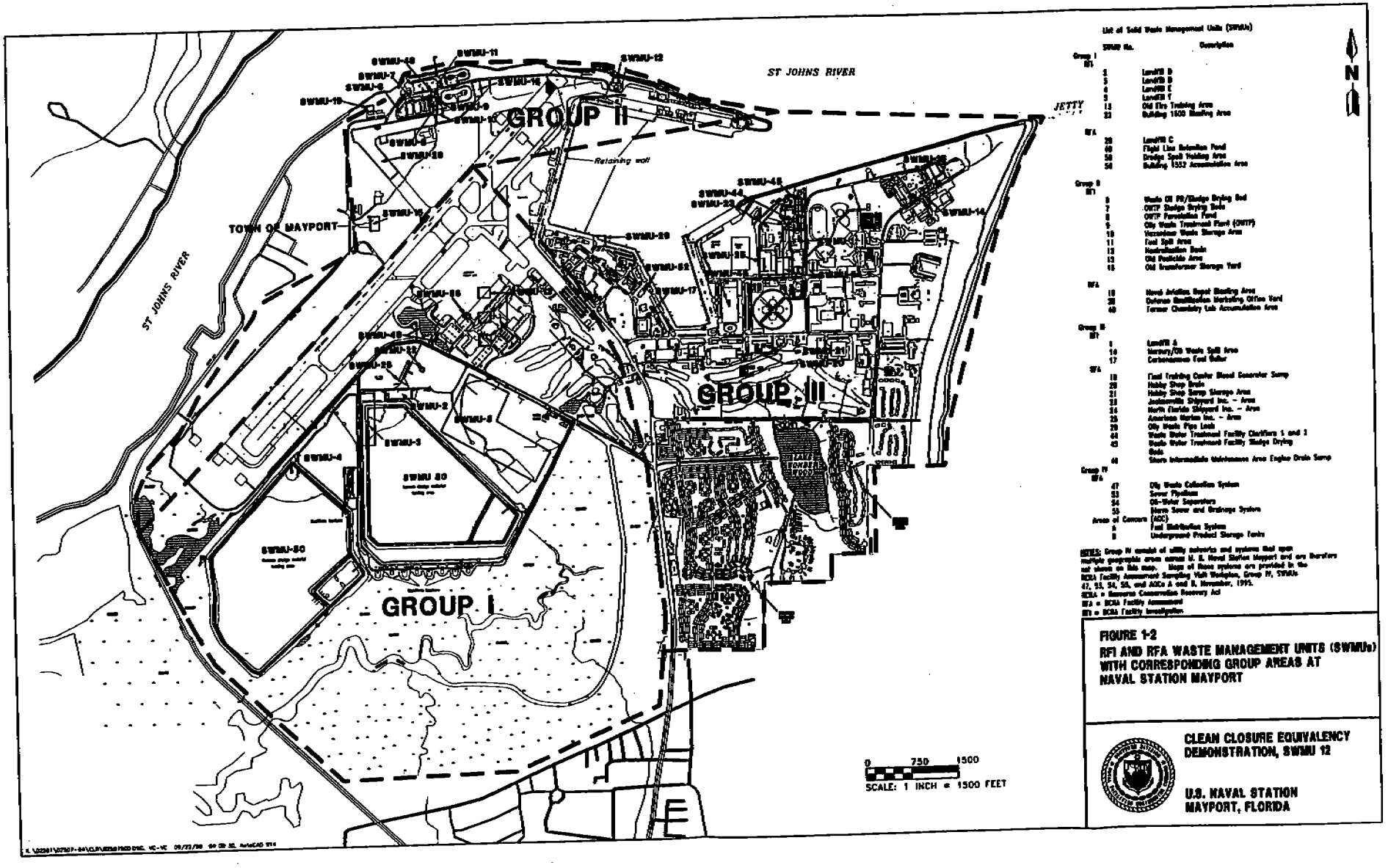


FIGURE 2
BLACK BEAUTY™ AND SURFACE AND SUBSURFACE SOIL SAMPLE LOCATIONS

AIRCRAFT DISPLAY AREA SAMPLING VISIT REPORT

U.S. NAVAL STATION MAYPORT, FLORIDA

N:\9500\002400\JMK\10-13-95



NOTES: Group IV consists of utility networks and systems that span multiple geographic areas across U. S. Naval Station Mayport and are therefore not shown on this map. Maps of these systems are provided in the RCRA Facility Assessment Sampling Visit Workplan, Group IV, SWMUs 47, 53, 54, 55, and AOCs A and B, November, 1995.
RCRA = Resource Conservation Recovery Act
RFA = RCRA Facility Assessment
RFI = RCRA Facility Investigation

FIGURE 1-2
RFI AND RFA WASTE MANAGEMENT UNITS (SWMUs) WITH CORRESPONDING GROUP AREAS AT NAVAL STATION MAYPORT

CLEAN CLOSURE EQUIVALENCY DEMONSTRATION, SWMU 12

U.S. NAVAL STATION MAYPORT, FLORIDA

ATTACHMENT C

1995 pH RESULTS

FORM 1
ANALYSIS DATA SHEET
GENERAL CHEMISTRY LEVEL 2 & 3

Client Sample Number: 11S00301

Lab Name: OAL, Inc.

Batch Number(s): MN001

Matrix (soil/water): SOIL

Date Collected: 11/14/95

% Solids (if soil): 92.9

Date Received: 11/15/95

Lab Sample ID: RA636006

METHOD	ANALYTE	CONCENTRATION	CONC. UNITS	DATE ANALYZED
SW9045	pH	8.82	Units	11/29/95

Comments:

FORM 1
ANALYSIS DATA SHEET
GENERAL CHEMISTRY LEVEL 2 & 3

Client Sample Number: 11S00101

Lab Name: OAL, Inc.

Batch Number(s): MN001

Matrix (soil/water): SOIL

Date Collected: 11/14/95

% Solids (if soil): 95.8

Date Received: 11/15/95

Lab Sample ID: RA636003

METHOD	ANALYTE	CONCENTRATION	CONC. UNITS	DATE ANALYZED
SW9045	pH	8.45	Units	11/29/95

Comments:

FORM I - GENERAL CHEMISTRY

FORM 1
ANALYSIS DATA SHEET
GENERAL CHEMISTRY LEVEL 2 & 3

Client Sample Number: 11S00201D

Lab Name: OAL, Inc.

Batch Number(s): MN001

Matrix (soil/water): SOIL

Date Collected: 11/14/95

% Solids (if soil): 97.2

Date Received: 11/15/95

Lab Sample ID: RA636005

METHOD	ANALYTE	CONCENTRATION	CONC. UNITS	DATE ANALYZED
SW9045	pH	8.46	Units	11/29/95

Comments:

FORM 1
ANALYSIS DATA SHEET
GENERAL CHEMISTRY LEVEL 2 & 3

Client Sample Number: 11S00201

Lab Name: QAL, Inc.

Batch Number(s): MN001

Matrix (soil/water): SOIL

Date Collected: 11/14/95

% Solids (if soil): 97.1

Date Received: 11/15/95

Lab Sample ID: RA636004

METHOD	ANALYTE	CONCENTRATION	CONC. UNITS	DATE ANALYZED
SW9045	pH	8.46	Units	11/29/95

Comments:

FORM 2
INITIAL AND CONTINUING CALIBRATION VERIFICATION
GENERAL CHEMISTRY

Lab Name: OAL, Inc.

Lab Reference No./SDG: RA636/MN[illegible]

ANALYTE	Conc. Units	INITIAL CALIBRATION			CONTINUING CALIBRATION					
		True	Found	% Rec.	True	Found	% Rec.	True	Found	% Rec.
pH	Units	7.00	7.03		7.00	7.02		7.00	7.02	

Control Limits: 90.0-110.0 (except as noted)
pH control limit: + 0.1

FORM 6
DUPLICATES
GENERAL CHEMISTRY

Client Sample Number: 11S00201MSD

Lab Name: OAL, Inc.

Lab Reference No./SDG: RA636/MN001

Matrix (soil/water): SOIL

Lab Sample ID: RA636

% Solids (if soil): 97.1

Analyte	Control Limit	Sample (S)	Duplicate (D)	Conc. Units	RPD
pH	0-20%	8.46	8.57	Units	1.3

Comments:

FORM 7
LABORATORY CONTROL SAMPLE
GENERAL CHEMISTRY LEVEL 2 & 3

Name: OAL, Inc.

Lab Reference No./SDG: RA636/MN001

ANALYTE	Conc. Units	AQUEOUS True	AQUEOUS Found	AQUEOUS % Rec	SOLID True	SOLID Found	SOLID % Rec	Limits
pH	Units				5.66	5.83	103.0	94.6-105

Comments:

FORM 7 - GENERAL CHEMISTRY

Attachment D
1993 pH Results

GROUNDWATER FIELD SAMPLE DATA RECORD

PAGE 1 OF 1

PROJECT MAYPORT - NEUTRALIZATION BASIN JOB NO 7551-40

STATION NO/LOCATION MAT-11-1 DATE 1/27/93

SKETCH ON BACK ☐ YES ☐ NO PHOTOGRAPHS ☐ YES ☐ NO ROLL NO/EXPOSURE NO ____

FIELD DATA TIME: START 1200 AIR TEMP 55°F
END 12.30 WEATHER CLEAR, WINDY

WATER DEPTH 10.12 ☐ TOP WELL ☒ TOP CASING WELL DEPTH 19.71 WELL DIAM 2" WELL MATERIAL PVC

WELL STICK-UP ____ WELL/CASING ____

SAMPLING EQUIPMENT USED TEFLON BAILER VOLUME PURGED ≈ 5 GAL.

FIELD DATA COLLECTION ☐ IN SITU ☐ IN BOTTLE VOA LEVEL(PPM) AMBIENT 0
SAMPLE LOCATION 5
: HEADSPACE 0

SAMPLE PURGE DATA

@ 3 GAL	@ 5 GAL	@ ____ GAL	@ ____ GAL
TEMP 75.7 °C	TEMP 74.6 °C	TEMP ____ °C	TEMP ____ °C
SP. COND 0.69x1000 @25°C	SP. COND 0.72x1000 @25°C	SP. COND ____ @25°C	SP. COND ____ @25°C
pH 7.13	pH 7.17	pH ____	pH ____
Eh ____	Eh ____	Eh ____	Eh ____

BOTTLE ID	LAB ID	VOL	MATERIAL	FILTERED	PRES./VOL	ANALYSIS REQUESTED

REMARKS/OBSERVATIONS ____

SAMPLER MIKE JAYNES + KELLY MURRAY

FIGURE 6-7

GROUNDWATER FIELD SAMPLE DATA RECORD

RCRA FACILITY INVESTIGATION QUALITY ASSURANCE PROJECT PLAN U.S. NAVAL STATION MAYPORT, FLORIDA

GROUNDWATER FIELD SAMPLE DATA RECORD

PAGE 1 OF 1

PROJECT MAYPORT - NEUTRALIZATION BASIN JOB NO 7551-40

STATION NO/LOCATION MPT-11-2 DATE 11/27/93

SKETCH ON BACK YES ☐ NO ☐ PHOTOGRAPHS YES ☐ NO ☐ ROLL NO/EXPOSURE NO ____

FIELD DATA TIME: START 1240 END 1305 AIR TEMP 55°F WEATHER CLEAR, WINDY

WATER DEPTH 7.50 ☐ TOP WELL ☒ TOP CASING WELL DEPTH 15.85 WELL DIAM. 2" WELL MATERIAL PVC

WELL STICK-UP ____ WELL/CASING ____

SAMPLING EQUIPMENT USED TEFLON BAILER VOLUME PURGED ≈ 5 GAL.

FIELD DATA COLLECTION ☐ IN SITU ☐ IN BOTTLE VOA LEVEL(PPM) AMBIENT 0 SAMPLE LOCATION 0 ; HEADSPACE 0

SAMPLE PURGE DATA

@ 3 GAL	@ 4.5 GAL	@ ____ GAL	@ ____ GAL
TEMP 63.8 °C	TEMP 64.1 °C	TEMP ____ °C	TEMP ____ °C
SP. COND 4.92 x 1000 @25°C	SP. COND 5.19 x 1000 @25°C	SP. COND ____ @25°C	SP. COND ____ @25°C
pH 10.00	pH 10.00	pH ____	pH ____
Eh ____	Eh ____	Eh ____	Eh ____

BOTTLE ID	LAB ID	VOL	MATERIAL	FILTERED	PRES./VOL	ANALYSIS REQUESTED

REMARKS/OBSERVATIONS ____

SAMPLER MIKE JAYNES + KELLY MURRAY

FIGURE 6-7

GROUNDWATER FIELD SAMPLE DATA RECORD

RCRA FACILITY INVESTIGATION QUALITY ASSURANCE PROJECT PLAN U.S. NAVAL STATION MAYPORT, FLORIDA

GROUNDWATER FIELD SAMPLE DATA RECORD

PAGE 1 OF 1

PROJECT MAYPORT - NEUTRALIZATION BASIN JOB NO 7551-40

STATION NO/LOCATION 11 MW 3 DATE 1/27/93

SKETCH ON BACK YES ☐ NO ☐ PHOTOGRAPHS YES ☐ NO ☐ ROLL NO/EXPOSURE NO ____

FIELD DATA TIME: START 1030 AIR TEMP ≈50°F

END 1145 WEATHER CLEAR, WINDY

WATER DEPTH 7.53' ☐ TOP WELL ☒ TOP CASING WELL DEPTH 16.85 WELL MATERIAL PVC

WELL DIAM. 2"

WELL STICK-UP ____ WELL/CASING ____

SAMPLING EQUIPMENT USED TEFLON BAILER VOLUME PURGED ≈5 GAL.

FIELD DATA COLLECTION ☐ IN SITU ☐ IN BOTTLE

VOA LEVEL (PPM) AMBIENT 0

SAMPLE LOCATION 0

HEADSPACE 0

SAMPLE PURGE DATA

@ 3 GAL	@ 5 GAL	@ END GAL	@ ____ GAL
TEMP 63.1 °C	TEMP 62.3 °C	TEMP 63.9 °C	TEMP ____ °C
SP. COND 2510 x1000 @25°C	SP. COND 2.76 x1000 @25°C	SP. COND 2.85 x1000 @25°C	SP. COND ____ @25°C
pH 6.85	pH 6.94	pH 6.96	pH ____
Eh ____	Eh ____	Eh ____	Eh ____

BOTTLE ID	LAB ID	VOL	MATERIAL	FILTERED	PRES./VOL.	ANALYSIS REQUESTED

REMARKS/OBSERVATIONS ____

SAMPLER MIKE JAYNES + KELLY MURRAY

FIGURE 6-7

GROUNDWATER FIELD SAMPLE DATA RECORD

RCRA FACILITY INVESTIGATION QUALITY ASSURANCE PROJECT PLAN U.S. NAVAL STATION MAYPORT, FLORIDA

ATTACHMENT E
1993, 1994 and 1995 CHAIN-OF-CUSTODY SHEETS

Field Trailer Ht # (904) 296-0205

CH2M HILL
QUALITY ANALYTICAL LABORATORIES

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M HILL Project # [illegible]

Purchase Order # 7551-40

Project Name: HS Mayport (Neutralization basin)

Company Name/CH2M HILL Office: Montgomery, AL
ABB-ES - Tallahassee

Project Manager & Phone #: Mr. [ ] Ms. [ ] Dr. [ ] Peggy Layne (904) 656-1293

Report Copy to: Greg Brown
MR. GENE WATSON/[illegible]

Requested Completion Date: 3 wk. Std. turnaround

Sampling Requirements: SDWA [ ] NPDES [ ] RCRA [X] OTHER ___

Sample Disposal: Dispose [X] Return [ ]

LAB TEST CODES

ANALYSES REQUESTED

SHADED AREA -- FOR LAB USE ONLY

Lab 1 # 23885

Lab 2 #

Quote #

Kit Request #

Project # LMG 35218.XY.MA

No. of Samples

Page 1 of 1

COC Rev BS 1/93

Login BS 1/93

LIMS Ver [illegible] 1/30/93

Ack Gen EW 2/2

Sampling Date	Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	CLIENT SAMPLE ID (9 CHARACTERS)	OF CONTAINERS	8240 VOAs	8010 VOAs	Metals 6010, 7420, 7470	8270 SVOAs	8080 Pest/PCB	REMARKS	LAB 1 ID	LAB 2 ID
1/27	1210		X	X		MPT-11-1	9	3	3	1	1	1		001	
1/27	1300					MPT-11-2	9	3	3	1	1	1		002	
1/27	1055					11MW3	9	3	3	1	1	1		003	
1/27	1055					11MW3D	9	3	3	1	1	1		004	
1/27	1055					~~11MW3MS~~	9	3	3	1	1	1	Matrix Spike	~~005~~	
1/27	1055					~~11MW3MSD~~	9	3	3	1	1	1	Matrix Spike Dup	~~006~~	
1/27	12:00					2FB005*	9	3	3	1	1	1		~~005~~ 005	
1/27	12:10					2QS006	9	3	3	1	1	1		~~006~~ 006	
1/27			X	X		TRIPBLANK	3	3					TRIP BLANK		

Sea 04-[illegible] 1/30/93 HCW

QC LEVEL 2 DATE DUE 2/12/93

REPORT TO E. WILLIAMS / LMG

SHIP # Bus [illegible] LGN [illegible] DJ

"E"

Sampled By & Title (Please sign and print name): MIKE JAYNES/KELLY MURRAY — Date/Time: 1/27/93

Relinquished By (Please sign and print name): Michael O. Jaynes — Date/Time: 1/28/93

Received By (Please sign and print name): — Date/Time:

Relinquished By (Please sign and print name): — Date/Time:

Received By (Please sign and print name): — Date/Time:

Relinquished By (Please sign and print name): Dan Jarvis — Date/Time: 1/29/93 1400

Received By (Please sign and print name): Dan Jarvis — Date/Time: 1/29/93 0930

Shipped Via: UPS BUS Fed-Ex Hand Other ___

Shipping #: Fed Ex 1924253435

Work Authorized By (Please sign and print name):

Remarks: Bill To Task Order #31 / Job # 7551-40 / * = #5 LTMS: DIT53295

HAZWRAP/NESSA: (Y) N

QC Level: (T) (2N) Other: "E"

COC Rec: yes ICE: yes

Ana Req: yes TEMP: 1°C

Cust Seal: yes Ph: NA

DISTRIBUTION ORIGINAL LAB Yellow LAB Pink Client

Instructions and Agreement Provisions on Reverse Side

ABB ENVIRONMENTAL SERVICES, INC.

SDG # COC # 070694A DATE: 07/06/94

Lab Batch No

ABB-ES
Task Order # 028
Job # 8533-04

Tallahassee Ph#:
(904) 656-1293
Field Office Ph#:
(904) 246-0205
(904) 246-7473 FAX

PROJECT NAME: NAVSTA MAYPORT
SITE NAME: MAYPORT
PROJECT MANAGER: PEGGY LAYNE
COPY TO PEGGY LAYNE & FRANK LESESNE
REQ. COMPLETION DATE: 08/06/94

Comments	SAMPLE IDENTIFIER	SAMPLE DATE	SAMPLE TIME	MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	TOTAL CONTAINERS	MVWO VOC 8240 HCl 40 ml	SVWOMP SVOC 8240 NONE 2.5L	PEWO PEPCB 8080 M NONE 2.5L	HEWO HERB 8150 NONE 2.5L	OPWO ORGANOPEST 8140 NONE 2.5L	ACPOMET METALS 6000/7000 HNO3 1L	CNW CYANIDE 9010/9012M NaOH 0.5 GAL	ICS (Y/N)	QAL LAB CODE PARAMETER METHOD PRESERVATIVE VOLUME
	11MW003S	07/06/94	11:15	W		X	5	3	1	1					N	
pH = 10.5	11MW002S	07/06/94	15:16	W		X	5	3	1	1					Y	
	11T012	07/06/94	08:30	W		X	3	3							N	
TOTAL PARAMETERS PER COLUMN							13	9	2	2	0	0	0	0		

NOTES: SENT TO QAL MONTGOMERY, AL LAB

RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME

SHIPPING AIRBILL NUMBER

0133637291 SHIPPED VIA FEDERAL EXPRESS

WHITE/YELLOW COPY - LABORATORY PINK COPY - ABB-ES

001EGW.WKD

ABB ENVIRONMENTAL SERVICES, INC.

COC # 0706941

DATE: 07/

ABB - ES
Task Order # 028
Job # 8533-01

Tallahassee Ph#
(904) 656-1293
Field Office Ph#
(904) 246-0205
(904) 246-7471 FAX

PROJECT NAME: NAVSTA MAYPORT
SITE NAME: MAYPORT
PROJECT MANAGER: PEGGY LAYNE
COPY TO: PEGGY LAYNE & TERRY HESTER
REQ COMPLETION DATE: 08/05/94

Comments	SAMPLE IDENTIFIER	SAMPLE DATE	SAMPLE TIME	MATRIX (A, B, I, X)	TYPE (C, O, M, P)	TYPE (G, R, A, P)	TOTAL # OF CONTAINERS	HNO3 pH <2 VOA 40ml	H2SO4 pH <2 NONE 250	HNO3 pH <2 NONE 250	H2SO4 pH <2 NONE 250	NaOH pH >12 NONE 250	ASCORBIC ACID/NaOH 0.008M ENCORE 11	NaOH pH >12 0.008M 0.50N	ICE (Y/N)	SAMPLE COOLING METHOD PRESERVATIVE VOLUME	LAB Batch No
	11MW003S	07/06/94	11:15	W		X	2							1	N		
	11MW003SF	07/06/94	11:15	W		X	1							1	N		
PH=10.5 PRIOR TO PRESERVATION	11MW002S	07/06/94	15:16	W		X	2							1	N		
	11MW002SF	07/06/94	15:16	W		X	1								N		
TOTAL PARAMETERS PER COLUMN							6	0	0	0	0	0	4	2			MISACCEIVED

NOTES: SENT TO MONTGOMERY ALTAR

RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME

SHIPPING AIRBILL NUMBER: 0133637291 SHIPPED VIA FEDERAL EXPRESS

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BO1EGW_M.WK3

ABB ENVIRONMENTAL SERVICES, INC.

SDG # | COC # 070594C | DATE: 07/06/94 | Lab Batch No

ABB-ES
Task Order #:
Job #: 8533-04

Tallahassee Ph#:
(904) 656-1293
Field Office Ph#:
(904) 246-0205
(904) 246-7473 FAX

PROJECT NAME: NAVSTA MAYPORT
SITE NAME: MAYPORT
PROJECT MANAGER: PEGGY LAYNE
COPY TO: PEGGY LAYNE & FRANK LESESNE
REQ. COMPLETION DATE: 08/06/94

Sample Type	SAMPLE IDENTIFIER	SAMPLE DATE	SAMPLE TIME	MATRIX	SAMPLE TYPE: COMP	SAMPLE TYPE: GRAB	TOTAL CONTAINERS	TDS (1) TDS See Below NONE 1L	TKN (2) TKN See Below H2SO4 1L	SWI SULFIDE 376.1 NaOH/ZnAc 500 ml	TOC TOC 415.1/415.2 H2SO4 250 ml	O&G (1) OIL&GREASE 413.1 H2SO4 1L	PHEN (1) PHEN 420.1 H2SO4 1L	QA LAB CODE PARAMETER METHOD PRESERVATIVE VOLUME
	11MW003S	07/06/94	11 15	W		X	5	1	1	1	1	1		
LH: 10.5	11MW002S	07/06/94	15.16	W		X	5	1	1	1	1	1		
							10	2	2	2	2	2	0	

TOTAL PARAMETERS/CONTAINERS SAMPLED

NOTES
(1) Parameters analyzed in this bottle include: TDS (160.1), Cl (325.1/325.2/325.3/300), ALK (310.1), hard (130.2), SO4 (375.4/375.2/300), Al+A (110.2), and pH (150.1)
(2) Parameters analyzed in this bottle include: TKN (351.3), NH3 (350.1/350.2), N/NAW (353.2/353.3/300), TPO4 (365.1/365.2/365.3/365.4)

SENT TO QAL LAB - MONTGOMERY, AL

RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME

SHIPPING AIRBILL NUMBER
0133637281 SHIPPED VIA FEDERAL EXPRESS

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ABB ENVIRONMENTAL SERVICES, INC.

SDG # COC # 070794A DATE: 07[illegible]4

Lab Batch No

ABB-ES
Task Order #: 028
Job #: 8533-04

Tallahassee Ph#
(904) 656-1293
Field Office Ph#
(904) 246-0205
(904) 246-7473 FAX

PROJECT NAME: NAVSTA MAYPORT
SITE NAME: MAYPORT
PROJECT MANAGER: PEGGY LAYNE
COPY TO: PEGGY LAYNE & FRANK LESESNE
REQ. COMPLETION DATE: 08/07/94

LAB TEST CODES

Comments	SAMPLE IDENTIFIER	SAMPLE DATE	SAMPLE TIME	MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	TOTAL CONTAINERS	MVWS VOC 8240 HCl 40 ml	SVWSMP SVOC 8270 NONE 2.5L	LEWS PCCB 8080M NONE 2.5L	HEWS HEOB 8150 NONE 2.5L	OPWS ORGANOPEST 8140 NONE 2.5L	ALPOMET METALS 6000/7000 HNO3 1L	CNW CYANIDE 9010/9012M NaOH 0.5 GAL	HCW VOC 8310 HCl 40 ml	TICS (Y/N)	QAL LAB CODE PARAMETER METHOD PRESERVATIVE VOLUME
	11MW001S	07/07/94	10:45	W		X	5	3	1	1						Y	
	16MW004S	07/07/94	13:40	W		X	8	3	1	1					3	Y	
	02T013	07/07/94	08:40	W		X	3	3								N	
TOTAL PARAMETERS PER COLUMN							16	9	2	2	0	0	0	0	3		

NET SA QC LEVEL C

NOTES: SENT TO QAL MONTGOMERY, AL LAB

RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[signature]	7/7/94	1502	[signature]	[signature]	7/7/94				
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME

SHIPPING AIRBILL NUMBER

0133637302 SHIPPED VIA FEDERAL EXPRESS

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ABB ENVIRONMENTAL SERVICES, INC.

SDG # | COC # 070794B | DATE: 07/07/94

ABB-ES
Task Order #: 028
Job #: 8533-04

Tallahassee Ph#
(904) 656-1293
Field Office Ph#
(904) 246-0205
(904) 246-7473 FAX

PROJECT NAME NAVSTA MAYPORT
SITE NAME MAYPORT
PROJECT MANAGER PEGGY LAYNE
COPY TO PEGGY LAYNE & FRANK LESESNE
REQ. COMPLETION DATE 08/07/94

Comments	SAMPLE IDENTIFIER	SAMPLE DATE	SAMPLE TIME	MATRIX	SAMPLE TYPE: COMP	SAMPLE TYPE: GRAB	TCLP CONTAINERS	TCLP VOC 40ml	TCLP SVOC 250	TCLP PEST/PCB 250	TCLP HERB 250	TCLP ORGANOPHOS 250	TCLP METALS 1L	TCLP CNW 0.5GAL	TCLP (Y/N)	ADDITIONAL PARAMETER METHOD PRESERVATIVE VOLUME	Lab Batch No.
	11MW001S	07/07/94	10 45	W		X	2						1	1	N		
	11MW001SF	07/07/94	10 45	W		X	1						1		N		
	16MW004S	07/07/94	13 40	W		X	2						1	1	N		
TOTAL PARAMETERS PER COLUMN							5	0	0	0	0	0	3	2			MS/SA QC LEVEL II

NOTES SENT TO MONIGOMERY ALLAB

RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[signature]	7/7/94	1532	[signature]	[signature]					
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME

SHIPPING AIRBILL NUMBER
0133637302 SHIPPED VIA FEDERAL EXPRESS

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ABB ENVIRONMENTAL SERVICES, INC.

SDG COC # 070794C DATE: 07/07/

Lab Batch No.

ABB-ES
Task Order #:
Job #: 8533-04

Tallahassee Ph#:
(904) 656-1293
Field Office Ph#:
(904) 246-0205
(904) 246-7473 FAX

PROJECT NAME: NAVSTA MAYPORT
SITE NAME: MAYPORT
PROJECT MANAGER: PEGGY LAYNE
COPY TO PEGGY LAYNE & FRANK LESESNE
REQ COMPLETION DATE: 08/07/94

Sample Type	SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	SAMPLE LOCATION COMP	SAMPLE LOCATION GRAB	TOTAL CONTAINERS	TDS (1) TDS See Below	TKN (2) TKN See Below	SW1 SULFIDE 376.1 NaOH/ZnAc	TOC 415.1/415.2 H2SO4	O&G (1) OR/GREASE 413.1 H2SO4	TOX 1650 1650 413.1 H2SO4	OAL LAB CODE PARAMETER METHOD PRESERVATIVE VOLUME
	11MW001S	07/07/94	10:45	W		X	5	1	1	1	1	1		
	16MW004S	07/07/94	13:40	W		X	6	1	1	1	1	1	1	
TOTAL PARAMETERS/CONTAINERS SAMPLED							11	2	2	2	2	2	1	

NOTES: (1) Parameters analyzed in this bottle include TDS (160.1), Cl (325.1/325.2/325.3/300), ALK (310.1), Hard (130.2), SO4 (375.4/375.2/300), ANDA (110.2), and pH (150.1)
(2) Parameters analyzed in this bottle include TKN (351.2), NH3 (350.1/350.2), N/NAW (353.2/353.3/300), TPO4 (365.1/365.2/365.3/365.4)

SENT TO OAL LAB - MONTGOMERY, AL

RELINQUISHED BY	DATE	TIME	RECEIVED BY
[signature]	7/7/94	1530	[signature]
RELINQUISHED BY	DATE	TIME	RECEIVED BY
RELINQUISHED BY	DATE	TIME	RECEIVED BY

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[signature]			[signature]		
RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME

SHIPPING AIRBILL NUMBER
0133637302 SHIPPED VIA FEDERAL EXPRESS

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ABB ENVIRONMENTAL SERVICES, INC.

SDG # MN001 COC# 111495E1 DATE: 14-Nov-95

COC Serial No

B 0108

ABB-ES
Task Order #: 028
Job #: 7551 - 50

Tallahassee Ph#
(904) 656-1293
Field Office Ph#:
(904) 246-0205
Field Fax #:
(904) 246-4197

PROJECT NAME: NAVSTA MAYPORT
SITE NAME: MAYPORT
PROJECT MANAGER: TERRY HANSEN
COPY TO: Terry Hansen & Frank Lesesne
REQ. COMPLETION DATE: 12/14/95

Comments	SAMPLE IDENTIFIER	SAMPLE DATE	SAMPLE TIME	MATRIX	Sample Type COMP	Sample Type GRAB	TOTAL CONTAINERS	MVW8 VOC 8240 HCl 40 ml	MVS8 VOC 8240 NONE 2 X 2 oz	SVS8MP/PPS91 SVOC/PEST/PCB 8270/8080M NONE 8 oz	APPMET/CNS METALS/CN - & pH 6000/7000 & 9045 NONE 8 oz	SVS8MP/PPS91/APPMET/CNS SVOC/PEST/PCB/METALS/CN 8270/8080M/6000/7000 NONE Sleeve	pH pH 9045 NONE 4 oz	TICS (Y/N)	QAL LAB CODE PARAMETER METHOD PRESERVATIVE VOLUME
	11S00101	14-Nov-95		S	S		1				1			N	
	11S00201	14-Nov-95		S	S		1				1			N	
	11S00201D	14-Nov-95		S	S		1				1			N	
	11S00201MS	14-Nov-95		S	S		1				1			N	
	11S00201MSD	14-Nov-95		S	S		1				1			N	
*End of SDG MN001	11S00301	14-Nov-95		S	S		1				1			N	
TOTAL PARAMETERS PER COLUMN							6	0	0	0	6	0	0		

NFESA QC LEVEL C

NOTES:

SENT TO QAL - REDDING, CA LAB

SAMPLED/RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	[illegible]	[illegible]							
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME

SHIPPING AIRBILL NUMBER: 0035/30830

SHIPPED VIA FEDERAL EXPRESS

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ABB ENVIRONMENTAL SERVICES, INC.

SDG # MN001 COC# 111495A1 DATE: 14-Nov-95

COC Serial No

B 0109

ABB-ES
Task Order #: 028
Job #: 7551-50

Tallahassee Ph#: (904) 656-1293
Field Office Ph#: (904) 246-0205
Field Fax #: (904) 246-4197

PROJECT NAME: NAVSTA MAYPORT
SITE NAME: MAYPORT
PROJECT MANAGER: TERRY HANSEN
COPY TO: Terry Hansen & Frank Lesesne
REQ. COMPLETION DATE: 12/14/95

Comments	SAMPLE IDENTIFIER	SAMPLE DATE	SAMPLE TIME	MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	TOTAL CONTAINERS	MWW1 VOC 8240 HCl 40 ml	SVW0MP SVOC 8270 NONE 2.5 L	PPW91 PPCB 8080M NONE 2.5 L	HLW1 HERB 8150 NONE 2.5 L	OLW0 ORGANOPEST 8140 NONE 2.5 L	APP0MET METALS 6000/7000 HNO3 1 L	CNW CYANIDE 9010/9012M NaOH 1 L	ITCS (Y/N)	QAL LAB CODE PARAMETER METHOD PRESERVATIVE VOLUME
	11Y001	14-Nov-95	[illegible]	W		W	2						1	1	N	
	11R001	14-Nov-95	[illegible]	W		W	2						1	1	N	
TOTAL PARAMETERS PER COLUMN							4	0	0	0	0	0	2	2		

NEESA QC LEVEL C

NOTES

SENT TO QAL - REDDING, CA LAB

SAMPLED/RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	[illegible]	[illegible]							
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME

SHIPPING AIRBILL NUMBER: C035/30X50

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