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NAVY ENVIRONMENTAL LEADERSHIP PROGRAM TECHNOLOGY EVALUATION REPORT FOR SOLID WASTE MANAGEMENT UNIT 14 NS MAYPORT FL

1/28/1998

ABB ENVIRONMENTAL SERVICES

NAVY ENVIRONMENTAL LEADERSHIP PROGRAM TECHNOLOGY EVALUATION REPORT FOR SOLID WASTE MANAGEMENT UNIT 14

U.S. NAVAL STATION MAYPORT, FLORIDA

Unit Identification Code: N60201

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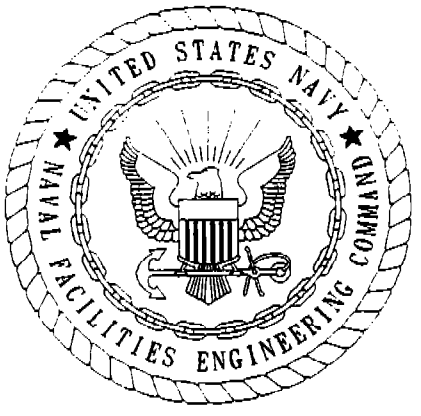
January 1998



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, ABB Environmental Services, Inc., 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 21, 1998

NAME AND TITLE OF CERTIFYING OFFICIAL: Terry J. Hansen, P.G.
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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.

One of these programs is the Installation Restoration (IR) program. This program complies with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act. The acts, passed by Congress in 1980 and 1986, respectively, established the means to assess and clean up hazardous waste sites for both private-sector and Federal facilities. These acts are the basis for what is commonly known as the Superfund program.

Originally, the Navy's part of this program was called the Navy Assessment and Control of Installation Pollutants (NACIP) program. Early reports reflect the NACIP process and terminology. The Navy eventually adapted the program structure and terminology of the standard IR program.

The IR program is conducted in several stages.

- The preliminary assessment (PA) identifies potential sites through record searches and interviews.
- A site inspection (SI) then confirms which areas contain contamination, constituting actual "sites." (Together, the PA and SI steps were called the initial assessment study under the Navy's old NACIP program.)

- Next, the remedial investigation and the feasibility study (RI/FS) together determine the type and extent of contamination, establish criteria for cleanup, and identify and evaluate any necessary remedial action alternatives and their costs. As part of the RI/FS, a risk assessment identifies potential effects on human health or the environment in order to help evaluate remedial action alternatives.

- The selected alternative is planned and conducted in the remedial design and remedial action stages. Monitoring then ensures the effectiveness of the effort.

A second program to address present hazardous material management is the Resource Conservation and Recovery Act (RCRA) Corrective Action program. This program is designed to identify and clean up releases of hazardous substances at RCRA-permitted facilities. RCRA is the law that ensures that solid and hazardous wastes are managed in an environmentally sound manner. The law applies primarily to facilities that generate or handle hazardous waste.

This program is conducted in three stages.

- The RCRA facility assessment identifies solid waste management units, evaluates the potential for releases of contaminants, and determines the need for future investigations.

- The RCRA facility investigation then determines the nature, extent, and fate of contaminant releases.

- The corrective measures study identifies and recommends measures to correct the release.

The hazardous waste investigations at Naval Station Mayport are presently being conducted under the RCRA Corrective Action program. Earlier preliminary investigations had been conducted at Naval Station Mayport under the Navy's old NACIP program and IR program following Superfund guidelines. In 1988, in coordination with the U.S. Environmental Protection Agency (USEPA) and the Florida Department of Environmental Protection (FDEP), the hazardous waste investigations were formalized under the RCRA program.

Naval Station Mayport is conducting the cleanup at their facility by working through the Southern Division, Naval Facilities Engineering Command. The USEPA and the FDEP oversee the Navy 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 Naval Station Mayport should be addressed to Mr. David Driggers, Code 1852, at (803) 743-0501.

EXECUTIVE SUMMARY

As part of the Navy Environmental Leadership Program (NELP), a technology demonstration for bioremediation of petroleum-contaminated soil and concrete surfaces was performed at Solid Waste Management Unit (SWMU) 14, the Mercury/Oil Waste Spill Area.

Through NELP, the Navy proposed to demonstrate *in situ* bioremediation of petroleum-related constituents from concrete surfaces and soil at and immediately adjacent to the SWMU 14 detention pond. The technology demonstration was conducted by RHS Technical Services, Inc. (RHS). ABB Environmental Services, Inc. (ABB-ES), observed the technology demonstration and collected baseline and performance evaluation samples to assess the effectiveness of the technology demonstration.

ABB-ES sampling events consisted of collecting surface water and surface and subsurface soil samples to evaluate the NELP technology demonstration. Baseline and performance evaluation samples were collected to assess whether or not the technologies achieved target treatment levels. The target treatment levels for the bioremediation of the concrete surface were evaluated by collecting surface water samples and comparing the analytical results to the State of Florida surface water quality criteria under Florida Administrative Code (FAC) 62-302. Target treatment levels for the bioremediation of soil were evaluated by collecting soil samples and comparing the analytical results (1) to criteria established under FAC 62-775 for thermal desorption of petroleum-contaminated soil and (2) to human health-based criteria to be established under FAC 62-770 for remediation of petroleum-contaminated sites.

The detention pond looked cleaner at the end of the technology demonstration. However, this may be more attributed to RHS using a 4,000-pounds-per-square-inch pressure washer to rinse the microbial solution from the concrete rather than the bioremediation.

Analytical results of surface water samples collected by ABB-ES suggest that the bioremediation was not effective in meeting the target cleanup levels. The analytical results from the baseline and performance evaluation surface water samples suggest that there was minimal difference prior to and after the technology demonstration at the detention pond. Concentrations of oil and grease detected in both the baseline and performance evaluation surface water samples were not in compliance with FAC 62-302.

Evaluation of the analytical results of performance evaluation soil samples suggests that the bioremediation of the petroleum hydrocarbons was successful in achieving the human health-based total recoverable petroleum hydrocarbons (TRPH) soil cleanup target levels but not the criteria for TRPH under State of Florida thermal treatment of petroleum-contaminated soil.

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
mg/kg	milligrams per kilogram
mg/ℓ	milligrams per liter
µg/kg	micrograms per kilogram
NAVSTA	Naval Station
NEESA	Navy Environment and Energy Support Division
NELP	Navy Environmental Leadership Program
NPDES	National Pollutant Discharge Elimination System
OWTP	oily waste treatment plant
PAH	polynuclear aromatic hydrocarbon
psi	pounds per square inch
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RHS	RHS Technical Services, Inc.
RPD	relative percent difference
SCTL	soil cleanup target level
SWMU	Solid Waste Management Unit
TRPH	total recoverable petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
VOH	volatile organic halocarbon

1.0 INTRODUCTION

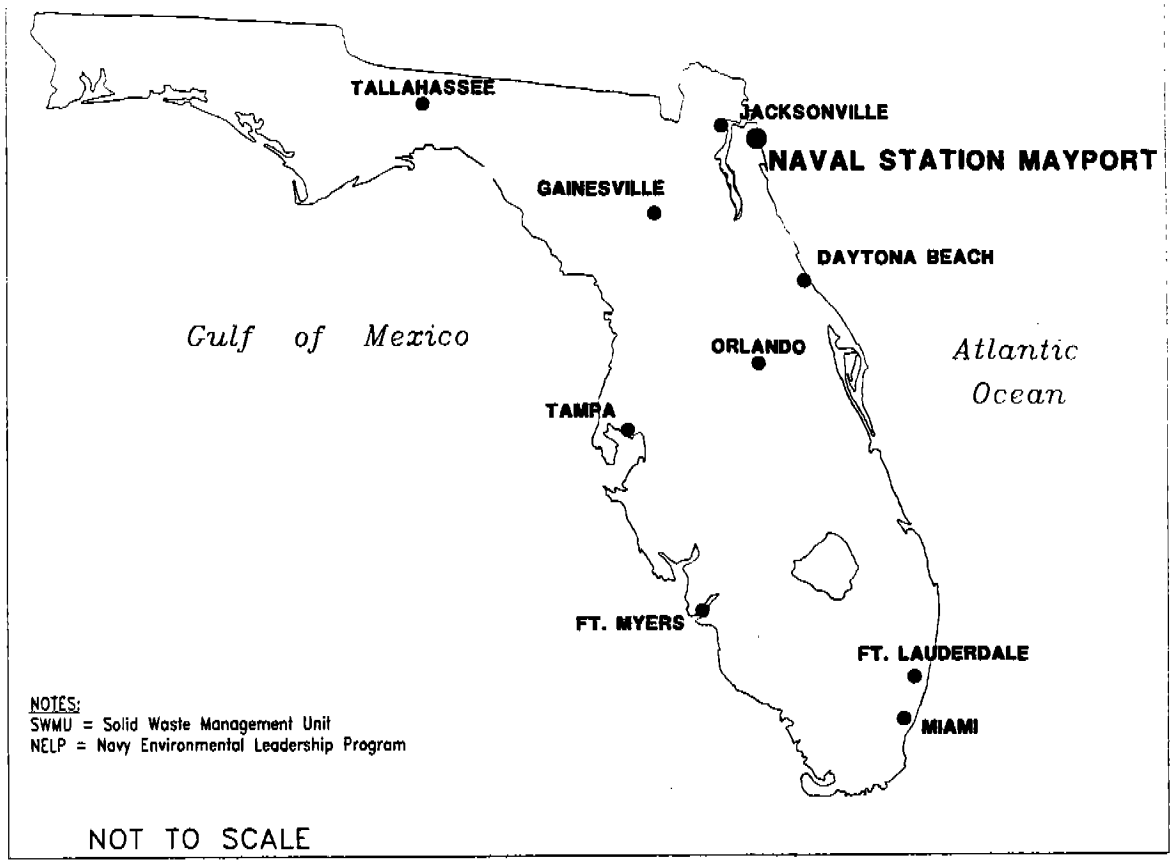
A technology demonstration was conducted under the Navy Environmental Leadership Program (NELP) for cleaning concrete containing petroleum residues and remediating soil containing petroleum-related constituents at Solid Waste Management Unit (SWMU) 14, Naval Station (NAVSTA) Mayport, Florida (Figures 1-1 and 1-2). NELP was created to promote the use of new and innovative technologies in the areas of compliance, conservation, cleanup, and pollution prevention within the Navy. NAVSTA Mayport was selected to participate in NELP because activities at this station are representative of similar activities at other naval stations.

ABB Environmental Services, Inc. (ABB-ES), was contracted by the Department of the Navy, Southern Division, Naval Facilities Engineering Command to provide technical oversight during the technology demonstration performed by others at SWMU 14. This technology evaluation report was prepared to describe and evaluate the effectiveness of activities carried out during the technology demonstration.

1.1 SITE DESCRIPTION AND BACKGROUND, SWMU 14. SWMU 14 includes a large concrete pad, adjacent to Buildings 1456 and 1388, that is used for firefighting training activities. The firefighting training activities conducted at SWMU 14 included the placing of used oil and other materials directly on the training pad within a bermed area and igniting the used oil (A.T. Kearney, 1989). Not all of the oil used in the training exercises was consumed in the fires. Much of the oil not consumed in the fire was washed from the pad by the water used to extinguish the fires. Since 1987, the oily-water runoff has been collected in an oil-water separator or a concrete detention basin prior to being pumped to the oily waste treatment plant (OWTP) (A.T. Kearney, 1989).

The concrete detention basin or pond was constructed in 1978 east of the firefighting training area. Stormwater drains from the firefighting training areas through a series of catch basins to an oil-water separator prior to treatment in the OWTP. The detention pond receives firefighting waste liquid when the oil-water separator is full. In addition, personnel who have worked at the NAVSTA Mayport firefighting training area in the past suggest that during the mid 1970s to early 1980s the piping from the oil-water separator to the OWTP would occasionally back up (A.T. Kearney, 1989). When this occurred, the manhole located southwest of Building 351 would overflow, allowing oily water from the firefighting training activities to flow into an open stormwater drainage ditch, eventually emptying into the detention pond. During periods of heavy rainfall, the detention pond often overflowed, resulting in a release of oily water from firefighting training and stormwater containing petroleum-related constituents onto the soils surrounding the detention pond.

The goal of the technology demonstration project is to demonstrate the applicability of bioremediation to reduce levels of petroleum residues on the concrete surface of the stormwater detention pond and the levels of petroleum-related constituents in the soils south of the detention pond. Petroleum staining of the concrete apron located in the firefighting training areas was not addressed as part of the technology demonstration. Figure 1-3 shows the location and general site features of SWMU 14, including areas treated during the technology demonstration.



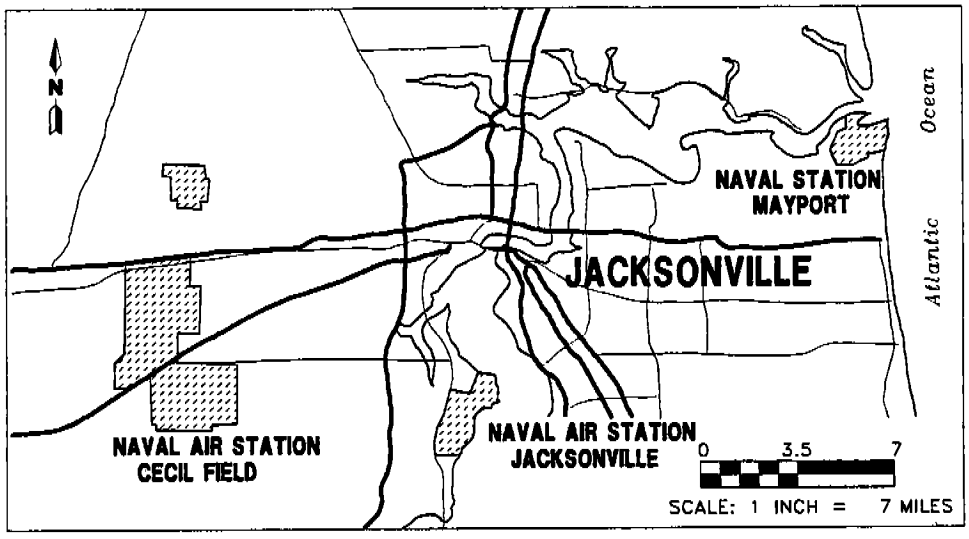


FIGURE 1-1
FACILITY LOCATION MAP

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NELP TECHNOLOGY EVALUATION REPORT SWMU 14

U.S. NAVAL STATION MAYPORT, FLORIDA

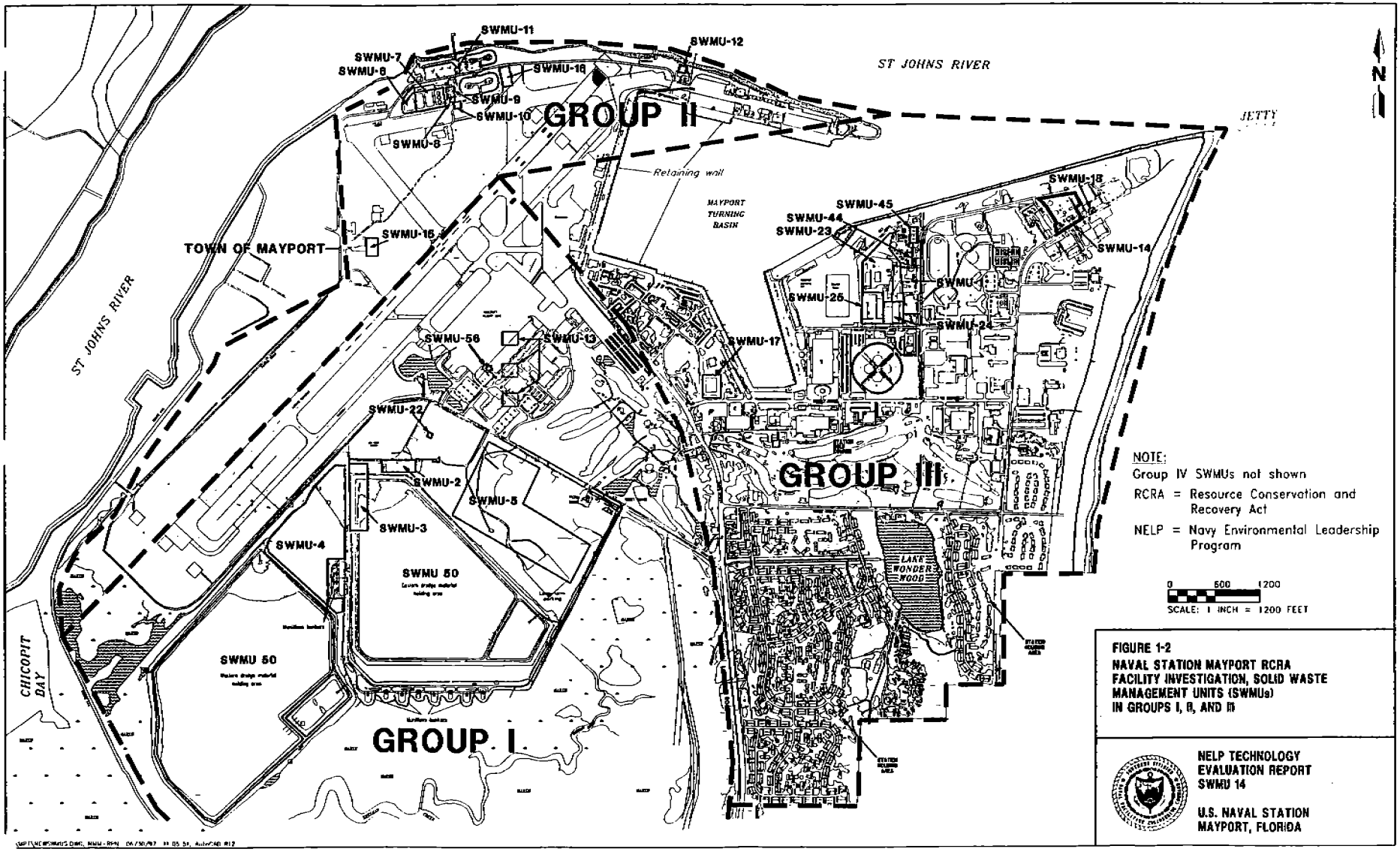

FIGURE 1-2
NAVAL STATION MAYPORT RCRA FACILITY INVESTIGATION, SOLID WASTE MANAGEMENT UNITS (SWMUs) IN GROUPS I, II, AND III

NELP TECHNOLOGY EVALUATION REPORT SWMU 14

U.S. NAVAL STATION MAYPORT, FLORIDA

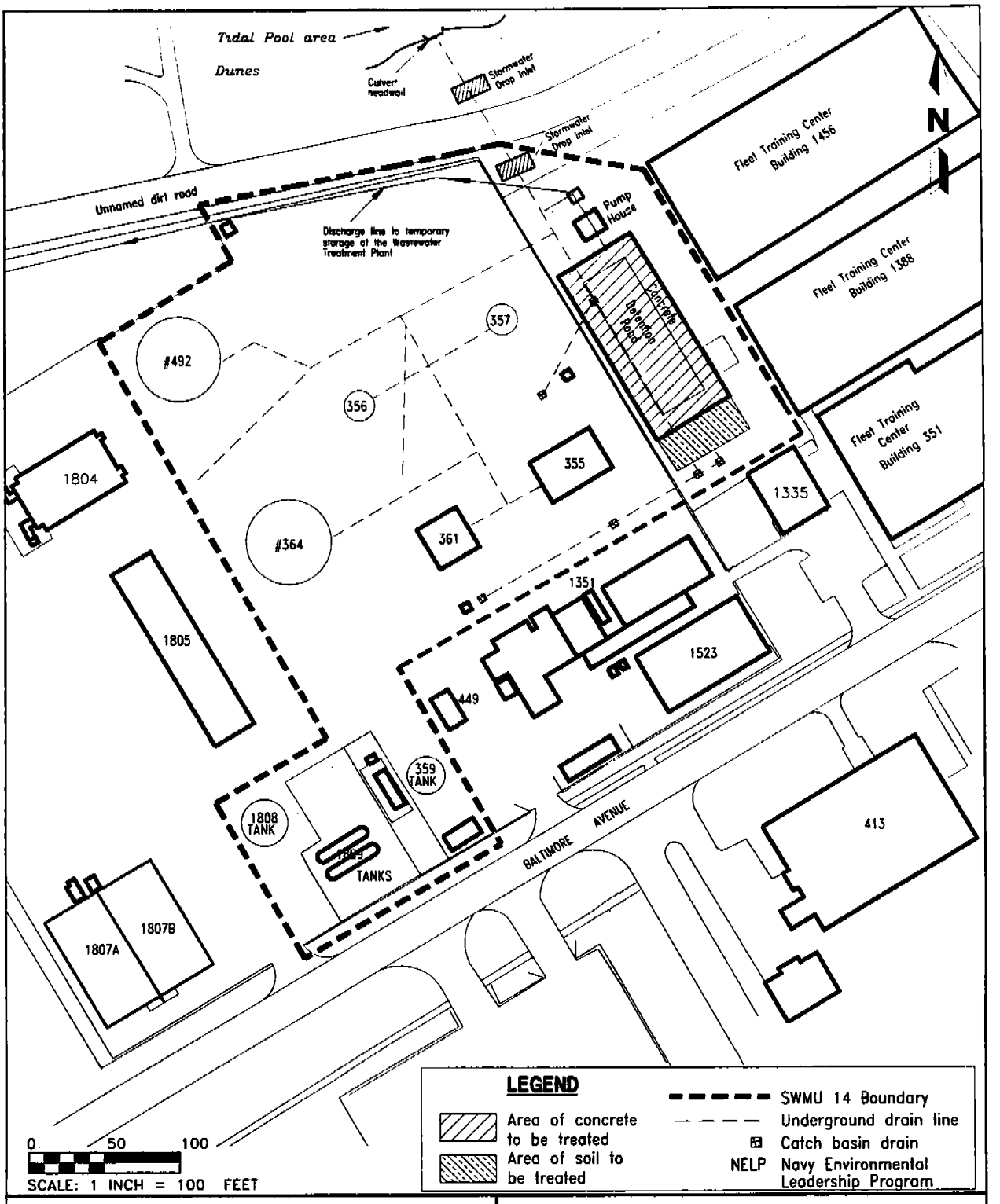

FIGURE 1-3
SOLID WASTE MANAGEMENT UNIT (SWMU) 14
GENERAL LOCATION AND SITE FEATURES

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NELP TECHNOLOGY EVALUATION REPORT SWMU 14

U.S. NAVAL STATION MAYPORT, FLORIDA

1.2 TARGET TREATMENT LEVELS FOR CONCRETE AND SOIL CONTAINING PETROLEUM-RELATED CONSTITUENTS AT SWMU 14. The petroleum residue staining the concrete at SWMU 14 is most likely within the top layer of concrete in the detention pond. Because the concrete pad is a solidified mass, the likelihood of ingestion and inhalation of oil-containing dust from the pad is small. The most likely route of exposure for human or ecological receptors is either through dermal contact or ingestion of stormwater runoff from the detention pond.

The station presently is a group participant in the Navywide National Pollutant Discharge Elimination System (NPDES) stormwater discharge permit. That permit limits the amount of oil and grease in the discharge to 5.0 milligrams per liter (mg/ℓ). Visual parameters are also regulated in the permit. These parameters include debris, foam, and any sheen that can be seen in the discharge. The runoff from the detention pond after treatment must comply with all conditions of the existing NPDES permit. In addition, the runoff must comply with the Florida Surface Water Quality Standards given in Chapter 62-302 of the *Florida Administrative Code* (FAC) (Florida Department of Environmental Protection [FDEP], 1995). Table 1-1 gives target treatment levels for chemicals applicable to petroleum-related constituents. These chemicals were chosen based on the site history of SWMU 14. FAC 62-302 gives a full listing of the standards for surface water for all chemicals. The runoff leaving the detention pond after the demonstration would have to meet the full requirements of FAC 62-302 as well as the existing NPDES permit.

Soil south of the detention pond may contain residual levels of petroleum constituents as a result of overflow from the detention pond. Ingestion of soil at SWMU 14 is unlikely as the area is an industrial site, and access is restricted. Inhalation of petroleum-containing dust and dermal contact with the surface soils are the most likely exposure pathways for humans.

At the time the technology demonstration was conducted, soil containing petroleum-related constituents were to be compared to clean soil requirements after treatment as described in FAC, Chapter 62-775, "Soil Thermal Treatment Facilities" as well as *Guidelines for Assessment and Remediation of Petroleum Contaminated Soil* (FDEP, 1994a, 1994b). Target treatment levels for surface soils at SWMU 14 are listed in Table 1-2 and are based on the above-referenced documents.

Since the technology evaluation was conducted, FDEP has been in the process of modifying the soil cleanup goals for petroleum sites to human health risk-based soil cleanup target levels (SCTLs) (Tonner-Navarro and Roberts, 1997). Human health-based target treatment levels for soil at SWMU 14 are listed in Table 1-3.

1.3 AREA OF CONCRETE AND VOLUME OF SOIL CONTAINING PETROLEUM-RELATED CONSTITUENTS AT SWMU 14. RHS Technical Services, Inc. (RHS), the remedial action contractor, proposed to treat approximately 1,000 square yards of concrete stained with petroleum residue (RHS, 1995a). The treated area (approximately 800 square yards) is the concrete area within the detention pond (Figure 1-3).

Concrete stained with petroleum residues at the firefighting training mockups was not addressed during this demonstration.

Table 1-1
Target Treatment Levels for Surface Water Runoff

Navy Environmental Leadership Program
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Constituent	Target Treatment Level[1]
Acenaphthene	Shall not exceed 2,700 $\mu g/\ell$.
Anthracene	Shall not exceed 110,000 $\mu g/\ell$.
Benzene	Shall not exceed 71.28 $\mu g/\ell$ annual average.
Dissolved oxygen	Shall not average less than 5 mg/ℓ in a 24-hour period and shall never be less than 4 mg/ℓ. Normal daily and seasonal fluctuations above these levels shall be maintained.
Fluoranthene	Shall not exceed 370 $\mu g/\ell$.
Fluorene	Shall not exceed 14,000 $\mu g/\ell$.
Lead	Shall not exceed 5.6 $\mu g/\ell$.
Mercury	Shall not exceed 0.025 $\mu g/\ell$.
Oils and greases	Dissolved or emulsified oils and greases shall not exceed 5.0 mg/ℓ. No undissolved oil or visible oil shall be present so as to cause taste or odor or otherwise interfere with the beneficial use of the water.
PAHs[2]	Shall not exceed 0.031 $\mu g/\ell$ annual average[3].
pH	Shall not vary more than one standard unit above or below natural background provided that the pH is not lower than 6 standard units or above 8.5 standard units.
Pyrene	Shall not exceed 11,000 $\mu g/\ell$.

[1] Target treatment levels taken from the requirements of Florida Administrative Code 62-302, (Florida Department of Environmental Protection, 1995) for Class III marine waters.
[2] PAHs are the total of acenaphthylene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and phenanthrene.
[3] Annual average means the maximum concentration at average annual flow conditions.

Notes: SWMU = solid waste management unit.
$\mu g/\ell$ = micrograms per liter.
mg/ℓ = milligrams per liter.
PAH = polynuclear aromatic hydrocarbon.

Table 1-2
Target Treatment Levels for Soil Based on Thermal Treatment of Petroleum-Contaminated Soil

Navy Environmental Leadership Program
Technology Evaluation Report for SWMU 14
U.S. Naval Station
Mayport, Florida

Constituent	Target Treatment Level[1]
Total recoverable petroleum hydrocarbons	[2]50
Volatile organic aromatics (BTEX)	[3]100
Volatile organic halocarbons	[3]50
Polynuclear aromatic hydrocarbons	[3]1,000
Arsenic	10
Barium	4,940
Cadmium	37
Chromium	50
Lead	108
Mercury	23
Selenium	389
Silver	353

[1] Target treatment levels are specified in the Florida Administrative Code (FAC) 62-775. The values are in milligrams per kilogram (mg/kg) unless noted otherwise.
[2] If total recoverable petroleum hydrocarbons are below 10 mg/kg, polynuclear aromatic hydrocarbons and volatile organic halocarbons do not have to meet the target treatment levels listed in this table (FAC 62-775).
[3] Values are in mg/kg.

Notes: SWMU = Solid Waste Management Unit.
BTEX = benzene, toluene, ethylbenzene, and xylene.

Table 1-3
Target Treatment Levels for Soil Based on Human Health Soil Cleanup Target Levels[1]

Navy Environmental Leadership Program
Technology Evaluation Report for SWMU 14
U.S. Naval Station
Mayport, Florida

Analyte	Industrial Exposure[1]	Residential Exposure[1]	Leachability[2]
Volatile Organic Compounds (µg/kg)			
Benzene	1,500	1,100	7
1,2-Dichloroethane	900	600	20
Ethylbenzene	240,000	240,000	400
Methyl-tert-butyl-ether	6,100,000	350,000	200
Toluene	2,000,000	300,000	400
Xylene	290,000	290,000	300
Inorganic Analytes (mg/kg)			
Arsenic	3.7	0.8	[3]5.0
Barium	87,000	5,200	[3]100
Cadmium	640	37	[3]1.0
Chromium	430	290	[3]5.0
Lead[4]	1,000	500	[3]5.0
Mercury	28	3.7	[3]0.2
Selenium	10,000	390	[3]1.0
Silver	9,100	390	[3]5.0
Polynuclear Aromatic Hydrocarbons (µg/kg)			
Acenaphthene	22,000,000	2,300,000	4,000
Acenaphthylene	11,000,000	1,100,000	22,000
Anthracene	290,000,000	19,000,000	2,000,000
Benzo(a)anthracene	5,100	1,400	2,900
Benzo(a)pyrene	500	100	7,800
Benzo(b)fluoranthene	5,000	1,400	9,800
Benzo(g,h,i)perylene	45,000,000	2,300,000	13,000,000
Benzo(k)fluoranthene	52,000	15,000	25,000
Chrysene	490,000	140,000	80,000
Dibenzo(a,h)anthracene	500	100	14,000
Fluoranthene	45,000,000	2,800,000	550,000
Fluorene	24,000,000	2,100,000	87,000
Indeno(1,2,3-cd)pyrene	5,200	1,500	28,000
Naphthalene	8,600,000	1,000,000	1,000
Phenanthrene	29,000,000	1,900,000	120,00
Pyrene	40,000,000	2,200,000	570,000

See notes at end of table.

Table 1-3 (Continued)
Target Treatment Levels for Soil Based on Human Health Soil Cleanup Target Levels[1]

Navy Environmental Leadership Program
Technology Evaluation Report for SWMU 14
U.S. Naval Station
Mayport, Florida

Analyte	Industrial Exposure[1]	Residential Exposure[1]	Leachability[2]
Total Recoverable Petroleum Hydrocarbons (mg/kg)			
TRPH	2,600	370	340

[1] Industrial and residential exposure values in µg/kg are from *Development of Soil Cleanup Target Levels for Chapter 62-770, Florida Administrative Code* (Tonner-Navarro and Roberts, 1997).
[2] The leachability to groundwater criteria are applicable where a chemical is detected in soil and groundwater samples and exceeds its groundwater guidance concentrations. Values are in µg/kg unless noted otherwise.
[3] Analysis by Toxicity Characteristic Leaching Procedure. Values are in mg/kg.
[4] Direct exposure values from U.S. Environmental Protection Agency (USEPA), Revised Interim Soil Lead Guidance for CERCLA and RCRA Corrective Action Facilities, OSWER Directive 9355.4-12 (1994). The residential value is in the middle of the USEPA suggested range of 400 to 600 mg/kg.

Notes: SWMU = Solid Waste Management Unit.
µg/kg = micrograms per kilogram.
mg/kg = milligrams per kilogram.
TRPH = total recoverable petroleum hydrocarbons.
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act.
RCRA = Resource Conservation and Recovery Act.
OSWER = Office of Solid Waste and Emergency Response.

RHS proposed to treat approximately 100 cubic yards of soil containing petroleum-related constituents (RHS, 1995b). The treated area (approximately 55 feet by 25 feet, assuming a 2-foot depth) is shown on Figure 1-3 and is located south of the stormwater detention pond.

1.4 TECHNOLOGY EVALUATION REPORT. This technology evaluation report includes the following:

- a description of the technology demonstrated at SWMU 14;
- a summary of monitoring and sampling activities performed by RHS during the technology demonstration;
- a description of technical oversight activities performed by ABB-ES during the demonstration, including photographs, observations, and analytical results;
- an evaluation of the technology demonstration by comparison of analytical results to target treatment levels and cleanup goals;
- an assessment of the uncertainty associated with evaluating the technology demonstration's ability to meet the target treatment levels and cleanup goals, and
- conclusions based on findings from the technology demonstration.

2.0 SUMMARY OF TECHNOLOGY DEMONSTRATION ACTIVITIES AT SWMU 14

Through NELP, the Navy proposed to demonstrate *in situ* bioremediation of petroleum-related constituents from concrete and soil at SWMU 14. RHS was selected as the contractor, by the Navy, to demonstrate a technology to meet this goal.

2.1 RHS TECHNOLOGY DEMONSTRATION ACTIVITIES. The contractor, RHS, conducted the technology demonstration from January to July 1996. The technology demonstration consisted of two areas: *in situ* bioremediation of a concrete surface stained with petroleum residues and *in situ* bioremediation of soil containing petroleum-related constituents. Photographs of activities conducted by RHS are provided in Appendix A. The bioremediation was conducted using a mixture of Earthwise Formula One, the bioremediation catalyst, and WinterBio RBC TPH/RBC 109 microbial bioremediation product (RHS, 1996).

Concrete Surface Stained with Petroleum Residues. RHS proposed to treat 1,000 square yards of concrete stained with petroleum residues within the detention pond (RHS, 1995a). A microbial solution was applied to the concrete containing residual petroleum staining in several 10-square-foot areas. Once applied, the surface of the areas was periodically agitated using push brooms and a mechanical scrubber to emulsify and separate the oils from the concrete so the microbes could biodegrade the petroleum-related constituents (RHS, 1996). The remediated area was also sprayed with a fine mist of water to keep the surface wet throughout treatment and control temperature. RHS used visual inspection of the treatment area to determine when they considered the remediation process to be complete (RHS, 1996). After each iteration of solution application, RHS sprayed the area of treated concrete using a high-pressure washer to create runoff and mobilize any remaining petroleum-related constituents.

Runoff from the concrete remediation area flowed toward a drain at the northern end of the detention pond (Figure 2-1). Runoff from the treatment area was collected by RHS prior to the drain and placed in a temporary tank until the completion of the demonstration. Samples of the solution in the tank were collected by RHS at the completion of the demonstration to determine if the rinse water could be recycled and/or released to the OWTP.

The technology demonstration of the concrete surface was temporarily halted by RHS on February 5, 1996, because of cold temperatures. RHS indicated to the Navy that the daily temperatures were too cold for the microbial solution to be most effective. The technology demonstration was not continued until warmer temperatures occurred on May 1, 1996. Upon resuming the technology demonstration, RHS did not collect any surface water runoff samples from the detention pond before, during, or after this part of the demonstration.

Soil Containing Petroleum Constituents. RHS chose *in situ* bioremediation as the demonstration technology to treat the surface soils south of the detention pond. RHS sprayed a microbial solution on the land surface and rototilled the soil to ensure proper mixing and oxidation in the underlying soils (RHS, 1996). The soil was rototilled to a depth of 2 feet below land surface (bls). Soil samples were collected from various locations within the treatment area by RHS during and upon completion of the demonstration to assess the technology's effectiveness.

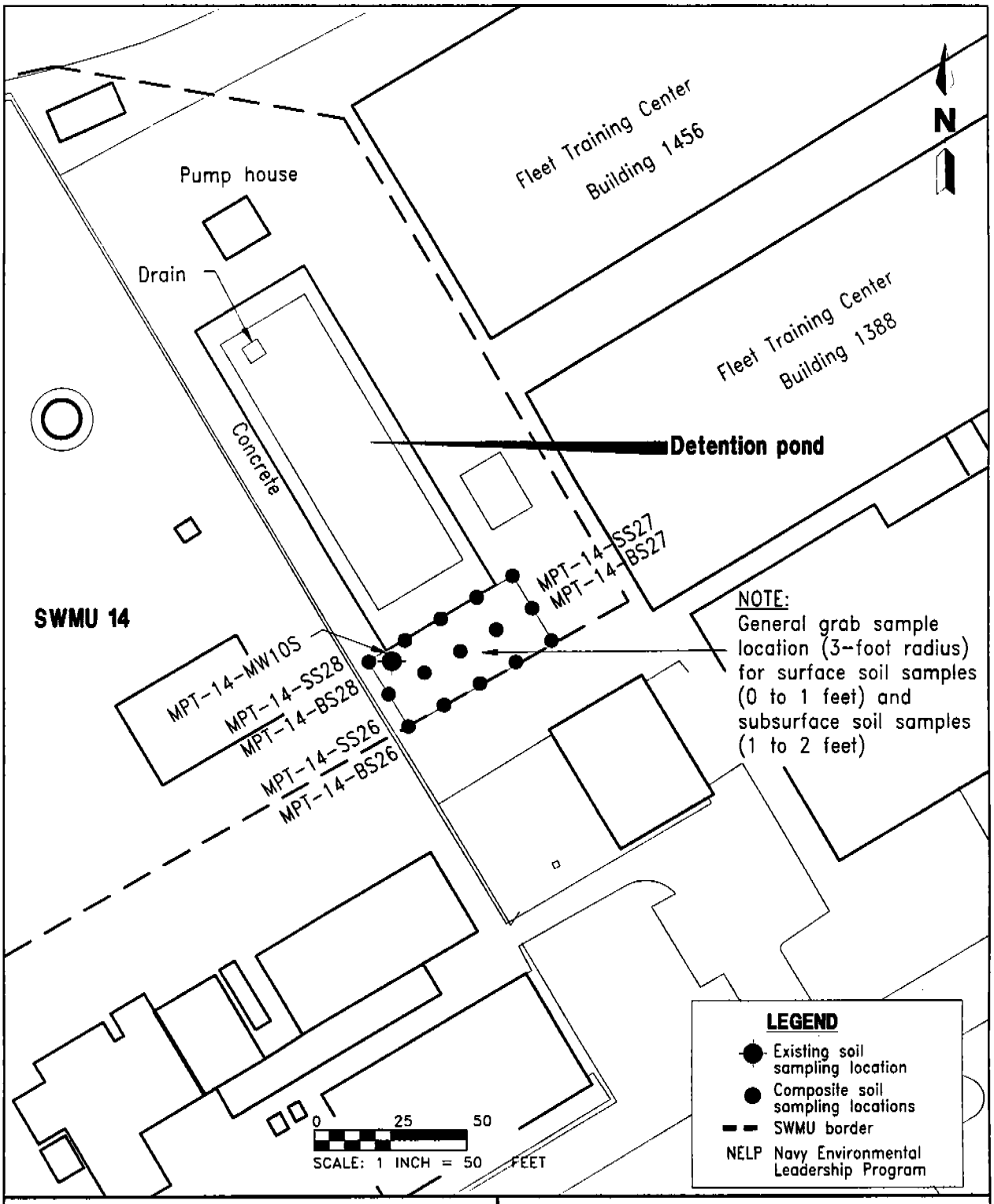

FIGURE 2-1
SOLID WASTE MANAGEMENT UNIT (SWMU) 14
SOIL SAMPLING LOCATIONS

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NELP TECHNOLOGY EVALUATION REPORT
SWMU 14

U.S. NAVAL STATION
MAYPORT, FLORIDA

The first soil sampling event was conducted on February 2, 1996. Subsequently, because of cold temperatures, the technology demonstration for the petroleum-impacted soil was temporarily halted by RHS on February 5, 1996. RHS indicated to the Navy that the daily temperatures were too cold for the microbial solution to be most effective. The technology demonstration was not continued until warmer temperatures occurred on May 1, 1996.

Subsequently, RHS collected additional soil samples on May 1, 1996, May 15, 1996, and July 10, 1996. The final sampling event coincided with ABB-ES's final performance sampling event. During this sampling event, ABB-ES and RHS split the soil samples that were collected. Please refer to RHS's report entitled *NELP Technology Demonstration Bioremediation of Concrete Surfaces and Soil at SWMU 14, U.S. Naval Station, Mayport, Florida* (RHS, 1996), for details of their soil sampling events conducted during the technology demonstration.

2.2 TECHNOLOGY DEMONSTRATION OVERSIGHT. ABB-ES provided technical oversight of the NELP technology demonstration contractor, RHS. ABB-ES was on site during the technology demonstration to observe contractor activities, as follows:

- site preparation,
- application and treating activities, and
- sampling.

Site Preparation. Site preparation of the detention pond was conducted by the Navy and included using water to spray sand that had collected in the pond into the drain located on the north side of the pond. The Navy removed the sand that collected in the drain.

Site preparation of the soil treatment area at SWMU 14 was conducted by RHS on January 17, 1996. Their site preparation activities included layout of the site boundary. RHS personnel measured and staked out the area to be treated and then placed a yellow caution tape around the border of the area. RHS personnel then rototilled the soil treatment area to a depth of approximately 2 feet bls using a conventional garden-type rototiller.

Application and Treating Activities. Application and treating activities at the soil treatment area commenced on January 19, 1996. The treatment area was raked using a rake with 2-inch-long tines. Subsequently, RHS tested soil at the treatment area for temperature, pH, nitrogen, phosphorus, and potassium to determine an application concentration for the bioaugmentation. RHS mixed up 110-gallon batches of the microbial solution on January 22 and 23, 1997, and applied it to the treatment area using buckets. After application, RHS covered the treatment area with black polyethylene sheeting.

The treatment of the concrete surface was initially conducted on January 24, 1996. RHS mixed up a batch of the microbial solution and initially used brushes to scrub the concrete. The scrubbing of the concrete did not resume until January 30 and 31, 1996, at which time RHS used mechanical scrubbers. The drain located at the northern end of the detention pond was plugged to prevent the microbial solution from being released to the OWTP. The "used" microbial solution was pumped from the pond to a 1,000-gallon-capacity holding tank.

On February 5, 1996, RHS determined that the weather was too cold for the technology to work successfully and requested that the project be delayed until warmer weather. The technology demonstration project was resumed in April 1996.

In April 1996, RHS rototilled the soil, applied the microbial solution, and then rototilled the solution into the soil. RHS made several other treatments; however, the number of treatments is not known. At this time ABB-ES was not conducting full-time oversight and the number of treatments was not provided in the RHS report (RHS, 1996).

The bioremediation of the concrete surface was recommenced on May 9, 1996, and completed on May 21, 1996 (RHS, 1996). The Navy cleaned out sand that accumulated in the detention pond since the first treatment was suspended because of the cold weather. Activities by RHS involved the application of the microbial solution, scrubbing the solution into the concrete, and rinsing the concrete with a 4,000-pounds-per-square-inch (psi) sprayer (RHS, 1996). The microbial solution was applied by spraying. This application and cleaning method was applied up to six times on some of the 10-foot by 10-foot concrete squares in the detention pond. During the washing and rinsing phases of treatment, droplets of free-phase hydrocarbons were observed to be leaking from the construction joints between the 10-foot by 10-foot concrete pads of the detention pond. The free-phase hydrocarbon droplets were observed to be leaking from the construction joints prior to the beginning of the technology demonstration. However, the pressure rinsing may have resulted in the removal of some of the gasket material in the construction joints.

Application of the microbial solution included mixing the solution in the desired ratio and operating the sprayers and pumps. The desired ratio of the microbial solution varied from day to day and depended on whether the soil or concrete was being treated. Generally the microbial solution consisted of the bacteria and microbes (RBC 109), the biocatalyst (Earthwise Formula One), and water. The solution was mixed in 55-gallon plastic drums using a wooden oar or paddle. The solution was left to set up for approximately 1 hour and then was transferred (pumped) from the drums through a garden hose to hand sprayers. The hand sprayers were used to apply the microbial solution to the soil or concrete. When the transfer pump was nonoperational or not available, RHS personnel also applied the microbial solution by pouring it from 5-gallon buckets onto the soil or concrete. Please refer to RHS's report entitled *NELP Technology Demonstration Bioremediation of Concrete Surfaces and Soil at SWMU 14, U.S. Naval Station, Mayport, Florida* (RHS, 1996), for details on the content and application of the microbial solution used during the demonstration.

Sampling. RHS did not collect any water samples during the technology demonstration for the *in situ* bioremediation of the concrete surface. RHS used visual inspections of the treated area to determine when the bioremediation process was complete (RHS, 1996).

RHS collected soil samples to determine an appropriate mixture of microbial solution and to assess the performance of the microbial solution at the soil treatment area. Parameters measured to determine the appropriate mixture were pH for nitrogen, phosphorous, and potassium using the Rapidtest soil tester.

RHS personnel periodically collected soil samples to assess the progress of the bioremediation. The soil samples were analyzed for total recoverable petroleum

hydrocarbons (TRPH) using the PetroFlag analyzer kit manufactured by DEXIL®. RHS personnel periodically collected temperature and moisture data from the soil treatment area using a moisture meter and a needle-type thermometer.

Please refer to RHS's report entitled *NELP Technology Demonstration Bioremediation of Concrete Surfaces and Soil at SWMU 14, U.S. Naval Station, Mayport, Florida* (RHS, 1996), for details on the PetroFlag analyzer kit and other RHS soil monitoring activities conducted during the demonstration.

2.3 TECHNOLOGY DEMONSTRATION CONFIRMATORY SAMPLING. The ABB-ES sampling and analysis program consisted of collecting baseline and performance evaluation samples from the detention pond and the soil treatment area at SWMU 14. Surface water samples were collected from the detention pond, and surface and subsurface soil samples were collected from the soil treatment area located south of the detention pond (Figure 1-3). Baseline samples were used to characterize the media sampled prior to RHS conducting the technology demonstration. The performance evaluation samples were collected to assess whether or not the technology demonstration achieved the target treatment levels.

Quality assurance and quality control (QA/QC) samples were also collected during baseline and performance sampling events to assess the validity of the data obtained during sample analysis.

The baseline sampling event for the technology demonstration at the detention pond took place on January 11, 1996, and the performance evaluation sampling event was on May 21, 1996.

The first baseline sampling event for the technology demonstration at the soil treatment area took place on January 9, 1996, and January 18, 1996. The surface and subsurface soil samples collected on January 9, 1996, represent conditions prior to RHS rototilling the soil. The surface and subsurface soil samples collected on January 18, 1996, represent conditions after the rototilling, prior to the application of the microbial solution.

After the technology demonstration was restarted from the temporary suspension because of weather considerations, additional baseline samples were collected on April 19, 1996. The performance evaluation samples for the *in situ* soil bioremediation activities were collected on June 10, 1996.

Below is the rationale for collection and analysis of baseline and performance evaluation samples at SWMU 14 during the technology demonstration.

2.3.1 Baseline Sampling Below is a description of the baseline surface water sampling event at the detention pond and surface and subsurface soil samples from the soil treatment area.

Surface Water Sampling at the Detention Pond. Prior to RHS conducting the technology demonstration at the detention pond, sand and water that had collected in the bottom of the pond were removed. The accumulation of runoff from a precipitation event in the detention pond was simulated on January 11, 1996. Surface water samples were collected during the simulated runoff event. The detention pond outlet was plugged to collect water used during the baseline performance sampling event at the drain.

The petroleum-stained concrete surface of the detention pond was rinsed by ABB-ES prior to treatment, using two garden hoses. Two one-inch-diameter garden hoses were placed at the south end of the pond, one on each side of the concrete slope. The hoses were moved to the north along the sides of the pond approximately 10 feet every 10 minutes in order to direct the flow of runoff water to the drain at the north end and rinse the majority of the surface area of the detention pond. The hoses were moved in this manner throughout the duration of the runoff event, approximately 140 minutes. The surface water accumulated at the bottom of the detention pond with the majority at the detention pond drain.

Four surface water samples were collected: one sample at the beginning of the simulated runoff event, two in the middle, and one sample at the end of the simulated runoff event. The volume of water used was measured by flow rate and time so the same volume would be used to collect the performance evaluation samples. Below is the surface water sample location, sample number, corresponding duration (minutes) from the start of the test, and volume (gallons) for the baseline sampling event.

Sample Location	Sample Identifier	Time (minutes from start of test)	Volume (gallons)
MPT-14-SW09	14W009	20	10
MPT-14-SW10	14W010	60	330
MPT-14-SW11	14W011	100	660
MPT-14-SW12	14W012	140	1,000

Each of the samples was collected at the location of the drain at the northern end of the detention pond (Figure 2-1).

Surface and Subsurface Soil Sampling at the Soil Treatment Area. Surface and subsurface soil samples were collected on January 9 and January 18, 1996, in the soil treatment area located to the south of the detention pond (Figure 2-1). The requirements for soil sampling were based on the *Guidelines for the Assessment and Remediation of Petroleum Contaminated Soil* (FDEP, 1994). The guidelines specify that soil containing petroleum-related constituents, to be treated by a method other than thermal treatment, should use a pretreatment soil sampling frequency equivalent to the requirements of FAC 62-775.410.

Based on RHS treating 100 cubic yards of soil, FAC 62-775.410 stipulates the collection of at least three composite soil samples. A sampling grid size was calculated assuming a 90 percent probability of finding a hot spot 12 feet in radius using a geostatistical model developed by R.O. Gilbert (1987). Based on the above assumptions, the appropriate grid size was determined to be approximately 14 feet. The calculations for determining the grid size are provided in Appendix B.

Each composite surface and subsurface soil sample consisted of five grab sample aliquots. The grab samples were collected approximately 3 to 5 linear feet apart along lines parallel to the edge of the detention pond (Figure 2-1). The surface soil samples were collected from land surface to a depth of 1 foot, and the subsurface soil samples were collected from 1 to 2 feet bls. The actual grab sampling locations were biased by collecting the sample at an area of obvious staining or stressed vegetation.

The samples from locations MPT-14-SS26 and MPT-14-SS27 were collected on January 9, 1996. These samples are representative of conditions prior to RHS rototilling the soil. The samples from location MPT-14-SS28 were collected on January 18, 1996, after completion of the rototilling, prior to the application of the microbial solution.

ABB-ES collected an additional set of baseline surface and subsurface soil samples from locations MPT-14-SS26, MPT-14-SS27, and MPT-14-SS28 on April 19, 1996, after the temporary suspension by RHS of the technology demonstration because of weather considerations.

2.3.2 Performance Evaluation Sampling ABB-ES collected performance evaluation samples at the detention pond and soil treatment area after receiving notification from the Navy that RHS had determined that the technology demonstrations were complete.

Surface Water Sampling at the Detention Pond. ABB-ES conducted surface water sampling at the detention pond in the same manner as conducted previously during the baseline sampling event. The following table presents the surface water samples and the corresponding time and volume at which they were collected during the runoff event.

Below is the surface water sample location, sample number, corresponding duration (minutes) from the start of the test, and volume (gallons) for the baseline sampling event.

Sample Location	Sample Identifier	Time (minutes from start of test)	Volume (gallons)
MPT-14-SW13	14W013	20	10
MPT-14-SW14	14W014	60	330
MPT-14-SW15	14W015	100	660
MPT-14-SW16	14W016	140	1,000

Each of the samples was collected at the location of the drain at the northern end of the detention pond (Figure 2-1).

Surface and Subsurface Soil Sampling at the Soil Treatment Area. Surface and subsurface soil samples were collected from locations MPT-14-SS26, MPT-14-SS27, and MPT-14-SS28 on July 10, 1996, from the same general locations as sampled during the baseline sampling events (Figure 2-1).

2.3.3 Sampling and Analytical Procedures. The methods used for surface water and soil sample collection were consistent with standard operating procedures described in the NAVSTA Mayport Resource Conservation and Recovery Act (RCRA) Facility Investigation workplan (ABB-ES, 1991), the NAVSTA Mayport General Information report (ABB-ES, 1995), and U.S. Environmental Protection Agency (USEPA) Region IV standard operating procedures (USEPA, 1991).

Surface water samples were analyzed for petroleum-related constituents listed in FAC 62-302, using the appropriate testing method, and were based on the site history of SWMU 14 (Table 2-1). Surface water samples were also analyzed for TRPH, although not listed in FAC 62-302, to provide a baseline to assess the effectiveness of the technology demonstration.

Table 2-1
Surface Water Sample Analysis

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Constituent	Testing Method
Acenaphthene	USEPA Method SW-846 8310
Anthracene	USEPA Method SW-846 8310
Benzene	USEPA Method SW-846 8020
Dissolved oxygen	USEPA Method 360.1 or 360.2
Fluoranthene	USEPA Method SW-846 8310
Fluorene	USEPA Method SW-846 8310
Lead	USEPA Method SW-846 7000
Mercury	USEPA Method SW-846 7470
Oils and greases	USEPA Method 413.1
Polynuclear aromatic hydrocarbons	USEPA Method SW-846 8310
Pyrene	USEPA Method SW-846 8310
Total recoverable petroleum hydrocarbons	USEPA Method 418.1

Notes: SWMU = Solid Waste Management Unit.
USEPA = U.S. Environmental Protection Agency.

Surface and subsurface soil samples were analyzed for petroleum-related constituents derived from the clean soil requirements described in FAC 62-775, *Soil Thermal Treatment Facilities* (Table 2-2).

The analysis of the surface water and soil samples was conducted using appropriate USEPA methodology contained in the document *Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, SW846* (USEPA, 1986). The analysis of surface water samples was also conducted using *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020 (USEPA, 1983) when appropriate. A summary of the analytical results is provided in Appendix C.

The groundwater and soil samples were placed in a cooler with ice and shipped by express-overnight delivery to a Naval Energy and Environment Support Activity (NEESA) approved laboratory under chain-of-custody protocol.

QA/QC Sampling. QA/QC samples were collected according to NEESA Level C requirements. QA/QC samples were collected during baseline and performance evaluation sampling. Trip, rinsate, and field blanks were collected and analyzed. Trip blanks were analyzed for only volatile organic compounds (VOCs). Environmental sample duplicates, matrix spike and matrix spike duplicate pairs, rinsate, and water source blanks were analyzed for the same constituents as the surface water and soil samples.

The analytical data package produced by the laboratory was NEESA Level C. The rationale for using NEESA Level C was to provide analytical data that could be validated substituting the SW846 method criteria for USEPA's Contract Laboratory Program method criteria according to *National Functional Guidelines for Organic Data Review* (USEPA, 1990). The data were validated so that the appropriate decision could be made as to whether or not SWMU 14 should be further evaluated through the RCRA Corrective Action Program. Data validation information is provided in Appendix D.

2.4 TEMPERATURE AND RAINFALL DATA. Maximum and minimum air temperature measurements and rainfall amounts were obtained for the period of January 15, 1996, to February 5, 1996, and May 1, 1996, to June 30, 1996, from the NAVSTA Mayport meteorology department. Periodic measurements were also made of the temperature of the soil at the treatment site. These data are presented in Section 3.2 along with the analytical results of the performance sampling.

A copy of the ABB-ES site logbook containing all oversight activities is provided in Appendix E.

Table 2-2
Surface and Subsurface Soil Analysis

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Constituent	Testing Method[1]
Volatile organic aromatics (BTEX)	USEPA Method 5030/8021 or 5030/8020
Total recoverable petroleum hydrocarbons	USEPA Draft Method 3540/9073
Volatile organic halocarbons	USEPA Method 5030/8010 or 5030/8021
Metals[2] (total)	USEPA Method 6000 and 7000

[1] USEPA SW-846 as specified by Florida Administrative Code 62-775.
[2] Arsenic, barium, cadmium, lead, mercury, selenium, and silver.

Notes: SWMU = Solid Waste Management Unit.
BTEX = benzene, toluene, ethylbenzene, and xylene.
USEPA = U.S. Environmental Protection Agency.

3.0 RESULTS AND EVALUATION OF TECHNOLOGY DEMONSTRATION SAMPLING EVENTS

This chapter presents analytical results from the baseline and performance evaluation sampling events that were obtained during the technology demonstration at the detention pond and soil treatment area and a comparison of the analytical results to target cleanup goals.

3.1 BASELINE AND PERFORMANCE EVALUATION SAMPLING AT THE DETENTION POND. Below are analytical results of surface water samples collected during the baseline and performance evaluation sampling events and comparison of the analytical results to target cleanup goals (Table 1-1) for the Detention Pond.

Baseline Sampling Events. Below are field measurements made during the baseline sampling event for pH, temperature, and dissolved oxygen.

Sample Location	Ph (standard units)	Temperature (centigrade)	Dissolved Oxygen (milligrams per liter)
MPT-14-SW09	7.12	18	8.2
MPT-14-SW10	7.42	17.4	6.2
MPT-14-SW11	7.44	17.6	5.9
MPT-14-SW12	7.4	17.9	5.6

An average pH of approximately 7.5 standard units was measured while collecting background surface water samples from the St. Johns River in September 1994 (ABB-ES, 1995). The pH measurements made during the baseline sampling event appear to comply with the criterion specified for Class III marine waters under FAC 62-302 (Table 1-1).

Measured values for dissolved oxygen appear to comply with the criterion specified for Class III marine waters under FAC 62-302 (Table 1-1).

None of the target VOCs, polynuclear aromatic hydrocarbons (PAHs) or inorganic analytes (Table 2-1), if present, were detected at concentrations exceeding the detection limit in the baseline surface water samples collected on January 11, 1996 (Table 3-1).

Oil and grease were detected at concentrations ranging from 12.3 to 25.7 mg/ℓ (Table 3-1). An arithmetic mean of 16.6 mg/ℓ was calculated for oil and grease. Samples and duplicates are considered one sample when calculating the arithmetic mean. Therefore, the arithmetic mean includes the average value for a sample and associated duplicate. The concentrations of oil and grease detected in the surface water samples (Table 3-1) appear to not comply with the criterion specified for Class III marine waters under FAC 62-302 (Table 1-1).

TRPH was detected at concentrations ranging from 0.92 to 12.1 mg/ℓ in baseline runoff samples collected from the detention pond (Table 3-1). An arithmetic mean of 6.5 was calculated for TRPH. Currently, there is no criterion under FAC 62-302 for TRPH.

Table 3-1
Analytes Detected in Baseline Surface Water Samples at SWMU 14

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Analytical Batch Number:	M9936	M9936	M9936	M9936	M9936
Sample Location:	MPT-14-SW09	MPT-14-SW10	MPT-14-SW10	MPT-14-SW11	MPT-14-SW12
Sample Number:	14W009	14W010	14W010D	14W011	14W012
Date Sampled:	11-JAN-96	11-JAN-96	11-JAN-96	11-JAN-96	11-JAN-96
Volatile Organic Compounds (µg/ℓ)					
Target analytes not detected.	--	--	--	--	--
Inorganic Analytes (µg/ℓ)					
Target analytes not detected.	--	--	--	--	--
Polynuclear Aromatic Hydrocarbons (µg/ℓ)					
Target analytes not detected.	--	--	--	--	--
General Parameters (mg/ℓ)					
Oil and grease	22.3	11.6	25.7	12.3	13.2
TRPH	0.92	8.75	12.1	7.07	7.45

Notes: SWMU = Solid Waste Management Unit.
D = duplicate.
µg/ℓ = micrograms per liter.
-- = target analytes, if present, were less than the detection limit.
mg/ℓ = milligrams per liter.
TRPH = total recoverable petroleum hydrocarbons.

Performance Evaluation Sampling Event. Below are field measurements made during the performance evaluation sampling event for pH, temperature, and dissolved oxygen.

Sample Location	Ph (standard units)	Temperature (centigrade)	Dissolved Oxygen (milligrams per liter)
MPT-14-SW13	7.29	28.8	3.2
MPT-14-SW14	7.32	29.3	3.4
MPT-14-SW15	7.36	28.8	3.5
MPT-14-SW16	7.36	27.8	3.5

Comparison of the pH measurements made during the performance evaluation sampling event to the average value for the St. Johns River (ABB-ES, 1995), suggest that the measured values comply with the criterion specified for Class III marine waters under FAC 62-302 (Table 1-1).

Measured values for dissolved oxygen appear to not comply with the criterion specified for Class III marine waters under FAC 62-302 (Table 1-1).

None of the target VOCs, or inorganic analytes (Table 2-1), if present, were detected at concentrations exceeding the detection limit in the performance evaluation surface water samples collected on May 21, 1996 (Table 3-2). One PAH, phenanthrene, was detected at a concentration of 5 micrograms per liter in surface water sample 14W014. Currently, there is no individual criterion under FAC 62-302 for phenanthrene. Based on the detection of phenanthrene in the environmental sample and not in the associated duplicate, there is a low probability that this singular detection would result in noncompliance with the total PAH criterion specified for Class III marine waters under FAC 62-302 (Table 1-1).

Oil and grease were detected at concentrations ranging from 7.58 to 31.1 mg/ℓ in performance evaluation samples collected from the detention pond (Table 3-2). An arithmetic mean of 15.8 mg/ℓ was calculated for oil and grease. The concentrations of oil and grease detected in the surface water samples (Table 3-2) appear to not comply with the criterion specified for Class III marine waters under FAC 62-302 (Table 1-1). The average values for oil and grease in the baseline and performance evaluation surface water samples were relatively similar.

TRPH was detected at concentrations ranging from 1.51 to 18.8 mg/ℓ in performance evaluation samples collected from the detention pond. An arithmetic mean of 6.7 was calculated for TRPH. The average values for TRPH in the baseline and performance evaluation surface water samples were relatively similar.

The analytical results from the baseline and performance evaluation surface water samples suggest that there was minimal difference prior to and after the technology demonstration at the detention pond. Concentrations of oil and grease detected in both the baseline and performance evaluation surface water samples were not in compliance with FAC 62-302.

Table 3-2
Analytes Detected in Performance Surface Water Samples at SWMU 14

Navy Environmental Leadership Program
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Analytical Batch Number:	MA970	MA970	MA970	MA970	MA970	MA970
Sample Location:	MPT-14-SW13	MPT-14-SW14	MPT-14-SW14	MPT-14-SW15	MPT-14-SW15	MPT-14-SW16
Sample Number:	14W013	14W014	14W014D	14W015	14W015D	14W016
Date Sampled:	21-MAY-96	21-MAY-96	21-MAY-96	21-MAY-96	21-MAY-96	21-MAY-96
Volatile Organic Compounds (µg/ℓ)						
Target analytes not detected.	--	--	--	--	NA	--
Inorganic Analytes (µg/ℓ)						
Target analytes not detected.	–	–	--	--	NA	--
Polynuclear Aromatic Hydrocarbons (µg/ℓ)						
Phenanthrene	--	5	--	--	NA	--
General Parameters (mg/ℓ)						
Oil and grease	31.1	7.58	NA	12.4	15.3	10.9
TRPH	18.8	3.63	NA	2.96	2.75	1.51

Notes: SWMU = Solid Waste Management Unit.
D = duplicate.
µg/ℓ = micrograms per liter.
– = target analytes, if present, were less than the detection limit.
NA = not analyzed.
mg/ℓ = milligrams per liter.
TRPH = total recoverable petroleum hydrocarbons.

The leaking of free-phase hydrocarbon from beneath the detention pond likely contributes to the phenanthrene, oil and grease, and TRPH detected in the surface water samples. This release of free-phase hydrocarbons to water contained in the detention pond was observed prior to and after the technology demonstration. It is also possible that the rinsing of the detention pond with the high pressure washer (4,000 psi) may also have removed some of the gasket material that separates the 10-foot by 10-foot square concrete pads that make up the detention pond.

The detention pond looked cleaner at the end of the technology demonstration. However, this may be more attributed to RHS using a 4,000-psi pressure washer to rinse the microbial solution from the concrete rather than bioremediation and scrubbing. Additionally, a concrete core obtained from the detention pond suggested that petroleum-related compounds had migrated approximately 3/4 of an inch into the concrete. It is not likely that the microbial solution would remove the petroleum-related compounds that penetrated the concrete.

3.2 SOIL TREATMENT AREA. Below are analytical results of surface and subsurface soil samples collected during the baseline and performance evaluation sampling events and comparison of the analytical results to target cleanup goals (Tables 1-2 and 1-3) for the soil treatment area.

3.2.1 Surface Soil Samples Target analytes detected in baseline and performance evaluation surface soil samples are provided in Table 3-3. VOCs were not detected in the surface soil samples. Volatile organic halocarbons (VOHs) were detected as a single occurrence in the performance evaluation sample collected at location MPT-14-SS27. VOHs were not detected in the corresponding environmental sample. The concentration of VOHs detected (Table 3-3) was in compliance with the thermal treatment of petroleum-contaminated soil (Table 1-2).

Three PAHs, pyrene, benzo(a)anthracene, and chrysene, were detected in a surface soil sample collected at the location of monitoring well MPT-14-MW10S (Figure 2-1). Monitoring well MPT-14-MW10S was installed for the RCRA Facility Investigation conducted for the Group III SWMUs at NAVSTA Mayport (ABB-ES, 1996).

The sum of the three PAH concentrations (2,960 micrograms per kilogram [µg/kg]) was not in compliance with the target treatment level (1,000 µg/kg) based on thermal treatment of petroleum-contaminated soil (Table 1-2). In addition, pyrene was detected (Table 3-3) at a concentration that was not in compliance with the residential SCTL (Table 1-3). However, the detection of the three PAHs was not confirmed during the technology demonstration. The PAHs were not detected in the baseline or performance evaluation surface soil samples.

The inorganic analytes (arsenic, barium, cadmium, chromium, lead, and mercury) were detected in the baseline and performance samples. Two inorganic chemicals, selenium and silver, that were target analytes of the baseline and performance evaluation samples, if present, were less than the detection limits.

Arsenic was detected in the baseline surface soil samples (Table 3-3) at a concentration that is not in compliance with the residential SCTL (Table 1-3).

Duplicate soil samples collected at location MPT-14-SS27 in January and April 1996 suggest that there was considerable variation between the concentrations of

Table 3-3
Analytes Detected in Surface Soil Samples at SWMU 14

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Analytical Batch Number:	R9756	M9907	MA782	MB348	M9970	M9970	MA782
Sample Location:	MPT-14-MW10S	MPT-14-SS26	MPT-14-SS26	MPT-14-SS26	MPT-14-SS27	MPT-14-SS27	MPT-14-SS27
Sample Number:	14S01001	14S02601	14S02601	14S02601	14S02701	14S02701D	14S02701
Date Sampled:	09-APR-95	09-JAN-96	19-APR-96	10-JUL-96	09-JAN-96	09-JAN-96	19-APR-96
Sample Depth (ft bls):	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Volatile Organic Compounds (µg/kg)							
Target analytes not detected.	--	--	--	--	--	--	--
Volatile organic halocarbons	NA	--	--	--	--	--	--
Inorganic Analytes (mg/kg)							
Arsenic	0.44 J	0.96 J	0.43 J	0.56 J	0.99 J	2.1 J	0.97 J
Barium	4.9 J	6.8 J	--	--	6.5 J	7.9 J	--
Beryllium	0.06 J	NA	NA	NA	NA	NA	NA
Cadmium	--	--	--	--	--	--	--
Chromium	2.5	5.7	3.4	3.2	4.1	7.3	5.2
Copper	4.7 J	NA	NA	NA	NA	NA	NA
Lead	3.2	4.1 J	5 J	3.1	5.2 J	5.5 J	5.8 J
Mercury	--	--	--	--	--	--	0.13
Vanadium	1.7 J	NA	NA	NA	NA	NA	NA
Zinc	20.7	NA	NA	NA	NA	NA	NA
Polynuclear Aromatic Hydrocarbons (µg/kg)							
Benzo(a)anthracene	120 J	--	--	--	--	--	--
Chrysene	140 J	--	--	--	--	--	--
Pyrene	2,700	--	--	--	--	--	--
Total Recoverable Petroleum Hydrocarbons (mg/kg)							
TRPH	NA	--	28.1	37.7	2.2	--	60.1

See notes at end of table.

Table 3-3 (Continued)
Analytes Detected in Surface Soil Samples at SWMU 14

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Analytical Batch Number:	MA782	MB348	MB348	M9986	M99862	MA782	MB348
Sample Location:	MPT-14-SS27	MPT-14-SS27	MPT-14-SS27	MPT-14-SS28	MPT-14-SS28	MPT-14-SS28	MPT-14-SS28
Sample Number:	14S02701D	14S02701	14S02701D	14S02801	14S02801D	14S02801	14S02801
Date Sampled:	19-APR-96	10-JUL-96	10-JUL-96	18-JAN-96	18-JAN-96	19-APR-96	10-JUL-96
Sample Depth (ft bls):	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Volatile Organic Compounds (µg/kg)							
Target analytes not detected.	--	--	--	--	--	--	--
Volatile organic halocarbons	--	--	15	--	--	--	--
Inorganic Analytes (mg/kg)							
Arsenic	1.7	0.54 J	0.63 J	--	--	0.42 J	--
Barium	--	6.6 J	6.1 J	6.3 J	9.1 J	--	5.3 J
Beryllium	NA	NA	NA	NA	NA	NA	NA
Cadmium	--	--	--	--	0.47 J	--	--
Chromium	5.2	4.6 J	3.1	2.6	3.2	2.3	3.1
Copper	NA	NA	NA	NA	NA	NA	NA
Lead	5.9 J	4.1	5.3 J	2.9 J	3.7	2.8 J	7.1 J
Mercury	--	--	--	--	--	--	--
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA
Polynuclear Aromatic Hydrocarbons (µg/kg)							
Benzo(a)anthracene	--	--	--	--	--	--	--
Chrysene	--	--	--	--	--	--	--
Pyrene	--	--	--	--	--	--	--
Total Recoverable Petroleum Hydrocarbons (mg/kg)							
TRPH	43.1	77.8	111	6,390	8,330	28.2	113

Notes: SWMU = Solid Waste Management Unit.
D = duplicate.
ft bls = feet below land surface.
µg/kg = micrograms per kilogram.
-- = target analyte, if present, was less than the detection limit.
NA = not analyzed.
mg/kg = milligrams per kilogram.
J = estimated value.
TRPH = total recoverable petroleum hydrocarbons.

arsenic detected in the environmental sample and its duplicate. This is based on the relative percent difference (RPD) between the environmental and duplicate samples. The RPD can be used to judge the precision of the analytical results for the sample pairs. An RPD of ±35 percent for a sample and its duplicate is generally considered acceptable precision for arsenic (USEPA, 1988). The RPDs for sample pairs collected at MPT-14-SS27 were 72 percent for January 1996, 55 percent for April 1996, and 15 percent for July 1996. The variation could result from the lack of precision of the analytical method, a variation in concentration over short distances, or incomplete mixing (homogenization) of the sample.

Beryllium, copper, vanadium, and zinc were also detected in the surface soil sample collected at monitoring well MPT-14-MW10S. These four inorganic chemicals were not target analytes for the baseline and performance sampling events.

Measurements of TRPH suggest that the concentrations increased from the baseline to performance evaluation sampling events at locations MPT-14-SS26 and MPT-14-SS27 and decreased at location MPT-14-SS28.

Each of the surface soil samples collected from the three sampling locations exhibited a different temporal distribution for TRPH. TRPH appears to slightly increase from nondetect to 37.7 milligrams per kilogram (mg/kg) in the sample collected at sampling location MPT-14-SS26. The concentration of TRPH in the samples collected from location MPT-14-SS26 was in compliance with the thermal desorption criteria (Table 1-2) and the SCTLs (Table 1-3).

An environmental sample and duplicate were collected at sampling location MPT-14-SS27 during each sampling event. TRPH appears to increase from nondetect to 60.1 mg/kg in the samples collected during the two baseline sampling events and increased to 111 mg/kg in the performance evaluation sample. The RPDs calculated for the April 1996 and July 1996 sampling events were 33 and 35 percent. There is no RPD criterion to evaluate TRPH. One baseline sample result (14S02701, Table 3-3) was not in compliance with the thermal desorption criterion (Table 1-2). However, the RPD for the April 1996 sample results suggests that there is some uncertainty with this exceedance. The other baseline sample results for sampling location MPT-14-SS27 were in conformance with the thermal desorption criteria (Table 1-2) and the SCTLs (Table 1-3). The performance evaluation samples (14S02701 and 14S02701D, Table 3-3) were not in conformance with the thermal desorption criteria (Table 1-2), but were in conformance with the SCTLs (Table 1-3).

The baseline environmental sample and duplicate collected in January 1996 at sampling location MPT-14-SS28 were not in conformance with either the thermal desorption criteria (Table 1-2) or the SCTLs (Table 1-3). The subsequent baseline sample collected in April 1996 contained substantially less TRPH, but TRPH appears to increase in the sample collected for the performance evaluation event. The performance evaluation sample contained TRPH at concentrations that were not in conformance with the thermal desorption criteria (Table 1-2), but are in conformance with the SCTLs (Table 1-3).

3.2.2 **Subsurface Soil Samples** VOCs and PAHs, if present, were not detected at concentrations that exceeded the detection limit in the subsurface soil samples (Table 3-4).

Table 3-4
Analytes Detected in Subsurface Soil Samples at SWMU 14

Navy Environmental Leadership Program
Technology Evaluation Report for SWMU 14
U.S. Naval Station
Mayport, Florida

Analytical Batch Number:	M9000	M9907	MA782	MB348	M9970
Sample Location:	MPT-14-MW10S	MPT-14-SS26	MPT-14-SS26	MPT-14-SS26	MPT-14-SS27
Sample Number:	14B01004	14B02602	14B02602	14B02602	14B02702
Date Sampled:	22-MAY-95	09-JAN-96	19-APR-96	10-JUL-96	09-JAN-96
Sample Depth (ft bls):	3 to 4	1 to 2	1 to 2	1 to 2	1 to 2
Volatile Organic Compounds (µg/kg)					
Target analytes not detected.	--	--	--	--	--
Volatile organic halocarbons	NA	--	--	--	--
Inorganic Analytes (mg/kg)					
Arsenic	0.79 J	0.63 J	0.57 J	0.53 J	0.59 J
Barium	3.2 J	3.4 J	--	3.4 J	2.9 J
Beryllium	0.11 J	NA	NA	NA	NA
Chromium	3.2	3	2.7	2.8	3.2
Copper	0.87 J	NA	NA	NA	NA
Lead	1.3	1.6 J	3.5 J	2	2.5 J
Selenium	0.13 J	NA	NA	NA	NA
Tin	3.5 J	NA	NA	NA	NA
Vanadium	2.2 J	NA	NA	NA	NA
Polynuclear Aromatic Hydrocarbons (µg/kg)					
Target analytes not detected.	--	--	--	--	--
Total Recoverable Petroleum Hydrocarbons (mg/kg)					
TRPH	NA	--	13.8	16.5	--

See notes at end of table.

Table 3-4 (Continued)
Analytes Detected in Subsurface Soil Samples at SWMU 14

Navy Environmental Leadership Program
Technology Evaluation Report for SWMU 14
U.S. Naval Station
Mayport, Florida

Analytical Batch Number:	MA782	MB348	M9986	MA782	MB348
Sample Location:	MPT-14-SS27	MPT-14-SS27	MPT-14-SS28	MPT-14-SS28	MPT-14-SS28
Sample Number:	14B02702	14B02702	14B02802	14B02802	14B02802
Date Sampled:	19-APR-96	10-JUL-96	18-JAN-96	19-APR-96	10-JUL-96
Sample Depth (ft bls):	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2
Volatile Analytes (µg/kg)					
Target analytes not detected.	--	--	--	--	--
Volatile organic halocarbons	--	--	--	--	--
Inorganic Analytes (mg/kg)					
Arsenic	0.28 J	0.47 J	--	0.44 J	--
Barium	--	4.3 J	4.3 J	--	3.6 J
Beryllium	NA	NA	NA	NA	NA
Chromium	3	3.4	3	2.7	3
Copper	NA	NA	NA	NA	NA
Lead	1.9 J	6.3	3.3	2.1 J	3
Selenium	NA	NA	NA	NA	NA
Tin	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA
Polynuclear Aromatic Hydrocarbons (µg/kg)					
Target analytes not detected.	--	--	--	--	--
Total Recoverable Petroleum Hydrocarbons (mg/kg)					
TRPH	24.9	94.1	1,680	36.7	22.1

Notes: SWMU = Solid Waste Management Unit.
ft bls = feet below land surface.
µg/kg = micrograms per kilogram.
-- = target analyte, if present, was less than the detection limit.
NA = not analyzed.
mg/kg = milligrams per kilogram.
J = estimated value.
TRPH = total recoverable petroleum hydrocarbons.

The inorganic analytes (arsenic, barium, chromium, and lead) were detected in the baseline and performance samples (Table 3-4). Four inorganic chemicals (cadmium, mercury, selenium, and silver) that were target analytes of the baseline and performance evaluation samples, if present, were less than the detection limits.

Beryllium, copper, vanadium, and zinc were also detected in the subsurface soil sample collected at monitoring well MPT-14-MW10S. These four inorganic chemicals were not target analytes for the baseline and performance sampling events.

None of the inorganic analytes (Table 3-4) were detected at concentrations that exceeded the thermal desorption criteria (Table 1-2) or the SCTLs (Table 1-3). TRPH, if present, was not detected at concentrations exceeding the detection limits in the baseline subsurface soil samples collected in January 1996, from locations MPT-14-SS26 and MPT-14-SS27. TRPH was detected in the baseline subsurface soil sample collected in January 1996, from location MPT-14-SS28 at a concentration that is not in conformance with the thermal desorption criterion (Table 1-2) or the SCTLs (Table 1-3).

TRPH, if present, was not detected in the baseline subsurface soil sample collected in April 1996, from location MPT-14-SS26. TRPH was detected in the baseline subsurface soil samples collected in April 1996, from locations MPT-14-SS27 and MPT-14-SS28 at concentrations that were in conformance with the thermal desorption criterion and the SCTLs.

TRPH was detected in the performance evaluation subsurface soil samples collected in July 1996, from locations MPT-14-SS26 and MPT-14-SS28 at concentrations that were in conformance with the thermal desorption criteria and the SCTLs. TRPH was detected in the performance evaluation subsurface soil sample collected in July 1996, from location MPT-14-SS27 at a concentration that was not in conformance with the thermal desorption criterion, but was in conformance with the SCTLs.

3.3 **RAINFALL AND TEMPERATURE**. Maximum and minimum air temperature measurements were obtained along with daily rainfall amounts and from the NAVSTA Mayport meteorology department. Temperature and rainfall measurements for the initial attempt to conduct the technology demonstration during winter months are provided in Table 3-5, and Table 3-6 includes temperature and rainfall measurements for May and June 1996 when the technology demonstration was resumed.

The technology demonstration was suspended by RHS on February 5, 1996, because of colder than normal temperatures. Biological degradation has been observed at soil temperatures ranging from 32 (0 degrees centigrade) to 77 degrees Fahrenheit (25 degrees centigrade), with a doubling in the microbial activity for every increase of 18 degrees Fahrenheit (10 degrees centigrade) (Sayles et al., 1992).

Table 3-5
Summary of Temperature and Rainfall Data

Navy Environmental Leadership Program
Technology Evaluation Report for SWMU 14
U.S. Naval Station
Mayport, Florida

Date	Air Temperature (Fahrenheit)		Soil Temperature (Fahrenheit)		Precipitation (inches)
	Minimum	Maximum	Morning	Afternoon	
15-Jan-96	45	69	--	--	0
16-Jan-96	48	67	--	--	0
17-Jan-96	53	61	--	--	0.03
18-Jan-96	61	74	--	--	0.15
19-Jan-96	36	68	60	--	0.06
20-Jan-96	30	53	--	--	0
21-Jan-96	48	56	--	--	0
22-Jan-96	46	54	46	--	0
23-Jan-96	49	63	62	--	0
24-Jan-96	57	75	62	--	0.06
25-Jan-96	39	74	45	--	0
26-Jan-96	56	72	58	--	0
27-Jan-96	44	73	--	--	0.03
28-Jan-96	42	56	--	--	0
29-Jan-96	49	67	--	--	0
30-Jan-96	49	74	60	--	0
31-Jan-96	56	74	60	--	Trace
1-Feb-96	52	62	40	--	0
2-Feb-96	54	73	60	--	0.09
3-Feb-96	40	63	--	--	0.03
4-Feb-96	28	40	--	--	0
5-Feb-96[1]	21	38	--	46	0

[1] RHS Technical Services, Inc. halted technology demonstration due to colder than expected temperatures.

Notes: SWMU = Solid Waste Management Unit.
-- = soil temperature not measured.

Table 3-6
Summary of Temperature and Rainfall Data

Navy Environmental Leadership Program
Technology Evaluation Report for SWMU 14
U.S. Naval Station
Mayport, Florida

Date	Air Temperature (Fahrenheit)		Soil Temperature (Fahrenheit)		Precipitation (inches)
	Minimum	Maximum	Morning	Afternoon	
1-May-96	57	71	74	--	0
2-May-96	55	73	72	--	0
3-May-96	59	77	77	--	0
4-May-96	68	83	78	--	0
5-May-96	68	85	--	--	0
6-May-96	69	86	71	--	0
7-May-96	68	84	79	--	0
8-May-96	65	82	72	--	0
9-May-96	64	83	78	--	0
10-May-96	65	82	72	--	0
11-May-96	68	83	71	--	0.15
12-May-96	65	81	74	--	0
13-May-96	62	79	78	--	0
14-May-96	68	76	78	--	0.1
15-May-96	69	78	75	--	0
16-May-96	65	83	78	--	0
17-May-96	65	86	77	--	0
18-May-96	67	90	--	--	0
19-May-96	71	91	76	--	0
20-May-96	71	93	79	--	0
21-May-96	72	84	74	--	0.04
22-May-96	72	86	80	--	Trace
23-May-96	73	86	80	--	0
24-May-96	72	86	--	--	0
25-May-96	72	86	73	--	0
26-May-96	69	86	71	--	0
27-May-96	71	89	78	--	0
28-May-96	69	90	78	--	0.22
29-May-96	68	91	76	--	0.02
30-May-96	74	89	76	--	0
31-May-96	72	83	74	--	0.26

See notes at end of table.

Table 3-6 (Continued)
Summary of Temperature and Rainfall Data

Navy Environmental Leadership Program
Technology Evaluation Report for SWMU 14
U.S. Naval Station
Mayport, Florida

Date	Air Temperature (Fahrenheit)		Soil Temperature (Fahrenheit)		Precipitation (inches)
	Minimum	Maximum	Morning	Afternoon	
1-Jun-96	73	82	74	--	0
2-Jun-96	73	83	76	--	0
3-Jun-96	69	82	71	--	Trace
4-Jun-96	66	85	70	--	0
5-Jun-96	68	85	76	--	0
6-Jun-96	69	85	76	--	0
7-Jun-96	70	86	73	--	0.02
8-Jun-96	69	87	72	--	0.87
9-Jun-96	71	88	72	--	0.32
10-Jun-96	71	83	72	--	Trace
11-Jun-96	71	88	72	--	0.04
12-Jun-96	NA	90	81	--	0
13-Jun-96	73	87	82	--	0.02
14-Jun-96	70	88	80	--	1.29
15-Jun-96	71	84	--	--	0.09
16-Jun-96	71	83	82	--	0
17-Jun-96	76	86	--	--	0.02
18-Jun-96	74	85	--	--	0
19-Jun-96	72	87	81	--	0.04
20-Jun-96	71	86	--	--	Trace
21-Jun-96	74	92	82	--	Trace
22-Jun-96	77	91	--	--	0
23-Jun-96	76	92	--	--	0
24-Jun-96	76	92	--	--	0
25-Jun-96	77	97	75	--	0
26-Jun-96	72	97	--	--	1.83
27-Jun-96	74	82	79	--	0.67
28-Jun-96	73	84	84	--	2.01
29-Jun-96	73	86	--	--	Trace
30-Jun-96	75	85	--	--	0

Notes: SWMU = Solid Waste Management Unit.
-- = soil temperature not measured.
NA = not available.

4.0 EVALUATION OF RHS TECHNOLOGY DEMONSTRATION

Technology Demonstration at Detention Pond. RHS did not collect surface water samples during the technology demonstration at the detention pond.

Soil Treatment Area. RHS conducted field screening analysis for TRPH to assess whether or not the bioremediation activities appear to be working successfully. They also collected soil samples for laboratory confirmation. A summary of the RHS laboratory analytical results for TRPH is provided in Table 4-1. Sampling locations are provided in their report, *NELP Technology Demonstration Bioremediation of Concrete Surfaces and Soil at SWMU 14* (RHS, 1996).

The baseline surface soil samples collected by RHS in February 1996 were not in conformance with the thermal desorption criteria (Table 1-2) and the SCTLs (Table 1-3). Analytical results of TRPH for surface soil samples collected in May 1966 by RHS suggest that each of the results exceeded the thermal desorption criteria and only one of the samples contained TRPH at a concentration that exceeded the TRPH SCTL. The soil samples collected in May and July 1966 by RHS did not contain TRPH at concentrations that exceeded the thermal desorption criteria or SCTL for TRPH.

Table 4-1
Summary of RHS Laboratory Analytical Results for Total Recoverable Petroleum Hydrocarbons

Navy Environmental Leadership Program
Technology Evaluation Report for SWMU 14
U.S. Naval Station
Mayport, Florida

Sample Location[1]	Sample Identification	Sample Depth (in bls)	Laboratory Sample Collection Date			
			2-FEB-96	1-MAY-96	16-MAY-96	10-JULY-96
Area #1	96050101L	0 to 8	NS	110	NS	NS
S-2	96020201L	0 to 6	4,238	NS	NS	NS
S-2	96051601L	0 to 8	NS	NS	–	NS
S-3	96020202L	0 to 6	21,350	NS	NS	NS
Area #3	96050102L	0 to 8	NS	510	NS	NS
S-3	96051602L	0 to 8	NS	NS	290	NS
S-3	96051603L	8 to 14	NS	NS	–	NS
S-7	96020203L	0 to 6	10,425	NS	NS	NS
Area #7	96050103L	0 to 8	NS	260	NS	NS
S-7	96051604L	0 to 8	NS	NS	30	NS
S-7	96051605L	8 to 14	NS	NS	5.0	NS
14-SS26[2]	96071005L	0 to 12	NS	NS	NS	NA
14-BS26[2]	96071006L	12 to 24	NS	NS	NS	11
14-SS27[2]	96071003L	0 to 12	NS	NS	NS	NA
14-BS27[2]	96071004L	12 to 24	NS	NS	NS	NA
14-SS28[2]	96071001L	0 to 12	NS	NS	NS	59
14-BS28[2]	96071002L	12 to 24	NS	NS	NS	NA
NA	9607Control	NA	NS	NS	NS	120

[1] Sample locations are provided in the RHS report entitled *NELP Technology Demonstration Bioremediation of Concrete Surfaces and Soil at SWMU 14, Naval Air Station, Mayport, Florida* (RHS, 1996).
[2] RHS split samples with ABB Environmental Services, Inc., at locations MPT-14-SS26, MPT-14-SS27, and MPT-14-SS28 (Figure 2-1).

Notes: RHS = RHS Environmental Services, Inc.
SWMU = Solid Waste Management Unit.
in bls = inches below the land surface.
NS = sample for laboratory analysis not collected on this date.
– = total recoverable petroleum hydrocarbons, if present, were less than the detection limit.
NA = quality control sample; data not available.

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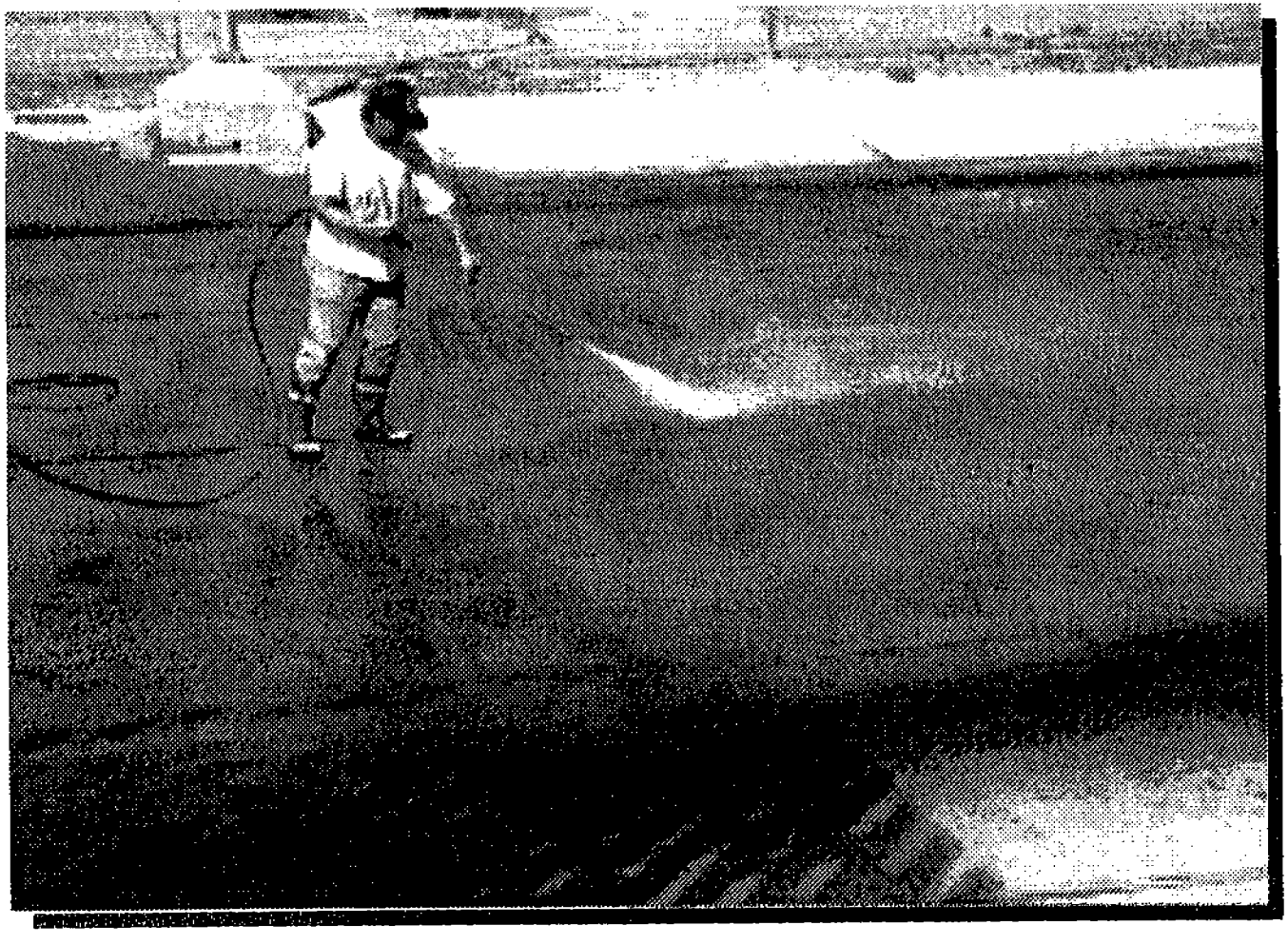
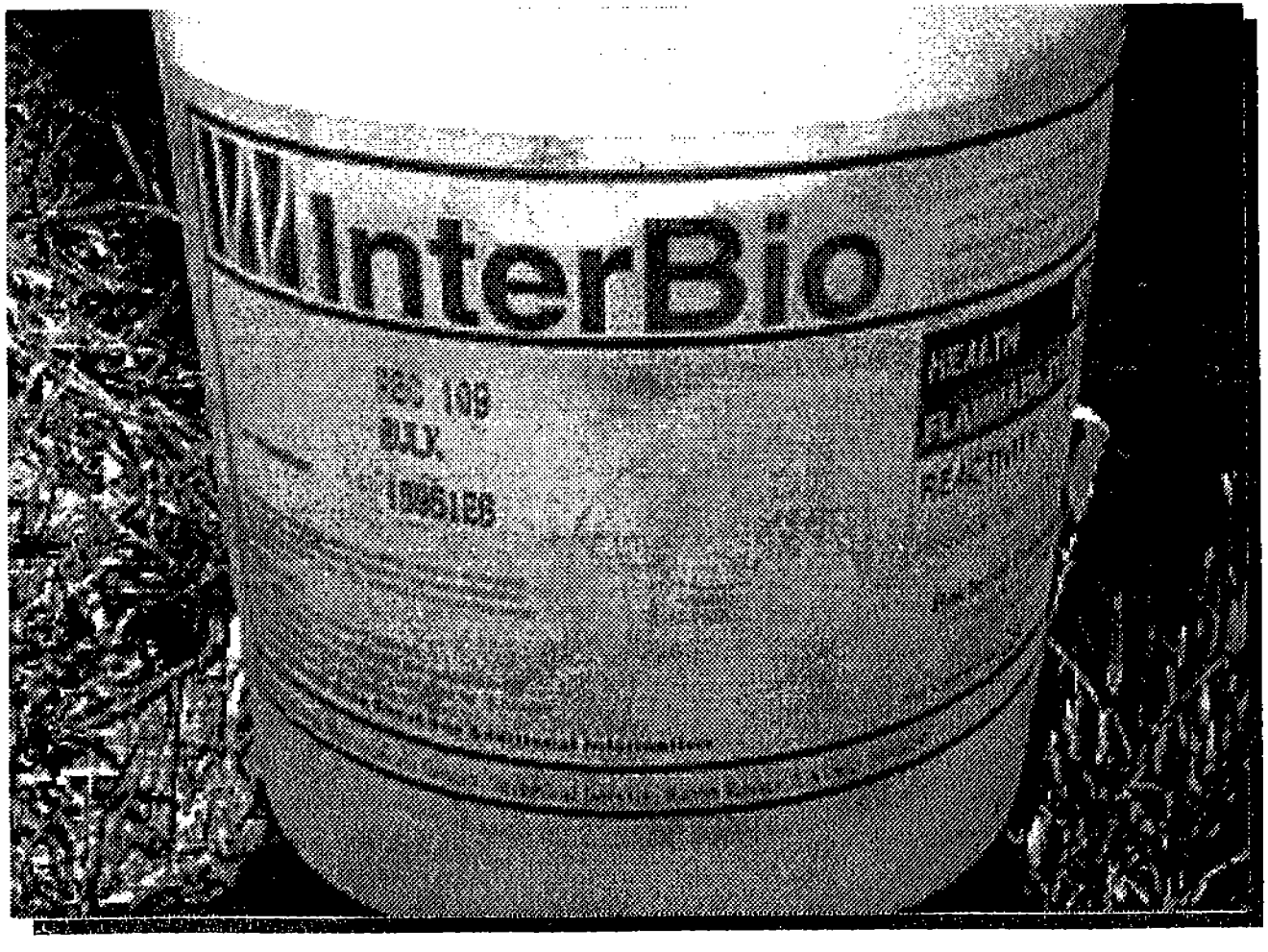
APPENDIX A

PHOTOGRAPHS



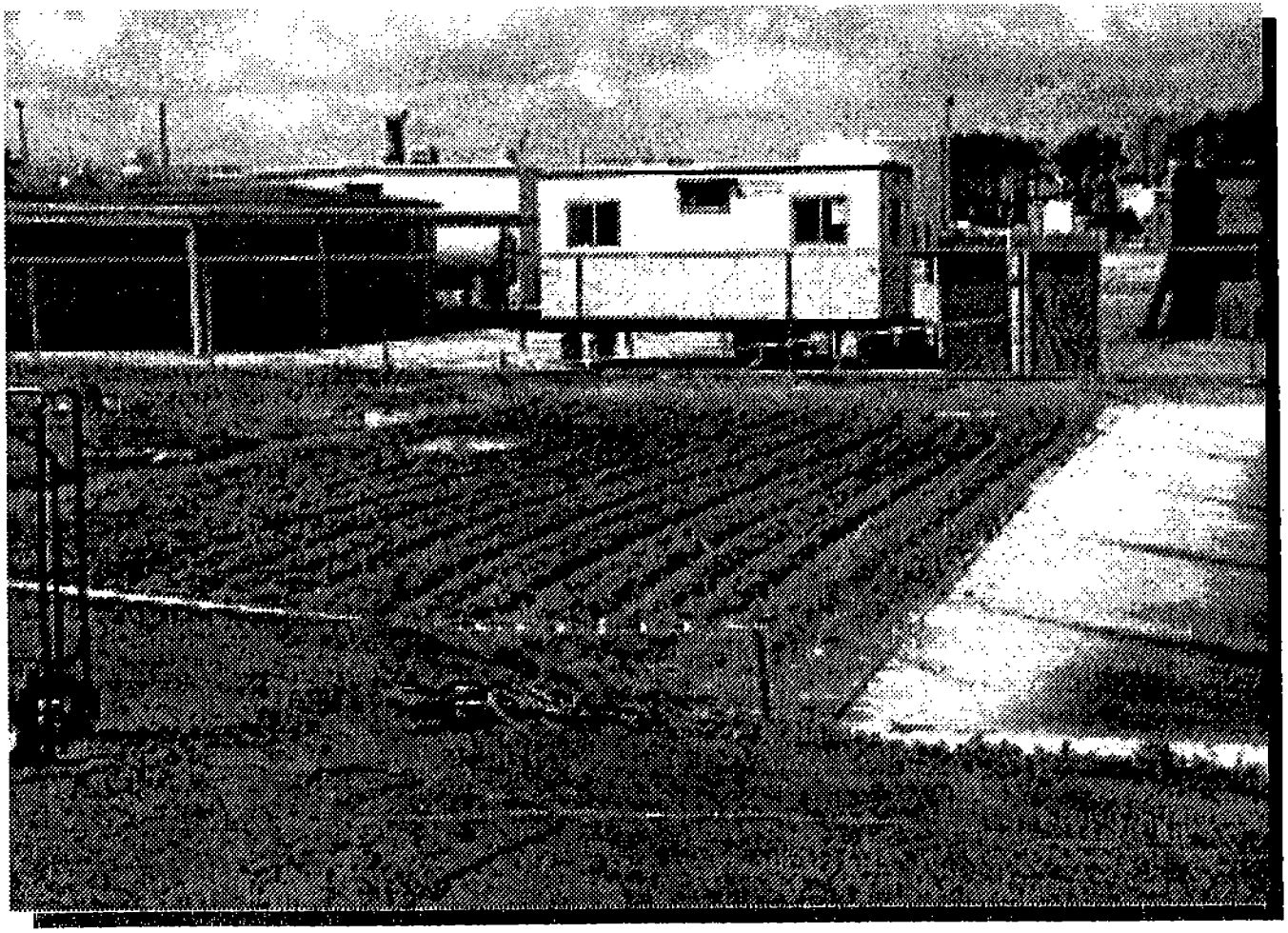
Photograph of RHS personnel using a 4,000-pounds-per-square-inch pressure washer to rinse the Microbial solution from the concrete surface.

View looking north from the southwest side of the soil treatment area. The detention pond is in the background. RHS personnel are rototilling the soil.



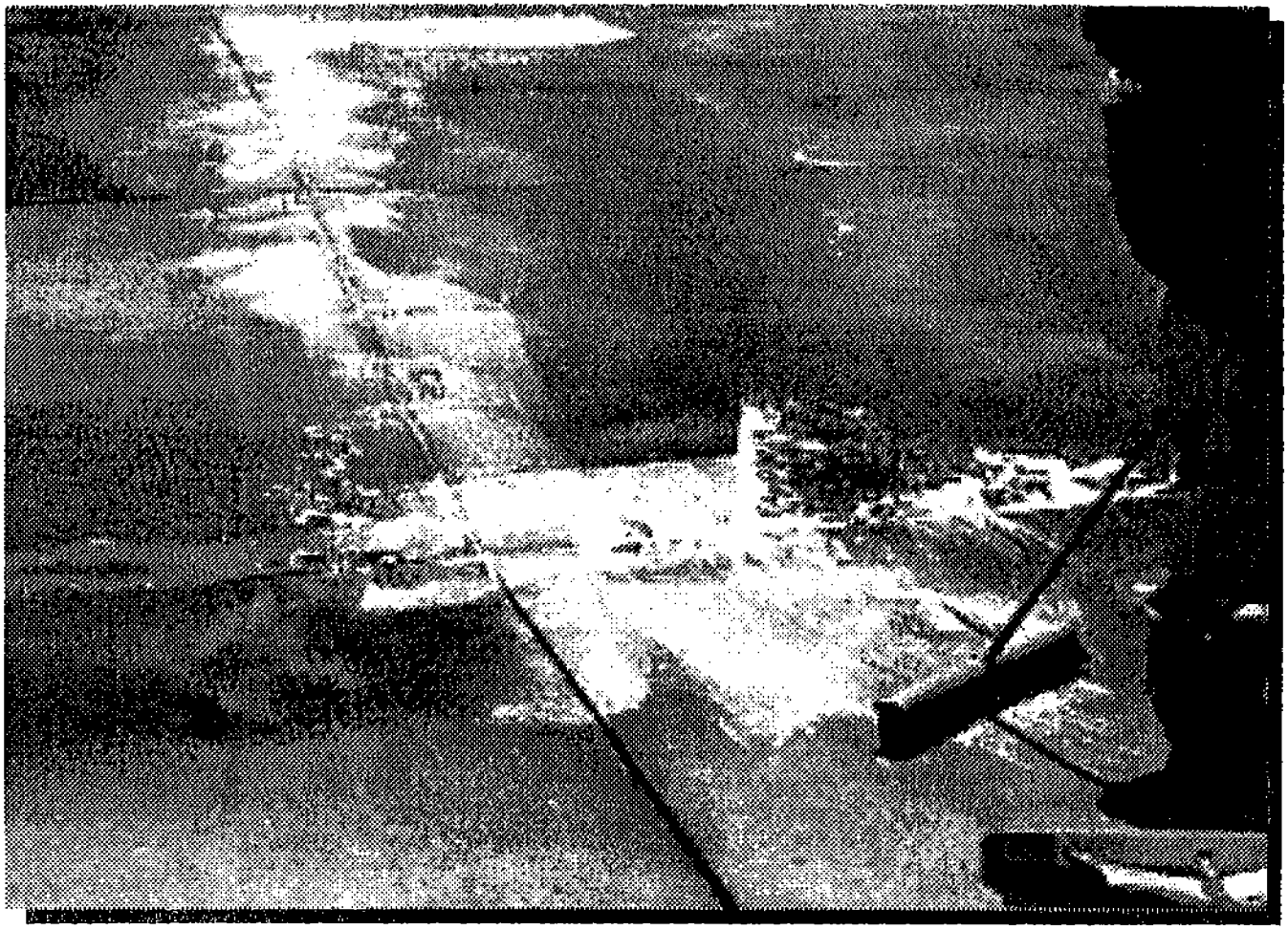
Photograph of the bioremediation product, WinterBio, used by RHS.

Photograph of RHS personnel using a power scrubber to scrub the Microbial solution into the concrete.

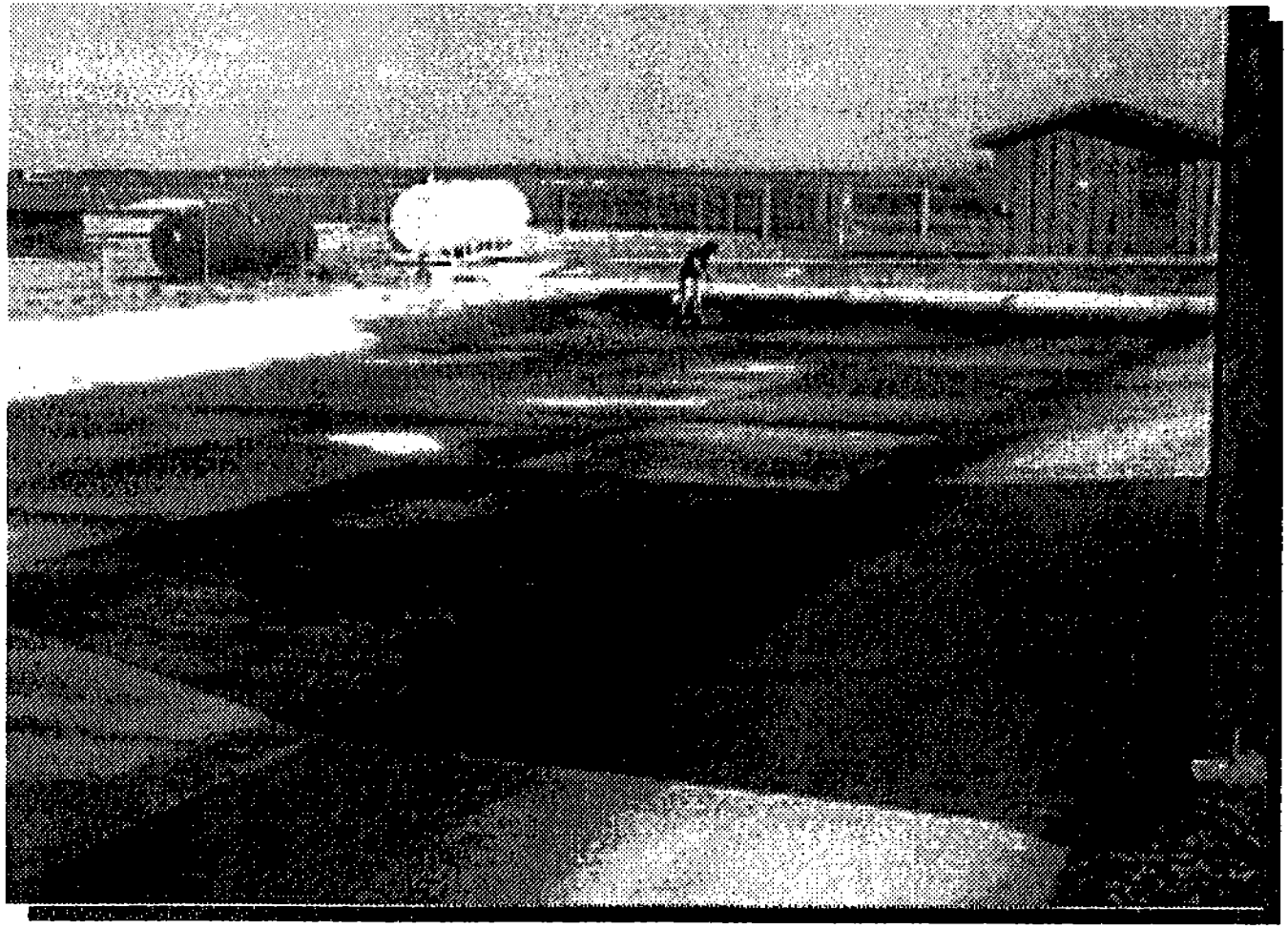


View looking west from the southeast end of the detention pond (right side of photograph). Photograph shows the rototilled soil treatment area.

Photograph of RHS mixing the Microbial solution.



Photograph of RHS personnel scrubbing the Microbial solution into the concrete.



View looking north from the southeast end of the detention pond. Photograph illustrates the difference between the treated and untreated areas.

APPENDIX B

SAMPLING CALCULATIONS

PROJECT	COMP. BY	JOB NO.
NELP Implementation Plan Grid 1 14	TH	06634.33
sampling calculations	CHK. BY	DATE
		2 14 95

Determine the number of samples and location of samples necessary for Boring soil sampling

Given:
- length of detention basin adjacent to area of soil contamination = 55 feet
- 100 yd^3 of soil will be treated

Assumptions:
- area of soil to be treated is 55 feet (width of detention basin) by 25 feet
- Assume a hot spot radius of L = 12 feet

Using the R.O. Gilbert model to determine grid spacing:

Assume:
- $p = 0.1$ (assumes a 90% probability of finding a hotspot)
- a square shaped grid
- $S = 0.5$ (a conservative elliptical shape)

Using p and S look on Figure 10.3 and find $\frac{L}{G} = 0.85$

$\frac{L}{G} = 0.85$ where L = 12 feet

$G = \frac{12 \text{ feet}}{0.85} = 14.12 \text{ feet} \sim 14 \text{ feet}$

Now plot the grid based on the grid spacing (see next page)

APPENDIX C

ANALYTICAL RESULTS

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

Lab Sample Number:		M9936004				M9936005				M9936006				M9936007			
Site		NELP				NELP				NELP				NELP			
Locator		14W009				14W010				14W010D				14W011			
Collect Date:		11-JAN-96				11-JAN-96				11-JAN-96				11-JAN-96			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Aromatics	ug/l																
Benzene		1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Ethylbenzene		1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Toluene		1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Xylenes (total)		1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Methyl tert-butyl ether		1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

Lab Sample Number:		M9936008				MA970002				MA970003				MA970004			
Site		NELP				NELP				NELP				NELP			
Locator		14W012				14W013				14W014				14W014D			
Collect Date:		11-JAN-96				21-MAY-96				21-MAY-96				21-MAY-96			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Aromatics	ug/l																
Benzene		1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Ethylbenzene		1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Toluene		1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Xylenes (total)		1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Methyl tert-butyl ether		1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

Lab Sample Number:		MA970005				MA970007			
Site		NELP				NELP			
Locator		14W015				14W016			
Collect Date:		21-MAY-96				21-MAY-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	
Aromatics			ug/l				ug/l		
Benzene		1	U ug/l	1		1	U ug/l	1	
Ethylbenzene		1	U ug/l	1		1	U ug/l	1	
Toluene		1	U ug/l	1		1	U ug/l	1	
Xylenes (total)		1	U ug/l	1		1	U ug/l	1	
Methyl tert-butyl ether		1	U ug/l	1		1	U ug/l	1	

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

Lab Sample Number:		M9936004				M9936005				M9936006				M9936007			
Site		NELP				NELP				NELP				NELP			
Locator		14W009				14W010				14W010D				14W011			
Collect Date:		11-JAN-96				11-JAN-96				11-JAN-96				11-JAN-96			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Polynuclear Aromatics (PAH)	ug/l																
Naphthalene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
2-Methylnaphthalene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
1-Methylnaphthalene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Acenaphthylene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Acenaphthene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Fluorene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Phenanthrene		80	UJ	ug/l	80	40	UJ	ug/l	40	20	UJ	ug/l	20	40	U	ug/l	40
Anthracene		80	UJ	ug/l	80	20	U	ug/l	20	10	U	ug/l	10	80	UJ	ug/l	80
Fluoranthene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Pyrene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Benzo (a) anthracene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Chrysene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Benzo (b) fluoranthene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Benzo (a) pyrene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Indeno (1,2,3-cd) pyrene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Dibenzo (a,h) anthracene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40
Benzo (g,h,i) perylene		40	U	ug/l	40	20	U	ug/l	20	10	U	ug/l	10	40	U	ug/l	40

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

Lab Sample Number:		M9936008				MA970002				MA970003				MA970004			
Site		NELP				NELP				NELP				NELP			
Locator		14W012				14W013				14W014				14W014D			
Collect Date:		11-JAN-96				21-MAY-96				21-MAY-96				21-MAY-96			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Polynuclear Aromatics (PAH)	ug/l																
Naphthalene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
2-Methylnaphthalene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
1-Methylnaphthalene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Acenaphthylene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Acenaphthene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Fluorene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Phenanthrene		40	UJ	ug/l	40	40	UJ	ug/l	40	5		ug/l	2	4	UJ	ug/l	4
Anthracene		20	U	ug/l	20	60	UJ	ug/l	60	4	UJ	ug/l	4	10	UJ	ug/l	10
Fluoranthene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Pyrene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Benzo (a) anthracene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Chrysene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Benzo (b) fluoranthene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Benzo (a) pyrene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Indeno (1,2,3-cd) pyrene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Dibenzo (a,h) anthracene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2
Benzo (g,h,i) perylene		20	U	ug/l	20	20	U	ug/l	20	2	U	ug/l	2	2	U	ug/l	2

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

Lab Sample Number:		MA970005				MA970007			
Site		NELP				NELP			
Locator		14W015				14W016			
Collect Date:		21-MAY-96				21-MAY-96			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Polynuclear Aromatics (PAH)	ug/l								
Naphthalene		2	U	ug/l	2	2	U	ug/l	2
2-Methylnaphthalene		2	U	ug/l	2	2	U	ug/l	2
1-Methylnaphthalene		2	U	ug/l	2	2	U	ug/l	2
Acenaphthylene		2	U	ug/l	2	2	U	ug/l	2
Acenaphthene		2	U	ug/l	2	2	U	ug/l	2
Fluorene		2	U	ug/l	2	2	U	ug/l	2
Phenanthrene		6	UJ	ug/l	6	4	UJ	ug/l	4
Anthracene		6	UJ	ug/l	6	4	UJ	ug/l	4
Fluoranthene		2	U	ug/l	2	2	U	ug/l	2
Pyrene		2	U	ug/l	2	2	U	ug/l	2
Benzo (a) anthracene		2	U	ug/l	2	2	U	ug/l	2
Chrysene		2	U	ug/l	2	2	U	ug/l	2
Benzo (b) fluoranthene		2	U	ug/l	2	2	U	ug/l	2
Benzo (a) pyrene		2	U	ug/l	2	2	U	ug/l	2
Indeno (1,2,3-cd) pyrene		2	U	ug/l	2	2	U	ug/l	2
Dibenzo (a,h) anthracene		2	U	ug/l	2	2	U	ug/l	2
Benzo (g,h,i) perylene		2	U	ug/l	2	2	U	ug/l	2

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

Lab Sample Number:		M9936004			M9936005			M9936006			M9936007		
Site		NELP			NELP			NELP			NELP		
Locator		14W009			14W010			14W010D			14W011		
Collect Date:		11-JAN-96			11-JAN-96			11-JAN-96			11-JAN-96		
		VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL
INORGANICS (WATER)	ug/l												
Antimony		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Arsenic		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Barium		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Beryllium		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Cadmium		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Calcium		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Chromium		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Cobalt		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Copper		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Cyanide		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Iron		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Lead		7.2 UJ	ug/l	7.2	7.2 UJ	ug/l	7.2	7.2 UJ	ug/l	7.2	7.2 UJ	ug/l	7.2
Magnesium		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Manganese		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Mercury		.13 U	ug/l	.13	.13 U	ug/l	.13	.13 U	ug/l	.13	.13 U	ug/l	.13
Nickel		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Selenium		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Silver		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Sodium		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Thallium		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Tin		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Vanadium		-	ug/l		-	ug/l		-	ug/l		-	ug/l	
Zinc		-	ug/l		-	ug/l		-	ug/l		-	ug/l	

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

Lab Sample Number:		M9936008			MA970002			MA970003			MA970004		
Site		NELP			NELP			NELP			NELP		
Locator		14W012			14W013			14W014			14W014D		
Collect Date:		11-JAN-96			21-MAY-96			21-MAY-96			21-MAY-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
INORGANICS (WATER)			ug/l				ug/l				ug/l				ug/l	
Antimony		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Arsenic		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Barium		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Beryllium		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Cadmium		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Calcium		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Chromium		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Cobalt		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Copper		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Cyanide		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Iron		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Lead		7.2	UJ ug/l	7.2		4.9	UJ ug/l	4.9		3.6	UJ ug/l	3.6		12.5	UJ ug/l	12.5
Magnesium		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Manganese		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Mercury		.13	U ug/l	.13		.07	U ug/l	.07		.19	UJ ug/l	.19		.07	U ug/l	.07
Nickel		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Selenium		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Silver		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Sodium		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Thallium		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Tin		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Vanadium		-	ug/l			-	ug/l			-	ug/l			-	ug/l	
Zinc		-	ug/l			-	ug/l			-	ug/l			-	ug/l	

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

		MA970005				MA970007			
Lab Sample Number:									
Site		NELP				NELP			
Locator		14W015				14W016			
Collect Date:		21-MAY-96				21-MAY-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	
INORGANICS (WATER)			ug/l				ug/l		
Antimony		-	ug/l			-	ug/l		
Arsenic		-	ug/l			-	ug/l		
Barium		-	ug/l			-	ug/l		
Beryllium		-	ug/l			-	ug/l		
Cadmium		-	ug/l			-	ug/l		
Calcium		-	ug/l			-	ug/l		
Chromium		-	ug/l			-	ug/l		
Cobalt		-	ug/l			-	ug/l		
Copper		-	ug/l			-	ug/l		
Cyanide		-	ug/l			-	ug/l		
Iron		-	ug/l			-	ug/l		
Lead	2.76	UJ	ug/l	2.76	2.76	UJ	ug/l	2.76	
Magnesium		-	ug/l			-	ug/l		
Manganese		-	ug/l			-	ug/l		
Mercury	.19	UJ	ug/l	.19	.07	U	ug/l	.07	
Nickel		-	ug/l			-	ug/l		
Selenium		-	ug/l			-	ug/l		
Silver		-	ug/l			-	ug/l		
Sodium		-	ug/l			-	ug/l		
Thallium		-	ug/l			-	ug/l		
Tin		-	ug/l			-	ug/l		
Vanadium		-	ug/l			-	ug/l		
Zinc		-	ug/l			-	ug/l		

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

Lab Sample Number:		M9936004			M9936005			M9936006			M9936007		
Site		NELP			NELP			NELP			NELP		
Locator		14W009			14W010			14W010D			14W011		
Collect Date:		11-JAN-96			11-JAN-96			11-JAN-96			11-JAN-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Oil and grease	22.3		mg/l	1	11.6		mg/l	1	25.7		mg/l	1	12.3		mg/l	1
Total petroleum hydrocarbons	.92		mg/l	.1	8.75		mg/l	.4	12.1		mg/l	.5	7.07		mg/l	.4

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Meyport
NELP - Firefighting Training Area Surface Water Data

	Lab Sample Number:	M9936008				MA970002				MA970003				MA970005		
	Site	NELP				NELP				NELP				NELP		
	Locator	14W012				14W013				14W014				14W015		
	Collect Date:	11-JAN-96				21-MAY-96				21-MAY-96				21-MAY-96		
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Oil and grease		13.2		mg/l	1	31.1		mg/l	1	7.58		mg/l	1	12.4		mg/l	1
Total petroleum hydrocarbons		7.45		mg/l	.4	18.8		mg/l	2.4	3.63		mg/l	.2	2.96		mg/l	0

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Water Data

Lab Sample Number:		MA970006				MA970007		
Site		NELP				NELP		
Locator		14W015D				14W016		
Collect Date:		21-MAY-96				21-MAY-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Oil and grease	15.3		mg/l	1	10.9		mg/l	1
Total petroleum hydrocarbons	2.75		mg/l	0	1.51		mg/l	0

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		M9907001				MA782004				MB348004				M9907003					
Site		NELP				NELP				NELP				NELP					
Locator		14S02601				14S02601				14S02601				14S02701					
Collect Date:		09-JAN-96				19-APR-96				10-JUL-96				09-JAN-96					
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL		
Halogenated Volatiles	ug/kg																		
1,1,1-Trichloroethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,1,2,2-Tetrachloroethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,1,2-Trichloroethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,1-Dichloroethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,1-Dichloroethene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,2-Dichlorobenzene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,2-Dichloroethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,2-Dichloropropane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,3-Dichlorobenzene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,4-Dichlorobenzene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
2-Chloroethylvinyl ether		6.3	UJ	ug/kg	6.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	5.4	UJ	ug/kg	5.4		
Bromodichloromethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Bromoform		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Bromomethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Carbon tetrachloride		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Chlorobenzene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Chloroethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Chloroform		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Chloromethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Dibromochloromethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Dichlorodifluoromethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Methylene Chloride		6.3	UJ	ug/kg	6.3	5	U	ug/kg	5	5.3	U	ug/kg	5.3	5.4	UJ	ug/kg	5.4		
Tetrachloroethene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Trichloroethene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Trichlorofluoromethane		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Vinyl chloride		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
cis-1,2-Dichloroethene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
cis-1,3-Dichloropropene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
trans-1,2-Dichloroethene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
trans-1,3-Dichloropropene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Aromatics	ug/kg																		
Benzene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Ethylbenzene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Toluene		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Xylenes (total)		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Methyl tert-butyl ether		1.3	UJ	ug/kg	1.3	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		MA782006				MB348006				M9907004				MA782007			
Site		NELP				NELP				NELP				NELP			
Locator		14S02701				14S02701				14S02701D				14S02701D			
Collect Date:		19-APR-96				10-JUL-96				09-JAN-96				19-APR-96			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Halogenated Volatiles	ug/kg																
1,1,1-Trichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
1,1,2,2-Tetrachloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
1,1,2-Trichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
1,1-Dichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
1,1-Dichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
1,2-Dichlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
1,2-Dichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
1,2-Dichloropropane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
1,3-Dichlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
1,4-Dichlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	5.3	UJ	ug/kg	5.3	1.1	U	ug/kg	1.1
2-Chloroethylvinyl ether		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Bromodichloromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Bromoform		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Bromomethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Carbon tetrachloride		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Chlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Chloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Chloroform		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Chloromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Dibromochloromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Dichlorodifluoromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Methylene Chloride		5.3	U	ug/kg	5.3	5.3	U	ug/kg	5.3	5.3	UJ	ug/kg	5.3	5.7	U	ug/kg	5.7
Tetrachloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Trichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Trichlorofluoromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Vinyl chloride		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
cis-1,2-Dichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
cis-1,3-Dichloropropene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
trans-1,2-Dichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
trans-1,3-Dichloropropene		1.1	U	ug/kg	1.1												
Aromatics	ug/kg																
Benzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Ethylbenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Toluene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Xylenes (total)		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1
Methyl tert-butyl ether		1.1	U	ug/kg	1.1												

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		MB348007				M9986001				MA782009				MB348009					
Site		NELP				NELP				NELP				NELP					
Locator		14S027010				14S02801				14S02801				14S02801					
Collect Date:		10-JUL-96				18-JAN-96				19-APR-96				10-JUL-96					
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL		
Halogenated Volatiles	ug/kg																		
1,1,1-Trichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
1,1,2,2-Tetrachloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
1,1,2-Trichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
1,1-Dichloroethane		1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
1,1-Dichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
1,2-Dichlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
1,2-Dichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
1,2-Dichloropropane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
1,3-Dichlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
1,4-Dichlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
2-Chloroethylvinyl ether		1.1	U	ug/kg	1.1	5.4	U	ug/kg	5.4	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Bromodichloromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Bromoform		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Bromomethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Carbon tetrachloride		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Chlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Chloroethane		1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Chloroform		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Chloromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Dibromochloromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Dichlorodifluoromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Methylene Chloride		5.3	U	ug/kg	5.3	5.4	U	ug/kg	5.4	5	U	ug/kg	5	5.3	U	ug/kg	5.3		
Tetrachloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Trichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Trichlorofluoromethane		1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Vinyl chloride		1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
cis-1,2-Dichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
cis-1,3-Dichloropropene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
trans-1,2-Dichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
trans-1,3-Dichloropropene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Aromatics	ug/kg																		
Benzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Ethylbenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Toluene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Xylenes (total)		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		
Methyl tert-butyl ether		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1		

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:	M9986002
Site	NELP
Locator	14S02801D
Collect Date:	18-JAN-96

		VALUE	QUAL	UNITS	DL
Halogenated Volatiles	ug/kg				
1,1,1-Trichloroethane		1.1	U	ug/kg	1.1
1,1,2,2-Tetrachloroethane		1.1	U	ug/kg	1.1
1,1,2-Trichloroethane		1.1	U	ug/kg	1.1
1,1-Dichloroethane		1.1	UJ	ug/kg	1.1
1,1-Dichloroethene		1.1	U	ug/kg	1.1
1,2-Dichlorobenzene		1.1	U	ug/kg	1.1
1,2-Dichloroethane		1.1	U	ug/kg	1.1
1,2-Dichloropropane		1.1	U	ug/kg	1.1
1,3-Dichlorobenzene		1.1	U	ug/kg	1.1
1,4-Dichlorobenzene		1.1	U	ug/kg	1.1
2-Chloroethylvinyl ether		5.4	U	ug/kg	5.4
Bromodichloromethane		1.1	U	ug/kg	1.1
Bromoform		1.1	U	ug/kg	1.1
Bromomethane		1.1	U	ug/kg	1.1
Carbon tetrachloride		1.1	U	ug/kg	1.1
Chlorobenzene		1.1	U	ug/kg	1.1
Chloroethane		1.1	UJ	ug/kg	1.1
Chloroform		1.1	U	ug/kg	1.1
Chloromethane		1.1	U	ug/kg	1.1
Dibromochloromethane		1.1	U	ug/kg	1.1
Dichlorodifluoromethane		1.1	U	ug/kg	1.1
Methylene Chloride		5.4	U	ug/kg	5.4
Tetrachloroethene		1.1	U	ug/kg	1.1
Trichloroethene		1.1	U	ug/kg	1.1
Trichlorofluoromethane		1.1	UJ	ug/kg	1.1
Vinyl chloride		1.1	UJ	ug/kg	1.1
cis-1,2-Dichloroethene		1.1	U	ug/kg	1.1
cis-1,3-Dichloropropene		1.1	U	ug/kg	1.1
trans-1,2-Dichloroethene		1.1	U	ug/kg	1.1
trans-1,3-Dichloropropene		1.1	U	ug/kg	1.1
Aromatics	ug/kg				
Benzene		1.1	U	ug/kg	1.1
Ethylbenzene		1.1	U	ug/kg	1.1
Toluene		1.1	U	ug/kg	1.1
Xylenes (total)		1.1	U	ug/kg	1.1
Methyl tert-butyl ether		1.1	U	ug/kg	1.1

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		M9907001			MA782004			MB348004			M9907003		
Site		NELP			NELP			NELP			NELP		
Locator		14S02601			14S02601			14S02601			14S02701		
Collect Date:		09-JAN-96			19-APR-96			10-JUL-96			09-JAN-96		
		VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL
Polynuclear Aromatics (PAH)	ug/kg												
Naphthalene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
2-Methylnaphthalene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
1-Methylnaphthalene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Acenaphthylene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Acenaphthene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Fluorene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Phenanthrene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	80 UJ	ug/kg	80
Anthracene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Fluoranthene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Pyrene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Benzo (a) anthracene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Chrysene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Benzo (b) fluoranthene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Benzo (a) pyrene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Indeno (1,2,3-cd) pyrene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Dibenzo (a,h) anthracene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53
Benzo (g,h,i) perylene		53 U	ug/kg	53	260 U	ug/kg	260	270 U	ug/kg	270	53 U	ug/kg	53

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		MA782006			MB348006			M9907004			MA782007		
Site		NELP			NELP			NELP			NELP		
Locator		14S02701			14S02701			14S02701D			14S02701D		
Collect Date:		19-APR-96			10-JUL-96			09-JAN-96			19-APR-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Polynuclear Aromatics (PAH)	ug/kg															
Naphthalene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
2-Methylnaphthalene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
1-Methylnaphthalene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Acenaphthylene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Acenaphthene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Fluorene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Phenanthrene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Anthracene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Fluoranthene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Pyrene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Benzo (a) anthracene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Chrysene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Benzo (b) fluoranthene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Benzo (a) pyrene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Indeno (1,2,3-cd) pyrene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Dibenzo (a,h) anthracene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110
Benzo (g,h,i) perylene		270	U	ug/kg	270	260	U	ug/kg	260	54	U	ug/kg	54	110	U	ug/kg	110

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		MB348007			M9986001			MA782009			MB348009		
Site		NELP			NELP			NELP			NELP		
Locator		14S02701D			14S02801			14S02801			14S02801		
Collect Date:		10-JUL-96			18-JAN-96			19-APR-96			10-JUL-96		
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	
Polynuclear Aromatics (PAH)	ug/kg												
Naphthalene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
2-Methylnaphthalene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
1-Methylnaphthalene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Acenaphthylene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Acenaphthene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Fluorene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Phenanthrene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Anthracene	260 U	ug/kg	260	5300 U	ug/kg	5300	200 UJ	ug/kg	200	530 U	ug/kg	530	
Fluoranthene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Pyrene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Benzo (a) anthracene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Chrysene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Benzo (b) fluoranthene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Benzo (a) pyrene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Indeno (1,2,3-cd) pyrene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Dibenzo (a,h) anthracene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	
Benzo (g,h,i) perylene	260 U	ug/kg	260	5300 U	ug/kg	5300	100 U	ug/kg	100	530 U	ug/kg	530	

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		M9986002		
Site		NELP		
Locator		14S02801D		
Collect Date:		18-JAN-96		
	VALUE	QUAL	UNITS	DL
Polynuclear Aromatics (PAH)	ug/kg			
Naphthalene	2700	U	ug/kg	2700
2-Methylnaphthalene	2700	U	ug/kg	2700
1-Methylnaphthalene	2700	U	ug/kg	2700
Acenaphthylene	2700	U	ug/kg	2700
Acenaphthene	2700	U	ug/kg	2700
Fluorene	2700	U	ug/kg	2700
Phenanthrene	2700	U	ug/kg	2700
Anthracene	2700	U	ug/kg	2700
Fluoranthene	2700	U	ug/kg	2700
Pyrene	5400	UJ	ug/kg	5400
Benzo (a) anthracene	2700	U	ug/kg	2700
Chrysene	2700	U	ug/kg	2700
Benzo (b) fluoranthene	2700	U	ug/kg	2700
Benzo (a) pyrene	2700	U	ug/kg	2700
Indeno (1,2,3-cd) pyrene	2700	U	ug/kg	2700
Dibenzo (a,h) anthracene	2700	U	ug/kg	2700
Benzo (g,h,i) perylene	2700	U	ug/kg	2700

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		M9907001				MA782004				MB348004				M9907003		
Site		NELP				NELP				NELP				NELP		
Locator		14S02601				14S02601				14S02601				14S02701		
Collect Date:		09-JAN-96				19-APR-96				10-JUL-96				09-JAN-96		
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
INORGANICS (SOIL)	mg/kg																
Antimony		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Arsenic		.96	J	mg/kg	.1	.43	J	mg/kg	.2	.56	J	mg/kg	.2	.99	J	mg/kg	.1
Barium		6.8	J	mg/kg	.1	4.7	UJ	mg/kg	4.7	4.8	UJ	mg/kg	4.8	6.5	J	mg/kg	.1
Beryllium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Cadmium		.47	U	mg/kg	.47	.38	U	mg/kg	.38	.7	U	mg/kg	.7	.47	U	mg/kg	.47
Chromium		5.7		mg/kg	.5	3.4		mg/kg	.4	3.2		mg/kg	.47	4.1		mg/kg	.5
Cobalt		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Copper		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Cyanide		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Lead		4.1	J	mg/kg	.2	5	J	mg/kg	.2	3.1		mg/kg	.16	5.2	J	mg/kg	.5
Mercury		.07	U	mg/kg	.07	.03	U	mg/kg	.03	.03	U	mg/kg	.03	.07	U	mg/kg	.07
Nickel		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Selenium		.49	U	mg/kg	.49	.27	U	mg/kg	.27	.27	UJ	mg/kg	.27	.49	U	mg/kg	.49
Silver		.49	U	mg/kg	.49	.46	U	mg/kg	.46	.47	U	mg/kg	.47	.49	U	mg/kg	.49
Thallium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Tin		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Vanadium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Zinc		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		MA782006			MB348006			M9907004			MA782007		
Site		NELP			NELP			NELP			NELP		
Locator		14S02701			14S02701			14S02701D			14S02701D		
Collect Date:		19-APR-96			10-JUL-96			09-JAN-96			19-APR-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
INORGANICS (SOIL)	mg/kg															
Antimony		-	mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Arsenic		.97	J mg/kg	.2	.54	J	mg/kg	.2	2.1	J	mg/kg	.1	1.7	J	mg/kg	.3
Barium		6.3	UJ mg/kg	6.3	6.6	J	mg/kg	.074	7.9	J	mg/kg	.1	7.1	UJ	mg/kg	7.1
Beryllium		-	mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Cadmium		.38	U mg/kg	.38	.7	U	mg/kg	.7	.48	U	mg/kg	.48	.41	U	mg/kg	.41
Chromium		5.2	mg/kg	.4	4.6		mg/kg	.46	7.3		mg/kg	.5	5.2		mg/kg	.5
Cobalt		-	mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Copper		-	mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Cyanide		-	mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Lead		5.8	J mg/kg	.2	4.1		mg/kg	.16	5.5	J	mg/kg	.3	5.9	J	mg/kg	.2
Mercury		.13	mg/kg	0	.03	U	mg/kg	.03	.07	U	mg/kg	.07	.04	U	mg/kg	.04
Nickel		-	mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Selenium		.28	U mg/kg	.28	.26	UJ	mg/kg	.26	.5	U	mg/kg	.5	.3	U	mg/kg	.3
Silver		.47	U mg/kg	.47	.46	U	mg/kg	.46	.5	U	mg/kg	.5	.5	U	mg/kg	.5
Thallium		-	mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Tin		-	mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Vanadium		-	mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Zinc		-	mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		MB348007				M9986001				MA782009				MB348009				
Site		NELP				NELP				NELP				NELP				
Locator		14S02701D				14S02801				14S02801				14S02801				
Collect Date:		10-JUL-96				18-JAN-96				19-APR-96				10-JUL-96				
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	
INORGANICS (SOIL)	mg/kg																	
Antimony		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Arsenic		.63	J	mg/kg	.2	.67	UJ	mg/kg	.67	.42	J	mg/kg	.2	.2	U	mg/kg	.2	
Barium		6.1	J	mg/kg	.074	6.3	J	mg/kg	.1	2.8	UJ	mg/kg	2.8	5.3	J	mg/kg	.074	
Beryllium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Cadmium		.7	U	mg/kg	.7	.47	U	mg/kg	.47	.38	U	mg/kg	.38	.69	U	mg/kg	.69	
Chromium		3.1		mg/kg	.47	2.6		mg/kg	.5	2.3		mg/kg	.4	3.1		mg/kg	.46	
Cobalt		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Copper		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Cyanide		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Lead		5.3		mg/kg	.16	2.9		mg/kg	.2	2.8	J	mg/kg	.2	7.1		mg/kg	.16	
Mercury		.03	U	mg/kg	.03	.07	U	mg/kg	.07	.03	U	mg/kg	.03	.03	U	mg/kg	.03	
Nickel		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Selenium		.26	UJ	mg/kg	.26	.49	U	mg/kg	.49	.27	U	mg/kg	.27	.26	UJ	mg/kg	.26	
Silver		.47	U	mg/kg	.47	.49	UJ	mg/kg	.49	.46	U	mg/kg	.46	.46	U	mg/kg	.46	
Thallium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Tin		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Vanadium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Zinc		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		M9986002			
Site		NELP			
Locator		14S02801D			
Collect Date:		18-JAN-96			
	VALUE	QUAL	UNITS	DL	
INORGANICS (SOIL)	mg/kg				
Antimony		-	mg/kg		
Arsenic		.43	UJ mg/kg	.43	
Barium		9.1	J mg/kg	.1	
Beryllium		-	mg/kg		
Cadmium		.47	J mg/kg	.4	
Chromium		3.2	mg/kg	.5	
Cobalt		-	mg/kg		
Copper		-	mg/kg		
Cyanide		-	mg/kg		
Lead		3.7	mg/kg	.2	
Mercury		.07	U mg/kg	.07	
Nickel		-	mg/kg		
Selenium		.49	U mg/kg	.49	
Silver		.49	UJ mg/kg	.49	
Thallium		-	mg/kg		
Tin		-	mg/kg		
Vanadium		-	mg/kg		
Zinc		-	mg/kg		

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		M9907001			MA782004			MB348004			M9907003		
Site		NELP			NELP			NELP			NELP		
Locator		14S02601			14S02601			14S02601			14S02701		
Collect Date:		09-JAN-96			19-APR-96			10-JUL-96			09-JAN-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Total Organic Halide	10	U	mg/kg	10	11	U	mg/kg	11	10	U	mg/kg	10	10	U	mg/kg	10
Total petroleum hydrocarbons	1.7	U	mg/kg	1.7	28.1		mg/kg	1.7	37.7		mg/kg	1.9	2.2		mg/kg	1.7

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:	MA782006				MB348006				M9907004				MA782007			
Site	NELP				NELP				NELP				NELP			
Locator	14S02701				14S02701				14S02701D				14S02701D			
Collect Date:	19-APR-96				10-JUL-96				09-JAN-96				19-APR-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Total Organic Halide	11	U	mg/kg	11	10	U	mg/kg	10	10	U	mg/kg	10	11	U	mg/kg	11
Total petroleum hydrocarbons	60.1		mg/kg	1.7	77.8		mg/kg	1.8	1.9	U	mg/kg	1.9	43.1		mg/kg	1.9

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		MB348007			M9986001			MA782009			MB348009		
Site		NELP			NELP			NELP			NELP		
Locator		14S02701D			14S02801			14S02801			14S02801		
Collect Date:		10-JUL-96			18-JAN-96			19-APR-96			10-JUL-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Total Organic Halide	15		mg/kg	10	10	U	mg/kg	10	11	U	mg/kg	11	10	U	mg/kg	10
Total petroleum hydrocarbons	111		mg/kg	1.9	6390		mg/kg	87	28.2		mg/kg	1.7	113		mg/kg	1.8

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:	M9986002			
Site	NELP			
Locator	14S02801D			
Collect Date:	18-JAN-96			
	VALUE	QUAL	UNITS	DL
Total Organic Halide	10	U	mg/kg	10
Total petroleum hydrocarbons	8330		mg/kg	174

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		M9907002				MA782005				MB348005				M9907005					
Site		NELP				NELP				NELP				NELP					
Locator		14802602				14802602				14802602				14802702					
Collect Date:		09-JAN-96				19-APR-96				10-JUL-96				09-JAN-96					
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL		
Halogenated Volatiles	ug/kg																		
1,1,1-Trichloroethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,1,2,2-Tetrachloroethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,1,2-Trichloroethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,1-Dichloroethene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,1-Dichloroethene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,2-Dichlorobenzene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,2-Dichloroethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,2-Dichloropropane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,3-Dichlorobenzene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,4-Dichlorobenzene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
2-Chloroethylvinyl ether		5.7	UJ	ug/kg	5.7	1	U	ug/kg	1	1.1	U	ug/kg	1.1	5.6	UJ	ug/kg	5.6		
Bromodichloromethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Bromoform		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Bromomethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Carbon tetrachloride		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Chlorobenzene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Chloroethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Chloroform		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Chloromethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Dibromochloromethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Dichlorodifluoromethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Methylene Chloride		5.7	UJ	ug/kg	5.7	5	U	ug/kg	5	5.5	U	ug/kg	5.5	5.6	UJ	ug/kg	5.6		
Tetrachloroethene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Trichloroethene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Trichlorofluoromethane		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Vinyl chloride		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
cis-1,2-Dichloroethene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
cis-1,3-Dichloropropene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
trans-1,2-Dichloroethene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
trans-1,3-Dichloropropene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Aromatics	ug/kg																		
Benzene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Ethylbenzene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Toluene		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Xylenes (total)		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Methyl tert-butyl ether		1.1	UJ	ug/kg	1.1	1	U	ug/kg	1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1		

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		MA782008				MB348008				M9907005RE				M9986003					
Site		NELP				NELP				NELP				NELP					
Locator		14B02702				14B02702				14B02702RE				14B02802					
Collect Date:		19-APR-96				10-JUL-96				09-JAN-96				18-JAN-96					
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL		
Halogenated Volatiles	ug/kg																		
1,1,1-Trichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
1,1,2,2-Tetrachloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
1,1,2-Trichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
1,1-Dichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
1,1-Dichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
1,2-Dichlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
1,2-Dichloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
1,2-Dichloropropane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
1,3-Dichlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
1,4-Dichlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
2-Chloroethylvinyl ether		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	5.6	UJ	ug/kg	5.6	5.4	U	ug/kg	5.4		
Bromodichloromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Bromoform		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Bromomethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Carbon tetrachloride		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Chlorobenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Chloroethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Chloroform		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Chloromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Dibromochloromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Dichlorodifluoromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Methylene Chloride		5.3	U	ug/kg	5.3	5.5	U	ug/kg	5.5	5.6	UJ	ug/kg	5.6	5.4	U	ug/kg	5.4		
Tetrachloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Trichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Trichlorofluoromethane		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
Vinyl chloride		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	UJ	ug/kg	1.1		
cis-1,2-Dichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
cis-1,3-Dichloropropene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
trans-1,2-Dichloroethene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
trans-1,3-Dichloropropene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Aromatics	ug/kg																		
Benzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Ethylbenzene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Toluene		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Xylenes (total)		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		
Methyl tert-butyl ether		1.1	U	ug/kg	1.1	1.1	U	ug/kg	1.1	1.1	UJ	ug/kg	1.1	1.1	U	ug/kg	1.1		

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Sta. ..., Mayport
NELP - Firefighting Training Area Surface Soil Data

Lab Sample Number:		MA782010			MB348010			M99860030		
Site		NELP			NELP			NELP		
Locator		14B02802			14B02802			14B02802D		
Collect Date:		19-APR-96			10-JUL-96			18-JAN-96		
		VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL
Halogenated Volatiles	ug/kg									
1,1,1-Trichloroethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
1,1,2,2-Tetrachloroethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
1,1,2-Trichloroethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
1,1-Dichloroethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 UJ	ug/kg	1.1
1,1-Dichloroethene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
1,2-Dichlorobenzene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
1,2-Dichloroethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
1,2-Dichloropropane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
1,3-Dichlorobenzene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
1,4-Dichlorobenzene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
2-Chloroethylvinyl ether		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	5.4 U	ug/kg	5.4
Bromodichloromethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Bromoform		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Bromomethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Carbon tetrachloride		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Chlorobenzene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Chloroethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 UJ	ug/kg	1.1
Chloroform		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Chloromethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Dibromochloromethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Dichlorodifluoromethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Methylene Chloride		5.5 U	ug/kg	5.5	5.5 U	ug/kg	5.5	5.4 U	ug/kg	5.4
Tetrachloroethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Trichloroethene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Trichlorofluoromethane		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 UJ	ug/kg	1.1
Vinyl chloride		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 UJ	ug/kg	1.1
cis-1,2-Dichloroethene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
cis-1,3-Dichloropropene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
trans-1,2-Dichloroethene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
trans-1,3-Dichloropropene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Aromatics	ug/kg									
Benzene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Ethylbenzene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Toluene		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Xylenes (total)		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1
Methyl tert-butyl ether		1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1	1.1 U	ug/kg	1.1

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Subsurface Soil Data

Lab Sample Number:		M9907002			MA782005			MB348005			M9907005		
Site		NELP			NELP			NELP			NELP		
Locator		14B02602			14B02602			14B02602			14B02702		
Collect Date:		09-JAN-96			19-APR-96			10-JUL-96			09-JAN-96		
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Polynuclear Aromatics (PAH)	mg/kg																
Naphthalene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
2-Methylnaphthalene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
1-Methylnaphthalene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Acenaphthylene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Acenaphthene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Fluorene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.11	UJ	mg/kg	.11
Phenanthrene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Anthracene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Fluoranthene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Pyrene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Benzo (a) anthracene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Chrysene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Benzo (b) fluoranthene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Benzo (a) pyrene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Indeno (1,2,3-cd) pyrene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Dibenzo (a,h) anthracene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054
Benzo (g,h,i) perylene		.054	U	mg/kg	.054	.052	U	mg/kg	.052	.054	U	mg/kg	.054	.054	U	mg/kg	.054

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Subsurface Soil Data

Lab Sample Number:		MA782008			MB348008			M9986003			MA782010		
Site		NELP			NELP			NELP			NELP		
Locator		14B02702			14B02702			14B02802			14B02802		
Collect Date:		19-APR-96			10-JUL-96			18-JAN-96			19-APR-96		
		VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL
Polynuclear Aromatics (PAH)	mg/kg												
Naphthalene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
2-Methylnaphthalene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
1-Methylnaphthalene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Acenaphthylene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Acenaphthene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Fluorene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Phenanthrene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Anthracene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Fluoranthene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Pyrene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Benzo (a) anthracene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Chrysene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Benzo (b) fluoranthene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Benzo (a) pyrene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Indeno (1,2,3-cd) pyrene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Dibenzo (a,h) anthracene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056
Benzo (g,h,i) perylene		.053 U	mg/kg	.053	.27 U	mg/kg	.27	1.1 U	mg/kg	1.1	.056 U	mg/kg	.056

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Subsurface Soil Data

Lab Sample Number:	MB348010
Site	NELP
Locator	14B02802
Collect Date:	10-JUL-96

		VALUE	QUAL	UNITS	DL
Polynuclear Aromatics (PAH)	mg/kg				
Naphthalene		.055	U	mg/kg	.055
2-Methylnaphthalene		.055	U	mg/kg	.055
1-Methylnaphthalene		.055	U	mg/kg	.055
Acenaphthylene		.055	U	mg/kg	.055
Acenaphthene		.055	U	mg/kg	.055
Fluorene		.055	U	mg/kg	.055
Phenanthrene		.055	U	mg/kg	.055
Anthracene		.055	U	mg/kg	.055
Fluoranthene		.055	U	mg/kg	.055
Pyrene		.055	U	mg/kg	.055
Benzo (a) anthracene		.055	U	mg/kg	.055
Chrysene		.055	U	mg/kg	.055
Benzo (b) fluoranthene		.055	U	mg/kg	.055
Benzo (a) pyrene		.055	U	mg/kg	.055
Indeno (1,2,3-cd) pyrene		.055	U	mg/kg	.055
Dibenzo (a,h) anthracene		.055	U	mg/kg	.055
Benzo (g,h,i) perylene		.055	U	mg/kg	.055

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Subsurface Soil Data

Lab Sample Number:		M9907002			MA782005			MB348005			M9907005		
Site		NELP			NELP			NELP			NELP		
Locator		14B02602			14B02602			14B02602			14B02702		
Collect Date:		09-JAN-96			19-APR-96			10-JUL-96			09-JAN-96		
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
INORGANICS (SOIL)	mg/kg																
Antimony		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Arsenic		.63	J	mg/kg	.1	.57	J	mg/kg	.2	.53	J	mg/kg	.21	.59	J	mg/kg	.1
Barium		3.4	J	mg/kg	.1	3.5	UJ	mg/kg	3.5	3.4	J	mg/kg	.076	2.9	J	mg/kg	.1
Beryllium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Cadmium		.48	U	mg/kg	.48	.38	U	mg/kg	.38	.72	U	mg/kg	.72	.48	U	mg/kg	.48
Chromium		3		mg/kg	.5	2.7		mg/kg	.4	2.8		mg/kg	.48	3.2		mg/kg	.5
Cobalt		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Copper		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Cyanide		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Lead		1.6	J	mg/kg	.3	3.5	J	mg/kg	.2	2		mg/kg	.16	2.5	J	mg/kg	.3
Mercury		.07	U	mg/kg	.07	.03	U	mg/kg	.03	.03	U	mg/kg	.03	.07	U	mg/kg	.07
Nickel		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Selenium		.5	U	mg/kg	.5	.27	U	mg/kg	.27	.27	UJ	mg/kg	.27	.5	U	mg/kg	.5
Silver		.5	U	mg/kg	.5	.46	U	mg/kg	.46	.48	U	mg/kg	.48	.5	U	mg/kg	.5
Thallium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Tin		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Vanadium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Zinc		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Subsurface Soil Data

Lab Sample Number:		MA782008				MB348008				M9986003				MA782010				
Site		NELP				NELP				NELP				NELP				
Locator		14B02702				14B02702				14B02802				14B02802				
Collect Date:		19-APR-96				10-JUL-96				18-JAN-96				19-APR-96				
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	
INORGANICS (SOIL)	mg/kg																	
Antimony		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Arsenic		.28	J	mg/kg	.2	.47	J	mg/kg	.21	.41	UJ	mg/kg	.41	.44	J	mg/kg	.2	
Barium		3.8	UJ	mg/kg	3.8	4.3	J	mg/kg	.077	4.3	J	mg/kg	.1	3.1	UJ	mg/kg	3.1	
Beryllium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Cadmium		.38	U	mg/kg	.38	.72	U	mg/kg	.72	.48	U	mg/kg	.48	.38	U	mg/kg	.38	
Chromium		3		mg/kg	.4	3.4		mg/kg	.48	3		mg/kg	.5	2.7		mg/kg	.4	
Cobalt		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Copper		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Cyanide		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Lead		1.9	J	mg/kg	.2	6.3		mg/kg	.16	3.3		mg/kg	.2	2.1	J	mg/kg	.2	
Mercury		.03	U	mg/kg	.03	.03	U	mg/kg	.03	.07	U	mg/kg	.07	.03	U	mg/kg	.03	
Nickel		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Selenium		.28	U	mg/kg	.28	.27	UJ	mg/kg	.27	.51	U	mg/kg	.51	.27	U	mg/kg	.27	
Silver		.47	U	mg/kg	.47	.48	U	mg/kg	.48	.51	UJ	mg/kg	.51	.46	U	mg/kg	.46	
Thallium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Tin		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Vanadium		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		
Zinc		-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg		

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Subsurface Soil Data

Lab Sample Number:		MB348010			
Site		NELP			
Locator		14802802			
Collect Date:		10-JUL-96			
	VALUE	QUAL	UNITS	DL	
INORGANICS (SOIL)	mg/kg				
Antimony		-	mg/kg		
Arsenic		.21	U mg/kg	.21	
Barium		3.6	J mg/kg	.077	
Beryllium		-	mg/kg		
Cadmium		.73	U mg/kg	.73	
Chromium		3	mg/kg	.48	
Cobalt		-	mg/kg		
Copper		-	mg/kg		
Cyanide		-	mg/kg		
Lead		3	mg/kg	.16	
Mercury		.03	U mg/kg	.03	
Nickel		-	mg/kg		
Selenium		.27	UJ mg/kg	.27	
Silver		.48	U mg/kg	.48	
Thallium		-	mg/kg		
Tin		-	mg/kg		
Vanadium		-	mg/kg		
Zinc		-	mg/kg		

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Subsurface Soil Data

Lab Sample Number:	M9907002			MA782005			MB348005			M9907005		
Site	NELP			NELP			NELP			NELP		
Locator	14802602			14802602			14802602			14802702		
Collect Date:	09-JAN-96			19-APR-96			10-JUL-96			09-JAN-96		
	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL
Total Organic Halide	10 U	mg/kg	10	11 U	mg/kg	11	10 U	mg/kg	10	10 U	mg/kg	10
Total petroleum hydrocarbons	1.8 U	mg/kg	1.8	13.8	mg/kg	1.7	16.5	mg/kg	1.9	1.8 U	mg/kg	1.8

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Subsurface Soil Data

Lab Sample Number:	MA782008			MB348008			M9986003			MA782010		
Site	NELP			NELP			NELP			NELP		
Locator	14802702			14802702			14802802			14802802		
Collect Date:	19-APR-96			10-JUL-96			18-JAN-96			19-APR-96		
	VALUE QUAL UNITS		DL	VALUE QUAL UNITS		DL	VALUE QUAL UNITS		DL	VALUE QUAL UNITS		DL
Total Organic Halide	11 U	mg/kg	11	10 U	mg/kg	10	10 U	mg/kg	10	11 U	mg/kg	11
Total petroleum hydrocarbons	24.9	mg/kg	1.7	94.1	mg/kg	1.8	1680	mg/kg	44	36.7	mg/kg	1.8

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

US Naval Station, Mayport
NELP - Firefighting Training Area Subsurface Soil Data

Lab Sample Number:	MB348010			
Site	NELP			
Locator	14802802			
Collect Date:	10-JUL-96			
	VALUE	QUAL	UNITS	DL
Total Organic Halide	10	U	mg/kg	10
Total petroleum hydrocarbons	22.1		mg/kg	1.9

U = NOT DETECTED R = RESULT IS REJECTED
J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS ESTIMATED
THE ADDITIONAL LISTINGS OF RESULTS FOR 1,2-; 1,3-; AND 1,4-DICHLOROBENZENE WERE GENERATED FROM THE SVOC (8270) ANALYTICAL RUN.

DATE: 7/3

FAX TO:

FRANK VESENE

FAX #: 904-620-3396

FAX FROM:

CHERYL L. MITCHELL, N4E4
ENVIRONMENTAL DIVISION
NAVAL STATION MAYPORT
MAYPORT, FL 32228-0067
904-270-6730(X13) FAX: -7398, DSN: 960-

SUBJECT: PHS - RINSE WATER IN TANK

TOTAL NUMBER OF PAGES (INCL COVER SHEET): 8

MESSAGE:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Navy Public Works Center
Project: 60408 Cell#152
Sample Matrix: Water

Service Request: J9600868
Date Collected: 6/27/96
Date Received: 6/27/96
Date Extracted: 7/2/96
Date Analyzed: 7/2/96

Oil and Grease
EPA Method 413.1
Units: mg/L (ppm)

Sample Name	Lab Code	MRL	Result
606-0589	J9600868-1	1	210
Method Blank	J9607702-MB	1	U

U Not detected at or above the MRL.

Approved By: Tom D Kissinger Date: 7/3/96

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Navy Public Works Center
Project: 60408 Call #152
Sample Matrix: Water

Service Request: J9600868
Date Collected: 6/27/96
Date Received: 6/27/96
Date Extracted: 6/28/96
Date Analyzed: 6/28/96

Total Recoverable Petroleum Hydrocarbons
EPA Method 418.1
Units: mg/L (ppm)

Sample Name	Lab Code	MRL	Result
606-0589	J9600868-1	1.0	[illegible]
Method Blank	J960628-MB	1.0	U

U Not detected at or above the MRL

Approved By: Tom D. Kissinger Date: 7/3/96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Navy Public Works Center
Project: 60808 Call#152
LCS Matrix: Water

Service Request: J9600868
Date Collected: NA
Date Received: NA
Date Extracted: 7/2/96
Date Analyzed: 7/2/96

Laboratory Control Sample Summary
Oil and Grease
EPA Method 413.1
Units: mg/L (ppm)

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Oil	25	24	96	75-125

Approved By: Tom D. Clissinger Date: 7/3/96

(6)

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Navy Public Works Center	**Service Request:**	J9600868
Project:	60408 Call#152	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	7/2/96
		Date Analyzed:	7/2/96

Matrix Spike/Duplicate Matrix Spike Summary
Oil and Grease
EPA Method 413.1
Units: mg/L (ppm)

Sample Name: TAP
Lab Code: J9600702-TAP

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Oil	25	U	21	23	84	92	75-125	9

U Not detected at or above the MRL.

Approved By: Tom D. Hissinger Date: 7/3/96

(7)

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Navy Public Works Center
Project: 60808 Call #152
LCS Matrix: Water

Service Request: J9600868
Date Collected: NA
Date Received: NA
Date Extracted: 6/28/96
Date Analyzed: 6/28/96

Laboratory Control Sample Summary
Total Recoverable Petroleum Hydrocarbons
EPA Method 418.1
Units: mg/L (ppm)

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Oil	2.5	2.4	96	75-125

The laboratory control sample is prepared using a standard obtained from Restek (Lot No. A005128) which is different than the source of the calibration standard.

Approved By: Tom D. Hissinger Date: 7/3/96

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Navy Public Works Center
Project: 60408 Call #152
Sample Matrix: Water

Service Request: J9600868
Date Collected: NA
Date Received: NA
Date Extracted: 6/28/96
Date Analyzed: 6/28/96

Matrix Spike/Duplicate Matrix Spike Summary
Total Recoverable Petroleum Hydrocarbons
EPA Method 418.1
Units: mg/L (ppm)

Sample Name: PS-OWS-EFF-696
Lab Code: J9600859-2

Analyte	MRL	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Oil	1.0	2.5	U	2.4	2.4	96	96	75-125	<1

U Not detected at or above the MRL.
The MS/MSD is prepared using a standard obtained from BUCK Scientific (Lot No. 9110A).

Approved By: Tam D. Ilsinger Date: 7/3/96

APPENDIX D

DATA VALIDATION REPORTS

Summary of Organic Data Validation
Volatile Organic Compounds
EPA Method 8010/8020

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:	MF001
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	February 14, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14S02601	M9907001	Soil
14B02602	M9907002	Soil
14S02701	M9907003	Soil
14S02701MS	M9907003MS	Soil
14S02701MSD	M9907003MSD	Soil
14S02701D	M9907004	Soil
14B02702	M9907005	Soil
14B02702R	M9907005R	Soil
14T001	M9907006	Water
14Y001	M9907007	Water
14R001	M9907008	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. Preserved water samples analyzed ≤ 14 days from date of sample collection.

   Yes: X No: ____ N/A: ____

   b. Unpreserved water samples, aromatic VOCs analyzed ≤ 7 days from date of sample collection; non-aromatic VOCs analyzed ≤ 14 days from date of sample collection.

   Yes: ____ No: ____ N/A: X

   c. Soil samples analyzed ≤ 14 days from date of sample collection.

   Yes: X No: ____ N/A: ____

   Comment: All samples were received at the laboratory with a temperature of 10°C. This exceeds the 4°C ± 2°C criteria, therefore, all associated sample results were qualified as estimated "J/UJ."

IV. 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 5, 10, 20, 35, and 100 ug/L.

   Yes: __X__ No: _____

2. The RRF percent relative standard deviation (% RSD) results from the initial calibration met QC acceptance criteria for each compound.

   Yes: _____ No: __X__

   Comment: Several compounds exceeded the 20% RSD QC criteria, however, all results were previously qualified as estimated "UJ" due to temperature problems, therefore, no further action was taken.

V. 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 continuing calibration concentration for each compound was within the specified range.

   Yes: __X__ No: _____

3. The retention times (RT) for each compound was within the specified RT window.

   Yes: __X__ No: _____

4. Comments: The following calibration calculations were verified during the validation process.

MF001 VAR3600 DB624 1/16/96 Bromomethane Mean RT=(Sum RT)/5 (0.1689+0.2157+0.3311 +0.4202+0.6561/5= 0.3584	MF001 VAR3600 DB624 1/16/96 Bromomethane %RSD=(Std.Deviation/Mean)* 100 %RSD=(0.1933/0.3584)*100 %RSD=53.93%	MF001 VAR3600 1/17/96 Bromomethane 20 ppb 12111/365734= =0.033114

VI. Blanks

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

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 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: __X__ No: ____

   Comment: The following table summarizes laboratory blank results:

Volatile Laboratory Blank Summary Table
SDG No. MF001

Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l or ug/kg	Action Level ** ug/l or ug/kg	Affected Sample	Lab Conc ug/l or ug/kg	Lab Qual	EDS Conc ug/l or ug/kg	EDS Qual
VWB10117 1/17/96	None Found	--	--	--	--	--	--	--
VSB10117 1/17/96	None Found	--	--	--	--	--	--	--

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: The following table summarizes field blank results:

Volatile Field Blank Summary Table
SDG No. MF001

Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l	Action Level ** ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
14T001 1/18/96	None Found	--	--	--	--	--	--	--
14Y001 1/18/96	None Found	--	--	--	--	--	--	--
14R001 1/18/96	None Found	--	--	--	--	--	--	--

VII. 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 QC acceptance criteria for fluorobenzene.

   Yes: ____ No: X

2. Sample reanalysis was performed if system monitoring results were outside of criteria.

   Yes: X No: ____ N/A: ____

   Comment: Samples 14S02701, 14S02701D and 14B02702 exhibited a high fluorobenzene % recovery. Sample 14B02702 was reanalyzed (14B02702R) with similar results. The laboratory did not reanalyze 14S02701 or

14S02701D, stating that since these were the duplicate pair no further action was necessary. All results for 14S02701, 14S02701D, 14B02702 and 14B02702R would be qualified as estimated "J" for positive results, however, there were no positive results reported for any of these samples, therefore, no qualifications were required.

VIII. 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.: 14S02701

3. MS/MSD sample results met QC acceptance criteria.

   Yes: __X__ No: _____ NA: _____

4. Comment: MS/MSD criteria have been met and no action has been taken.

IX. 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.

X. Field Duplicates

1. The following duplicate set(s) was analyzed with this SDG:

   a. 14S02701 and 14S02701D

2. Comment: There were no positive results for either duplicate sample.

XI. 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: ____ No: __X__ N/A: ____

XII. System Performance

1. The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance.

   Yes: __X__ No: ____

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 III (Holding Times) 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.

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
Polynuclear Aromatic Hydrocarbons

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:	MF001
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	February 14, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14S02601	M9907001	Soil
14B02602	M9907002	Soil
14S02701	M9907003	Soil
14S02701MS	M9907003MS	Soil
14S02701MSD	M9907003MSD	Soil
14S02701D	M9907004	Soil
14B02702	M9907005	Soil
14Y001	M9907007	Water
14R001	M9907008	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: __X__ No: _____ N/A: _____

   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: _____

Comment: Initial calibration criteria have been met and no action has been taken.

2. Were continuing calibration data reviewed and found to meet all method requirements?

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 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 retention times within specified limits?

Yes: X No: ____

Comment: Retention time criteria have been met and no action has been taken.

The following calculations were verified for this data package:

PNAs MF001 RTX-5 H8904 8/2/95 Anthracene mean RT= 20.56+20.55+20.55+20.55+ 20.56/5 = 20.554	PNAs MF001 RTX-5 H8904 1/19/96 Anthracene 0.5 Std = area ratio = 203373/605903 = 0.33565	PNAs MF001 RTX-5 H8904 1/15/96 Naphthalene %D = (19.32-19.76)/19.32 x 100 =-2.3%

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. Laboratory blanks WBLK01 and SBLK01 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: Field blank 14Y001 and rinsate blank 14R001 were both 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 terphenyl-d14.

Yes: __X__ No: _____

Comment: Surrogate criteria have been met and no action has been taken.

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.: 14S02701

3. MS/MSD sample results were acceptable.

   Yes: __X__ No: _____

   Comment: MS/MSD criteria have been met and no action has been taken.

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.: BS011161

3. Blank spike sample results were within acceptable QC limits.

   Yes: __X__ No: _____ N/A: _____

   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.: W01116B1 and S01116B1

3. The percent recoveries for the LCS compound were within acceptable limits.

   Yes: __X__ No: _____ N/A: _____

Comment: The LCS' performed on 1/15/96 were acceptable.

X. Field Duplicates

1. The following duplicate set was analyzed with this SDG:

   a. 14S02701 and 14S02701D

2. Comment: There were no positive results for either duplicate sample.

XI. Target Compound Identification

Target compound identification is not reviewed for Level C validation.

XII. Compound Quantitation and Reported CRQLS

Compound quanititation and reported CRQLS are not reviewed for Level C validation.

1. 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: __X__ No: ____ N/A: ____

2. Comments: The laboratory raised the reporting limits for phenanthrene in samples 14S02701 and 14B02702 due to chemical interferences during analysis. The laboratory qualified phenanthrene "UI" and the reviewer further qualified this compound as estimated "UJ."

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 XII (Compound Quantitation) 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.

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 Inorganic Data Validation
Metals

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:	MF001
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Susan Dalla
Secondary Reviewer:	Nancy Weaver
Date Review Completed:	February 16, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14S02601	M9907001	Soil
14B02602	M9907002	Soil
14S02701	M9907003	Soil
14S02701MS	M9907003MS	Soil
14S02701MSD	M9907003MSD	Soil
14S02701D	M9907004	Soil
14B02702	M9907005	Soil
14Y001	M9907007	Water
14R001	M9907008	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 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.

   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: ____ No: ____ N/A: __X__

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	2557/2500 x 100	102.3
CCV	Barium	2566/2500 x 100	102.6
ICV	Arsenic	27.25/25.0 x 100	109.0
CCV	Arsenic	25.27/25.0 x 100	101.1
ICV	Mercury	4.73/5.0 x 100	94.6
CCV	Mercury	5.05/5.0 x 100	101.0

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.

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. MF001

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 1/15/96	Cadmium	2.41B	NA	14Y001 14R001	2.2 2.2	U U	2.4 2.4	UJ UJ

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: ____ N/A: X

2. Analytes were detected, but associated sample aliquot concentrations were greater than 5X the blank concentration.

Yes: ____ No: ____ N/A: __X__

Comment: Analytes were not detected in field blanks 14Y001 and 14R001.

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 MF001, 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: 14S02701

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
14S02601	Lead	257	J
14B02602	Lead	257	J
14S02701	Lead	257	J
14S02701D	Lead	257	J
14B02701	Lead	257	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	(430.6-6.46)/426.4 x 100	99.5
GFAA	Lead	(16.18-5.24)/4.26 x 100	256.8
CV	Mercury	(1.00-0.0)/1.04 x 100	96.2

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 is 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	474/500 x 100	94.8

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	2744/2500 x 100	109.8
GFAA	Lead	51.94/50.0 x 100	103.9
CV	Mercury	5.05/5.0 x 100	101.0

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: 14S02701, 14S02701D

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: ____

   Comment: Reported lead results were flagged with a "*" by the laboratory because the RPD for duplicate lead analysis was 32.7. This is within the ± 35 allowed for soil samples.

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	Barium	[(6.46-6.81)/(6.46+6.81)]/2 x 100	5.1
GFAA	Lead	[(5.24-7.29)/(5.24+7.29)]/2 x 100	32.7 (±35)
CV	Mercury	[(0.0-0.0)/(0.0+0.0)]/2 x 100	NC

B. Field Duplicates

1. The following duplicate sets were analyzed with this SDG:

   a. 14S02701 and 14S02701D

2. Comment: Field duplicate criteria have not 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.

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: __X__ No: ____

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

1. ICP serial dilution analysis was performed on one sample from each SDG of a similar matrix type and concentration level.

Yes: ____ No: ____ N/A: X

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: ____ N/A: X

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.

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, VI.3 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)	Qual	Conc. (ug/L)	Qual
14Y001	Cadmium	N	3	2.2	U	2.4	UJ
14R001	Cadmium	N	3	2.2	U	2.4	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
14S02601	Lead	%R=257	NA	NA	NO	4.1	J
14B02602	Lead	%R=257	NA	NA	NO	1.6	J
14S02701	Lead	%R=257	NA	NA	NO	5.2	J
14S02701D	Lead	%R=257	NA	NA	NO	5.5	J
14S02702	Lead	%R=257	NA	NA	NO	2.5	J

Summary of Organic Data Validation

Volatile Organic Compounds

EPA Method 8020

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:	MF002
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	February 13, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14T002	M9936001	Water
14R002	M9936002	Water
14Y002	M9936003	Water
14W009	M9936004	Water
14W010	M9936005	Water
14W010MS	M9936005MS	Water
14W010MSD	M9936005MSD	Water
14W010D	M9936006	Water
14W011	M9936007	Water
14W012	M9936008	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. Preserved water samples analyzed ≤ 14 days from date of sample collection.

   Yes: X No: ____ N/A: ____

   b. Unpreserved water samples, aromatic VOCs analyzed ≤ 7 days from date of sample collection; non-aromatic VOCs analyzed ≤ 14 days from date of sample collection.

   Yes: ____ No: ____ N/A: X

   c. Soil samples analyzed ≤ 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. 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 5, 10, 20, 50, and 100 ug/L.

   Yes: X No: ____

2. The RRF percent relative standard deviation (% RSD) results from the initial calibration met QC acceptance criteria for each compound.

   Yes: X No: ____

V. 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 continuing calibration concentration for each compound was within the specified range.

   Yes: X No: ____

3. The retention times (RT) for each compound was within the specified RT window.

   Yes: X No: ____

4. Comments: The following calibration calculations were verified during the validation process.

MF002 VAR3600 DB624 1/16/96 Chlorobenzene Mean RT=(Sum RT)/5 (1.0920+0.9960+0.9457 +0.9382+0.9597/5= 0.9863	MF002 VAR3600 DB624 1/16/96 Chlorobenzene %RSD=(Std.Deviation/Mean)* 100 %RSD=(0.063/0.9863)*100 %RSD=6.38%	MF002 VAR3600 1/18/96 Benzene %Recovery = 21.39/20.00 = 107%

VI. Blanks

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

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 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: X No: ____

   Comment: The following table summarizes laboratory blank results:

Volatile Laboratory Blank Summary Table
SDG No. MF002

Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l	Action Level ** ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
VWB10118 1/18/96	None Found	--	--	--	--	--	--	--

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: The following table summarizes field blank results:

Volatile Field Blank Summary Table
SDG No. MF002

Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l	Action Level ** ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
14T002 1/18/96	None Found	--	--	--	--	--	--	--
14R002 1/18/96	None Found	--	--	--	--	--	--	--
14Y002 1/18/96	None Found	--	--	--	--	--	--	--

VII. 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 QC acceptance criteria for fluorobenzene.

   Yes: X No: ____

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.

VIII. 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.: 14W010

3. MS/MSD sample results met QC acceptance criteria.

   Yes: __X__ No: _____ NA: _____

4. Comment: MS/MSD criteria have been met and no action has been taken.

IX. 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.

X. Field Duplicates

1. The following duplicate set(s) was analyzed with this SDG:

   a. 14W010 and 14W010D

2. Comment: There were no positive results for either duplicate sample.

XI. 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: ____

XII. System Performance

1. The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance.

   Yes: __X__ No: ____

XIII. Overall Assessment of Data

The final validated results represent the compilation of all quality control qualification. The analyses of environmental samples and quality control samples are valid.

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
Polynuclear Aromatic Hydrocarbons

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:	MF002
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	February 13, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14R002	M9936002	Water
14Y002	M9936003	Water
14W009	M9936004	Water
14W010	M9936005	Water
14W010MS	M9936005MS	Water
14W010MSD	M9936005MSD	Water
14W010D	M9936006	Water
14W011	M9936007	Water
14W012	M9936008	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: ____

Comment: Initial calibration criteria have been met and no action has been taken.

2. Were continuing calibration data reviewed and found to meet all method requirements?

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 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 retention times within specified limits?

Yes: __X__ No: _____

Comment: Retention time criteria have been met and no action has been taken.

The following calculations were verified for this data package:

PNAs MF002 RTX-5 GC #4 8/2/95 Naphthalene mean RT= 10.55+10.52+10.52+10.52+ 10.52/5 = 10.526	PNAs MF002 RTX-5 GC #4 1/19/96 Naphthalene 0.5 Std = area ratio = 174560/919526 = 0.18984	PNAs MF002 RTX-5 1/17/96 Fluorene %D = (19.34-19.74)/19.34 x 100 =-2.1%

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. Laboratory blank WBLK01 was 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: Field blank 14Y002 and rinsate blank 14R002 were both 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 terphenyl-d14.

Yes: __X__ No: _____

Comment: Surrogate criteria have been met and no action has been taken.

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.: 14W010

3. MS/MSD sample results were acceptable.

   Yes: __X__ No: ____

   Comment: MS/MSD criteria have been met and no action has been taken. Due to the dilution requirements of 14W010, several of the spiking compounds recovered below the reporting limits. No action was taken by the reviewer on this basis.

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.: BW011561

3. Blank spike sample results were within acceptable QC limits.

   Yes: __X__ No: ____ N/A: ____

   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.: W01156B1

3. The percent recoveries for the LCS compound were within acceptable limits.

Yes: __X__ No: ____ N/A: ____

Comment: The LCS performed on 1/17/96 was acceptable.

X. Field Duplicates

1. The following duplicate set was analyzed with this SDG:

   a. 14W010 and 14W010D

2. Comment: There were no positive results for either duplicate sample.

XI. Target Compound Identification

Target compound identification is not reviewed for Level C validation.

XII. Compound Quantitation and Reported CRQLS

Compound quanititation and reported CRQLS are not reviewed for Level C validation.

1. 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: __X__ No: ____ N/A: ____

2. Comments: Samples 14W009, 14W010, 14W010D, 14W011 and 14W012 were diluted due to chemical interferences. These samples also exhibited chromatographic interferences for phenanthrene and/or anthracene. The laboratory raised the reporting limits for these compounds and flagged them as "UI." The reviewer further qualified these compounds as estimated "UJ."

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 XII (Compound Quantitation) 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.

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 Inorganic Data Validation
Lead/Mercury

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:	MF002
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Susan Dalla
Secondary Reviewer:	Nancy Weaver
Date Review Completed:	February 15, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14R002	M9936002	Water
14Y002	M9936003	Water
14W009	M9936004	Water
14W010	M9936005	Water
14W010MS	M9936005MS	Water
14W010MSD	M9936005MSD	Water
14W010D	M9936006	Water
14W011	M9936007	Water
14W012	M9936008	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 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.

   Yes: __X__ No: ____

   Comment: Holding time criteria have been met and no action has been taken.

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	Lead	24.85/25.0 x 100	99.4
CCV	Lead	23.97/25.0 x 100	95.9
ICV	Mercury	4.98/5.0 x 100	99.6
CCV	Mercury	5.12/5.0 x 100	102.4

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: X No: ____

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. MF002

Blank ID	Affected Analyte	Absolute Conc. ug/L	Action Level ug/L	Affected Sample	Lab Conc ug/L	Lab Qual	EDS Conc ug/L	EDS Qual
14Y002	Lead	7.2	36.0	14W009	3.1	--	7.2	UJ
				14W010	2.8	B	7.2	UJ
				14W010D	1.8	B	7.2	UJ
				14W011	2.4	B	7.2	UJ
				14W012	2.7	B	7.2	UJ

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 MF002, 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: 14W010

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: __X__ No: _____

4. The following spike calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation %R=(SSR-SR/SA)*100	%R
GFAA	Lead	(22.8-2.83)/20.0 x 100	99.8
CV	Mercury	(1.78-0.0)/2.0 x 100	89.0

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: _____ No: _____ N/A: __X__

2. Solution AB analyte recovery results were within the control limits of 80%-120%.

Yes: ____ No: ____ N/A: __X__

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__

4. Cr, Cu, Ni, and V are present in a sample(s) at concentrations less than 10,000 ug/L.

Yes: ____ No: ____ N/A: __X__

5. Comments: None.

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: ____ 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
GFAA	Lead	51.9/50.0 x 100	103.8
CV	Mercury	5.05/5.0 x 100	101.0

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: 14W010

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
GFAA	Lead	[(2.83-2.61)/(2.83+2.61)]/2 x 100	8.1
CV	Mercury	0.0-0.0/0+0/2 x 100	NC

B. Field Duplicates

1. The following duplicate sets were analyzed with this SDG:

   a. 14W010 and 14W010D

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.

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: __X__ No: ____

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: ____ No: ____ N/A: X

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: ____ N/A: X

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 calibrated range of the instrument for AA.

   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.B.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)	Qual	Conc. (ug/L)	Qual
14W009	Lead	P	3	3.1	--	7.2	UJ
14W010	Lead	P	3	2.8	B	7.2	UJ
14W010D	Lead	P	3	1.8	B	7.2	UJ
14W011	Lead	P	3	2.4	B	7.2	UJ
14W012	Lead	P	3	2.7	B	7.2	UJ

Rationale
1 = Professional judgement
2 = Blank contamination (laboratory or field)
3 = Prep Blank - negative value > IDL

Environmental Data Services, Inc.

Specializing in Laboratory Data Validation

Summary of Organic Data Validation

Volatile Organic Compounds

EPA Method 8010/8020

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:	MF003
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	February 21, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14S02801	M9986001	Soil
14S02801MS	M9986001MS	Soil
14S02801MSD	M9986001MSD	Soil
14S02801D	M9986002	Soil
14S02802	M9986003	Soil
14S02802DUP	M9986003DUP	Soil
14T003	M9986004	Water
14R003	M9986005	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. Preserved water samples analyzed ≤ 14 days from date of sample collection.

   Yes: __X__ No: _____ N/A: _____

   b. Unpreserved water samples, aromatic VOCs analyzed ≤ 7 days from date of sample collection; non-aromatic VOCs analyzed ≤ 14 days from date of sample collection.

   Yes: _____ No: _____ N/A: __X__

   c. Soil samples analyzed ≤ 14 days from date of sample collection.

   Yes: __X__ No: _____ N/A: _____

   Comment: Holding time criteria have been met and no action has been taken.

IV. 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 5, 10, 20, 35, and 100 ug/L.

   Yes: __X__ No: ____

2. The RRF percent relative standard deviation (% RSD) results from the initial calibration met QC acceptance criteria for each compound.

   Yes: ____ No: __X__

   Comment: Several compounds exceeded the 20% RSD QC criteria, however, there were no positive results reported for these compounds, therefore, no qualifications were required.

V. 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 continuing calibration concentration for each compound was within the specified range.

   Yes: ____ No: __X__

   Comment: The concentrations for vinyl chloride, chloroethane, trichlorofluoromethane, and 1,1-dichloroethane were below the concentration ranges. All of the listed compounds were qualified as estimated "UJ" for all associated samples.

3. The retention times (RT) for each compound was within the specified RT window.

   Yes: __X__ No: ____

4. Comments: The following calibration calculations were verified during the validation process.

MF003 VAR3600 DB624 1/16/96 1,1-DCE Mean RT=(Sum RT)/5 (2.0687+1.9258+2.0652 +2.0034+2.0258/5= 2.0177	MF003 VAR3600 DB624 1/16/96 1,1-DCE %RSD=(Std.Deviation/Mean)* 100 %RSD=(0.0582/2.0177)*100 %RSD=28.8%	MF003 VAR3600 1/17/96 Bromomethane 20 ppb 12111/365734= =0.033114

VI. Blanks

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

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 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: X No: _____

   Comment: The following table summarizes laboratory blank results:

Volatile Laboratory Blank Summary Table
SDG No. MF003

Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l or ug/kg	Action Level ** ug/l or ug/kg	Affected Sample	Lab Conc ug/l or ug/kg	Lab Qual	EDS Conc ug/l or ug/kg	EDS Qual
VWB10127 1/27/96	None Found	--	--	--	--	--	--	--
VSB10127 1/27/96	None Found	--	--	--	--	--	--	--

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: The following table summarizes field blank results:

Volatile Field Blank Summary Table
SDG No. MF003

Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l	Action Level ** ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
14T003 1/27/96	None Found	--	--	--	--	--	--	--
14R003 1/27/96	None Found	--	--	--	--	--	--	--

VII. 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 QC acceptance criteria for fluorobenzene.

   Yes: ____ No: X

2. Sample reanalysis was performed if system monitoring results were outside of criteria.

   Yes: ____ No: X N/A: ____

   Comment: Samples 14S02801, 14S02801D and 14S02802DUP exhibited a high fluorobenzene % recovery. All results for these samples would be qualified as estimated "J" for positive results, however, there were no positive results reported for any of these samples, therefore, no qualifications were required.

VIII. 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.: 14S02801

3. MS/MSD sample results met QC acceptance criteria.

   Yes: _____ No: __X__ NA: _____

4. Comment: Several of the MS/MSD compounds exhibited high percent recovery values. No action has been taken on this basis.

IX. 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.

X. Field Duplicates

1. The following duplicate set(s) was analyzed with this SDG:

   a. 14S02801 and 14S02801D
   b. 14S02802 and 14S02802DUP

2. Comment: There were no positive results reported for either set of duplicate samples.

XI. 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: ____

XII. System Performance

1. The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance.

   Yes: __X__ No: ____

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 V (Continuing Calibration) 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.

Additional Comments:

1. The chain of custody and sample tracking form identify sample M9986003 as 14B02802, however, the laboratory identifies this sample as 14S02802.

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
Polynuclear Aromatic Hydrocarbons

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:	MF003
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	February 21, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14S02801	M9986001	Soil
14S02801MS	M9986001MS	Soil
14S02801MSD	M9986001MSD	Soil
14S02801D	M9986002	Soil
14S02802	M9986003	Soil
14R003	M9986005	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: X No: ____ N/A: ____

   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: ____

Comment: Initial calibration criteria have been met and no action has been taken.

2. Were continuing calibration data reviewed and found to meet all method requirements?

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 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 retention times within specified limits?

Yes: __X__ No: _____

Comment: Retention time criteria have been met and no action has been taken.

The following calculations were verified for this data package:

PNAs MF003 RTX-5 GC#4 8/2/95 Fluorene mean RT= 18.02+18.01+18.01+18.01+ 18.01/5 = 18.012	PNAs MF003 RTX-5 GC#4 1/19/96 Fluorene 0.5 Std = area ratio = 193314/605903 = 0.31905	PNAs MF003 RTX-5 H8904 1/25/96 Acenaphthylene %D = (19.34-19.89)/19.34 x 100 =-2.9%

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. Laboratory blanks WBLK01 and SBLK01 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 14R003 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 terphenyl-d14.

Yes: _____ No: __X__

Comment: Due to the dilution requirements of samples 14S02801 and 14S02801D, the surrogate did not recover and was reported as zero. No action was taken on this basis.

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.: 14S02801

3. MS/MSD sample results were acceptable.

   Yes: _____ No: __X__

   Comment: Due to the dilution requirements of sample 14S02801, the MS/MSD compounds did not recover. No action has been taken on this basis.

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.: BS012261

3. Blank spike sample results were within acceptable QC limits.

   Yes: __X__ No: _____ N/A: _____

   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.: W01226B1 and S01226B1

3. The percent recoveries for the LCS compound were within acceptable limits.

Yes: __X__ No: ____ N/A: ____

Comment: The LCS' performed on 1/25/96 and 1/26/96 were acceptable.

X. Field Duplicates

1. The following duplicate set was analyzed with this SDG:

a. 14S02801 and 14S02801D

2. Comment: There were no positive results for either duplicate sample.

XI. Target Compound Identification

Target compound identification is not reviewed for Level C validation.

XII. Compound Quantitation and Reported CRQLS

Compound quanititation and reported CRQLS are not reviewed for Level C validation.

1. 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: __X__ No: ____ N/A: ____

2. Comments: The laboratory raised the reporting limits for pyrene in sample 14S02801D due to chemical interferences during analysis. The laboratory qualified pyrene "UI" and the reviewer further qualified this compound as estimated "UJ."

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 XII (Compound Quantitation) 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.

Additional Comments:

1. The chain of custody and sample tracking form identify sample M9986003 as 14B02802, however, the laboratory identifies this sample as 14S02802.

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 Inorganic Data Validation
Metals

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:	MF003
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Susan Dalla
Secondary Reviewer:	Nancy Weaver
Date Review Completed:	March 1, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14S02801	M9986001	Soil
14S02801MS	M9986001MS	Soil
14S02801MSD	M9986001MSD	Soil
14S02801D	M9986002	Soil
14S02802	M9986003	Soil
14R003	M9986005	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 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.

   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: _____ No: _____ N/A: __X__

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	27.23/25.0 x 100	108.9
CCV	Barium	26.44/25.0 x 100	105.8
ICV	Arsenic	2451/2500 x 100	98.0
CCV	Arsenic	2466/2500 x 100	98.6
ICV	Mercury	5.03/5.0 x 100	100.6
CCV	Mercury	4.21/5.0 x 100	84.2

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. MF003

Blank ID/ Date	Affected Analyte	Absolute Conc. mg/kg	Action Level mg/kg	Affected Sample	Lab Conc mg/kg	Lab Qual	EDS Conc mg/kg	EDS Qual
PBS 1/23/96	Arsenic	0.236	1.18	14S02801	0.67	B	0.67	UJ
				14S02801D	0.43	B	0.43	UJ
				14S02802	0.41	B	0.41	UJ

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: X No: ____ N/A: ____

2. Analytes were detected, but associated sample aliquot concentrations were greater than 5X the blank concentration.

Yes: ____ No: __X__ N/A: ____

Comment: Mercury was detected in field blank 14R003, but the reported sample results are non-detected.

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 MF003, 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: 14S02801

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
14S02801	Silver	33.5	UJ
14S02801D	Silver	33.5	UJ
14S02802	Silver	33.5	UJ

Comment: Recovery of arsenic in the matrix spike was 144.9%. Arsenic results have been qualified for preparation blank contamination and no further action has been taken by the reviewer.

4. The following spike calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation %R=(SSR-SR/SA)*100	%R
ICP	Barium	(427.8-6.28)/425.5 x 100	99.1
GFAA	Arsenic	(13.0-0.67)/8.51 x 100	144.9
CV	Mercury	(0.992-0.0)/1.06 x 100	93.6

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

4. Cr 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	456/500 x 100	91.2

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	Silver	440/500 x 100	88.0
GFAA	Arsenic	96.77/100 x 100	96.8
CV	Mercury	5.04/5.0 x 100	100.8

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: 14S02801

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: _____

   Comment: Reported lead results were flagged with a "*" by the laboratory. The duplicate difference meets the 2X CRDL for soils and the "*" has been removed by the reviewer.

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	2.5936-2.5596	0.03 (±4.2)
GFAA	Lead	2.9383-3.9489	1.0 (±1.2)
CV	Mercury	[(0.0-0.0)/(0.0+0.0)]/2 x 100	NC

B. Field Duplicates

1. The following duplicate sets were analyzed with this SDG:

   a. 14S02801 and 14S02801D

2. Comment: Field duplicate criteria have not 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.

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: __X__ No: ____

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

1. ICP serial dilution analysis was performed on one sample from each SDG of a similar matrix type and concentration level.

   Yes: ____ No: ____ N/A: __X__

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: ____ N/A: __X__

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.

   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. VI.3 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 and matrix interferences are summarized on Tables A-1 and A-3, respectively.

Additional Comments:

1. The chain of custody and sample tracking form identify sample M9986003 as 14B02802, however, the laboratory identifies this sample as 14S02802.

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. (mg/kg)	Qual	Conc. (mg/kg)	Qual
14S02801	Arsenic	P	2	0.67	B	0.67	UJ
14S02801D	Arsenic	P	2	0.43	B	0.43	UJ
14S02802	Arsenic	P	2	0.41	B	0.41	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
14S02801	Silver	%R=33.5	NA	NA	NO	0.49 UJ	VI.3
14S02801D	Silver	%R=33.5	NA	NA	NO	0.49 UJ	VI.3
14S02802	Silver	%R=33.5	NA	NA	NO	0.51 UJ	VI.3

Summary of Organic Data Validation
Polynuclear Aromatic Hydrocarbons

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:	MF004
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	May 17, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14Y003	MA782002	Water
14R004	MA782003	Water
14S02601	MA782004	Soil
14B02602	MA782005	Soil
14S02701	MA782006	Soil
14S02701MS	MA782006MS	Soil
14S02701MSD	MA782006MSD	Soil
14S02701D	MA782007	Soil
14B02702	MA782008	Soil
14S02801	MA782009	Soil
14B02802	MA782010	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 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: __X__ No: _____ N/A: _____

   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: _____

Comment: Initial calibration criteria have been met and no action has been taken.

2. Were continuing calibration data reviewed and found to meet all method requirements?

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 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 retention times within specified limits?

Yes: __X__ No: ____

Comment: Retention time criteria have been met and no action has been taken.

The following calculations were verified for this data package:

PNAs MF004 RTX-5 HP8904A 4/1/96 Fluorene mean RT= 18.02+18.01+18.01+18.01+ 18.01/5 = 18.01	PNAs MF004 RTX-5 HP8904A 4/17/96 Naphthalene 0.5 Std = area ratio = 204640/995417 = 0.20558	PNAs MF004 HP8904A 4/25/96 Anthracene %D = (20.38-19.79)/20.38 x 100 =2.9%

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. Laboratory blanks NBLK22 and NBLK32 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: Field blank 14Y003 and rinsate blank 14R004 were 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 terphenyl-d14.

Yes: X No: ____

Comment: Surrogate criteria have been met and no action has been taken.

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.: 14S02701

3. MS/MSD sample results were acceptable.

   Yes: _X_ No: ____

   Comment: MS/MSD criteria have been met and no action has been taken.

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.: BS042261

3. Blank spike sample results were within acceptable QC limits.

   Yes: _X_ No: ____ N/A: ____

   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.: S04226B1

3. The percent recoveries for the LCS compound were within acceptable limits.

   Yes: _X_ No: ____ N/A: ____

Comment: The LCS performed on 4/26/96 was acceptable.

X. Field Duplicates

1. The following duplicate set was analyzed with this SDG:

   a. 14S02701 and 14S02701D

2. Comment: There were no positive results reported for either duplicate sample.

XI. Target Compound Identification

Target compound identification is not reviewed for Level C validation.

XII. Compound Quantitation and Reported CRQLS

Compound quanititation and reported CRQLS are not reviewed for Level C validation.

1. 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: __X__ No: ____ N/A: ____

2. Comment: The laboratory raised the reporting limits for anthracene in sample 14S02801 due to chemical interferences during analysis. The laboratory qualified anthracene "UI" and the reviewer further qualified this compound as estimated "UJ."

3. Comment: Samples 14S02601, 14S02701, 14S02701D, and 14S02801 were analyzed at a dilution due to interferences. No action was taken on this basis.

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 XII (Compound Quantitation) 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.

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.

received
5/29/96

Environmental Data Services, Inc.

Specializing in Laboratory Data Validation

Summary of Organic Data Validation
Volatile Organic Compounds
EPA Method 8010/8020

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:	MF004
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	May 17, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14T004	MA782001RE	Water
14Y003	MA782002	Water
14R004	MA782003	Water
14S02601	MA782004	Soil
14B02602	MA782005	Soil
14S02701	MA782006	Soil
14S02701MS	MA782006MS	Soil
14S02701MSD	MA782006MSD	Soil
14S02701D	MA782007	Soil
14B02702	MA782008	Soil
14S02801	MA782009	Soil
14B02802	MA782010	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 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 ≤ 14 days from date of sample collection.

   Yes: X No: ____ N/A: ____

   b. Unpreserved water samples, aromatic VOCs analyzed ≤ 7 days from date of sample collection; non-aromatic VOCs analyzed ≤ 14 days from date of sample collection.

   Yes: ____ No: ____ N/A: X

   c. Soil samples analyzed ≤ 14 days from date of sample collection.

   Yes: X No: ____ N/A: ____

   Comment: Holding time criteria have been met and no action has been taken.

IV. 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.

   Yes: __X__ No: ____

2. The correlation coefficient (r) results from the initial calibration met QC acceptance criteria for each compound.

   Yes: __X__ No: ____

   Comment: Initial calibration criteria have been met and no action has been taken.

V. 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.

   Yes: __X__ No: ____

2. The % difference for each compound was within acceptance criteria.

   Yes: __X__ No: ____

3. The retention times (RT) for each compound was within the specified RT window.

   Yes: __X__ No: ____

4. Comments: The following calibration calculations were verified during the validation process.

MF004 GC9-VAR3400 5/2/96 Vinyl Chloride r= 0.9986384 r squared= 0.997278	MF004 GC9-VAR3400 5/2/96 Bromomethane %D= (100-108.08)/100 x 100 = 8.1%

VI. Blanks

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

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 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: __X__ No: _____

   Comment: The following table summarizes laboratory blank results:

Volatile Laboratory Blank Summary Table
SDG No. MF004

Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l	Action Level ** ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
VBLK001 5/3/96	None Found	--	--	--	--	--	--	--

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: The following table summarizes field blank results:

Volatile Field Blank Summary Table SDG No. MF004								
Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l	Action Level ** ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
14T004 5/3/96	None Found	--	--	--	--	--	--	--
14Y003 5/3/96	None Found	--	--	--	--	--	--	--
14R004 5/3/96	None Found	--	--	--	--	--	--	--

VII. 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 QC acceptance criteria for fluorobenzene.

   Yes: __X__ No: _____

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.

VIII. 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.: 14S02701

3. MS/MSD sample results met QC acceptance criteria.

Yes: ____ No: __X__ NA: ____

4. Comment: The RPD for bromomethane exceeded QC advisory limits. Bromomethane was not detected in any of the samples, therefore, no action was taken.

IX. Laboratory Control Samples (LCS)

Laboratory control charts were included in the data packages.

1. Laboratory control charts were provided for each surrogate recovery.

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.

X. Field Duplicates

1. The following duplicate set(s) was analyzed with this SDG:

a. 14S02701 and 14S02701D

2. Comment: There were no positive results reported for either duplicate sample.

XI. 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: _____

XII. System Performance

1. The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance.

Yes: __X__ No: _____

XIII. Overall Assessment of Data

The final validated results represent the compilation of all quality control qualification. The analyses of environmental samples and quality control samples are valid.

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 Inorganic Data Validation
Metals

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:	MF004
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Susan Dalla
Secondary Reviewer:	Nancy Weaver
Date Review Completed:	May 24, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14Y003	MA782002	Water
14R004	MA782003	Water
14S02601	MA782004	Soil
14B02602	MA782005	Soil
14S02701	MA782006	Soil
14S02701MS	MA782006MS	Soil
14S02701MSD	MA782006MSD	Soil
14S02701D	MA782007	Soil
14B02702	MA782008	Soil
14S02801	MA782009	Soil
14B02802	MA782010	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.

   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: ____ No: ____ N/A: X

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 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	Arsenic	25.54/25.0 x 100	102.2
CCV	Arsenic	25.03/25.0 x 100	100.1
ICV	Barium	2585/2500 x 100	103.4
CCV	Barium	2587/2500 x 100	103.5
ICV	Mercury	4.60/5.0 x 100	92.0
CCV	Mercury	4.96/5.0 x 100	99.2

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. MF004

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
PBW 4/24/96	Barium	1.18	5.9	14Y003	0.72	B	1.18	UJ

Comment: Barium was detected in PBS 4/26/96 at a level of 0.63 mg/kg. Reported sample results for barium in soils were less than the action level but sample barium results will be qualified for barium contamination in the field rinsate blank, which is higher in barium concentration.

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 Laboratory Blank Summary Table
SDG No. MF004

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
14R004	Barium	2.5	12.5	14S02601	4.7	B	4.7	UJ
				14B02602	3.5	B	3.5	UJ
				14S02701	6.3	B	6.3	UJ
				14S02701D	7.1	B	7.1	UJ
				14B02702	3.8	B	3.8	UJ
				14S02801	2.8	B	2.8	UJ
				14B02802	3.1	B	3.1	UJ

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 MF004, 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: 14S02701

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
14S02601	Lead	52.5	J
14B02602	Lead	52.5	J
14S02701	Lead	52.5	J
14S02701D	Lead	52.5	J
14B02702	Lead	52.5	J
14S02801	Lead	52.5	J
14B02802	Lead	52.5	J

4. The following spike calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation %R=(SSR-SR/SA)*100	%R
GFAA	Arsenic	(8.86-0.97)/8.47 x 100	93.2
ICP	Cadmium	(9.91-0.0)/10.59 x 100	93.6
CV	Mercury	(0.956-0.129)/1.03 x 100	80.3

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

4. Cr is 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	483.6/500 x 100	96.6

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	2505/2500 x 100	100.2
GFAA	Arsenic	91.57/100 x 100	91.6
CV	Mercury	5.33/5.0 x 100	106.6

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: 14S02701

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	5.16-4.88	0.28 (±4.2)
GFAA	Lead	[(5.85-4.85)/(5.85+4.85/2)]*100	18.7 (±35)

B. Field Duplicates

1. The following duplicate sets were analyzed with this SDG:

   a. 14S02701 and 14S02701D

2. Comment: Field duplicate criteria have not 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.

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: Analytical spike recovery of lead for sample 14Y003 was 122%. The above result has been qualified as estimated, UJ, due to possible interference.

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

1. ICP serial dilution analysis was performed on one sample from each SDG of a similar matrix type and concentration level.

   Yes: ____ No: ____ N/A: __X__

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: ____ N/A: __X__

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 GFAA.

   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 and X.2 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 and matrix interferences are summarized on Tables A-1 and A-3, respectively.

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
14Y003	Barium	P	2	0.72	B	1.18	UJ
14S02601	Barium	P	2	4.7	B	4.7	UJ
14B02602	Barium	P	2	3.5	B	3.5	UJ
14S02701	Barium	P	2	6.3	B	6.3	UJ
14S02701D	Barium	P	2	7.1	B	7.1	UJ
14B02702	Barium	P	2	3.8	B	3.8	UJ
14S02801	Barium	P	2	2.8	B	2.8	UJ
14B02802	Barium	P	2	3.1	B	3.1	UJ

Rationale
1 = Professional judgement
2 = Blank contamination (laboratory or field)

Table A-3
Matrix Interferences (Inorganics)

Sample	Parameter	Initial	Re-analysis ID	Final	Was the Re-analysis Needed?	Most Appropriate Result	Comment
14S02601	Lead	%R=52.5	NA	NA	NO	5.0 J	VI.3
14B02602	Lead	%R=52.5	NA	NA	NO	3.5 J	VI.3
14S02701	Lead	%R=52.5	NA	NA	NO	5.8 J	VI.3
14S02701D	Lead	%R=52.5	NA	NA	NO	5.9 J	VI.3
14B02702	Lead	%R=52.5	NA	NA	NO	1.9 J	VI.3
14S02801	Lead	%R=52.5	NA	NA	NO	2.8 J	VI.3
14B02802	Lead	%R=52.5	NA	NA	NO	2.1 J	VI.3
14Y003	Lead	%R=122	NA	NA	NO	1.2 UJ	X.2

Received
7-8-96

Environmental Data Services, Inc.

Specializing in Laboratory Data Validation

Summary of Organic Data Validation
Volatile Organic Compounds
EPA Method 8020 Modified

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:	MF005
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	July 5, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14T005	MA970001	Water
14W013	MA970002	Water
14W014	MA970003	Water
14W014MS	MA970003MS	Water
14W014MSD	MA970003MSD	Water
14W014D	MA970004	Water
14W015	MA970005	Water
14W016	MA970007	Water
14Y004	MA970008	Water
14R005	MA970009	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. Preserved water samples were analyzed ≤ 14 days from date of sample collection.

   Yes: X No: ____ N/A: ____

   b. Unpreserved water samples, aromatic VOCs analyzed ≤ 7 days from date of sample collection; non-aromatic VOCs analyzed ≤ 14 days from date of sample collection.

   Yes: ____ No: ____ N/A: X

   c. Soil samples analyzed ≤ 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. 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.

   Yes: __X__ No: ____

2. The correlation coefficient (r) results from the initial calibration met QC acceptance criteria (>0.995) for each compound.

   Yes: __X__ No: ____

   Comment: Initial calibration criteria have been met and no action has been taken.

V. 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.

   Yes: __X__ No: ____

2. The % difference for each compound was within acceptance criteria.

   Yes: __X__ No: ____

3. The retention times (RT) for each compound was within the specified RT window.

   Yes: __X__ No: ____

4. Comments: The following calibration calculations were verified during the validation process.

MF005 GC9-VAR3400 5/28/96 Benzene r= 0.9999480 r squared= 0.999896	MF005 GC9-VAR3400 5/28/96 Toluene %D= (100-98.80)/100 x 100 = 1.2%

VI. Blanks

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

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 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: __X__ No: _____

   Comment: The following table summarizes laboratory blank results:

Volatile Laboratory Blank Summary Table
SDG No. MF005

Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l	Action Level ** ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
VBLK001 5/28/96	None Found	--	--	--	--	--	--	--

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: The following table summarizes field blank results:

Volatile Field Blank Summary Table SDG No. MF005								
Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l	Action Level ** ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
14T005 5/28/96	None Found	--	--	--	--	--	--	--
14Y004 5/28/96	None Found	--	--	--	--	--	--	--
14R005 5/28/96	None Found	--	--	--	--	--	--	--

VII. 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 QC acceptance criteria for fluorobenzene.

   Yes: __X__ No: _____

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.

VIII. 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.: 14W014

3. MS/MSD sample results met QC acceptance criteria.

Yes: __X__ No: _____ NA: _____

IX. Laboratory Control Samples (LCS)

Laboratory control charts were included in the data packages.

1. Laboratory control charts were provided for each surrogate recovery.

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.

X. Field Duplicates

1. The following duplicate set(s) was analyzed with this SDG:

   a. 14W014 and 14W014D

2. Comment: There were no positive results reported for either duplicate sample.

XI. 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: ____

XII. System Performance

1. The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance.

Yes: X No: ____

XIII. Overall Assessment of Data

The final validated results represent the compilation of all quality control qualification. The analyses of environmental samples and quality control samples are valid.

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
Polynuclear Aromatic Hydrocarbons
EPA Method 8100

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:	MF005
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	July 5, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14W013	MA970002	Water
14W014	MA970003	Water
14W014MS	MA970003MS	Water
14W014MSD	MA970003MSD	Water
14W014D	MA970004	Water
14W015	MA970005	Water
14W016	MA970007	Water
14Y004	MA970008	Water
14R005	MA970009	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: ____

Comment: Initial calibration criteria have been met and no action has been taken.

2. Were continuing calibration data reviewed and found to meet all method requirements?

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 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 retention times within specified limits?

Yes: __X__ No: ____

Comment: Retention time criteria have been met and no action has been taken.

The following calculations were verified for this data package:

PNAs MF005 RTX-5 HP8904A 4/1/96 Fluorene mean RT= 18.02+18.01+18.01+18.01+ 18.01/5 = 18.01	PNAs MF005 RTX-5 HP8904A 6/3/96 Naphthalene 0.5 Std = area ratio = 204640/995417 = 0.20558	PNAs MF005 HP8904A 5/31/96 Anthracene %D = (20.38-19.11)/20.38 x 100 =6.2%

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. Laboratory blank NBLK22 was 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: Field blank 14Y004 and rinsate blank 14R005 were 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 terphenyl-d14.

Yes: __X__ No: ____

Comment: Surrogate criteria have been met and no action has been taken.

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.: 14W014

3. MS/MSD sample results were acceptable.

   Yes: __X__ No: ____

   Comment: MS/MSD criteria have been met and no action has been taken.

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.: BC052361

3. Blank spike sample results were within acceptable QC limits.

   Yes: __X__ No: ____ N/A: ____

   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.: C05226B1

3. The percent recoveries for the LCS compound were within acceptable limits.

   Yes: __X__ No: ____ N/A: ____

Comment: The LCS performed on 5/31/96 was acceptable.

X. Field Duplicates

1. The following duplicate set was analyzed with this SDG:

   a. 14W014 and 14W014D

2. Comment: Phenanthrene was reported in sample 14W014 at 5 ug/l and 4UJ in sample 14W014D. The RPD was not calculated since one result is positive and the other result is a non-detect. No action was taken.

XI. Target Compound Identification

Target compound identification is not reviewed for Level C validation.

XII. Compound Quantitation and Reported CRQLS

Compound quanititation and reported CRQLS are not reviewed for Level C validation.

1. 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: _X_ No: ____ N/A: ____

2. Comment: Sample 14W013 was diluted and analyzed at 10X due to chemical interferences. The reporting limits were raised in samples 14W013, 14W014D, 14W015, and 14W016 for phenanthrene and anthracene, also due to chemical interferences. The laboratory flagged these results as "UI" and the reviewer further qualified these results as estimated "UJ." Sample 14W014 was flagged "UJ" for anthracene only.

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 XII (Compound Quantitation) 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.

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 Inorganic Data Validation
Metals

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:	MF005
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Susan Dalla
Secondary Reviewer:	Nancy Weaver
Date Review Completed:	June 27, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14W013	MA970002	Water
14W014	MA970003	Water
14W014MD	MA970003MD	Water
14W014MS	MA970003MS	Water
14W014DUP	MA970004	Water
14W015	MA970005	Water
14W016	MA970007	Water
14Y004	MA970008	Water
14R005	MA970009	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 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.

   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: ____ No: ____ N/A: __X__

   Comment: ICP analysis was not performed for this SDG.

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: ____ No: ____ N/A: __X__

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 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	Lead	45.94/50.0 x 100	91.9
CCV	Lead	53.82/50.0 x 100	107.6
ICV	Mercury	4.37/5.0 x 100	87.4
CCV	Mercury	4.74/5.0 x 100	94.8

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. MF005

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 5/28/96	Lead	2.76	13.8	14W013	4.9	-	4.9	UJ
				14W014	3.6	-	3.6	UJ
				14W014D	12.5	-	12.5	UJ
				14W015	1.5	B	2.76	UJ
				14W016	2.4	B	2.76	UJ
				14Y004	3.5	-	3.5	UJ

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 Laboratory Blank Summary Table
SDG No. MF005

Blank ID	Affected Analyte	Absolute Conc. ug/l	Action Level ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
14R005	Mercury	0.19	0.95	14W014 14W015	0.15 0.10	B B	0.19 0.19	UJ UJ

Comment: Water source blank 14Y004 exhibited lead at a level of 3.5 ug/l. This is probably a reflection of the prep blank contamination.

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 MF005, 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: 14W014

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: X No: ____

4. The following spike calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation %R=(SSR-SR/SA)*100	%R
GFAA	Lead	(18.8-3.58)/20.0 x 100	76.1
CV	Mercury	(1.92-0.15)/2.0 x 100	88.5

VII. Interference Check Samples

Since no ICP analysis was performed for this SDG, an ICS was not necessary.

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: ____ No: ____ N/A: X

2. Solution AB analyte recovery results were within the control limits of 80% - 120%.

Yes: ____ No: ____ N/A: X

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

4. Cr is present in a sample(s) at concentrations less than 10,000 ug/L.

Yes: ____ No: ____ N/A: X

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: ____ 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
GFAA	Lead	50.77/50 x 100	101.5
CV	Mercury	4.93/5.0 x 100	98.6

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: 14W014, 14W014D

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
GFAA	Lead	3.58-5.39	1.81 (±3.0)
CV	Mercury	0.15-0.32	0.17 (±0.2)

B. Field Duplicates

1. The following duplicate sets were analyzed with this SDG:

   a. 14W014 and 14W014D

2. Comment: Field duplicate analysis of lead resulted in a difference of 8.9 (±3). Lead results have been qualified for prep blank contamination and no further 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.

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: Lead analysis of sample 14W015 resulted in an analytical spike recovery of 83%. The lead result for the above sample has already been qualified for prep blank contamination and no further action has been taken.

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

1. ICP serial dilution analysis was performed on one sample from each SDG of a similar matrix type and concentration level.

Yes: ____ No: ____ N/A: __X__

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: ____ N/A: __X__

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 calibrated range of the instrument for GFAA and mercury.

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, 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)	Qual	Conc. (ug/l)	Qual
14W013	Lead	P	2	4.9	-	4.9	UJ
14W014	Lead	P	2	3.6	-	3.6	UJ
14W014D	Lead	P	2	12.5	-	12.5	UJ
14W015	Lead	P	2	1.5	B	2.76	UJ
14W016	Lead	P	2	2.4	B	2.76	UJ
14Y004	Lead	P	2	3.5	-	3.5	UJ
14W014	Mercury	P	2	0.15	B	0.19	UJ
14W015	Mercury	P	2	0.10	B	0.19	UJ

Rationale
1 = Professional judgement
2 = Blank contamination (laboratory or field)
3 = Prep Blank

Environmental Data Services, Inc.

Specializing in Laboratory Data Validation

Summary of Organic Data Validation
Volatile Organic Compounds
EPA Method 8010/8020

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:	MF006
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	August 27, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14T006	MB348001	Water
14Y005	MB348002	Water
14R006	MB348003	Water
14S02601	MB348004	Soil
14B02602	MB348005	Soil
14S02701	MB348006	Soil
14S02701MS	MB348006MS	Soil
14S02701MSD	MB348006MSD	Soil
14S02701D	MB348007	Soil
14B02702	MB348008	Soil
14S02801	MB348009	Soil
14B02802	MB348010	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 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 ≤ 14 days from date of sample collection.

   Yes: X No: ____ N/A: ____

   b. Unpreserved water samples, aromatic VOCs analyzed ≤ 7 days from date of sample collection; non-aromatic VOCs analyzed ≤ 14 days from date of sample collection.

   Yes: ____ No: ____ N/A: X

   c. Soil samples analyzed ≤ 14 days from date of sample collection.

   Yes: X No: ____ N/A: ____

   Comment: Holding time criteria have been met and no action has been taken.

IV. 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.

   Yes: X No: _____

2. The correlation coefficient (r) results from the initial calibration met QC acceptance criteria for each compound.

   Yes: X No: _____

   Comment: Initial calibration criteria have been met and no action has been taken.

V. 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.

   Yes: X No: _____

2. The % difference for each compound was within acceptance criteria.

   Yes: X No: _____

3. The retention times (RT) for each compound was within the specified RT window.

   Yes: X No: _____

4. Comments: The following calibration calculations were verified during the validation process.

MF006 GC10 VAR3400 7/18/96 Vinyl Chloride r= 0.999507 r squared= 0.999014	MF006 GC9 VAR3400 7/15/96 Chloroethane %D= (100-96.67)/100 x 100 = -3.3%

VI. Blanks

One hundred percent of the results on the summary forms were checked to ensure that reported results met required quality control criteria.

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 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: __X__ No: _____

   Comment: The following table summarizes laboratory blank results:

Volatile Laboratory Blank Summary Table
SDG No. MF006

Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l	Action Level ** ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
VBLK001 7/15/96	None Found	--	--	--	--	--	--	--
VBLK002 7/18/96	None Found	--	--	--	--	--	--	--

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: The following table summarizes field blank results:

Volatile Field Blank Summary Table SDG No. MF006								
Blank ID/Date Analyzed	Affected Analyte	Conc. ug/l	Action Level ** ug/l	Affected Sample	Lab Conc ug/l	Lab Qual	EDS Conc ug/l	EDS Qual
14T006 7/15/96	None Found	--	--	--	--	--	--	--
14Y005 7/15/96	None Found	--	--	--	--	--	--	--
14R006 7/15/96	None Found	--	--	--	--	--	--	--

VII. 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 QC acceptance criteria for fluorobenzene.

   Yes: __X__ No: ____

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.

VIII. 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.: 14S02701

3. MS/MSD sample results met QC acceptance criteria.

Yes: __X__ No: ____ NA: ____

4. Comment: MS/MSD criteria have been met and no action has been taken.

IX. Laboratory Control Samples (LCS)

Laboratory control charts were included in the data packages.

1. Laboratory control charts were provided for each surrogate recovery.

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.

X. Field Duplicates

1. The following duplicate set(s) was analyzed with this SDG:

a. 14S02701 and 14S02701D

2. Comment: There were no positive results reported for either duplicate sample.

XI. 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: _____

XII. System Performance

1. The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance.

Yes: __X__ No: _____

XIII. Overall Assessment of Data

The final validated results represent the compilation of all quality control qualification. The analyses of environmental samples and quality control samples are valid.

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
Polynuclear Aromatic Hydrocarbons

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:	MF006
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Nancy Weaver
Secondary Reviewer:	Linda Harding
Date Review Completed:	August 27, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14Y005	MB348002	Water
14R006	MB348003	Water
14S02601	MB348004	Soil
14B02602	MB348005	Soil
14S02701	MB348006	Soil
14S02701MS	MB348006MS	Soil
14S02701MSD	MB348006MSD	Soil
14S02701D	MB348007	Soil
14B02702	MB348008	Soil
14S02801	MB348009	Soil
14B02802	MB348010	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 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: __X__ No: ____ N/A: ____

   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: ____

Comment: Initial calibration criteria have been met and no action has been taken.

2. Were continuing calibration data reviewed and found to meet all method requirements?

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 linearity check criteria?

Yes: __X__ No: _____

Comment: The coefficient of determination was not calculated for any of the compounds. Insufficient data was printed in the coefficient of determination space. The curves all appeared to meet linearity criteria. No action was taken.

4. Were the retention times within specified limits?

Yes: __X__ No: _____

Comment: Retention time criteria have been met and no action has been taken.

The following calculations were verified for this data package:

PNAs MF006 RTX-5 HP8904A 7/19/96 Fluorene mean RT= 17.97+17.96+17.96+17.96+ 17.97/5 = 17.964	PNAs MF006 RTX-5 HP8904A 7/22/96 Naphthalene 0.5 Std = area ratio = 156839/929950 = 0.16865	PNAs MF006 HP8904A 7/25/96 Anthracene %D = (19.32-19.71)/19.32 x 100 =-2.0%

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. Laboratory blanks NBLK08 and NBLK09 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: Field blank 14Y005 and rinsate blank 14R006 were 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 terphenyl-d14.

   Yes: __X__ No: ____

   Comment: Surrogate criteria have been met and no action has been taken.

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.: 14S02701

3. MS/MSD sample results were acceptable.

   Yes: __X__ No: _____

   Comment: MS/MSD criteria have been met and no action has been taken.

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.: BS071561

3. Blank spike sample results were within acceptable QC limits.

   Yes: __X__ No: _____ N/A: _____

   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.: W07126B1 and S07156B1

3. The percent recoveries for the LCS compound were within acceptable limits.

Yes: __X__ No: _____ N/A: _____

Comment: The LCS' performed on 7/25/96 and 7/29/96 were acceptable.

X. Field Duplicates

1. The following duplicate set was analyzed with this SDG:

a. 14S02701 and 14S02701D

2. Comment: There were no positive results reported for either duplicate sample.

XI. Target Compound Identification

Target compound identification is not reviewed for Level C validation.

XII. Compound Quantitation and Reported CRQLS

Compound quanititation and reported CRQLS are not reviewed for Level C validation.

1. 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: __X__ No: _____ N/A: _____

2. Comment: Several samples were analyzed at a dilution due to chemical interferences. No action was taken on this basis.

XIII. Overall Assessment of Data

The final validated results represent the compilation of all quality control qualification. The analyses of environmental samples and quality control samples are valid.

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 Inorganic Data Validation
Metals

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:	MF006
Purchase Order Number:	SE4-21-017
NEESA Level:	C
Data Reviewer:	Susan Dalla
Secondary Reviewer:	Nancy Weaver
Date Review Completed:	August 30, 1996

Contractor Sample Number	Laboratory Sample Number	Sample Matrix
14Y005	MB348002	Water
14R006	MB348003	Water
14S02601	MB348004	Soil
14B02602	MB348005	Soil
14S02701	MB348006	Soil
14S02701MS	MB348006MS	Soil
14S02701MSD	MB348006MSD	Soil
14S02701D	MB348007D	Soil
14B02702	MB348008	Soil
14S02801	MB348009	Soil
14B02802	MB348010	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.

   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: ____ N/A: ____

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: ____ No: ____ N/A: X

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 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 and mercury 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	2436/2500 x 100	97.4
CCV	Barium	2438/2500 x 100	97.5
ICV	Arsenic	26.5/25.0 x 100	106.0
CCV	Arsenic	25.7/25.0 x 100	102.8
ICV	Mercury	5.10/5.0 x 100	102.0
CCV	Mercury	4.76/5.0 x 100	95.2

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. MF006

Blank ID/ Date	Affected Analyte	Absolute Conc. mg/kg or ug/l	Action Level mg/kg or ug/l	Affected Sample	Lab Conc mg/kg or ug/l	Lab Qual	EDS Conc mg/kg or ug/l	EDS Qual
PBW 7/15/96	Barium	1.16	5.8	14Y005	2.0	B	2.0	UJ
PBW 7/15/96	Lead	0.85	4.25	14R006	1.0	B	1.0	UJ

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 Laboratory Blank Summary Table
SDG No. MF006

Blank ID	Affected Analyte	Absolute Conc. mg/kg or ug/l	Action Level mg/kg or ug/l	Affected Sample	Lab Conc mg/kg or ug/l	Lab Qual	EDS Conc mg/kg or ug/l	EDS Qual
14R006	Barium	1.74	8.7	14S02601	4.8	B	4.8	UJ
				14B02602	3.4	B	3.4	UJ
				14S02701	6.6	B	6.6	UJ
				14S02701D	6.1	B	6.1	UJ
				14B02702	4.3	B	4.3	UJ
				14S02801	5.3	B	5.3	UJ
				14B02802	3.6	B	3.6	UJ

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 MF006, 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: 14S02701

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__

The following samples were qualified due to matrix spike sample recovery deficiencies:

Sample	Analyte	% Recovery	Qualifier
14S02601	Selenium	72.4	UJ
14B02602	Selenium	72.4	UJ
14S02701	Selenium	72.4	UJ
14S02701D	Selenium	72.4	UJ
14B02702	Selenium	72.4	UJ
14S02801	Selenium	72.4	UJ
14B02802	Selenium	72.4	UJ

4. The following spike calculations were verified during the validation process.

Instrument or Method	Analyte	Calculation %R=(SSR-SR/SA)*100	%R
ICP	Barium	(377-6.62)/422 x 100	87.8
GFAA	Selenium	(1.53-0.0)/2.11 x 100	72.5
CV	Mercury	(0.88-0.0)/1.0 x 100	88.0

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 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: ____ N/A: ____

2. Solution AB analyte recovery results were within the control limits of 80%-120%.

Yes: X No: ____ N/A: ____

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

4. Cr is present in a sample(s) at concentrations less than 10,000 ug/L.

Yes: X No: ____ N/A: ____

5. ICP ICSs criteria have been met and no action has been taken.

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	2368/2500 x 100	94.7
GFAA	Arsenic	100.6/100.0 x 100	100.6
CV	Mercury	5.2/5.0 x 100	104.0

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: 14S02701

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	4.58-3.79	0.79 (±4.2)
GFAA	Arsenic	NA	NC
CV	Mercury	NA	NC

B. Field Duplicates

1. The following duplicate sets were analyzed with this SDG:

   a. 14S02701 and 14S02701D

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.

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: __X__ No: ____

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

1. ICP serial dilution analysis was performed on one sample from each SDG of a similar matrix type and concentration level.

Yes: _____ No: _____ N/A: __X__

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: _____ N/A: __X__

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 calibrated range of the instrument for GFAA and mercury.

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 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 and matrix interferences are summarized on Tables A-1 and A-3, respectively.

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. (mg/kg or ug/l)	Qual	Conc. (mg/kg or ug/l)	Qual
14Y005	Barium	P	2	2.0	B	2.0	UJ
14R006	Lead	P	2	1.0	B	1.0	UJ
14S02601	Barium	P	2	4.8	B	4.8	UJ
14B02602	Barium	P	2	3.4	B	3.4	UJ
14S02701	Barium	P	2	6.6	B	6.6	UJ
14S02701D	Barium	P	2	6.1	B	6.1	UJ
14B02702	Barium	P	2	4.3	B	4.3	UJ
14S02801	Barium	P	2	5.3	B	5.3	UJ
14B02802	Barium	P	2	3.6	B	3.6	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
14S02601	Selenium	%R=72.4	NA	NA	NO	0.27 UJ	VI.3
14B02602	Selenium	%R=72.4	NA	NA	NO	0.27 UJ	VI.3
14S02701	Selenium	%R=72.4	NA	NA	NO	0.26 UJ	VI.3
14S02701D	Selenium	%R=72.4	NA	NA	NO	0.26 UJ	VI.3
14B02702	Selenium	%R=72.4	NA	NA	NO	0.27 UJ	VI.3
14S02801	Selenium	%R=72.4	NA	NA	NO	0.26 UJ	VI.3
14B02802	Selenium	%R=72.4	NA	NA	NO	0.27 UJ	VI.3

APPENDIX E

FIELD LOGBOOK

(83)

9/8/94 Thurs

08:22 Lost boat finder

08:30 At location MPT-BG-MW SW/SD 14 (MW is right)

08:35 Sediment samples collected as before

08:45 River water sample collected as described previously with the lid left on until the prescribed depth was reached then the lid was removed, then tightened again. VOAs were filled from the 1 Liter amber unpreserved bottles immidiatly after the diver surfaced. LWS/9/8/94

Triangulation for sample site MPT-BG-SW/SD 14

165° Base Flight Tower

73° End of Fuel Farm Pier

111° Center line of Power Station (SWMU 11 Bldg)

08:50 Mob to MPT-BG-SW/SD-13 (Ten feet west of SWMU 12 end of N Basin Pier LWS 9/8/94)

09:10 Sediment Sample Time

09:20 River water Sample Time

09:30 Mob to E Pier to exchange iced coolers. MPT-BG-SW/SD-12

09:50 Mob to Red Buoy #4 @ North side of the NAVSTA Mayport channel - depth to bottom 37ft. very little water movement (slack) collected Sample, Duplicate, Matrix spike + MSD.

10:00 Sediment sample time - as described previously

10:10 River water samples collected as described previously

10:30 Moved to Location MPT-BG-SW/SD-10

Larry W Smith 9/8/94

(84)

Thurs 9/8/94

MPT-BG-SW/SD-15		15
Water	Conductivity	40,000 umhos
	Temp.	26°C
	pH	7.23
	Salinity	25.5‰
	Turbidity	Low (visual observation)
MPT-BG-SW/SD-14		
	Conductivity	32,900 umhos
	Temp.	26°C
	pH	7.31
	Salinity	27.5‰
	Turbidity	Low (V.O.)
MPT-BG-SW/SD-13		
	Cond.	35,000 umhos
	Temp.	27°C
	pH	ph 7.55
	Salinity	15‰
	Turbidity	Low (V.O.)

Larry W Smith 9/8/94

Property of the U.S. Government
Possible reward if lost and returned to owner!

Property of ABB Environmental Services
2590 Executive Center Circle East
Berkley Building
Address Tallahassee Florida 32301

Telephone 904-656-1293

Site Address:

ABB Construction Trailer
Mayport Naval Station
West of Building 1600
Mayport, Florida 32228
(904) 246-0205
Mayport Naval Station Contact:

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Michael Davenport/Public Works Dept.
(904) 270-6730

INDEX

1/8/96 SWMU 14 Cloudy 30°F

Objective: Observe bioremediation at SWMU 14

Personnel: Srin Kuchibotla, ABB-ES
Mike Jaynes, ABB-ES

0900 Arrival at trailer. Personnel (Srin and Mike) working on setting up equipment to collect soil and surface water samples at SWMU 14.

1400 Arrival at SWMU 14. Meeting with RHS at site. Precon meeting attended by NAS/Mayport personnel, South Div Nav Fac Englom personnel, FTC personnel, RHS person, ROICC personnel, Cole/Jon Personnel and ABB-ES personnel. RHS person indicates that he is mobilizing this week and intends to begin bioremediation at the site next week. Cheryl Mitchell has got the plugs for the piping through Cole/Jon personnel. Cole/Jon personnel intend to install the plugs for the piping in the sump at the middle of the detention pond on Wednesday.

1530 Arrival at wastewater treatment plant. Cole/Jon personnel show us the

pipe plugs. Cheryl mentions that may attach additional piping to the plugs to prevent them from going into the piping due to backpressure from water in the sump and pond. Also, Cheryl mentioned that the bugs may not act on the plugs because of the material the plugs are made of.

1600 Cheryl also mentioned that ~~they had researched~~ (SW) 1/8 she was concerned about the bugs reaching the Oily Waste Treatment Plant. RHS personnel could not promise that ~~none of~~ (SW) 1/8 no bugs would reach the OWTP. Cheryl wanted to prevent the bugs from reaching the OWTP because the oil ~~at the~~ (SE) 1/8 reaching the OWTP is seperated from the water and the water is reused in the ships, and she was concerned that the bugs may hinder reuse of the oil. RHS personnel will wash the water into the sump. The water is runoff from the concrete pad. This water will

be transfered into a 1000 gallon tank. Cheryl mentioned that they intend to reuse the water in the 1000 gallon on the pad. She said She would check with the regulatory agencies on reuse of the water on the concrete since soil may be a concern as (SK) 1/8 due to the potential of the bags reaching the groundwater. Return to trailer

1615 Meeting with SouthDiv personnel at trailer. Harold and Harry Doo brief Srin and Mike about our involvement in the construction oversight.

1645 Mike and Srin working on sampling for next day.

1830 Completing bottle sets for soil sampling. End of day.

SRINIVAS KUCHIBHOTLA
1/9/96

1/9/96 SWMU 14 Sunny 50°F

Objective: Soil Sampling at SWMU 14.

Personnel: Srin Kuchibhotla, ABB-ES
Mike Jaynes, ABB-ES

0915 Arrival at site. Mike and Srin working on setting up sampling event at SWMU 14.

0930 Depart site for SWMU 5. Arrival on site. Locate spikes for water and verify sampling area. Depart site.

1200 Trip Blank collected.

1315 Source Blank 14Y001 Collected

1330 Equipment Blank 14R0010-(SK) 1/9 14R001 Collected. Cheryl Mitchell arrives to trailer. She informs us that the pipes will be plugged on 1/10 afternoon and rain simulation could be conducted on 1/10.

1345 (SK) 1/9 1130 Arrival on-site. Srin (SK) 1/9 Setting up soil sampling. Depart site for flags

1500 Arrival on site. Flags placed at sampling locations. Harold McGill and Harry Doo arrive at site. Anticipate completion of sampling by evening

1630 Soil Sample Times	Time
14T001	1200
14Y001	1325
14R001	1330
14S02601	1325
14B02602	1350
14S02701	1600
14S02701D	1600
14S02701MS	1600
14S02701MSD	1600
14B02702	1630

1645 Depart site for trailer. Paperwork completed at trailer. End of day.

(SN) 1/9

Srinivas Kuchibotla
1/9/96

1/10/96 SWMU 8 Sunny 65°F

Objective: Collect surface water sample at site

Personnel: Srin Kuchibotla, ABB-ES

0800 Working at trailer, preparing for sampling event.

1000 Still working on paperwork.

1330 Arrival on site. Cheryl Mitchell working with Cole/Jon personnel on plugging the pipes in the sump. Also Cole/Jon initially cleaning sump before plugging pipes. Envirotech truck (vacuum truck) arrives onsite for cleaning of the sump.

1300 Cleaning of sump still in progress. Depart site for buying supplies.

1430 Arrival onsite. Cheryl mentioned that one of the plugs does not fit the pipe properly. They will arrange to plug the pipes the next day. Also, FTC to cleanup the concrete pad tommorow around 0900 hrs. (SN) 1/10 hrs.

1500 Depart site. Collected Surface

water source blank directly from hose before departing site.
1515 Will collect and simulate rainfall on 1/10 in the morning. Depart site.
1530 Samples collected today (SW) 1/10

Sample	Time
14T002	0830
14R002	10.30
14Y002	1515

1545 End of day. Preparation for next day in progress.

Srinivas Kuchibotla
1/10/96

1/11/96 SWMW14
Objective: Collect surface water samples at site.
Personnel: Srin Kuchibotla, ABB-ES
0810 Arrival at trailer. Working on redox probe to observe if it could be used for Dissolved (SW) 1/11 Oxygen measurement.
0945 Arrival at site. Unloading of equipment in progress. Cheryl Mitchell of HALSTA/Mayport and Cole/Ton (two) personnel at site. The pipes have been blocked at the sump. The concrete pad was cleaned by the FTC personnel this morning. Small puddles of water were observed on the pad.
1015 Garden hose connected. Mike and Srin check the flow of water. Water flowing at 9 gallons/minute from the two hoses. Two hoses used one along East edge and one along the west edge.
1030 Simulation of the storm event begins. Simulation begins at the south end of the detention pond. Setup includes dissolved oxygen meter for Cole/Ton.

pH and temperature meter and garden hoses.

1050 First sample collection in progress. Water ~~arrive~~ (EK) 1/11. Time taken for water to arrive at sump is approximately 20 minutes. Hoses moved along the detention pond. Hoses moved (EK) ~~of~~ along the east - west edge of the pond. Hoses moved every 10 minutes to four locations along the east - west length of the pond. pH, Temperature and dissolved oxygen data collected during each sampling event.

1130 Collecting sample 2. Flow rate from both hoses 9 gallon/minute. To collect 333.3 gallons it would take approximately 40 minutes, therefore, samples were collected every 40 minutes.

1210 Third sample collected

1250 Final sample collected. End of stormwater sampling event. Samples stored in van. NAVSTA Maxpart personnel closing catch basins at the south end of detention pond

1330 Depart site for sample packing and shipping. Photographs taken ~~above~~ (EK) 1/11 during sampling event.

(EK) 1/11

Sample	pH	Temperature	Time (EK) 1/11 ~~Dissolved~~	Dissolved Oxygen
1	7.12	18.0°C	1050	8.2 mg/L
2	7.42	17.4°C	1130	6.2 mg/L
3	7.44	17.6°C	1210	5.9 mg/L
4	7.40	17.9°C	1250	5.6 mg/L

(EK)

Photographs using Digital Camera

5 Stormwater sampling event
6 "
7 "
8 "
9 "
10 Closing of catch basins at south end by NAVSTA/MAYPORT personnel
11 "

Photographs using Film - Roll 2

25 Stormwater sampling event
24
23 Closing of catch basin at south end by NAVSTA/MAYPORT personnel
1345 Photographs taken may have missing number because camera is being used at SAN MIGUEL also.

1400 Packing and shipping of samples in progress. End of sampling event.

1500 Fedex collects samples.
1530 Arrival at site to ~~remove~~ (SL) 1/11 clean up our equipment.
1600 Depart site. Return to trailer to complete other items. End of day

Reviewed 1/11/96 KUCHIBOTLA

1/12/96 SWMU 14

Objective: Wrap up Stormwater Sampling events at site.

personnel: Srini Kuchibotla, ABB-ES

1300 Arrival at site. No personnel at site. Cheryl called at 1200 and mentioned that the RHS personnel could expedite ABB-ES soil and stormwater samples if they needed the results. However, David Driggers mentioned that RHS may have to pay the cost difference associated with ~~the~~ expediting the results. Cheryl requested me to convey to RHS person (Ted) to call her about the above detail. Message convey to Terry Hansen. Also Cheryl requested that the garden hose be transfered to RHS personnel. RHS to return hose after their use. This message also conveyed to Terry and Frank at Tallahassee. Depart site.

1430 Arrival again at site. No personnel at site. Talked to Dee Wetland ~~about tee~~. (SL) 1/12. Talked to

Lt. Elmer M. Navaran of FTC about leaving garden hose at FTC Lt. Navaran said that it was not a concern and that the hose would be safe at the site.
1500 Depart site for trailer. End of day

Srinivas Kuchibotla
1/12/96

1/15/96 SWMU 14

Objective: Prepare for soil sampling

Personnel: Srin Kuchibotla, ABB-ES

0845 Arrival at trailer. Finishing paper work and collecting bottle sets for soil sampling. Soil sample to be collected after the soil is rototilled by the RTFS personnel. Rototill date not available. Trying to reach Ted of RTFS.

1135 Mike and Srin discuss labels and equipment requirement situation.

1330 Arrival at site. Site closed for Martin Luther Kings day. Depart site. Finishing work for sample collection later this week. End of day.

Srinivas Kuchibotla
1/15/96

(13) (15)

1/17/96 SWMU 14 Cloudy 65°F

Objective: Observe bioremediation at Site

Personnel: Srin Kuchibotla, ABB-ES

1230 Arrival at site Ted and Jim Hamant of RHS at site Setting up of work zone and decon pad in progress Rototill at site.

1300 Rototilling begins Ted mentioned that they would be wearing a face mask for the not grassed areas. Isopropanol and deionized water being used for decontamination. Ted also mentioned that their microbes and nutrient had arrived at the site. They were planning on applying the bacteria next week. Ted also mentioned that they would be using Petroflag to analyze soil samples that they collect during the course of bioremediation they also have pH tester at site. The type of sump being used on the concrete pad is called the Rotary Basins from Africa.

(16)

Photographs with Digital Camera

1 Rototilling at site
2 "
3 "
4 Soil removed from sump in pond
5 Decon pad at site
6 Rototilling at site
7 "
8 Covered sumps in work area
9 "
10 Rototilled site

(SK) 1/17

Photographs using normal camera - Roll 2

21 Rototilling in progress
20 "
19 "
18 Soil removed from sump in pond
17 "
16 Decon pad at site
15 Rototilling at site
14 "
13 Covered sumps in work area
12 Rototilled site

Srinivas Kuchibotla
1/17/96

(13) (17)

1400 Rototilling still in progress. Approximately 40% of work area completed. Rototill is refueled. The Petroflag Analyzer has a response setting based on type of Hydrocarbon. The setting is from 0 to 10. Copy of manual borrowed from RHS.

1600 Rototilling of site complete. RHS personnel informed by Srin that he would be collecting soil samples in their work zone on 1/18/96

1630 Depart site. End of day

Srinivas
1/17/96
Kuchibotla

(18)

1/18/96 Summary

Objective: Observe bioremediation and collect soil samples at site

Personnel: Srin Kuchibotla, ABB-ES

0845 Arrival at site. No (8K) 1/8

0930 Rinsate blank collected at trailer.

1045 Arrival at site unloading equipment for collecting soil samples

1130 Collect first soil sample MPT-14-SS028

1130 Collect second soil sample - MPT-14-SB028.

1230 Depart site for trailer

1315 Parking for Fedex in progress.

1700 Called Ted on Mobile. Ted mentioned that they had collected soil samples in the afternoon and analyzed them using Petroflag for TPH. Results were available in his trailer. He will provide results the next day.

Soil samples collected and time

14T003	Trip Blank	0900
14R003	Rinsate Blank	0930
14SD280	Soil Sample	1100

(13) (19)

14S02801D	Duplicate	1100
14S02801MS	Matrix Spike	1100
14S02801MSD	Matrix Spike Dup	1100
14B02801	Boring	1130

1730 End of day.

Srinivas Kuchibotla
1/19/96

(20)

1/19/96 SWMU 14

Objectives: Observe bioaugmentation (BX) 1/19 bioremediation at SWMU 14

Personnel: Srin Kuchibotla, ABB-ES

0900 Arrival at site. Personnel not at site. Awaiting arrival of personnel.

1030 Called Ted from trailer. Ted mentioned that they were arriving at site late today.

1130 Ted calls at trailer and informs Srin that they were at site and performing some soil tests for TPH using Petroflag. Collection of soil samples not observed. However, observed test in progress. Test involves mixing of enzyme with soil, and collecting filtered solution from mixture and finally applying find enzyme to it. The Petroflag indicator is used to determine results.

1330 Results from tests available. Soil Sample collected from near sump indicating high results of petroleum

(21)

Photographs using Digital Camera

11 Petroflag equipment or test kit
12 ~~Mixing~~ Filtering (SB) 1/19 Filter sample
13 Mixing of enzyme with sample
14 Obtaining Final Result

Photographs using Camera - Roll 2

11 Petroflag test kit
10 Obtaining final result.
1400 Noting results from log book of RITS.
Moisture Content of soil tests found using moisturemeter.
Result of moisture test indicated readings at ~~SB~~ (SB) 1/19 1400 hrs on 1/18 as follows.

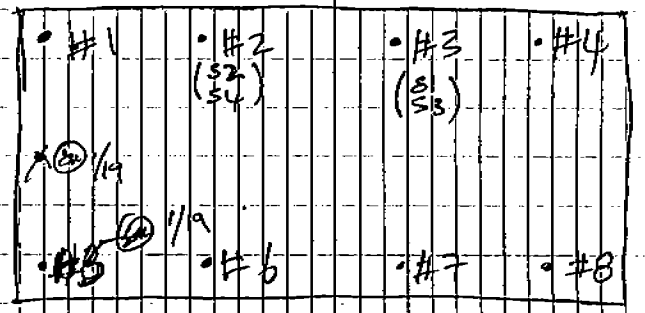
1400 (SB) (1/19)

Moisture Readings @ ~~1400~~ 1/18

M#1	2	7
M#2	1	6
M#3	2	10
M#4	1	8
M#5	3	10
M#6	2	10
M#7	8	10
M#8	6	10
Depth	1ft	2ft

(22)

N ↑



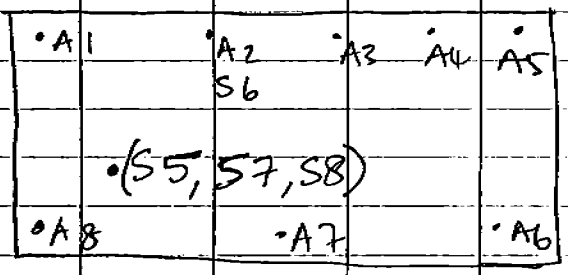
PH of ~~Soil~~ (SA) 1/19 tap water on 1/18 was 7.6 at 72°F. Compost soil sample PH is 8.4. pH meter used is pH Tester 2 by Dalton (Model No. 35624-20)

Soil moisture tested using Soil Moist Meter, P.O. Box 67274. Phone No. (402) 488-6343.

1400 ~~Two Soil Samp~~ (SA) 1/19 Four soil samples were collected. Soil location showed in figure above. Soil samples were collected at two locations at two depth intervals (1 feet and 2 feet). Test kit used for TPH is Petroflag

TPH Test: S-1 at 1' >2000PPM
S-2 at ~~2'~~ 1' = 871 PPM (SA) 1/19
S-3 at 2' = 210 PPM
S-4 at 2' = 23 PPM

1400 Data for 1/19 noted below:
Soil Temp 60° at 1' } at 1050
60° at 2'
Outdoor Tap ~~@~~ 59°F



Test results
1. S5 at Surface >4000 ppm
using 5 gram Sample
2. S6 at 1' (Resample of S1)
using 2grams = 4435 ppm
3. S7 at 1'
using 2grams = >10,000 ppm
4. S8 at 2'
using 2grams = >10,000 ppm.
1415 End of day. Data above transfered for RHS logbook.

SRINIVAS KUCHIBHOTLA
1/19/96

1/22/96 SWMU 14 Sunny 65°F
Objective: Observe bioremediation at SWMU 14
Personnel: Srini Kuchibhotla, ABB-ES
0930 Arrival at site. Two RHS personnel on site. RHS personnel testing soil temperature and process water or tap water temperature.
0940 Soil Temperature: 46°F Surface
42°F @ 1 feet
Temperature checked at 0949.
Tap water 60°F
1100 Tony Matani of RHS is other person on site. Tony involved in raking of soil at site. Decon ing procedure currently does not involve Alconox wash. Decon pad setup has been dismantled because it is not stable.
1115 Decon pad maybe set up later by Ted. Ted using Rapitest by Soiltester to determine the pH, Nitrogen, Phosphorus and Potassium content in the soil. Collection of Soil Samples in progress

Soil sample collected at edge of the work zone. For testing ~~for~~ (SW) 1/19 for nitrogen, phosphorus and nitrog mix 1 cup of soil with 5 cups of water. Empty a capsule ~~not~~ (SL) 1/9 of material into the water and shake well (SW) 1/19 ~~for~~ for 10 minutes. (SW) 1/19 After 10 minutes compare color against color (SL) 1/19 chart. Color chart indicated that Nitrogen was low (17 ppm). Phosphorus was at 6 ppm (low). pH is neutral at 7.0.

1140 Ted mentioned that he needed 50 ppm ~~for~~ (SL) 1/19 ~~for~~ Nitrogen for the bacteria to function. Ted to use air sprayer used for spraying paint for spraying nutrients and bacteria on the concrete and a submersible utility pump for pumping bacteria and nutrients on the soil in the work zone. (SL) 1/19

1150 Biotechnology and biologists being used by RHS include

Ken Greenup and Susan Laborde of Enterra in Louisiana.

1200 Depart site.

1230 Arrival onsite. RHS personnel ~~still~~ working on (SL) 1/19 out for lunch

1245 They arrive on-site. Personnel working on mix design for spraying on the site. Biospray and water being mixed in 40-60 percentage. Biocatalyst and bacteria being mixed in 1:5 to 1 mix. Bacteria was 5 billion/gm

1400 Mixing still in progress. Paddle will be used for mixing the biocatalyst, bacteria and water.

1445 mixing of bacteria into biocatalyst in progress. Finally water will be added to this mixture. Mixture will be allowed to work for about an hour before application on the soil.

1500 An aerator is being used to aerate the biocatalyst and bacteria for better mixing.

1600 Ted leaves site to obtain pump for spraying bacteria onsite.

1630 Ted arrives at site. 3hp pump not

Photographs using Digital Camera

15 Test for Nitrogen, Phosphoros & Potash
16 "
17 "
18 Mixing of biocatalyst and bacteria at site
19 "
20 Bacteria being used
21 ~~Aerator at site~~ (SV) 1/22 "
22 Aerator (SV) 1/22 being used.
23 Applying of bacteria in high concentr area
24 "

(SV) 1/22 ~~Photographs using Camera - Roll 2~~

25 "
27 "

Photographs using Camera - Roll 2

11 Test for checking Nitrogen, Phosphoros & Potash (SV) 1/22

not available. Ted and Tony to put bacteria and biocatalyst on soil using buckets.

1730 Bacteria application almost complete. Ted mentioned that he would delay work tommorow as he may have to go out and purchase a pump. Also, he may start concrete pad for new site. Ted to place black sheet on site.

1745 SRINIVAS KUCHIBOTLA 1/22/96

1/23/96 SWMU14 Sunny 65°F

Objective: Observe bioremediation at site

Personnel: Srin Kuchibotla, ABB-ES

0930 Arrival onsite. RHS personnel still not at site. Black visqueen placed on east side of the work zone near catch basins.

1000 Depart site to Staff Ofc.

1015 Arrival onsite. Personnel still not at site. Cheryl mentioned that Ted may need to call in advance about blocking pipes in sump if that needs to be done today. Mentioned to Cheryl that I will have Ted call her. Depart site.

1200 RHS personnel arrive onsite. RHS personnel check soil moisture content and temperature. RHS brought in a pump and Floor Maintainer. Floor Maintainer being used is Clarke. Soil Temperature surface 62° at 1' 59° and 2 feet 59° at 1205 hrs. Soil Moisture content is 50%.

1300 RHS personnel working on preparing fresh batch of bacteria and meal for the site.

1400 Spraying using pump and hose begins.

Photographs using Digital Camera

28 Site covered with visqueen
29 "
30 Pump and drum setup
31 "
32 Spraying of bacteria and nutrients on soil
33 "
34 "
35 Devon in progress
36 Pumping setup
37 Spraying in visqueen area
38 "

SRINIVAS KUCHIBOTLA
1/23/96

Photographs using Camera - Roll 2

10 Site covered with visqueen.
9 Spraying of bacteria at site.

SRINIVAS KUCHIBOTLA
1/23/96

1400 Ted mentioned that he would continue to spray in the unvisqueened area of the site. Ted said that the bacteria were strong yesterday and therefore he had spread the bacteria around using buckets because they would have eaten the nutrients and started dying SRI 1/23

1415 Quantity of mixture, 3 million/gm of bacteria 20% Calcium peroxide, 30% high nitrogen fertilizer, 50% bugs and then water 50 gallons. This is the mix for 1/23/96. SRI 1/23

1430 Ted mentioned that he spread 50% of the 110 gallons yesterday in between the two catch basins, which according to his Petroflag Soil tests make very high relatively very high concentrations. Other 50% was spread on each side of his suspected hot area. Moisture content for his bacteria to function had to be 30%.

1430 Ted and Tony are mixing more water to mix and applying it to the site.

1445 Decon of boots of Ted who was in the work zone in progress. Decon procedure involves
- Rinse with tap water
- Wash with Isopropylalcohol
- Rinse with tap water

1445 Today bacteria has ~~more oxyg~~ SW 1/23 an oxygen source mixed in and the oxygen source is Calcium peroxide. Reinoculation of soil again on 2/2. Ted said he would check the TPH in the soil on 2/2 and maybe do a bacteria count to see how well his bacteria & SW 1/23 are functioning.

1500 Spraying in visqueened area in progress. Cheryl Mitchell arrives at site.

1530 Cheryl mentions that she will be at the site ~~babysitting~~ SW 1/23 overlooking the concrete cleanup on 1/24. She ~~to~~ SW 1/23 also mentioned that we note down the mix design SW 1/23 provided by RHS. Cheryl departs site.

1600 Depart site. End of day. Approx. 110 gallons of mix has been spread on the remaining soil today.

SRINIVAS KUCHIBOTLA 1/25/96

SW 1/24

1/24/96 OWTP SUNNY 70°F

Objective: Observe Bioremediation at site.

Personnel: Srini Kuchibotla, ABB-ES

0830 Arrival onsite. RHS personnel have not arrived at site.

0920 Cheryl Mitchell arrives at site. She said she may inform RHS that they may have to work from 0900 to 1600hrs everyday. Visqueen has been left at site. Part of the area is uncovered because of wind.

0945 Depart site.

1045 Arrive onsite. RHS personnel onsite. Tony and Ted at site. RHS personnel trying to setup pad cleanup today. Personnel working on covering soil with black visqueen.

SW 1/24 ~~1100~~ 1130 Depart site.

1200 Arrive onsite. Cheryl Mitchell at site. Ted and Tony working on applying bacteria to the concrete. Data in their log book

Air Temp - 64°F
Soil Temp Surface - 62°F
Soil Temp 1ft - 59°F

The moisture content from pots 1 to 8

Photographs using Digital Camera

39 Scrubbing in petroleum area without bacteria
40 Area with no bacteria after just scrubbing
41 Scrubbing in area with bacteria
42 "
43 "
44 Area after Scrubbing
45 "
46 Pumping setup
47 Cleanup of water in pond by RHS.
48 Pumping Setup
49 Pumping & water in sump

SIGNED KUCHYBOTA 1/24/96

Varies from 20% - 100%. Ted mentioned that the moisture content of areas #7 and #8 was too high.

1230 Mix for concrete 1 pound RBC 109 to two gallons Earthwise Formula One, will allow microbial growth for 1 hour prior to use.

1230 Ted and Tony pouring the bacteria solution on concrete because it is too windy. Ted also mentioned that two gallons of water and ½ pound of RBC TPH-OX was being used to provide bacteria with an oxygen source.

1300 RHS personnel still working on scrubbing. Weather conditions changing. Possibility of rain. FTC personnel conducting some training in the FTC area.

1400 Cheryl departs site. Personnel still pumping water from the sump. Personnel sweeping water into sump using brooms. Rain begins. Scott of Life Tox arrives onsite.

1500 Pumping from sump continues. Water from sump being pumped into 1000 gallon tank. 1000 gallon tank approximately 1/4 to 1/3 full. May check level of water

(35)

(SK) 1/24

in ~~sump~~ tank next day (using groundwater probe). Small amount of water left behind in sump after pumping is complete. This water was discharged into other sump located to the north by removing plugs

1515 The plug for the southern Catch basins was removed and a splash of water flowed through the sump in the pond. RHS personnel to cleanup equipment and prepare for next day. Cheryl and Scott of Cole/Jon depart site. Rain stops.

1545 End of day. Depart site. RHS to show up early tomorrow

SRINIVAS

1/24/96

KUCHIBOTLA

(36)

1/25/96 Sunny 30°F

Objective: Observe bioremediation at site

Personnel: Srin Kuchibotla, NBB-ES

0845 Arrival at site. Ted and Tony of RHS on site. Air Temperature is 40°F and soil temperature at surface is 45°F, at 1 feet is 52°F and at 1.5' is 59°F. Moisture content at points #1 through #8 ranges from 10% - 100%. Temperature is too low and therefore, no ~~planned~~ (SK) 1/25 cleanup is planned for today.

0930 RHS personnel still awaiting to see if temperature would rise. Scott of Cole/Jon arrives on site. He requested Ted to call him if he needed the pipes plugged. Ted said he may not conduct any remediation today. Scott mentioned that Cheryl had arrived at the site this morning.

1000 Depart site. End of day.

Photograph with Digital Camera

50 Cleaned area of concrete yesterday.

SRINIVAS KUCHIBOTLA

1/25/96

1/26/96 SWMU 14 Sunny 60°F

Objective: Observe bioremediation at SWMU 14.

Personnel: Srini Kuchibotla, ABB-ES

0830 Arrival onsite. No personnel onsite Depart Site.

0920 Arrival at site. Ted of R+S at site. Ted mentioned that he had spoken with Cheryl about the weather. He mentioned that he was having trouble applying the bacteria because they would not be able to perform well in this cold weather. He also mentioned that the concrete and soil were badly saturated with petroleum and he may not be able to cleanup the ~~site~~ (SK) 1/26 concrete to ~~s~~potlessly clean. He mentioned that the bacteria needed atleast 6-8 hours to work on the concrete and that it was very cold in the morning ~~upto 0900 hrs and they~~ (SK) 1/26 from 0700 to 1100 hrs and he had to stop at 1500 and

he sees that as a potential concern.

1000 Soil temperature 58°F. Outside temperature 60°F. Ted mentioned that they may (SK) 1/26 he may not do any bioremediation today. He plans to start again on Monday. Informed him that Mike would be replacing me upto Thursday next week.

1030 Depart Site. End of day.

SK 1/26

(39)

1/29/96 SUMMA 14 CLEAR, WARM ± 70°F

OBJECTIVE: OVERSITE OBSERVATION OF RMS BIOREMEDIATION AT FTC AREA DETENTION POND.

PERSONNEL ON-SITE: MIKE JAYNES (ARB-ES)

1400 ARRIVE AT SITE, NO-PERSONNEL ON-SITE AND NO SIGN OF WORK BEING DONE ON THIS DAY.

PHOTOS W/ DIGITAL CAMERA: (NEW DISK)

#1 OPERATOR ERROR - PICTURE NO GOOD

#2 EAST SIDE OF POND FROM SOUTH

#3 WEST SIDE OF POND FROM SOUTH

1430 DEPART SITE.

Michael O. Jaynes

1/29/96

(40)

1/30/96 SUMMA 14 CLEAR ± 65°F

OBJECTIVE: OVERSITE OBSERVATION OF RMS BIOREMEDIATION AT FTC AREA (SUMMA 14) DETENTION POND.

PERSONNEL ON-SITE: MIKE JAYNES (ARB-ES) TED BONKOWSKI (RMS) 1130 DEPART

0830 ARRIVE AT FTC AREA, NO RMS PERSONNEL ON-SITE AS YET. LTO RMS TRUCK TO HELP GW SAMPLERS.

1000 CALL CHERYL MITCHELL FOR UPDATE, SHE HAS NOT HEARD FROM RMS.

1130 ARRIVE AT SITE, TED BONKOWSKI OF RMS IS ON-SITE PREPPING FOR TODAY'S ACTIVITIES. HE IS IN THE PROCESS OF MIXING A BATCH OF THE BIO-BUGS FOR THE CONCRETE. MIX CONTAINS OR CONSISTS OF: ¼ POUND ROC 109 TO 1 GAL. EARTHWISE FORMULA ONE CATALYST.

1200 TED B. (RMS) PREPS AREA + EQUIPMENT FOR SCRUBBING OPERATION. MENTIONS THAT HE SENT HIS HELP HOME LAST WEEK + WILL BE WORKING ALONE.

1220 INDICATES A ½ HR. HOLD TIME FOR BUG/BACTERIA MIX. HE ATTEMPTS TO BEGIN SCRUBBING, BUT SEEMS TO HAVE NO POWER.

(41)

1/30/96 — SUMP 14 — CLEAR x 70°F

1230 POWER PROBLEM RESOLVED, SCRUBBING BEGINS.

1235 SCRUBBER SHORTS OUT, THIS TIME TED B. CAN'T GET IT GOING AGAIN.

1245 HE DECIDES TO RETURN THE SCRUBBER TO THE RENTAL MART AND GET A NEW ONE.

1250 DEPART SITE TO MEET ON GREEN FOR LUNCH.

1445 ARRIVE BACK AT SITE, TED B. HAS RETURNED W/ NEW SCRUBBER AND IS CURRENTLY UNSHRINK DOWN & CLEANING REMAINS OF LATEST SCRUBBING OPERATION TOWARDS THE SUMP AT NORTH END OF DETENTION POND.

1515 STOPS TO TAKE SOIL TEMP & MOISTURE READINGS: SOIL AT SURFACE - 71°F
SOIL AT 1-FT (dbl) - 64°F

MOISTURE @	#1	2	3	4	5	6	7	8
(%)	50	50	30	10	40	50	100	80

1530 PHIL (COLE JOHN) ARRIVES AT SITE, TED B. BEGINS TO PUMP OUT THE SUMP.

(42)

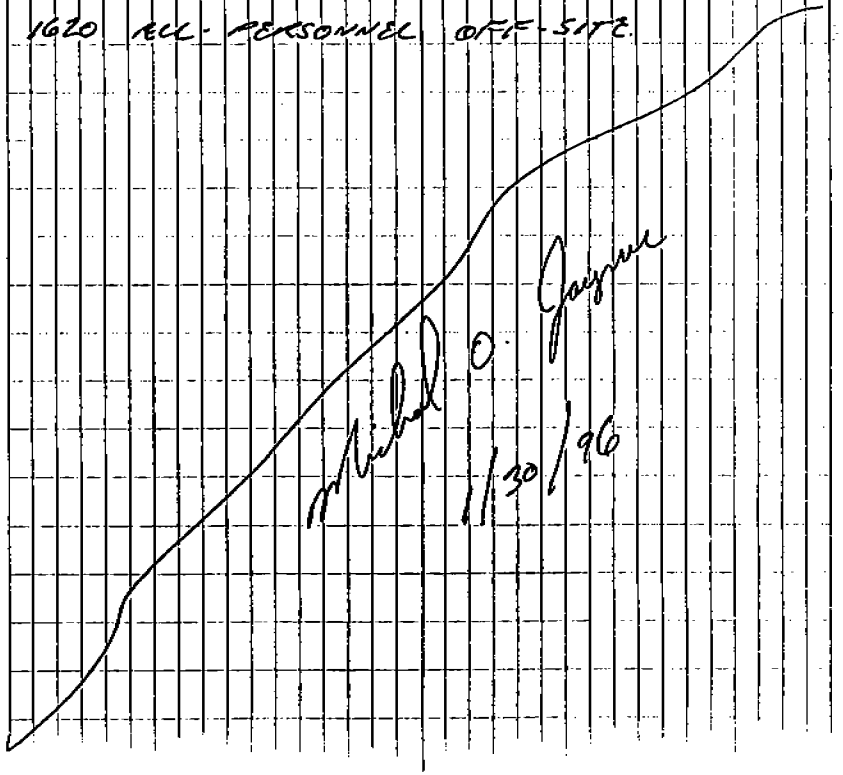
1/30/96 — SUMP 14 — CLEAR x 65°F

1600 SUMP IS PUMPED OUT AND PHIL PULLS THE PLUGS, TED B. CLEANS UP THE WORK AREA.

1610 PHIL OFF-SITE. NOTICE SOME EXCESS RINSE WATER STILL DRAINING INTO THE SUMP.

1615 TED B. DEPARTS SITE, SAYS HE PLANS TO GET AN EARLY START TOMORROW.

1620 ALL PERSONNEL OFF-SITE.



(43)

1/31/96 SUMMIT 14 PARTLY CLOUDY ≈ 60°F

OBJECTIVE: OVERSITE OBSERVATION AT FTC AREA DETENTION POND.

PERSONNEL: MIKE JAYNES (ABB-ES)
TED BONKOWSKI (AHS) 0920

0800 ARRIVE AT FTC AREA, SCOTT AND PHIL (COLE JOHN JONES) ARE INSERTING THE INFLATABLE PLUGS IN THE SUMP. NO SIGN OF AHS PERSONNEL.

0830 PLUGS ARE IN, STILL NO AHS PERSONNEL. DEPART SITE FOR ABB TRAILER.

0920 BACK AT SITE, TED B. (AHS) HAS ARRIVED AND IS CURRENTLY TAKING TEMP + MOISTURE READINGS IN THE SOIL SOUTH OF THE DETENTION POND.

PHOTOS W/ DIGITAL CAMERA (FROM TUES. 1/30/96)

#4 INTERFACE SCANNER IN POND

#5 END OF DRY SUMP PUMPING PROCESS.

0930 TED B. HAS DEPARTED SITE.

(44)

1/31/96 SUMMIT 14 CLEMENT ≈ 65°F

1020 RECORD SOIL READINGS FROM AHS LOGBOOK: AIR TEMP. - 60°F
SOIL TEMP @ SURFACE - 60°F
SOIL TEMP. @ 1-FT - 59°F

MOISTURE @	1	2	3	4	5	6	7	8
(%)	50	50	30	10	40	50	100	88

1025 TED B. HAS RETURNED AND BEGINS TO SET-UP FOR TODAY'S SCARIFYING OPERATION.
TODAY'S MIX IS THE SAME AS YESTERDAY'S - 1# POUND OF RBC 109 TO 1 GALLON EARTHWISE FORMULA ONE CATALYST.

1100 TED B. COMPLETES SCARIFYING ITERATION ON THE SOUTH END OF THE POND.

1105 DEPART SITE TO CHECK ON GW CREW.

1115 BACK AT SITE, TED B. THE HSO IS NOT PRESENT.

1130 TED B. RETURNS, BEGINS SOIL TESTING PROCEDURE. SOIL SAMPLING CONDUCTED USING SMALL TRAY, COVERED W/ AL FOIL, + A SPATULA. PETRO FLAG SAMPLE KIT USED TO ANALYZE SAMPLES.

1210 TED B. ROLLS BACK A PORTION OF VISQUEEN COVERING THE SOIL AREA USING

(45)

1/31/96 SUMP 14 CLOUDY AND COOL ~ 70°F

1210 (CONT.) TREATED BY THE BIO-BACTERIA AND DISCOVERS THAT THE LOWER (ON WEST) PORTION OF THE FIELD IS FLOODED. HIS THEORY IS THE FIRE TRAINING ACTIVITIES WHICH ARE CURRENTLY GOING ON ARE THE CAUSE OF THIS. THE DRAINAGE FROM THE FIRE RUNOFF IS COMING UP THROUGH THE SUMP LOCATED IN HIS SOIL TREATMENT FIELD. HE IS UPSET.

1230 TED B. CONTINUES W/ SOIL ANALYSES, PROCESS IS SLOW. SLIGHT RAIN BEGINS.

1250 RAIN IS INTERMITTENT, TED B. IS BACK TO SCRUBBING THE CONCRETE AGAIN.

1310 TED B. STOPS OPERATIONS TO BREAK FOR LUNCH, SAYS HE HAS SOME ERRANDS TO RUN.

1315 DEPART SITE TO HELP ON CREW TRUCK SAMPLES.

1550 BACK AT SITE, NO PERSONNEL ON-SITE. PUMPS ARE OUT AND THE SUMP IS PUMPED. IT

(46)

1/31/96 SUMP 14

1550 (CONT.) LOOKS LIKE TEDDY B. HAS SECURED OPERATIONS FOR THE DAY W/ LITTLE MORE DONE THAN HE HAD ACCOMPLISHED BY LUNCH.

1600 ALL PERSONNEL OFF-SITE

PHOTOS W/ DIGITAL CAMERA

#6 SCRUBBING BRICK, SOUTH END
#7 " " " "
#8 FLOODED AREA IN SOIL FIELD
#9 " " " "

Michael O. Jayne
1/31/96

(47)

2/1/96 SWMU14 Cloudy 60°F

Objective: Observe bioremediation at SWMU14

Personnel: Srin Kuchibotla, ABB-ES

0945 Arrival onsite. No personnel at site. Mike mentioned that Ted left early yesterday and did not mention his return time to the site for 2/1.

1030 Still awaiting arrival of Ted B.

1130 Still awaiting arrival of RHS personnel

1300 2/1 Depart site,

1300 Return to Site. No RHS personnel at site. Met with Cheryl Mitchell at 1200. Cheryl mentioned that Ted will not be doing any work today. He had mentioned that the flooding of the unvegetated area in between his two catch basins in the soil area had caused his bacteria to be washed away or die. Therefore he was waiting to talk to Harold to setup some system that works for him. Depart site. End of day

SRINIVAS KUCHIBOTLA
2/1/96

(48)

2/2/96 SWMU14 Sunny 65°F

Objective: Observe bioremediation at SWMU14

Personnel: Srin Kuchibotla, ABB-ES
Ted B. RHS (0900)

0830 Arrival onsite. No personnel onsite.

0900 Ted B. arrives. Ted taking temperature and moisture readings at the site in the soil area.

Air Temperature - 58°F

Soil Temperature - 60°F

Soil Temperature at 1 foot - 59°F

(49)

Moisture	#1	#2	#3	#4	#5	#6	#7	#8
Reading	20%	50%	30%	10%	80%	80%	100%	80%

0930 Ted mentioned that the area of flooding was left uncovered for two days but no apparent evaporation had occured. He is covering the site again as there is expected to be a hard freeze today. Also due to rain this afternoon, Ted B. is planning on not cleaning the concrete today. Ted collected three samples for lab analysis (52) 2/2 for Total Petroleum Hydrocarbons Lab samples being sent to ENCO laboratories

in Jacksonville, Florida. Soil samples collected using aluminium spatula and no gloves were worn during collection of first two samples. Decon after coming out of work zone not performed.

1000 Soil samples collected

		Time
96.020201L	taken @ S-2	0900
96.020202L	taken @ S-3	0930
96.020203L	take @ S-7	1000

Gloves worn for third sample collected. locations of S-2, S-3 & S-7 Some QC that drawn in logbook on 1/19/96.

1030 Ted working on collecting equipment to depart site.

Photographs taken with Digital Camera

10 Collection of soil sample

11 "

1045 Ted and Srin depart site. Ted said work was not anticipated for Monday and Tuesday due to cold weather. He will call Jax office and leave message if possible. Site covered with black visqueen. Depart site. End of day

SRINIVAS KUCHIBOTLA
2/2/96

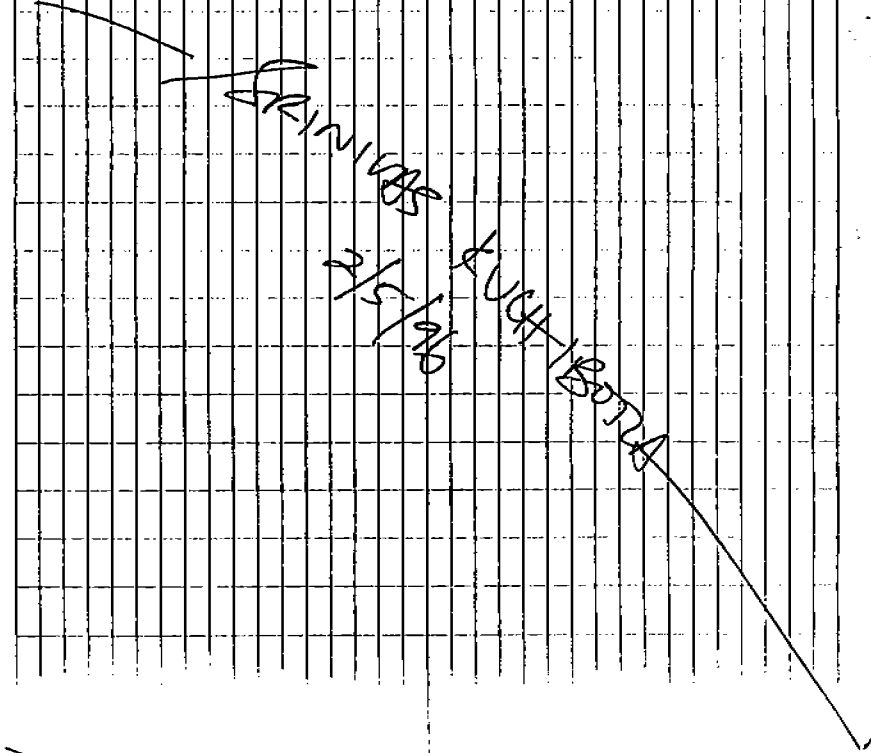
2/5/96 SWMU 14 Cloudy 30°F

Objective: Observe soil temperatures at site

Personnel: Srin Kuchibotla, ABB-ES

300 Arrival at site. No personnel at site. Soil temperature checked just outside work zone. Soil temperature varies from 46°F at surface to 48°F ~~at~~ 6 inches below ground surface. Air Temperature 30-32°F.

315 Depart site. End of day



(51)

2/8/96 SWMU 14 Sunny 65°F

Objective: Observe bioremediation at site

Personnel: Srin Kuchibotla, ABB-ES

1300 Arrival at site. No personnel at site. Visqueen on soil has been removed and caution tape around work zone has also been removed. FTC personnel informed me that Ted of RHS had left the site for Miami and is expected to return only when warm weather returns. Tried to contact Cheryl. Cheryl not available at her office.

1315 Depart site. End of day

SRINIVAS
2/8/96
KUCHIBOTLA

(52)

2/9/96 SWMU 14 Sunny 70°F

Objective: Logging Phone Call

Personnel: Srin Kuchibotla, ABB ES

1230 Cheryl Mitchell called to inform me that the RHS person had departed the site. He is not expected to return (8n) 2/9. This return date is currently not available and he may return after the weather stabilizes.

End of day

SRINIVAS
2/9/96
KUCHIBOTLA

(53)

Sunny 50°F Wind 15-20 from North

4/16/96 SWMU 14

Objective: Meet with Ted Bonkowski of RHS to learn what RHS's plans are regarding the second attempt at the SWMU 14 clean-up

Personnel: Cheryl Mitchell, Larry Smith, and Mike Jaynes

9:00 onsite @ 9:00 AM for meeting. Ted arrived @ 9:12. Stated that he would be working on finding accomodations, aquisition of a new scrubber that worked better, and a different laboratory for their analytical testing.

- During this event the soil will be rotofilled and shoveled to homogenize to reduce "hot" spots.
- In the following week additional people will be employed in the clean up.
- Laboratory results will be analyzed to determine what mix to apply in two weeks.
- Ted suggested that plugging the system was not neccessary because the bugs die in water with > 1,000 ppm oil concentration.

9:45 Departed to Trailer

10:05 Called Frank Lesemore reported that no significant work would be done this week. Will try to - table wells, determine process at NB Talk with Haz Waste about future materials to be turned in, study Incinerator.

Larry W Smith 4/16/96

(54)

SWMU 14

4/19/96 CLEAR, WARMING ≈ 75°F

OBJECTIVE: COLLECT ADDITIONAL ROUND OF SOIL SAMPLES IN AREA TO BE TREATED BY RHS W/ BIO-BUGS.

*NOTE: THIS WILL BE A RE-SAMPLING OF SAMPLES COLLECTED ON 1/9/96 & 1/18/96 (THE PRE-DEMO SAMPLES)

PERSONNEL: MIKE JAYNES (ABB-ES)

0830 AT TRAILER TO PREP BOTTLES AND COLLECT QA/QC SAMPLES.

0930 TRIP, SOURCE, AND RINSATE BLANK COLLECTED AND SECURED. LOAD UP FOR ROAD TO SITE FOR COLLECTION OF COMPOSITE SOIL SAMPLES

1015 ARRIVE AT SITE, NO RHS PERSONNEL PRESENT AND NO SIGN OF WORK BEING DONE THIS WEEK (JUST LIKE EVERY OTHER DAY). SET-UP FOR SOIL SAMPLING. SAMPLES WILL CONSIST OF 5 GRABS COLLECTED FROM PRE-DETERMINED GRID LINES (SEE IMPLEMENTATION PLAN) WHICH WILL THEN BE COMPOSITED INTO ONE SAMPLE AT EACH INTERVAL (0-1' & 1-2') FOR SHIPMENT TO LAB.

1030 COLLECT COMPOSITE SAMPLE 14302601 & 14302602 (1-2')

(55)

4/19/96 VERY NICE, WARMER ≈80°F

1100 REPORT SITE FOR SUPPLIES (ICE, ETC.).

1145 BACK AT SITE TO FINISH SAMPLING.

1210 COLLECT COMPOSITE SAMPLES - 14S02701, 14S02701D, 14S02701MS, & 14S02701MSD - BOTTLE VOLUME PROCESS VERY TIME CONSUMING.

1300 COLLECT 14B02702 (1-2'), TERRE SHORT BREAK.

1330 COLLECT 14S02801 (0-1') & 14S02802 (1-2')

1400 SOIL SAMPLE COLLECTION COMPLETE. CLEAN-UP, LOAD UP, AND RUN TO TRAILER TO PACK ALL SAMPLES FROM ALL SITES.

SAMPLE COLLECTION SUMMARY:

SAMPLE ID	TIME	TYPE
14T004	0830	TRIP
14Y003	0900	SOURCE
14R004	0915	RINSATE
14S02601	1030	SOIL (0-1')
14S02602	1045	SOIL (1-2')
14S02701, D, MS, MSD	1210	SOIL (0-1')
14B02702	1300	SOIL (1-2')
14S02801	1330	SOIL (0-1')
14S02802	1345	SOIL (1-2')

(56)

4/19/96 CLEAR ≈ 80°F

1500 AT TRAILER, SAMPLE PACKING & PAPERWORK PROCESS COMMENCES.

1700 STILL PACKING & PROCESSING SAMPLES.

1830 SAMPLES PACK, READY FOR SHIPMENT WILL HAND DELIVER TO FED-EX. OFF-SITE, END OF DAY.

Michael O. Joyner
4/19/96

(57)

SWMU 14

4/24/96 CLEAR, COOL ≈ 70°F

OBJECTIVE: CHECK FOR ANY SIGN THAT RMS HAS BEGUN THE 2nd PHASE (ATTEMPT) OF THE BIO-REMEDIATION EFFORTS AT THE SWMU 14, FTC AREA.

PERSONNEL: MIKE JAYNES (CRDB-ES)

1100 ARRIVE BY SITE AND THERE IS A SIGN OF WORK. A NO RMS PERSONNEL ON-SITE, BUT A MED ROTOTILLER IS PRESENT NEAR THE SOIL AREA TO BE TREATED. A SMALL AMOUNT OF ROTOTILLING HAS BEEN DONE ON THE EAST SIDE OF THE SOIL GRID.

1110 DEPART TO SWMUs 6 & 7.

1500 ARRIVE BACK AT SITE, NO PERSONNEL ON-SITE AND THE ROTOTILLER HAS BEEN SECURED BY THE SWEO. FOR THE MOST PART, THE ENTIRE SOIL AREA HAS BEEN WORKED, BUT THERE ARE SEVERAL AREAS UNDISTURBED. WILL TRY TO CATCH TED G. LATER TO FIND OUT WHAT HE'S DONE.

1525 DEPART SITE, END OF DAY.

Michael O. Jaynes
4/24/96

(58)

4/30/96 CLOUDS, HEAVY RAINS ≈ 75°F

OBJECTIVE: CHECK ON PROGRESS (IF ANY) OF RMS BIOREMEDIATION AT SWMU 14, FTC AREA.

PERSONNEL: MIKE JAYNES (CRDB-ES)

1400 ARRIVE AT SITE, NO RMS PERSONNEL ON-SITE. IT HAS BEEN RAINING HEAVILY OFF AND ON ALL DAY, & DON'T THINK ANY WORK HAS BEEN DONE TODAY. IT DOES APPEAR THE ENTIRE SOIL AREA HAS BEEN TILLED AND THERE IS AN IRRIGATION HOSE STRETCHED AROUND THE AREA.

THERE HAS BEEN SOME PROGRESS SINCE WE LAST LEFT THE SITE, WHAT WE DON'T KNOW. STILL HAVE NOT BEEN ABLE TO GET IN TOUCH W/ TED G. OTHER WILL TRY AGAIN TOMORROW.

1415 DEPART SITE FOR TRUCK.

Michael O. Jaynes
4/30/96

(59)

5/1/96 CLEAR, COOL ≈ 65°F

OBJECTIVE: ONCE AGAIN, ATTEMPT TO GET UPDATE ON WHAT RAS HAS DONE AND WHAT THEY PLAN TO DO AT SWMU 14.

PERSONNEL: MIKE JAYNES (ABB-ES)

1100 ARRIVE AT SITE, RAS IS ACTIVELY ON-SITE. TALKED W/ TED B. (FOREM) HE EXPLAINS WHAT THEY HAVE DONE TO THE SOIL. THEY ROTOTILLED TO APPROX 2 FOOT BLS. IN THE PROCESS, THEY LEVELED THE AREA, SOMEWHAT, BY MOVING SOIL FROM THE HIGH SIDE (EAST) TO THE LOW (WEST). THE AREA HAS BEEN KEPT MOIST BY AN IRRIGATION HOSE (SPRINKLER LINE) AND THE HEAVY RAINS FROM YESTERDAY (THE AREA IS NOT COVERED). TED SAYS THEY WILL TAKE SOME SAMPLES TODAY AND ATTEMPT TO START BACKFILLING THE HOLES, BUT FIRST THEY HAVE TO GO PICK UP THEIR VAN FROM THE SHOP AND RETURN RENTAL.

1130 DEPART SITE, WILL RETURN AFTER LUNCH TO CHECK ON THINGS.

(60)

5/1/96 CLEAR ≈ 70°F

1330 BACK AT SITE, NO RAS PERSONNEL PRESENT. THERE IS EVIDENCE SAMPLES (3) WERE COLLECTED FROM WITHIN IN THE SOIL AREA.

1345 TED B. ARRIVES BACK ON-SITE INFORMS ME SAMPLES WERE COLLECTED FROM ZONES #1, #3, AND #7 (SEE PREVIOUS DAILY pg. 22) AND SENT TO LAB FOR TPH ANALYSIS. HE MENTIONS THEY WILL COLLECT SAMPLES FROM THE SAME LOCATIONS AND SCREEN THEM FOR TPH W/ *PETRO-FLAG TEST KIT.

1400 TED B. UPDATING LOG BOOK.

1410 CALL TRW TO UPDATE FRANK LESSIE ON THE SITUATION.

1420 RAS SCREENING SOIL SAMPLES. PHIL + SCOTT (CORE JOHN) ARE ON-SITE. THEY MENTION THAT THE DETENTION POND WILL BE DRAINED AND CLEANED OUT BY FTC TOMORROW AT 0900. THEY WANT TO KNOW WHEN RAS PLANS ON WORKING IN THE POND AREA.

1445 CHECK W/ TED B., THEY ARE STILL

(61)

5/1/96 CLEAR ≈ 75°F

1445 (CONT.) SCREENING SAMPLES HE SAYS THEY WON'T BE APPLYING THE BUGS UNTIL TOMORROW, IT'S TOO LATE. HE ALSO MENTIONS THEY PLAN TO BEGIN WORK IN THE POND NEXT WEEK OR WHENEVER THEY GET THE SOIL SCREENED, WE WILL SEE.

1505 DEPART SITE FOR SUMMA 6+7.

PHOTO LOG: (NEW DISK)

#1 - SOIL AFTER, TILLED
#2 - " " " , LEVELED
#3 - " " , SHOWING SAMPLE LOCATIONS.

Michael O. Joyce
5/1/96

(62)

5/2/96 CLEAR, NICE ≈ 60°F

OBJECTIVE: OBSERVE RMS BIOREMEDIATION ACTIVITIES AT SUMMA 14.

PERSONNEL: MIKE JAYNES (ARES-ES)

0850 ARRIVE AT SITE, TED B. NOT PRESENT. RMS HELO (MIKE) IS SETTING UP EQUIPMENT FOR BIO APPLICATION. ALSO, FTC PERSONNEL ARE READY & WAITING TO START DOWN THE DETENTION POND.

0905 PHIL FROM OLE-JOHN ON-SITE TO OVERSEE POND CLEANING AND MAN THE PUMPS.

0915 TED B. ARRIVES ON-SITE, FTC GUYS BEGIN CLEANING THE POND.

0930 RMS (MIKE) BEGINS PREPARING THE BIO-BUG MIXTURE.

PHOTO LOG:

#4 - SET-UP FOR BIO-BUG APPLICATION
#5 - SPRAYING THE DETENTION POND
#6 - POND BEFORE CLEANING
#7 - PREPARING THE BIO-BUG MIXTURE
#8 - " " " "
#9 - ABC-109 (BIO-BUGS) LABEL
#10 - PREPARING THE MIXTURE (CONT.)

1000 FTC CREW IS NEARING COMPLETION

5/2/96 CLEAR & 75°F

1000 (CONT.) OF SPRAYING DOWN THE POND. TED B. SAYS THE BIO-MIXTURE NEEDS TO SIT ABOUT 2 HOURS SO THEY WILL BEGIN APPLICATION AROUND NOON.

1005 PHIL (COLE-JOHN) TALKS TO TED ABOUT RECIRCULATION OF SAND IN THE SUMP AT NORTH END OF POND DURING CLEANING. THEY DECIDE TO SHOVEL IT OUT AND PLACE IT IN THE SOIL BIER TO BE TREATED W/ THE SOIL.

PHOTO LOG:

#11 - POND CLEANING NEAR COMP.
#12 - SAND RECIRCULATION IN SUMP.

1010 DEPART SITE TO SUMPS 6 & 7.

1200 BACK AT SITE, RHS PREPPING SITE FOR FIRST APPLICATION OF BIO-BUGS. THEY HAVE TAKEN THE SOIL (SAND) FROM THE POND SUMP AND TILLED IT IN THE EAST END OF THE SOIL BIER.

PHOTO LOG:

#13 - SOIL BIER WHERE SUMP SAND WAS TILLED IN.

5/2/96 CLEAR, VERY NICE & 75°F

PHOTO LOG: (CONT.)

#14 - SUMP AFTER SAND WAS REMOVED
#15 - DETENTION POND AFTER CLEANING

1220 RHS BEGINS FIRST APPLICATION OF THE BIO-BUGS. THE MIXTURE CONTAINS *22 POUNDS RBC-109 (3-5 GALLON BAGS/ACRE) COMBINED W/ APPROX 100 GALS. WATER, THAT WILL BE FOLLOWED BY *25 POUNDS RBC TPH-EX (ENZYME) COMBINED W/ 100 GALS. OF WATER.

THE MIXTURE IS MIXED UP IN 2-55 GALLON PLASTIC DRUMS AND STIRRED UP W/ AN OAR (WOODEN). IT IS THEN APPLIED USING A TRASH PUMP AND GARDEN HOSE W/ PRESSURE NOZZLE. ONE MAN SPRAYS ON THE MIXTURE WHILE THE OTHER TILLS THE SOIL.

PHOTO LOG:

#16 - BIO-BUGS APPLICATION AND TILLING
#17 - " " " " " "
#18 - " " " " " "
#19 - BOTTOM OF 1ST DRUM CONTAINING BIO-BUGS MIXTURE.

1250 RHS SWITCHES TO 2nd 55-GALLON DRUM CONTAINING MIXTURE.

(65)

5/2/96 CLEAR ~ 75°F

1300 BIO-BUB APPLICATION CONTINUES, DEPART SITE FOR SAMMU 6 & 7.

1500 RETURN TO SITE, NO RMS PERSONNEL ON-SITE. THEY HAVE COMPLETED THE FIRST APPLICATION OF THE BIO-BUBS AND CLEANED-UP.

PHOTO LOG:

#20 - SOIL GAS PROBE AFTER FIRST COMPLETE BIO-BUB APPLICATION

1515 DEPART SITE, END OF DAY AT THIS SITE.

Michael O Gaynor
5/2/96

(66)

5/6/96 SAMMU 14 - FTC Area Sunny 80°F

Objective: Observe field activities at the FTC Area

Personnel: Srin Kuchibotla, ABB-ES

0930 Arrival onsite. No personnel onsite
Depart site
1130 Visit Cheryl Mitchell at her office. She said Ted B. of RMS just finished a conference call with her and that he may not be working today. His pump that he uses for cleaning the concrete does not function properly.

1200 Arrival onsite. No personnel at site
Depart site
1300 Arrival onsite. No personnel still at site. End of day. Depart site.

SRINIVAS KUCHIBOTLA
5/6/96

(67)

5/8/96 PARTLY CLOUDY ≈ 80°F

OBJECTIVE: OBSERVE RMS BIOREMEDIATION ACTIVITIES AT SUMP 14, PTC.

PERSONNEL: MIKE JAYNES (CRBO-ES)

0945 ARRIVE AT SITE, RMS IS IN THE PROCESS OF PRESSURE ~~WASHING~~ RINSING THE CONCRETE DETENTION POND. (WAS THIS PART OF THE BIO-REMO?)

PHOTO LOG:

- #21 - PRESSURE ~~WASHING~~ RINSING IN POND 5/8/96
- #22 - " " " "
- #23 - SUMP ON NORTH END OF POND BACKING UP W/ RINSE SOLUTION.
- #24 - MORE PRESSURE RINSING

1010 TED B. (RMS) INFORMS ME THEY ARE PRESSURE RINSING TO REMOVE THE TOP LAYER OF BUILD-UP AND REDUCE THE AMOUNT OF TPH THAT THEY WILL HAVE TO BIO. HE PLANS ON RINSING AND THEN BEGINNING BIO-BUG APPLICATION W/ SCRUBBER LATER TODAY. HE INTENDS TO COMPLETE CLEANING OF THE POND BY FRIDAY (5/10).

1020 CALL CHERYL HITCHEN (SCE) TO INFORM HER OF THE HAPPENINGS. SHE SAYS

(68)

5/8/96 CLEARING ≈ 80°F

1020 (CONT.) SHE'LL BE STOPPING BY THE SITE IN AVENUE.

1040 C. MITCHELL ARRIVES ON-SITE, PRESSURE RINSING CONTINUES.

1050 TED B. EXPRESSES HIS CONCERN ABOUT THE BACKFILLING SUMP. MITCHELL GOES TO CALL COLE-JOHN TO PUMP DOWN THE SUMP.

1055 RMS STOPS TO WAIT FOR PUMP DOWN.

PHOTO LOG:

- #25 - BACKFILLING SUMP AT NORTH END OF POND.

1105 COLE-JOHN PERSONNEL ARRIVES, BEGINS TO PUMP DOWN THE SUMP.

1125 SUMP IS PUMPED DOWN, RMS RESUMES RINSING OPERATIONS.

1130 DEPART SITE W/ CHERYL MITCHELL TO CHECK LOCATION AT JSZ (SUMP 23).

1315 BACK AT SITE, RINSING OPERATIONS CONTINUE. TALKED TO TED B. (RMS) AND HE INFORMS ME THEY WILL NOT BE APPLYING BIO-BUGS OR SCRUBBING UNTIL TOMORROW. THEY WILL FINISH THE PRESSURE RINSE

(69)

5/8/96 CLEAR = 85°F

1315 (CONT.) LEFT TODAY AND WRAP UP THIS PHASE HOPEFULLY BEFORE 1600.

1330 THEY ARE CURRENTLY WETTING THE SOIL BASE W/ THE IN-LINE SPRINKLER HOSES THEY HAVE LAID OUT.

PHOTO LOG:

#26 - RESULT OF PRESSURE RINSE ON WEST BANK OF POND.

#27 - POND NEARING THE END OF PRESSURE RINSE.

#28 - SOIL BASE W/ IRRIGATION LAYOUT.

1430 RINSING CONTINUES, DEPART SITE.

1530 AT SITE, HAS WRAPPING UP THE PRESSURE RINSE AND CLEANING UP. THEY WILL BEGIN BUG APPLICATION IN THE A.M.

1545 DEPART SITE, END OF DAY.

Michael O. Joyce
5/8/96

(70)

5/9/96 CLEAR = 80°F

OBJECTIVE: OBSERVE HAS BIO-REMEDIATION ACTIVITIES AT SUMP 14, PTC.

PERSONNEL: MIKE JOYNES (CERES-ES)

0915 ARRIVE AT SITE, HAS HAS JUST STARTED W/ THE BIO-BUG APPLICATION AND SCRUBBING PROCESS. HAROLD MCGILL (SOUTHERN) IS ON-SITE OBSERVING OPERATIONS.

0930 TALKED TO TED B. (HAS), HE HAS DECIDED TO APPLY THE BIO-BUGS OVER THE ENTIRE POND AREA AND LET THEM SIT OVER THE WEEKEND BEFORE RINSING HE HOPES THAT WILL INCREASE THEIR EFFECTIVENESS.

PHOTO LOG:

#29 - BIO-BUG APPLICATION W/ SCRUBBER

#30 - " " " W/ SPRAYER

#31 - " " " AND SCRUBBING

#32 - NORTH END SUMP AFTER RINSE + BEFORE BIO-BUG APPLICATION.

0945 H. MCGILL OFF-SITE.

1080 APPLICATION CONTINUES, TED B. NOT HAPPY W/ CONSTANT SHORTING OF THE POWER TO THE SCRUBBER, DEPARTS SITE TO OBTAIN GENERATOR.

(71)

5/9/96 CLEAR ≈ 80°F

1040 TED B. RETURNS, THEY ATTEMPT TO HOOK THINGS UP, BUT THE SCRUBBER WON'T GO. THEY WILL HAVE TO NOW SOLVE YET ANOTHER PROBLEM.

1050 OBTAIN BIO-BUG MIXTURE INFO FROM TEDDY B. HE INFORMS ME IT IS A 1 GRAMS HSC-109/GALLON WATER MIX THAT HAS SET FOR 96 HOURS.

1100 RAN OFF-SITE TO CHANGE OUT SCRUBBER.

1110 OFF-SITE TO MAKE THE ROUNDS + GRAB LUNCH.

1315 STOP BY CHERYL MITCHELL'S OFFICE TO DISCUSS THE HAPPENINGS AT FTC. SHE SAYS THEY (THEY'S) PROBABLY NOT BE ABLE TO LEAVE THE BUGS ON THE CONCRETE OVER THE WEEKEND. SHE WILL LIKELY HAVE THEM RINSE DOWN THE POND AT LEAST BY TOMORROW (FRIDAY 5/10) AFTERNOON. ALSO SHE WILL BE COVERING FOR ME IN MY ABSENSE TOMORROW.

(72)

5/9/96 CLEAR, HOT ≈ 85°F

1330 AT SITE, BIO-BUG APPLICATION CONTINUES AT A VERY SLOW RATE. THEY SEEM TO BE RELEGATED TO USING A PUSH BROOM AS IT LOOKS LIKE THE "NEW" SCRUBBER IS NOT OPERATIONAL. THEY ARE ALSO POURING SOLUTION DIRECTLY FROM THE CONTAINER ONTO THE CONCRETE. (THAT WOULD CHANGE THE RATIO OF THE MIXTURE WOULDN'T IT?)

PHOTO LOG:

#33 - PROGRESS OF APPLICATION IN RETENTION POND.

#34 - " " " "

#35 - APPLICATION USING PUSH BROOM

#36 - POURING OF SOLUTION

1400 THE SCRUBBER IS WORKING, BUT NOT FOR LONG. BACK TO THE BROOM.

1435 A NEW WRINKLE, THEY HAVE GONE TO PRESSURE RINSING THE BARK AFTER BRUSHING ON THE BIO-BUGS.

PHOTO LOG:

#37 - PRESSURE RINSING THE BIO-BUGS.

#38 - " " " " "

(73)

5/9/96 CLEAR & 80°F

1500 TED B. SAYS THEY WEREN'T "RINSING" THEY WERE JUST HITTING SPOTS THAT NEEDED EXTRA MOISTURE. BUT IT IS APPARENT SOMETHING IS BEING RINSED INTO THE SUMP. (SEE PHOTO)

PHOTO LOG:

#39 - SOLUTION FLOWING INTO SUMP

#40 - MORE BIO-BUG APPLICATION

#41 - " " "

#42 - " " "

1515 RHS BEGINS BREAKDOWN OF EQUIPMENT AND CLEAN-UP. TED B. MENTIONS IT WILL PROBABLY TAKE A GOOD 4 DAYS OF THIS TO COMPLETE THE BIO-BUG APPLICATION ON THE CONCRETE.

HE ALSO INFORMS ME, THE SOLUTION THEY ARE POURING DIRECTLY ON THE CONCRETE IS THE OXIDIZER (CRBC TPH-OX) WHICH DOES NOT CHANGE THE PH.

1530 DEPART SITE FOR TRAILER, END OF ACTIVITIES ON THIS DAY.

Richard O. Jaynes

5/9/96

(74)

5/13/96 CLEAR & 75°F

OBJECTIVE: OBSERVE CONTINUING BIO-REMEDIATION ACTIVITIES AT SWMU #4, FTC.

PERSONNEL: MIKE JAYNES (CRBC-ES)

1400 ARRIVE AT SITE, NO RHS PERSONNEL PRESENT. IT DOES APPEAR THE SUMP AREA HAS BEEN TILLED RECENTLY. WILL CHECK BACK IN THE AM.

1415 DEPART SITE, END OF DAY

Richard O. Jaynes

5/13/96

(75)

5/14/96 PARTLY CLOUDY ≈ 70°F

OBJECTIVE: OBSERVE BIO-REMEDIATION ACTIVITIES (IF ANY) AT SWMU 14, FTC.

PERSONNEL: MIKE JAYNES (ABB-ES)

0830 ARRIVE AT SITE, RHS HELP (MIKE) IS WORKING IN THE POND CONTINUING W/ SCRUBBING OPERATION. HE DOES NOT SEEM TO KNOW WHAT IS PLANNED OR WHEN TED B. WILL BE SHOWING UP. HE DID MENTION THAT HE THOUGHT TED B. DID TILL THE SOIL AREA YESTERDAY.

0900 A CHECK OF THE RHS LOGBOOK DOES SHOW THAT THE SOIL WAS TILLED MONDAY (5/13) AND SOIL % MOISTURE READINGS WERE TAKEN OVER THE WEEKEND. THE LATEST READINGS (5/13): (FROM RHS LOGBOOK): BEFORE TILLING

AIR TEMP. - 76°F

SOIL TEMP. - 78°F

MOISTURE @	1	2	3	4	5	6	7	8
(%)	50	50	60	50	50	60	70	60

- AFTER TILLING:

MOISTURE @	1	2	3	4	5	6	7	8
(%)	50	50	50	40	40	40	50	40

- SOIL TILLED TO APPROX. 1 FOOT.

(76)

5/14/96 PARTLY CLOUDY ≈ 70°F

0930 STILL NO SIGN OF TEDDY B. WILL CHECK BACK LATER TO FIND OUT WHAT THE PLAN IS.

PHOTO LOG:

#43 - SCRUBBING W/BRUSH, N. END OF POND

#44 - SOIL AREA AFTER LATEST TILLING.

0945 DEPART SITE FOR TRAILER.

1115 BACK AT SITE. TED B. HAS ARRIVED AND IS WORKING IN THE POND. WILL TALK W/ HIM LATER.

LOGBOOK SHOWS ANOTHER ROUND OF SOIL READINGS:

AIR TEMP. - 68°F

SOIL TEMP - 78°F

MOISTURE @	1	2	3	4	5	6	7	8
(%)	40	30	80	50	70	60	80	50

1145 DEPART SITE FOR LUNCH

1300 BACK AT SITE. TALK W/ TED B. (JUST AS HE IS LEAVING). THEY HAVE STOPPED OPERATIONS FOR TODAY. HE SAYS THEY PLAN TO FINISH UP CONCRETE PAD IN THE NEXT COURSE OF DAYS. ALSO, HE HAS WATERED THE SOIL AS FAR AS THE CONCRETE GOES. HE IS COMPLAINING ABOUT "EXCESSIVE"

(77)

5/14/96 CLEAR ≈ 75°F

1300 (CONT.) CONTAMINATION (HYDROCARBONS) COMING UP OR "WICKING" UP THROUGH CONCRETE IN THE AREAS WHERE HE HAS CLEANED. HE DOESN'T KNOW IF HIS BUGS CAN HANDLE IT. HE IS GENERALLY FRUSTRATED. BUT HE DOES SEEM PLEASED WITH THE SOIL AREA AND THE MOISTURE LEVELS.

1330 TED B. DEPARTS SITE.

1345 I ATTEMPT TO TALK W/ FTC PERSONNEL ABOUT SOME OTHER CONCERNS ON THE FIRE FIELD.

1430 DEPART SITE, END OF DAY

Michael O. Jaynes
5/14/96

(78)

5/15/96 CLEAR, AND ≈ 70°F

OBJECTIVE: OBSERVE CONTINUING BIO-REMEDIATION ACTIVITIES AT SOUTH 14, FTC DETENTION POND.

PERSONNEL: MIKE JAYNES (CRAIG-ES.)

0830 ARRIVE AT SITE, RHS ON-SITE AND WORKING IN THE POND ON THE CONCRETE, SCRUBBING IN BUGS W/ BROOM. PHIL COOLE-JOHN IS ON-SITE MANNING THE PUMPS TO KEEP OVERFLOW CONTROLLED AS FIRE FIGHTING TRAINING IS CURRENTLY IN PROGRESS ON THE FIELD.

PHOTO LOG:

#45 - SCRUBBING IN "EXCESSIVELY" CONTAMINATED AREA OF DETENTION POND.

#46 - WORK AT SOUTH END OF POND.

0940 CHERYL MITCHELL ARRIVES ON-SITE TO CHECK THINGS OUT, SCRUBBING CONTINUES ON SOUTH END OF POND.

1000 C. MITCHELL DEPARTS SITE.

1030 DEPART SITE FOR TRAILER, WILL CHECK BACK AFTER LUNCH.

1330 BACK AT SITE. RHS HAS APPARENTLY COMPLETED BIO-BUG APPLICATION AS THEY HAVE BEGUN PRESSURE RINSING PROCESS,

5/15/96 CLEAR, WARMER ≈ 80°F

1330 (CONT.) AT SOUTH END OF POND. HOWEVER, THE PLUGS ARE NOT IN PLACE AT THE SUMP. TED B. SAYS HE HAS CALLED COLE-JOHN JONES TO COME INSERT THE PLUGS

PHOTO LOG:

#47 - PRESSURE RINSING, SOUTH END

1430 PRESSURE RINSING CONTINUES, BUT NO PLUGS YET, TED B. GOES TO CALL COLE-JOHN AGAIN.

1500 COLE-JOHN PERSONNEL ARRIVE ON-SITE TO INSERT PLUGS. RINSING IS HALTED WHILE PLUG IS INSERTED.

PHOTO LOG:

#48. END OF "EXCESSIVE" CONTAMINATION AND PLUG INSERTION IN SUMP, NORTH END.

*PHOTO ALSO SHOWS BIO-BUG RINSE FLOWING INTO SUMP PRIOR TO PLUG INSERTION.

1530 PLUG IS INSERTED, RHS BEGINS OR CONTINUES FINAL RINSE OF THE CONCRETE POND.

1630 RINSING CONTINUES, WORKING FROM

5/15/96 CLEAR ≈ 85°F

1630 (CONT.) SOUTH END TO THE NORTH END SUMP W/ PRESSURE RINSER AND BROOM.

1655 RINSING COMPLETE, RHS PUMPING OUT THE SUMP. TED B. SAYS THEY ARE BASICALLY DONE, BUT HE WANTS TO COME BACK AND HIT SOME OF THE "HOT SPOTS" W/ MORE BIO-BUGS EITHER TOMORROW OR THE NEXT DAY.

PHOTO LOG:

#49 - PRESSURE RINSE AND SWEEPING IN DETENTION POND.

#50 - "EXCESSIVELY" CONTAMINATED AREA NEAR SUMP AFTER RINSE.

1710 DEPART SITE, END OF DAY.

Michael O. Joyce
5/15/96

(81)

5/16/96 CLEAR, WARM ≈ 75°F

OBJECTIVE: OBSERVE CONTINUING BIO-REMEDIATION AT SUMP 14, FTC DETENTION POND.

PERSONNEL: MIKE JAYNES (CRA-ES)

0800 ARRIVE AT SITE, NO RHS PERSONNEL ON-SITE, NO SIGN OF ACTIVITIES.

0810 DEPART SITE, WILL CHECK BACK LATER.

0930 BACK AT SITE, STILL NO RHS PERSONNEL ON-SITE. COLE-JOHN GUY IS ON-SITE RUNNING SUMP PUMP AS FIRE TRAINING IS IN PROGRESS.

1000 DEPART SITE.

1030 BACK AT SITE, RHS HAS REMOVED CFAN CREW, TED B. AND 2 HELPERS). THEY ARE SETTING UP FOR BIO-BUG APPLICATION IN THE SOIL AREA. TED B. MENTIONS THAT DUE TO A LOW NITROGEN COUNT IN THE SOIL, THEY WILL BE USING AN EMULSIFYING AGENT, EARTHWISE FORMULA II TO HELP W/ MICROBIAL ACTIVITY.

TODAY'S SOLUTION MIX IS #25 POUNDS RBC 109 PER APPROX. 100 GALLONS WATER NO TPH-OX WILL BE ADDED THIS TIME

(82)

5/16/96 SOME CLOUDS, WARMER ≈ 80°F

PHOTO LOG: (NEW DISK #2)

#1 - POND AFTER FIRST COMPLETE APPLICATION AND RINSE

#2 - "EXCESSIVELY" CONTAMINATED NORTH END WASH SUMP

#3 - SET-UP FOR BIO-BUG APPLICATION IN SOIL AREA

#4 - SOLUTION IN 55-GAL DRUMS

#5 - SOIL AREA BEFORE APPLICATION

1100 BIO-BUG APPLICATION AND TILLING IN THE SOIL AREA IN PROGRESS.

1110 PERSON FROM VOC LAB ARRIVES TO COLLECT SOIL SAMPLES FOR RHS. TED B. HAS HIRED MORE HELP

1135 VOC BEGINS SAMPLE COLLECTION. HE WILL BE COLLECTING SAMPLES AT 3 LOCATIONS DESIGNATED BY RHS FOR TPH ANALYSIS.

PHOTO LOG:

#6 - TILLING IN SOIL AREA

#7 - TED B. EXPLAINING SAMPLE PROCEDURE

#8 - SAMPLE LOCATIONS (ORANGE FLAGS)

#9 - SAMPLE COLLECTION BY VOC PERSON

#10 - " " " " "

#11 - " " " " "

1215 SAMPLE COLLECTION COMPLETED. SAMPLES

(83)

5/16/95 WARM ≈ 85°F

1215 (CONT.) WERE COLLECTED AT RHS LOCATIONS - #1 (0-8"), #3 (0-8" + 8-14"), AND #7 (0-8" + 8-14"). SEE PREVIOUS GRID FOR LOCATIONS. SAMPLES WERE COLLECTED USING A STAINLESS STEEL SCOOP/HAND SHOVEL CLEANED BETWEEN LOCATIONS, BUT NOT BETWEEN DEPTHS AT SAME LOCATION. SOIL WAS PLACED IN 8 OZ. GLASS JARS, SEALED AND LABELED.

1220 OFF-SITE FOR LUNCH

1330 BACK AT SITE, RHS HAS COMPLETED 2nd BIO-SUB APPLICATION AND IS CLEANING UP.

1345 AFTER CHECKING MOISTURE READINGS, TED B. DECIDES MORE TILLING NEEDS TO BE DONE IN THE AREA NEAR THE GATES (SW CORNER). HE IS NOT HAPPY W/ HIGH MOISTURE CONTENT. (100% BETWEEN THE GATES).

PHOTO LOG:

#12 - TILLING IN HIGH MOISTURE AREA BETWEEN GATES

1400 RHS GIVES UP ON TILLING SOIL, THEN GOT MOISTURE DOWN TO ≈ 90%.

1415 OFF-SITE, END OF DAY.

Michael O. Jaynes 5/16/96

(84)

5/17/96 CLEAR ≈ 75°F

OBJECTIVE: OBSERVE CONTINUING BIO-REMEDIATION ACTIVITIES AT SWMU 14, FTC.

PERSONNEL: MIKE JAYNES (ABB-ES)

0840 ARRIVE AT SITE. RHS IS ON-SITE, SET-UP AND SCRUBBING AWAY. (EARLY START TODAY!). TED B. EXPLAINS THEY WILL BE HITTING THE "HOT SPOTS" AND THEN GIVING THE WHOLE POND ONE MORE GOOD ~~RAKE~~ TOSSING INSTEAD OF LETTING BUGS SIT OVER THE WEEKEND AS HE HAD PREVIOUSLY SAID. HE'S GIVING UP, IT'S AS CLEAN AS HE CAN GET IT AND HE'S RUN OUT OF BUGS.

0930 DEPART SITE FOR TRAILER

1120 BACK AT SITE, "HOT SPOT" SCRUBBING CONTINUES. TED B. HAS ARRANGED FOR CAT-JOHN TO PUMP THE SUMP SO THEY CAN BEGIN FINAL RINSE DOWN SHORTLY.

PHOTO LOG:

#13 - APPARENT "HOT SPOTS" SOUTH END

#14 - " " " NORTH END OF POND NEAR SUMP.

(85)

5/17/96 VERY WARM ≈ 85°F

1150 OFF-SITE FOR QUICK LUNCH AND SOME TRAILER CLEANING AND PREP FOR DEPARTURE.

1345 SWUNG BACK BY THE SITE, FINAL PRESSURE RINSE IN PROGRESS. SUMP HAS BEEN PLUGGED, PUMP OUTLET ONLY.

1420 FINAL PRESSURE RINSE CONTINUES, PROGRESSING FROM SOUTH END TO SUMP AT NORTH END.

1500 RINSE COMPLETE, MD RHS PUMPING SOLUTION FROM SUMP.

PHOTO LOG:

#15 - PRESSURE RINSING THE POND

#16 - DETENTION AND AFTER RINSE

#17 - " " " "

1530 RHS WRAPS THINGS UP, TED B. INFORMS ME CLEANING OF THE POND IS COMPLETE. ACKNOWLEDGED. WE WILL SAMPLE NEXT WEEK.

1535 DEPART SITE HEAD OF MD SHAFT

Michael O. Joyner

5/17/96

(86)

5/21/96 OVERCAST, LIGHT RAIN ≈ 80°F

OBJECTIVE: PERFORM RUNWATER RUNOFF SIMULATION AT SUMP 14, FTC DETENTION POND, AND COLLECT ALL APPLICABLE SURFACE WATER SAMPLES.

PERSONNEL: MIKE JOYNES (EEG-35)
RICHARD STEPHENS (RSS-25)

1330 ARRIVE ON-SITE, NO ACTIVITY, NO RHS PERSONNEL PRESENT, SITE'S ARE THAWING.

1345 DEPART FOR TRAILER.

1400 BEGIN PREPARATIONS FOR RUNOFF SAMPLING EVENT.

1430 TALKED W/ CHERYL MITCHELL, SHE IS WORRIED ABOUT THE RAIN AND BACKFILLING W POND. WOULD PREFER SAMPLING BE DONE ASAP. WE SHIFT TO RUSH MODE. COLLECT UP ALL BOTTLES AND LOAD UP SAMPLING EQUIPMENT.

1445 RHS BACK TO SUMP 14.

1500 AT SITE SETTING UP FOR RUNOFF EVENT, COLE-JOHN PERSONNEL PLUGGING THE SUMP.

1520 RUNOFF EVENT BEGINS, LIGHT RAIN CONTINUES.

(87)

5/21/96 LIGHT RAIN ≈ 80°F

1520 (CONT.) SET-UP IS IDENTICAL TO INITIAL EVENT (1/11/96). CHECK FLOW IN FROM BOTH SETS OF HOSES. TOTAL FLOWRATE IS 13 GPM. WITH 4 GARDEN HOSES ARE SET-UP ON EACH SIDE (EAST + WEST) OF POND AND WILL BE MOVED APPROXIMATELY EVERY 10 MINUTES.

1535 BEGIN COLLECTION OF INITIAL SAMPLE - 14W013. pH - 7.29
TEMP. - 28.8 °C
DO. - 3.2 mg/l
TURB. - 12.9 NTU

1605 COLLECT SAMPLE - 14W014 (APPROX. 333 GALS. ACCUMULATED).
pH - 7.32
TEMP. - 29.3 °C
DO - 3.4 mg/l
TURB. - 10.55 NTU
LIGHT DRIZZLE CONTINUES.

1640 COLLECT SAMPLE - 14W015 (APPROX 666 GALS. ACCUMULATED).
pH - 7.36
TEMP. - 28.8 °C
DO - 3.5 mg/l
TURB. - 7.60 NTU

(88)

5/21/96 LIGHT RAIN ≈ 80°F

1705 COLLECT SAMPLE - 14W016 (APPROX. 1000 GALS. ACCUMULATED).
pH - 7.36
TEMP - 27.8°C
DO - 3.5 mg/l
TURB - 4.12 NTU

1715 SAMPLING COMPLETE. BREAK DOWN EQUIPMENT, CLEAN UP SITE, AND MOVE TO TRUCK.

1745 UNLOAD, STORE SAMPLES ON ICE FOR SHIPMENT TOMORROW.

PHOTO LOG:
#18 - SET-UP FOR RUNOFF SAMPLING EVENT
#19 - RUNOFF WATER COLLECTING IN SWALE
#20 - SAMPLING EQUIPMENT SET-UP
#21 - DETENTION POND DURING RUNOFF SAMPLING EVENT
#22 - DETENTION POND NEAR THE END OF SAMPLING EVENT

1800 OFF-SITE, END OF DAY

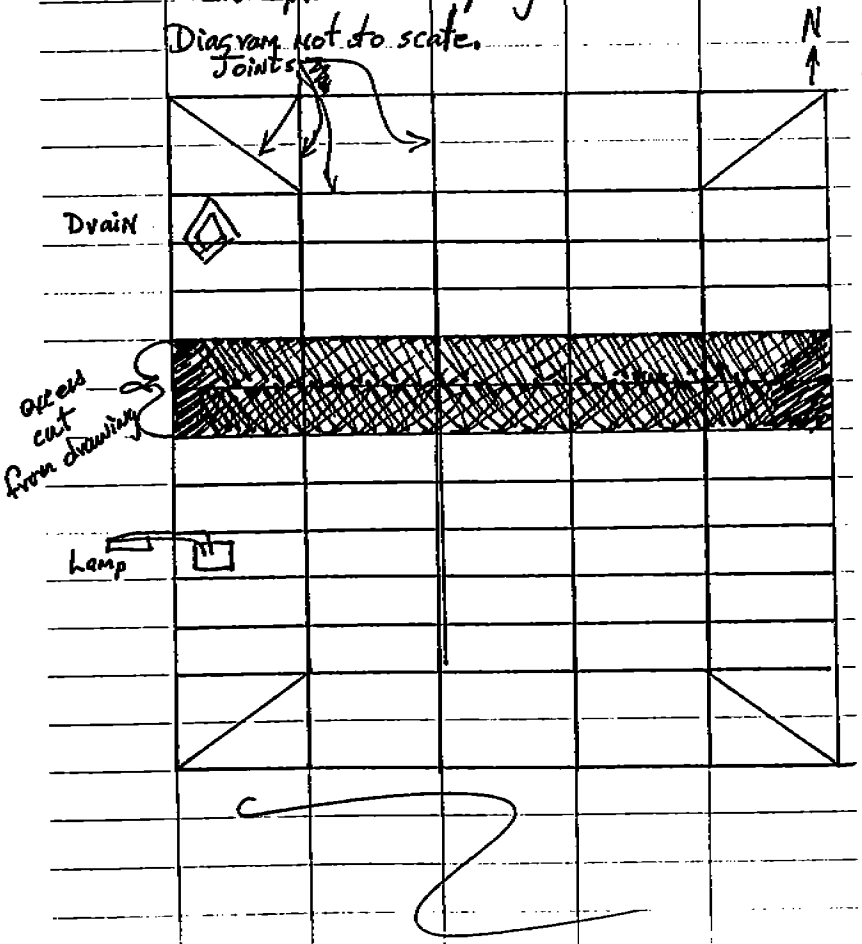
Michael O. Joyner
5/21/96

(89)

6/27/96 Windy 20 plus knots Lt. Rain

11:00 Arrive @ site to draw site map of detention pond, and airplane and helicopter burn areas that will include the major joints and cracks. This will permitt planning relative to the planned sampling of these areas.

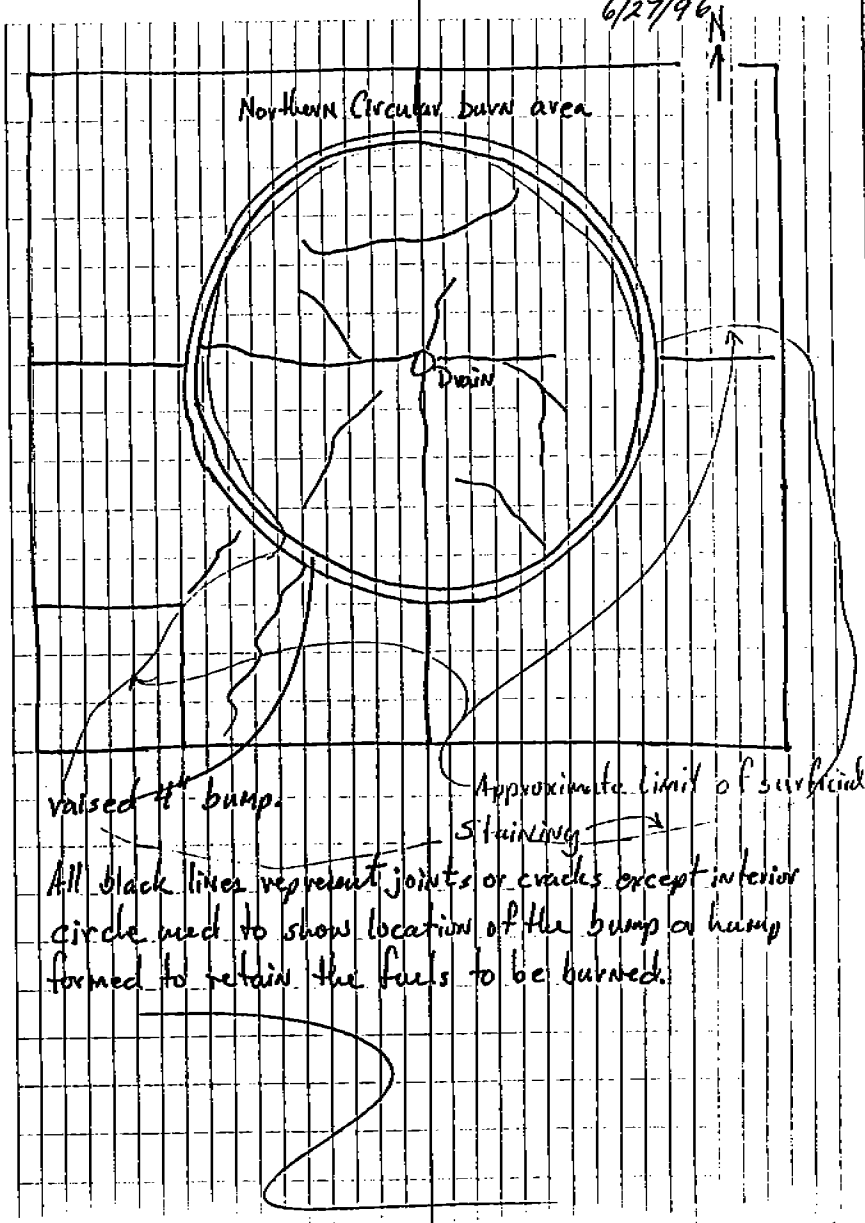
Diagram not to scale.



Larry W Smith 6/27/96

(90)

6/27/96



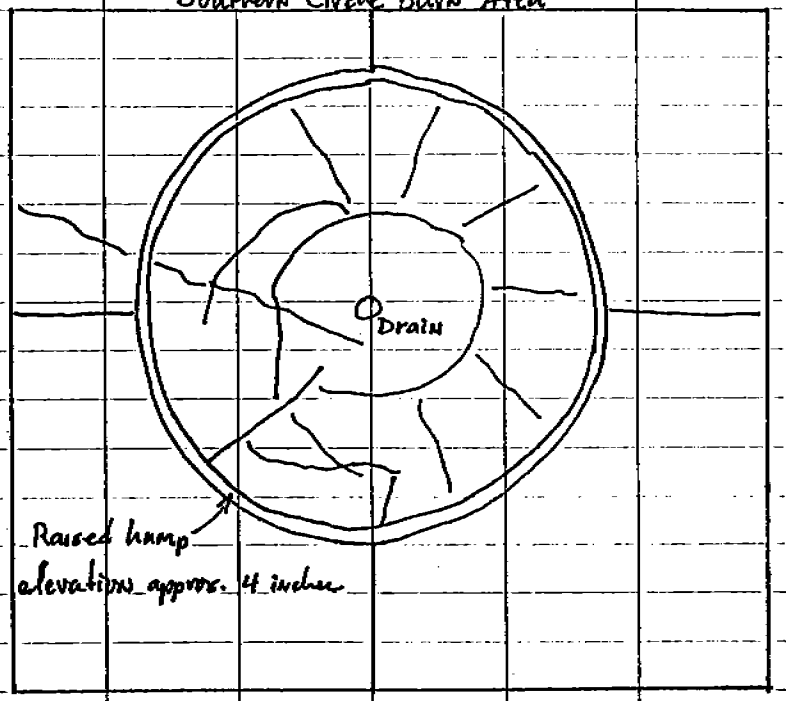
All black lines represent joints or cracks except interior circle used to show location of the bump or hump formed to retain the fuels to be burned.

Larry W Smith 6/27/96

(91)

6/27/96

Southern Circle Burn Area



Notes from previous page apply. Note staining was apparent.

6/27/96 Larry W. Smith

(92)

7/10/96 Final Help Sampling @ FTC

7:20 Arrive @ trailer - Objective: collect composite (SS/SB) surface and subsurface soil samples from the bio-remediated area at the south end of the detention basin. Personnel: Mike Jaynes, Brad Gardner, Larry Smith of ABB-ES; Jeff Bush of VOC Analytical, to collect sample splits for RHS.

7:45 Set out pin flags, three rows of five, set out sampling gear - decon'ed the augers, spoons, and bowls, bagged ice, set up sample sets.

8:30 Arrived @ the FTC detention pond area (see Mapp next page (93) set out pin flags as shown on Map, collected sample of Set 3, Set 2, then Set 1 corresponding sample locations are MPT-14-SS/SB26 PS LWS 7/10/96, MPT-14-SS/SB27 PS LWS 7/10/96, and MPT 14-SS/SB28. Each sample was a composite of the five shown sample set locations. Diagram Next Pg.

9:45 Cheryl Mitchell arrives onsite as final sampling is completed.

10:00 Departed site.

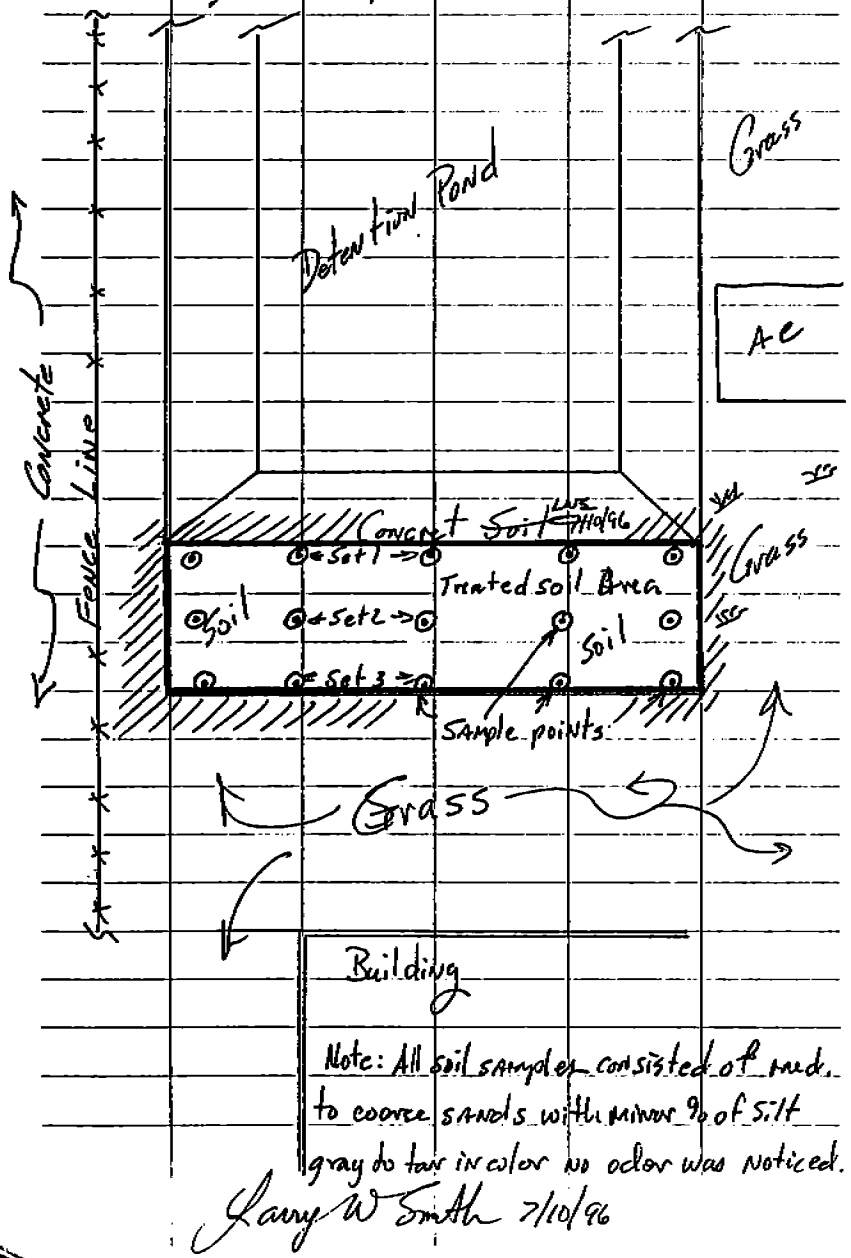
P.S. Note Theodore Boyd also arrived onsite to observe sample collections and splits @ approximately 8:50.

Larry W Smith 7/10/96

(93)

7/10/96 Sunny 10mph Breeze ≈ 88°F

Diagram of Sample Collection Points FTC



Note: All soil samples consisted of med. to coarse sands with minor % of silt gray to tan in color no odor was noticed.

Larry W Smith 7/10/96

(94)

8/13/96 Partly cloudy, hot ≈ 90°F

OBJECTIVE: OBTAIN WATER LEVEL MEASUREMENTS FROM WELLS WITHIN FTC AREA (SEE MAP)

PERSONNEL: MIKE JAYNES REG-ES

LARRY SMITH REG-ES

TIME	M.W. ID	DTW (FT.)	DTP (FT.)	NOTES (NAPL)
1105	MAT-14-MW09S	3.86	-	MW (0.0)
1110	MAT-14-MW11S	3.99	-	MW (0.0)
1115	MAT-14-MW07S	3.73	-	MW
1120	MAT-14-MW03S	4.10	-	OK
1125	MAT-14-MW13S	3.43	-	"
1130	MAT-14-MW14S	4.38	-	"
1133	MAT-14-MW08S	4.33	-	"
1138	MAT-14-MW10S	3.17	-	NEW CAP NEEDED
1145	NO PRODUCT DETECTED DURING EVENT. ORDER TO SOIL SCREENING + SAMPLING (SEE BOOKS #21 - #24).			

Michael O. Jaynes

8/13/96

APPENDIX F

RESPONSE TO REGULATORY COMMENTS

1.0 INTRODUCTION

As part of the Navy Environmental Leadership Program (NELP), a technology demonstration for bioremediation of petroleum-contaminated soil and concrete surfaces was performed at Solid Waste Management Unit (SWMU) 14, the Mercury/Oil Waste Spill Area.

Through NELP, the Navy proposed to demonstrate *in situ* bioremediation of petroleum-related constituents from concrete surfaces and soil at and immediately adjacent to the SWMU 14 detention pond. The technology demonstration was conducted by RHS Technical Services, Inc. ABB Environmental Services, Inc. (ABB-ES), observed the technology demonstration and collected baseline and performance evaluation samples to assess the effectiveness of the technology demonstration.

The purpose of this document is to respond to comments by the Florida Department of Environmental Protection (FDEP) concerning the draft report (June 1997) entitled *NELP Program Technology Evaluation Report for SWMU 14, U.S. Naval Station, Mayport, Florida* (ABB-ES, 1997a). The U.S. Environmental Protection Agency declined to comment on the report.

The following correspondence was received from FDEP:

- October 2, 1997, Correspondence from James H. Cason, P.G., Remedial Project Manager, FDEP, to Mr. David Driggers, Department of the Navy, Southern Division Naval Facilities Engineering Command, Subject: Draft Technology Evaluation Report: Naval Environmental Leadership Program Technology Evaluation Report for SWMU 14.

The following chapter provides point-by-point responses to FDEP's comments.

2.0 RESPONSE TO FDEP COMMENTS

2.1 Comment 1. **The technology demonstration occurred during the colder winter months; as such, I am unsure as to the value of any conclusions regarding the efficacy of the technology type. For this reason, I recommend that the Navy consider conducting any/all bioremediation demonstration projects only in the warmer months of the year. It appears that the demonstration did not adequately establish that the bioremediation of the concrete surface was responsible for the observed effects at SWMU 14.**

Comment acknowledged.

2.2 Comment 2. **One of the underlying reasons for the consideration of this site as a NELP project was due to the fact that the storm water runoff from the detention pond often failed criteria for petroleum constituents prior to discharge into the St. Johns River. In the conclusions, ABB noted little difference in the surface water baseline and performance evaluation samples from this area. In this respect the technology did not appear to yield beneficial results. This technology should therefore not be utilized for remediation of petroleum-contaminated concrete surfaces and certainly not for those instances where the petroleum has penetrated into the material.**

Comment acknowledged. It should be noted that free-phase hydrocarbons were observed to emanate between construction joints in the concrete pads prior to and after the demonstration. The free-phase hydrocarbons may have contributed to the concentrations of petroleum-related chemicals detected in the surface water samples.

2.3 Comment 3. **The technology may have had a beneficial effect on the petroleum -contaminated soil; however, an adequate evaluation which accounted for the effects of rototilling was not available. Future projects of this nature should include this aspect.**

Baseline soil samples were collected before and after the rototilling occurred. However, the variations in concentrations observed in the soil samples may be related to the rototilling, poor mixing of the soil samples, and/or the precision of the analytical method. It is likely that the rototilling of the soil provided oxygen required for the bioremediation to occur.

2.4 Comment 4. **How does the Navy intend to utilize the date from this demonstration in the evaluation of the present status of these portions of SWMU 14.**

Petroleum-impacted soil at the southern end of the detention pond appears to have been adequately treated during the technology demonstration to concentrations less than the human health risk-based soil cleanup target levels. The human health-based target treatment levels were promulgated under Florida Administrative Code 62-772 by the State of Florida in September 1997.

The petroleum-related constituents were not compared to ecological screening criteria. However, this is currently not a concern under the assumption that ecological receptors will not utilize the site because of the industrial setting (i.e., firefighting training). Should future use of the site change from

industrial, the ecological criteria may need to be assessed. It should be noted that it is likely that bioremediation will continue to naturally occur and that the concentration of petroleum-related chemicals will likely reduce over time.

Because the detention pond was in use at the time the Resource Conservation and Recovery Act Facility Investigations were being conducted, soil and groundwater directly beneath the detention pond were not evaluated, which was considered a data gap (ABB-ES, 1996). Additional soil and groundwater samples were collected since the NELP technology demonstration was conducted at SWMU 14 and reported in the Interim Measures (IM) Performance Specifications report for SWMU 14 (ABB-ES, 1997b).

Remediation of the soil beneath the detention pond was not recommended in the IM Performance Specifications report because land use at the site is currently industrial, the volatile and semivolatile organic compounds were detected in soil samples at concentrations less than the FDEP soil cleanup criteria (Tonner-Navarro and Roberts, 1997), and the existing concrete surface is an engineering control that prevents exposure to the chemicals (ABB-ES, 1997b). The soil beneath the detention pond should be reassessed if the detention pond (engineering control) is removed.

Natural attenuation was recommended as the interim measure for petroleum-impacted groundwater beneath the site (ABB-ES, 1997b). Monitoring of the natural attenuation should be conducted to document the success of the remedial measure, and to assess whether or not other remedial options should be considered.

The Navy is planning to make improvements to the former firefighting training areas and detention pond including cleaning the stormwater drain system, slip lining the drain pipe, resealing construction joints, and sealing the concrete surfaces of the training areas and detention pond with an epoxy (KJB Architects, 1997).

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