Final
Site Specific Work Plan
Phase I RCRA Facility Investigation
Atlantic Fleet Weapons Training Facility
Vieques Island, Puerto Rico

Prepared for

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command

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Prepared by

CH2MHILL

Tampa, Florida

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Contents

List of Appendices

List of Figures

List of Tables

List of Exhibits

List of Acronyms

AFWTF	Atlantic Fleet Weapons Training Facility
AOC	Area of Concern
ASTM	American Society for Testing and Materials
BLS	Below Land Surface
CLP	Contract Laboratory Procedure
COC	Chain-of-Custody
CTO	Contract Task Order
DQE	Data quality evaluation
DQO	Data quality objectives
EMA	Eastern Maneuver Area
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
GIS	Geographic Information System
GPS	Global Positioning System
HASP	Health and Safety Plan
IAS	Initial Assessment Study
ID	Identification
IDWMP	Investigation-Derived Waste Management Plan
JIG	Joint Interest Group
LANTDIV	Atlantic Division
LC	Low Concentration
LCSs	Laboratory confirmation samples
MDL	Method detection limit
MS/MSD	Matrix spike/matrix spike duplicate
NASD	Naval Ammunition Support Detachment
Navy	U.S. Navy
NSRR	Naval Station Roosevelt Roads
OP	Observation Post
OVA	Organic Vapor Analyzer
PAOC	Potential Area of Concern
PARCCs	Precision, accuracy, representativeness, comparability, and completeness
PI	Photo-Identified
PREQB	Puerto Rico Environmental Quality Board
QAPP	Quality Assurance Project Plan
RBC	Risk based criterion
RCRA	Resource Conservation and Recovery Act

RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RL	Reporting limit
SAP	Sampling and Analysis Plan
SOPs	Standard Operating Procedures
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TCLP	Toxicity characteristic leaching procedure
TM	Technical Memorandum
UST	Underground storage tank
VOC	Volatile Organic Compound

SECTION 1

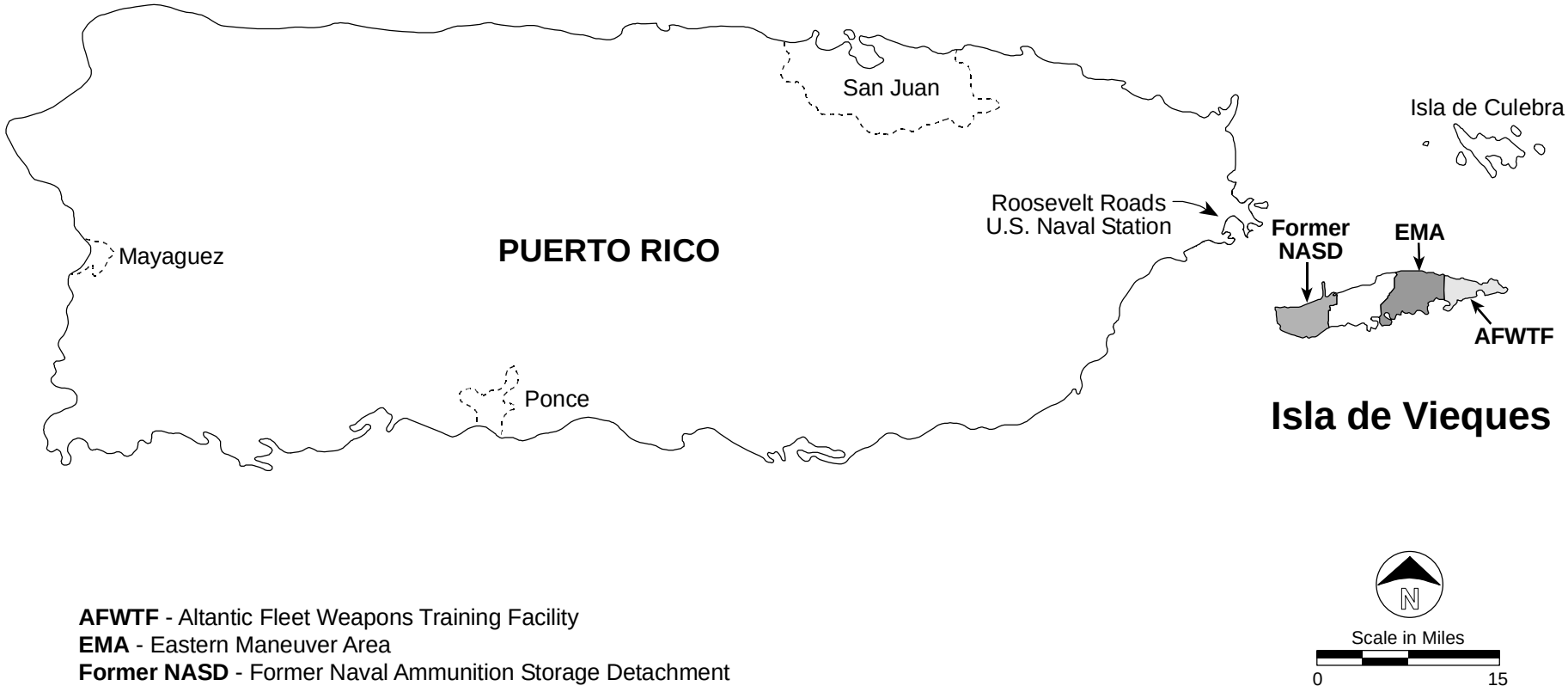
Introduction

This Site-Specific Work Plan for the Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was prepared for the U. S. Navy (Navy) Atlantic Fleet Weapons Training Facility (AFWTF) on Vieques Island, Puerto Rico. It was prepared in accordance with Consent Order RCRA-02-99-7301 entered into agreement between the U.S. Environmental Protection Agency (EPA) and the Navy on January 20, 2000, and in response to requirements presented under Contract Task Order (CTO)-031 between the Navy and CH2M HILL. This Work Plan presents the work proposed for the Phase I RFI to be completed at nine Solid Waste Management Units (SWMUs) and three Areas of Concern (AOCs) at the AFWTF located on the eastern end of Vieques Island. Additionally, 12 Potential Areas of Concern (PAOCs) and 23 photo-identified (PI) areas will be investigated as part of the Phase I RFI to determine whether release of hazardous materials has occurred at each site. The nine SWMUs and three AOCs are located on the AFWTF and in the Eastern Maneuver Area (EMA), which is adjacent to and contiguous with the AFWTF. In addition, some of the SWMUs and AOCs are located at Camp Garcia, which is located within the EMA. Figure 1-1 shows the location of Vieques Island. Figure 1-2 shows the location of the AFWTF, EMA, and Camp Garcia on Vieques Island.

A background study for metals is proposed for the AFWTF to establish the concentrations of naturally occurring metals in soil and groundwater. Laboratory analytical results from this effort will establish background criteria for comparison to normal environmental sample data. A work plan for the background study will be developed and submitted as a separate document from this Site-Specific Work Plan, but will be referenced in relation to comparison studies for sampling and analysis rationale at particular SWMU and AOC sites.

Previous investigations of the sites consist of an Initial Assessment Study (IAS) (Greenleaf/Telesca, 1984), a RCRA Facility Assessment (RFA) completed by A.T. Kearney, Inc., on October 13, 1988, and an updated RFA completed by the Puerto Rico Environmental Quality Board (PREQB) on September 27, 1995, identifying 11 SWMUs and eight AOCs. The designations of AOCs and SWMUs have since been updated to include 12 SWMUs and three AOCs. Of these designations, nine SWMUs and three AOCs were included in the EPA Consent Order for the AFWTF investigation, as follows:

- SWMU 1 – Camp Garcia Landfill (Camp Garcia)
- SWMU 2 – Fuels Off-Loading Site (Camp Garcia)
- SWMU 4 – Waste Areas of Building 303 (Camp Garcia)
- SWMU 5 – Spent Battery Accumulation Area (Observation Post (OP)-1, Inner Range, AFWTF)
- SWMU 6 – Waste Oil and Paint Accumulation Area (Seabees Area, Camp Garcia)
- SWMU 7 – Waste Oil Accumulation Area (outside Building 303 at Camp Garcia)



AFWTF - Altantic Fleet Weapons Training Facility
EMA - Eastern Maneuver Area
Former NASD - Former Naval Ammunition Storage Detachment

Figure 1-1
SITE LOCATION MAP
Vieques Island, Puerto Rico

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Figure 1-2
SITE LOCATION MAP
Atlantic Fleet Weapons Training Facility, Vieques Island

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- SWMU 8 – Waste Oil Accumulation Area (OP-1, Inner Range, AFWTF)
- SWMU 10 – Sewage Treatment Lagoons (Camp Garcia)
- SWMU 12 – Solid Waste Collection Unit Area (OP-1, Inner Range, AFWTF -formerly AOC B)
- AOC A – Diesel Fuel Fill Pipe Area (OP-1, Inner Range, AFWTF)
- AOC F – Rock Quarry (Camp Garcia)
- AOC G – Pump Station and Chlorinating Building at Sewage Lagoons (Camp Garcia)

The remaining three SWMUs (SWMUs 3, 9, and 11) not included in the Phase I RFI are located in the active military range area and are excluded from any corrective action requirements at this time under the terms and conditions of EPA Consent Order Docket No. RCRA-02-99-7301.

SECTION 2

Initial Evaluation and Sampling Rationale

This section presents a site summary, previous investigation results (if any), and sampling rationale for the sites (nine SWMUs and three AOCs) included in the Phase I RFI.

Previous studies performed in these areas include an RFA completed by A.T. Kearney, Inc., on October 13, 1988, an updated RFA completed by PREQB on September 27, 1995, and an initial field sampling investigation at five of the sites located at Camp Garcia (SWMU 4, SWMU 6, SWMU 7, SWMU 10, and AOC F) performed by CH2M HILL in June 2000. The purpose of the initial field sampling investigation of the five Camp Garcia sites was to evaluate potential contamination at the sites because they were planned for use by Naval Ammunition Support Detachment (NASD) activities that were in the process of being relocated from the western portion of Vieques to Camp Garcia. No previous investigations at the seven other sites have included environmental sampling.

In addition to these previous studies, CH2M HILL visually inspected the sites in February and June 2000 to assess the current condition of the sites.

2.1 SWMU 1 – Camp Garcia Landfill

2.1.1 Site Summary

According to the RFA, the Camp Garcia Landfill is located in the EMA approximately 4,000 feet north-northwest of Blue Beach, approximately 3,000 feet east of Camp Garcia (PREQB, 1995).

According to the IAS, the landfill was in operation from approximately 1954 to 1978, when it became inactive. When the landfill was operational, it was used for the disposal of waste paper, corrugated containers, cans and food packaging material, rags, scrap metal, and yard waste. Normal trash (food waste, waste paper, etc.) from both Camp Garcia and the Inner Range of the AFWTF was also disposed at the landfill. The landfill was not lined. It serviced approximately 150 individuals, depending on military exercises. One 5-ton dump truck was used every day, 5 days per week, to dispose waste at this site. According to PREQB (1995), approximately 1,800 to 3,120 tons of waste was distributed over the 100 to 200 acre area. An aerial photo analysis of the landfill, however, indicated that the fill area extended over an area of approximately 55 acres (ERI, 2000). When operation of the landfill ceased in 1978, a cap consisting of compacted native soils was installed. Today, the landfill is vegetated with dense grasses. A gravel road was constructed down its center in the mid-1980s. During the 1995 RFA (PREQB, 1995), no signs of erosion or stresses on vegetation were observed in the landfill area, and no documentation was found regarding releases of hazardous constituents from the landfill.

During the February 2000 CH2M HILL site visit, no signs of previous landfill activities were visible at the site. The site was heavily vegetated (see Figure 2-1).

SWMU-1: Camp Garcia Landfill, Looking West

SWMU-1: Camp Garcia Landfill, Looking East

Figure 2-1
SWMU 01 CAMP GARCIA LANDFILL
Vieques Island, Puerto Rico

2.1.2 Previous Investigation Results

No previous environmental sampling has been performed at the landfill. The landfill cells and trenches were determined based on ground scarring and cleared vegetation evident on historical aerial photographs reviews conducted by Environmental Research, Inc (ERI, 2000). Based on the aerial photographic survey, apparent landfill cells and trenches were identified in the 1959, 1962, and 1964 aerial photographs. Figure 2-2 has been color coded to present the limits of the apparent landfill cells and trenches evident in the above mentioned aerial photographs.

The approximate landfill boundary line shown on Figure 2-2 was drawn only to provide a preliminary estimate of the extent for SWMU-1, which encompassed the evident landfill cells and trenches. This line has been relabeled as SWMU-1, not approximate landfill boundary. The landfill boundary will be determined after interpreting the results of the geophysical survey.

2.1.3 Sampling Rationale

Based on the review of the limited information available for the site, CH2M HILL will conduct a geophysical survey over the former landfill area, collect surface soil samples based on results of the geophysical survey, and install five groundwater monitoring wells. The geophysical survey will use magnetic and electromagnetic methods to map the aerial extent of former disposal cells and trenches. Geophysical transects will be run on approximately 100-foot line spacings in both east-west and north-south directions over the former landfill areas mapped from aerial photographs. Data will be collected digitally and location will be maintained using a Global Positioning System (GPS).

The geophysical survey transects will be located based on the locations (latitude and longitude) of the former landfill cells and trenches determined through interpretation of aerial photographs of the site (ERI, 2000). Surface soil samples will be collected at those locations where the highest magnetic on conductivity anomalies occur. The purpose of the samples are to assess potential risk to human health from direct contact and, therefore, will be collected to a depth of 0-6”.

The five groundwater monitoring wells will be installed based on the results of the geophysical survey at the locations shown in Figure 2-2. One well will be installed hydraulically up-gradient and four wells will be installed downgradient from former landfill cells. The ERI aerial photograph interpretation results will be used to site the monitoring wells. If subsequent groundwater flow maps indicate that the wells are not installed downgradient from the former landfill cells, additional wells may be required to adequately monitor the site. All wells will be screened in the shallow surficial aquifer. The monitoring wells will be installed at a depth of less than 10 feet below the first encountered groundwater using a 10-foot screen in order to allow detection of potential floating free phase product, if any, at the groundwater/vadose zone interface. If the data from these wells provide an indication that a DNAPL is present, then additional deeper wells will be installed during a Phase II RFI.

The Navy will implement institutional controls to preclude any intrusive activities in the landfill area. The types of controls will be based on the results of the risk assessment that will be completed for the RFI. The institutional controls will limit subsurface excavation through the fill material.

Figure 2-2
SWMU 01 PROPOSED SAMPLE LOCATIONS
CAMP GARCIA LANDFILL
Vieques Island, Puerto Rico

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Groundwater samples will be analyzed for Appendix IX constituents and explosives. Although historical information for SWMU 1 does not indicate the potential presence of explosives or related residues at this site, explosives are included in the sample analyses because of the use of explosives in the range areas of the AFWTF, and the public concern regarding explosives and related residues at the AFWTF.

2.2 SWMU 2 – Fuels Off-Loading Site (Camp Garcia)

2.2.1 Site Summary

Site SWMU02 is located at Camp Garcia, and is the former location of four aboveground fuel storage tanks (ASTs). Two 20,000-gallon tanks and two 30,000-gallon tanks which were used to store diesel fuel, leaded gasoline, AVGAS, and JP-5 fuel. These tanks became operational in 1953 and were removed between 1978 and 1979. Tank refueling occurred every 3 months, and involved pumping fuel from a barge through an 8-inch submarine line to each of these tanks. Prior to initiating the refueling, seawater had to be flushed from the submarine line, during which approximately 1,000 gallons of fuel was reportedly discharged into the ocean and onto the soil along the shoreline in the vicinity of the concrete loading ramp at the shoreline. According to the IAS, this refueling process took place for approximately 25 years; therefore, approximately 100,000 gallons of fuel was potentially discharged during this period of time.

The sludge that accumulated in the bottom of the tanks was periodically removed by a private contractor and disposed of on the main island of Puerto Rico.

The site is currently overgrown with grass and small shrubs, with only minimal signs of previous activity consisting of the concrete loading ramp and the steel pipeline supports next to the loading ramp. During the 1995 RFA (PREQB, 1995), no signs of previous releases of fuel to either the soil at the site or the ocean along the shorelines were apparent, and no release controls were identified. These same conditions were observed during the CH2M HILL February 2000 site visit.

2.2.2 Previous Investigation Results

No previous environmental sampling investigations have been conducted at this site.

2.2.3 Sampling Rationale

Based on the review of the limited information available for the site, CH2M HILL will collect 12 surface soil (0 to 6 inches) samples and install two soil borings at locations illustrated on Figures 2-3 and 2-4. Eight surface soil samples will be collected and one soil boring will be installed from the area of the four fuel tank pads (two surface soil samples from each pad area) as shown in Figure 2-3. The ERI aerial photograph interpretation and existing concrete pads will be used to identify the former tank locations and soil sampling locations. Four surface soil samples will be collected and one soil boring will be installed near the two fuel pipe supports in the concrete ramp area (two surface soil samples from each pipe support area) as shown in Figure 2-4. The soil borings will be installed to 15 feet below land surface (bls) and soil samples will be screened continuously with an organic vapor analyzer (OVA). Three samples with the highest OVA values will be submitted for laboratory volatile organic compound (VOC) and semi-volatile organic compound (SVOC) analysis. Surface soil samples will be analyzed for

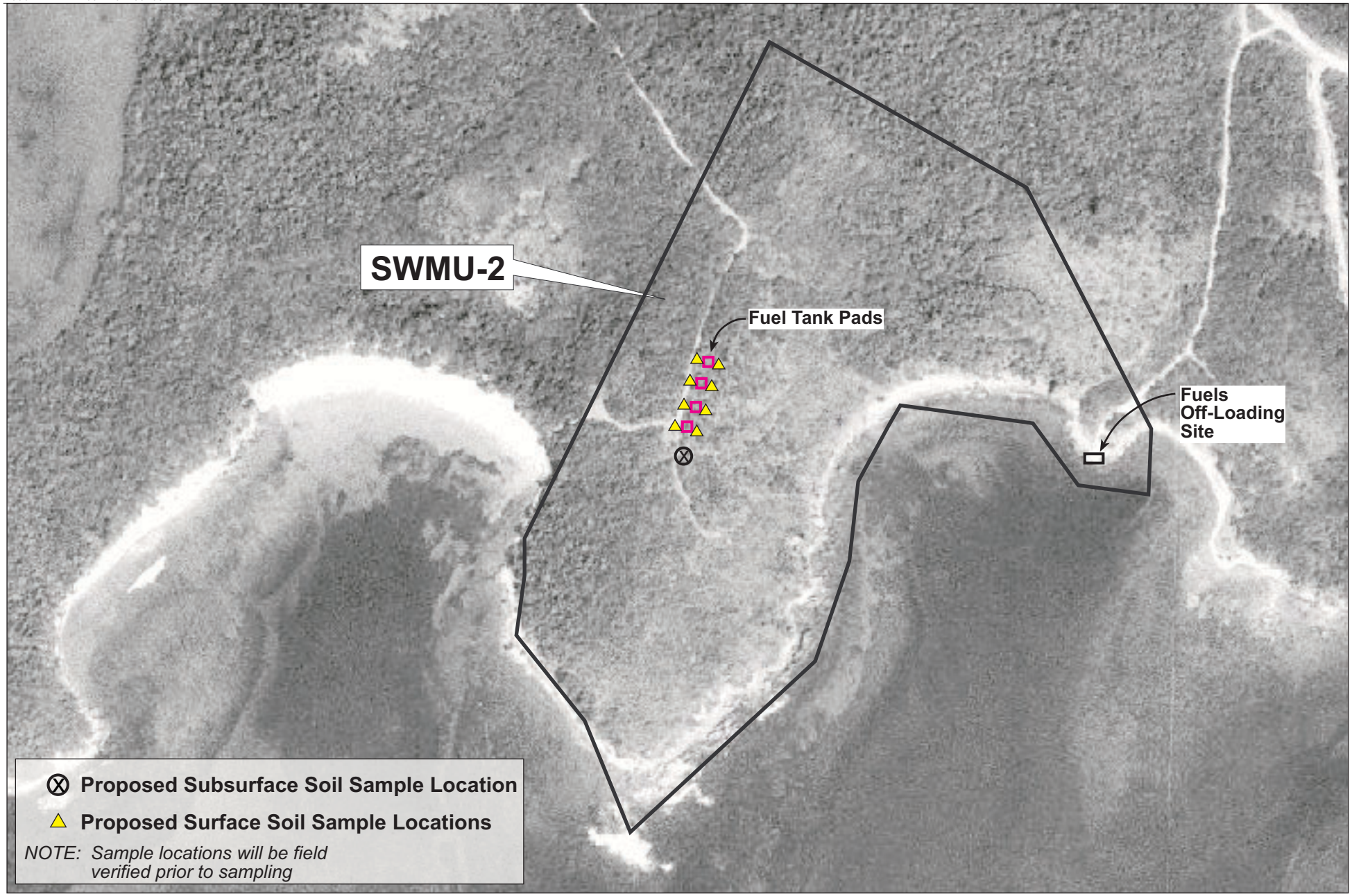

Figure 2-3
SWMU 02 PROPOSED SAMPLE LOCATIONS
FUEL TANK PADS (CAMP GARCIA)
Vieques Island, Puerto Rico

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△ Proposed Surface Soil Sample Location

⊗ Proposed Subsurface Soil Sample Location

Figure 2-4
SWMU 02 PROPOSED SAMPLE LOCATIONS
FUELS OFF-LOADING SITE (CAMP GARCIA)
Vieques Island, Puerto Rico

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Appendix IX constituents and explosives. Although historical information for SWMU 2 does not indicate the potential presence of explosives or related residues at this site, explosives are included in the sample analyses because of the use of explosives in the range areas of the AFWTF, the potential for airborne migration of explosives residues via fugitive dust emissions, and the public concern of explosives and related residues at the AFWTF.

2.3 SWMU 4 – Waste Areas of Building 303 (Camp Garcia)

2.3.1 Site Summary

The SWMU 4 waste areas located in Building 303 at Camp Garcia include a spent battery accumulation area, a catch basin for hydraulic oil, a cleaning/degreasing basin, and a storage area for waste rags, absorbent material, and grease. Per the classifications in the 1988 and 1995 RFAs, the oil catch basin, cleaning/degreasing basin, and storage area for rags, absorbent material, and grease were designated as AOCs C, D, and E, respectively. The areas have since been determined to be SWMUs. Because they are all located inside or adjacent to Building 303 at Camp Garcia, they were all included as one SWMU (SWMU 4). Locations of AOCs C, D, and E at SWMU 4 are illustrated in Figure 2-5.

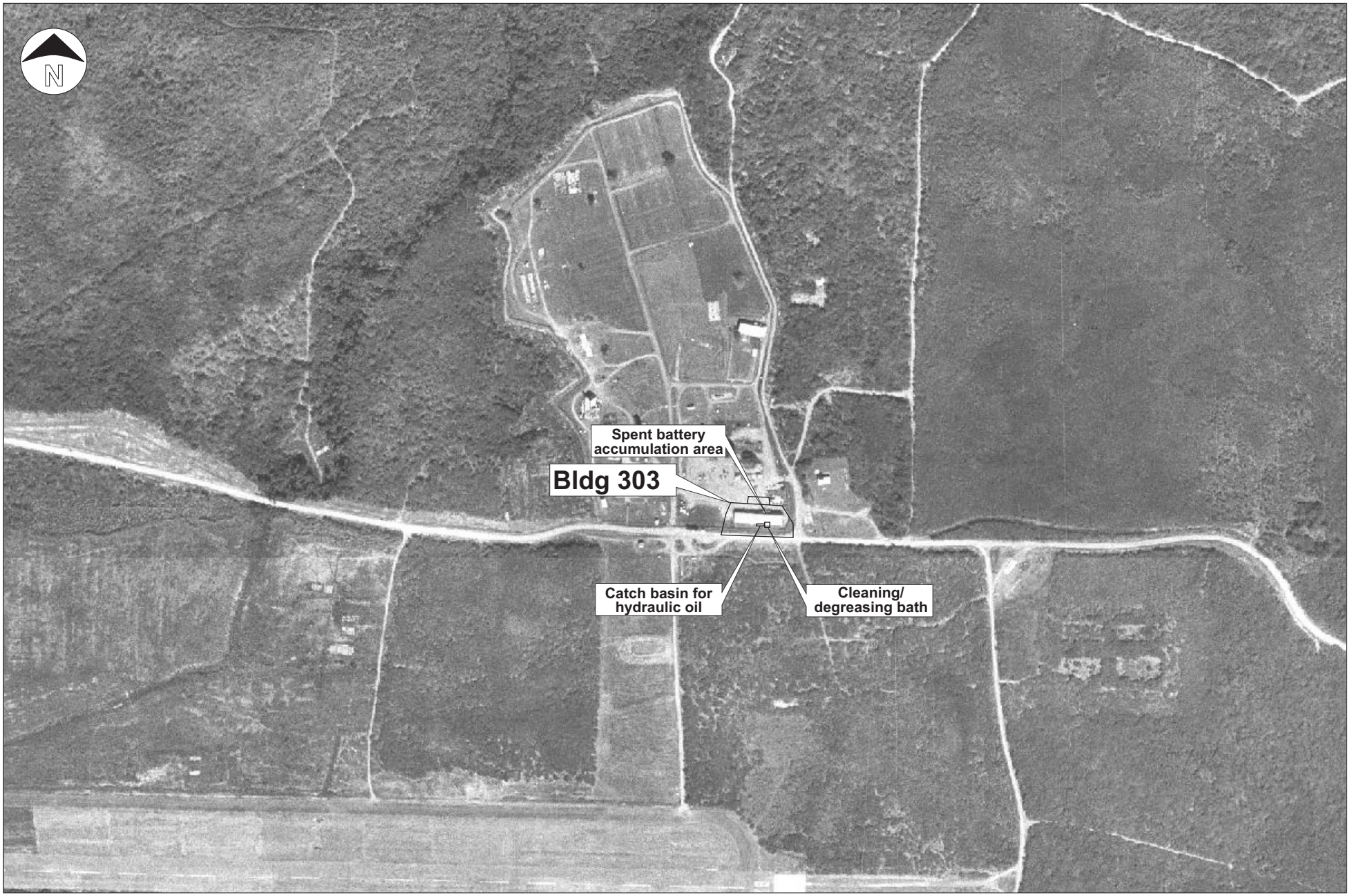
The battery accumulation area consists of a small building adjacent to Building 303 designated as "Corrosive Materials Storage." In the past, it contained spent batteries and battery acid, which were disposed of offsite at Naval Station Roosevelt Roads (NSRR). According to the 1995 RFA (PREQB, 1995), this building was established as a storage area for batteries ever since it was erected in the 1960s. During the 1995 RFA, no batteries or acid were present at this location, nor were there visible signs of acid leakage on the concrete floor from previous storage of these materials. These same conditions were observed during the CH2M HILL February 2000 site visit.

The catch basin for hydraulic oil (formerly AOC C) is approximately 5 feet long and 6 inches wide, and is located inside Building 303. It was designed to catch spills and leaks of hydraulic oil from vehicles during maintenance operations. During the 1995 RFA (PREQB, 1995), no signs of leakage were noted on the cement floor under the basin. These same conditions were observed during the CH2M HILL February 2000 site visit, although this area could be viewed only through a locked chain link fence at the time of the visit because the building was locked.

In the past, the storage area for rags, absorbent material, and grease (formerly AOC E) contained barrels of waste grease, rags, and absorbent materials generated during cleanup of spills within Building 303. This area consists of a small building located adjacent to Building 303 and is designated as "Flammable Storage." According to the 1988 and 1995 RFAs, spent batteries were also once stored in this area. During the 1995 RFA (PREQB, 1995), no signs of spills were noted. This same condition was observed during the CH2M HILL February 2000 site visit.

2.3.2 Previous Investigation Results

Because of the ongoing transfer of NASD activities to Camp Garcia, CH2M HILL conducted a surface soil sampling investigation at SWMU 4 in June 2000. Twelve surface soil samples were collected from a depth of 0 to 6 inches in the areas of the Corrosive Materials Storage



Base imagery is comprised of 1994 1-meter USGS Digital Ortho-imagery quarter quadrangles (DOQQs).

Scale in Feet

0 1000 2000

Figure 2-5
SWMU-04 AERIAL PHOTO
Atlantic Fleet Weapons Training Facility, Vieques Island

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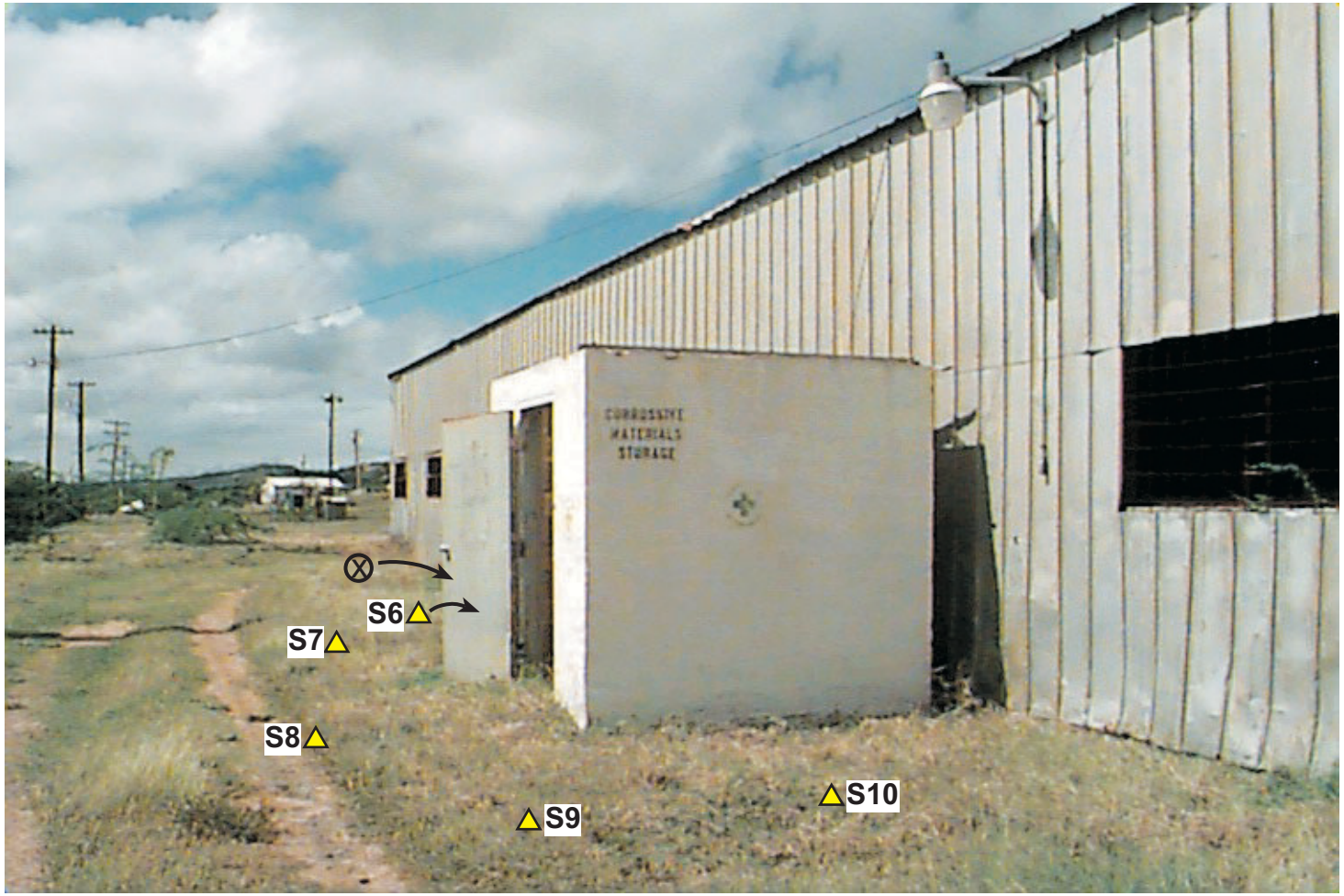

△ Sample Location
⊗ Proposed Soil Boring

NOTE: 2 Additional Soil Samples: S11 and S12 located at the catch basin area outside Building 303

Figure 2-6
SWMU 04 PREVIOUS SAMPLE LOCATIONS
CORROSIVE MATERIALS STORAGE SHED
Vieques Island, Puerto Rico

△ Sample Location

Proposed soil boring to be installed if degreasing basin is found.

Figure 2-7
SWMU 04 PREVIOUS SAMPLE LOCATIONS
FLAMMABLE STORAGE SHED
Vieques Island, Puerto Rico

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Building (spent battery accumulation area), Flammable Materials Storage Building (area of rags, absorbent material, and grease - AOC E), and near Building 303 adjacent to the inner catch basin for hydraulic oil (AOC C). Figures 2-6 and 2-7 show the surface soil sample locations surrounding these areas at Building 303. As shown, five samples were collected around the Corrosive Materials Storage Building, five samples were collected around the Flammable Materials Storage Building, and two samples were collected outside of the catch basin area. The samples were analyzed for Appendix IX constituents and explosives. The surface soil sampling results indicated that only arsenic was detected above the residential risk-based criterion (RBC). The presence of arsenic in the soil is probably naturally occurring, which is expected given the volcanic origin of the soils on the island. Analytical results will be included in Phase I RFI Report along with the analytical results of the proposed background study. The results from both investigations will be used to determine whether additional investigations are warranted.

2.3.3 Sampling Rationale

As discussed in Section 1, a background study for metals is proposed for the AFWTF to determine the levels of naturally occurring metals in soil and groundwater. Further surface soil sampling at SWMU 4 will not be undertaken if the arsenic identified is determined to be naturally occurring. Risk-based screening results for the June 2000 sampling effort will be presented in the Phase I RFI Report.

During the time of sampling, inside access to Building 303 was not available. To sample for areas associated with the catch basin for hydraulic oil, one soil boring will be installed to a depth of 5 feet outside of Building 303 and adjacent to the hydraulic oil catch basin. Samples will be collected continuously (every 2 feet). Soil samples will be screened in the field with an OVA. One sample will be collected for analysis from the boring. The soil sample will be analyzed for VOCs and SVOCs. The sample with the highest OVA reading will be selected for analysis. If no vapors are detected with the OVA, the sample will be collected from a depth of 5 feet.

If the degreasing basin can be located, an additional soil boring will be installed to a depth of 15 feet at the degreasing basin. If the degreasing basin is located in the middle of Building 303, the boring will be installed through the concrete floor. Samples will be collected continuously (every 2 feet). Soil samples will be screened in the field with an organic vapor analyzer (OVA). Four samples will be collected from the boring for analysis. The soil samples will be analyzed for VOCs and SVOCs. The samples with the highest OVA readings will be selected for analysis. If no vapors are detected with the OVA, the samples will be collected at land surface (0-6inches) and every five feet for laboratory analysis (i.e., 5, 10, and 15 feet).

Building 303 will be inspected for potential floor drains and dry wells. If a dry well is found, a boring will be installed to a depth of 15 feet, using the same sampling procedure as described above. Samples will be collected continuously (every 2 feet). The soil samples will be analyzed for VOCs and SVOCs. The samples with the highest OVA readings will be selected for analysis. If no vapors are detected with the OVA, the samples will be collected at land surface (0 to 6 inches) and every 5 feet for laboratory analysis (i.e., 5, 10, and 15 feet).

2.4 SWMU 5 – Spent Battery Accumulation Area (Observation Post 1, Inner Range, AFWTF)

2.4.1 Site Summary

SWMU 5 is located in the vicinity of OP-1 at the Inner Range of the AFWTF. The area is similar to SWMU 4; however, the batteries and battery acid were stored outside on a gravel driveway. According to the 1995 RFA, acid from these batteries was typically emptied into plastic containers and shipped to NSRR.

Although the start up date for this SWMU is unknown, it remains active. During the 1995 RFA (PREQB, 1995), nine batteries were stored at this site on the gravel driveway. No signs of any spills or leaks from these batteries were apparent, and no release controls were identified at this SWMU (PREQB, 1995).

During the CH2M HILL February 2000 site visit, release controls (plastic storage trays) for battery storage were present, but no batteries were stored at the site. No signs of releases of battery acid were observed.

2.4.2 Previous Investigation Results

No previous environmental sampling investigations have been performed at SWMU 5.

2.4.3 Sampling Rationale

Based on the review of the limited information available for the site, CH2M HILL will collect four surface soil samples (0 to 6 inches) at the locations shown in Figure 2-8. Samples will be analyzed for Appendix IX constituents and explosives. Although historical information for SWMU 5 does not indicate the potential presence of explosives or related residues at this site, explosives are included in the sample analyses because of the use of explosives in the range areas of the AFWTF, the potential for airborne migration of explosives residues via fugitive dust emissions, and the public concern of explosives and related residues at the AFWTF.

△ Proposed Surface Soil Sample Location

Figure 2-8
SWMU 05 PROPOSED SAMPLE LOCATIONS
SPENT BATTERY ACCUMULATION AREA
(OBSERVATION POST 1, INNER RANGE, AFWTF)
Vieques Island, Puerto Rico

2.5 SWMU 6 – Waste Oil and Paint Accumulation Area (Seabees Area at Camp Garcia) and SWMU 7 - Waste Oil Accumulation Area (outside Building 303 at Camp Garcia)

2.5.1 Site Summary

During interviews with Navy employees in February 2000 and June 2000, it was confirmed that SWMU 6 and SWMU 7 are adjacent sites and will be investigated at the same time as one contiguous unit. The area encompassing these two sites currently consists of an open area, which contains a small covered chain-link cage and a concrete pad. Each SWMU is described below.

2.5.1.1 SWMU 6 Waste Oil and Paint Accumulation Area (Seabees Area at Camp Garcia)

According to the 1988 RFA, this area was used by the Seabees as a storage area for waste oil and paint. The waste oil at this location was containerized in 55-gallon drums, and the paint was housed in small containers. During the RFA, tires and two drums of lubricating oil were present at the site. The waste oil and tires were stored on a grassy area until they were shipped offsite to NSRR. The RFA states that this area became active in approximately 1978, and was still active in 1988. During the 1995 RFA (PREQB, 1995), signs of oil leakage onto the soil surface from the drums were visible, and no release controls were present at the site.

During the CH2M HILL February 2000 site visit, no drums or waste materials were present at the site.

2.5.1.2 SWMU 7 Waste Oil Accumulation Area (Outside Building 303 at Camp Garcia)

SWMU 7 is a waste oil accumulation area located outside Building 303 at Camp Garcia. It was used by the U.S. Marines 3 months per year during training exercises. During these 3 months, Marines conducted training exercises at the EMA, and used the waste oil accumulation area to store waste oil from the maintenance of their vehicles. During the 1988 RFA, one open-top 55-gallon drum, a 25-gallon trash can, and two drums cut in half were present in the waste oil accumulation area. It was reported that the soil in the waste oil accumulation area was typically stained with waste oil as a result of spillage and leakage after vehicle maintenance procedures. Once the Marines completed their training, the stained soil was reportedly mixed with sand, excavated, containerized in 55-gallon drums, and shipped to NSRR.

During the 1995 RFA, drums full of waste oil were present in the waste oil accumulation area, the soil in the area was stained with oil, and no release controls were present. During the CH2M HILL February 2000 site inspection, no drums of waste oil or other material were present in the area.

2.5.2 Previous Investigation Results

A surface soil sampling investigation was conducted in June 2000 because of the transfer of NASD activities to Camp Garcia. Ten surface soil samples were collected around the cage and concrete pad as shown in Figure 2-9. The surface soil sampling results indicated that

9. List any other deviations or variations from the Master HASP: None

10. Emergency Response (Check that all names and numbers are correct on page 47 of Master HASP and attach corrected page to this checklist)

11. Map to hospital (Highlight route to hospital from site and attach to this checklist)

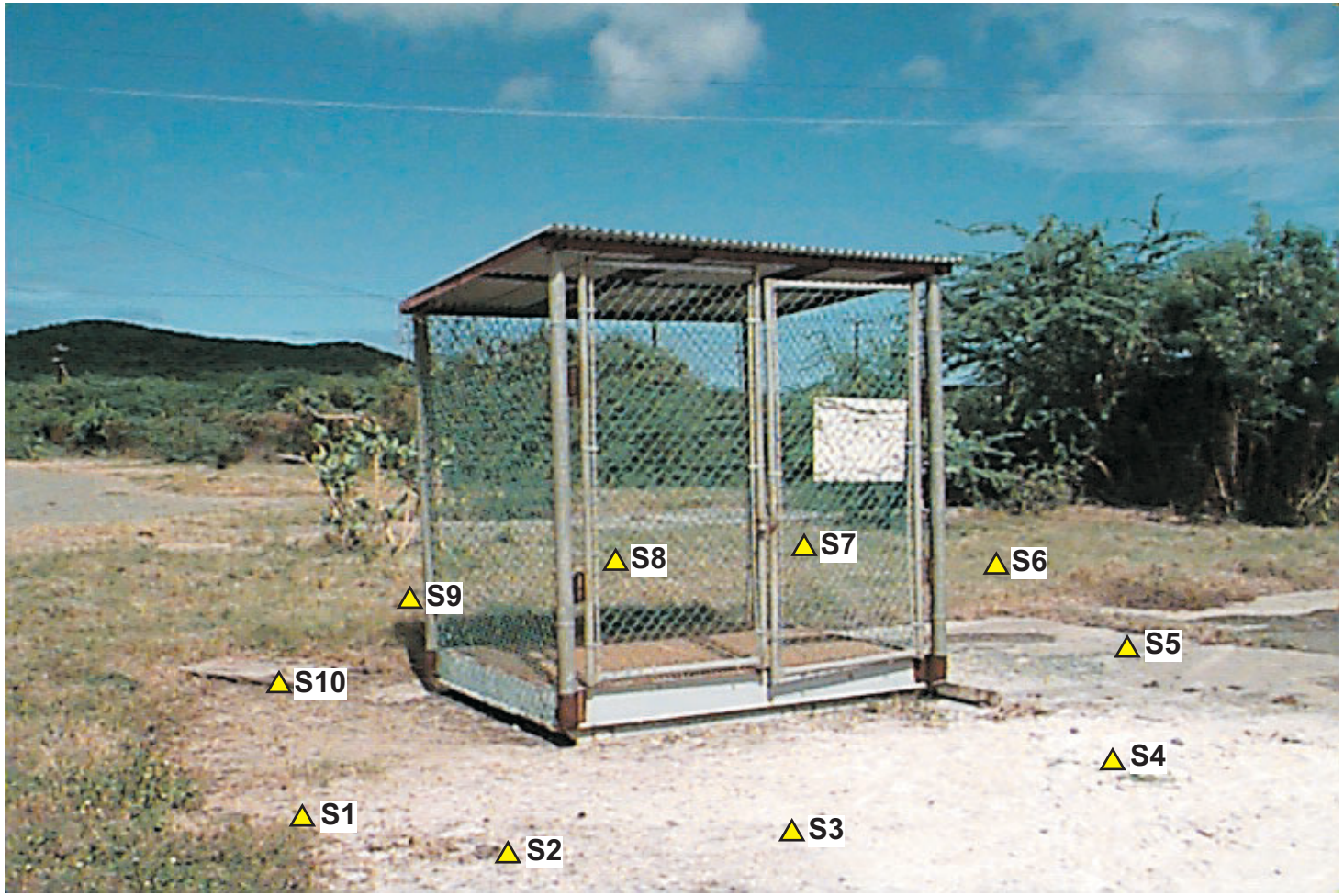
12. Emergency Contacts (Check that all names and numbers are correct on page 49 of Master HASP and attach corrected page to this checklist)

13. Approval. This prepared site-specific checklist must be approved by John Longo/NJO or Laura Johnson/NJO or their authorized representative

    Name _____Title: Health and Safety Manager Date: _____

    (Signature will be included in the Final HASP)

14. Employee Signoff. All CH2M HILL employees working at the site must sign the attached Employee Signoff for the checklist as well as for the Master HASP.



△ Sample Location

Figure 2-9
SWMU 06 PREVIOUS SAMPLE LOCATIONS
WASTE OIL AND PAINT ACCUMULATION AREA (SEABEES AREA AT CAMP GARCIA)
AND SWMU 07 WASTE OIL ACCUMULATION AREA
Vieques Island, Puerto Rico

arsenic, cadmium, and lead were detected above the RBCs. These results were provided in the August 1, 2000, Quarterly Report and will be presented in the Phase I RFI along with analytical results from the proposed Background Study.

2.5.3 Sampling Rationale

If arsenic, cadmium, and lead are determined to be naturally occurring in site soils based on results of the proposed background study, no additional sampling will be performed at SWMU 6 and SWMU 7. Risk-based screening results for the June 2000 sampling effort will be presented in the Phase I RFI Report along with the analytical results from the background study. The results from both investigations will be used to determine whether additional investigations are warranted at these SWMUs.

2.6 SWMU 8 – Waste Oil Accumulation Area (Observation Post 1, Inner Range, AFWTF)

2.6.1 Site Summary

SWMU 8 consists of a waste oil accumulation area, which is located outside the generator building at OP-1 on Cerro Matías of the AFWTF.

According to the 1988 RFA, the waste oil accumulation area contained drums of both waste lubricants and oils. The drums were stored on bare soil prior to being shipped offsite to NSRR. The accumulation area began operation in approximately 1978, and was still active in 1988. During the 1995 RFA, minor spills of lubricating oil onto the soil were present in the accumulation area, and no release controls were present (PREQB, 1995).

During the CH2M HILL February 2000 site inspection, no soil staining was evident in the accumulation area, and the drums were stored in plastic secondary containment trays for release control.

2.6.2 Previous Investigation Results

No previous environmental sampling investigations have been performed at SWMU 8.

2.6.3 Sampling Rationale

Based on the review of the limited information available for the site, CH2M HILL will collect five surface soil samples (0 to 6 inches) in the locations shown in Figure 2-10. Surface soil samples will be analyzed for Appendix IX constituents and explosives. Although historical information for SWMU 8 does not indicate the potential presence of explosives or related residues at this site, explosives are included in the sample analyses because of the use of explosives in the range areas of the AFWTF, and the public concern of explosives and related residues at the AFWTF.

△ Proposed Surface Soil Sample Location

Figure 2-10
SWMU-08 PROPOSED SAMPLE LOCATIONS
WASTE OIL ACCUMULATION
(OBSERVATION POST 1, INNER RANGE, AFWTF)
Vieques Island, Puerto Rico

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are set to bracket the water table for the purpose of evaluating any potential free phase product accumulation that may exist.

Four surface (0-6 inches) soil and subsurface soil sample locations will be located in each quadrant of each lagoon. The subsurface soil samples will be collected immediately below the liner to determine if the liner has remained intact. The depth of the subsurface soil sample will be dependent on the depth to liner and can vary from one location to the other. Upon abandonment, the soil borings will be capped at the liner depth with a cement grout in order to maintain liner integrity.

Sample locations and monitoring well locations are also shown in Figure 2-11. The groundwater and surface soil samples will be analyzed for Appendix IX constituents and explosives. Although historical information for SWMU 10 does not indicate the potential presence of explosives or related residues at this site, explosives are included in the sample analyses because of the use of explosives in the range areas of the AFWTF, and the public concern of explosives and related residues at the AFWTF.

Figure 2-11
SWMU 10 SAMPLE LOCATIONS
SEWAGE TREATMENT LAGOONS
Vieques Island, Puerto Rico

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2.8 SWMU 12 – Solid Waste Collection Unit Area (Observation Post 1, Inner Range, AFWTF)

2.8.1 Site Summary

This area was formerly referred to as AOC B, but in accordance with the EPA Administrative Order of Consent, this area was designated as a waste management unit identified as SWMU 12. The aerial extent of SWMU 12 is illustrated in Figure 2-12.

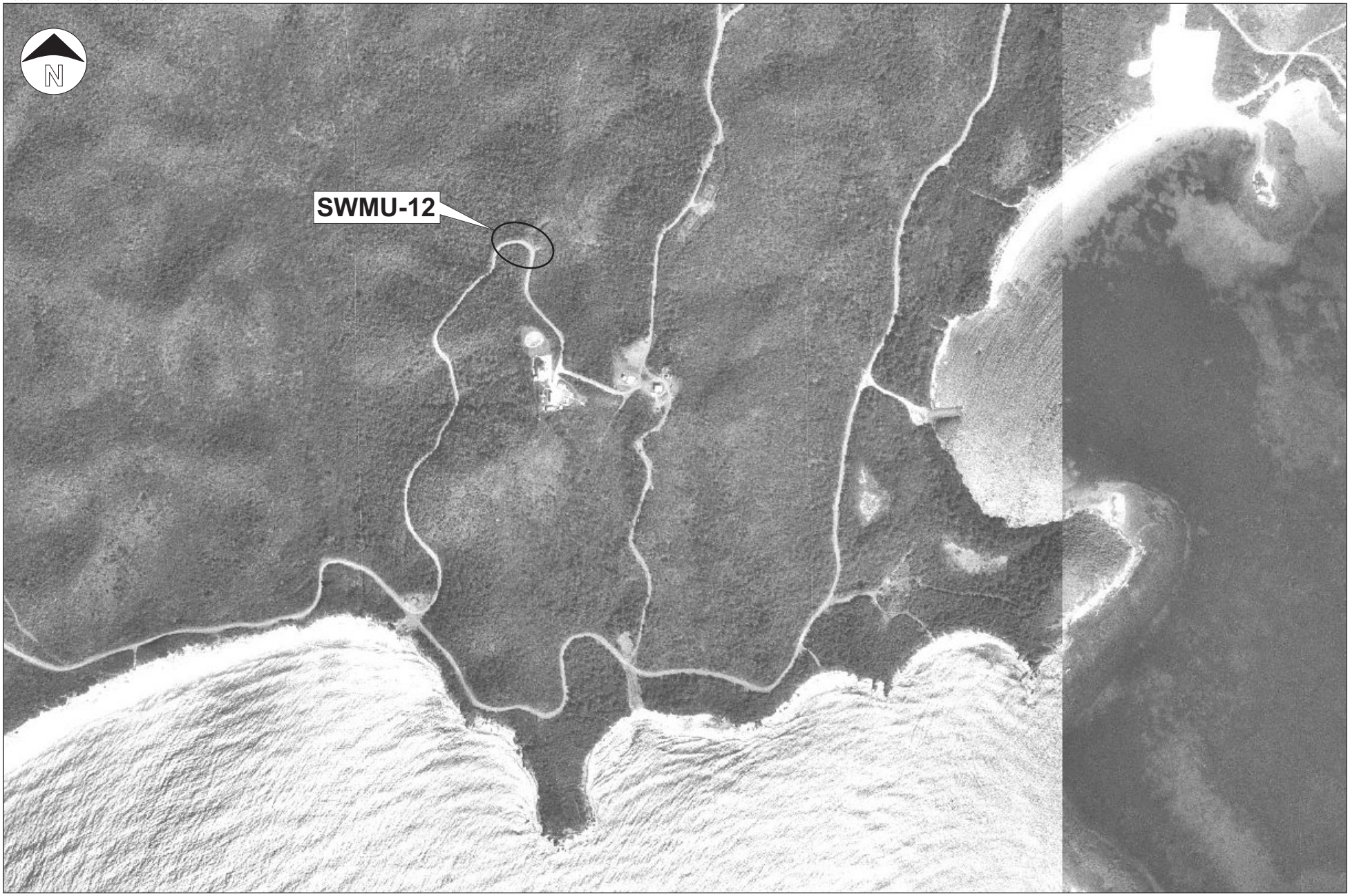
The solid waste unit collection area serves as a solid waste storage and transfer area, prior to pickup of the solid waste for disposal at the Vieques Island landfill. Containers used to store solid wastes collected at the site include wooden boxes, wooden trailers, and metal dumpsters and cans. During the 1995 RFA, only a wooden trailer was visible at this site (PREQB, 1995). Results of the recent visual inspection indicates that SWMU 12 currently consists of two trailers used for storage of domestic waste from OP-1 that is subsequently transported to the landfill at NSRR.

2.8.2 Previous Investigation Results

No previous environmental sampling investigations have been performed at SWMU 12.

2.8.3 Sampling Rationale

Based on the review of the information available for the site, CH2M HILL will collect five surface soil samples around the waste collection units as shown in Figure 2-13. Samples will be collected from a depth of 0 to 6 inches, and the results will be used to determine if a release of hazardous materials has occurred at the site. Soil samples will be analyzed for Appendix IX constituents and explosives. Although historical information for SWMU 12 does not indicate the potential presence of explosives or related residues at this site, explosives are included in the sample analyses because of the use of explosives in the range areas of the AFWTF, and the public concern of explosives and related residues at the AFWTF.



Base imagery is comprised of 1994 1-meter USGS Digital Ortho-imagery quarter quadrangles (DOQQs).

Scale in Feet

0 1000 2000

Figure 2-12
MAP ILLUSTRATING AERIAL EXTENT OF SWMU 12
SOLID WASTE COLLECTION UNIT AREA
Atlantic Fleet Weapons Training Facility, Vieques Island

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△ Proposed Surface Soil Sample Location

Figure 2-13
SWMU 12 PROPOSED SAMPLE LOCATIONS
SOLID WASTE COLLECTION UNIT AREA
(OBSERVATION POST 1, INNER RANGE, AFWTF)
Vieques Island, Puerto Rico

CH2MHILL

2.9 AOC A – Diesel Fuel Fill Pipe Area (Observation Post 1, Inner Range, AFWTF)

2.9.1 Site Summary

According to the 1988 RFA, this area contained the fill pipe for the underground storage tank (UST) located at the OP-1 in the Cerro Matías area of the AFWTF. The UST was located 25 feet southwest and downgradient of the fill pipe. An aerial map showing AOC A is provided as Figure 2-14.

The UST and the fill pipe were first put into service in approximately 1978. During the 1995 RFA, the soil surrounding the fill pipe was stained, apparently as a result of fuel spills that had occurred during tank refueling. The total impacted area was approximately 6 feet by 6 feet. No fuel releases from the UST were apparent, and no release controls were found at this site (PREQB, 1995).

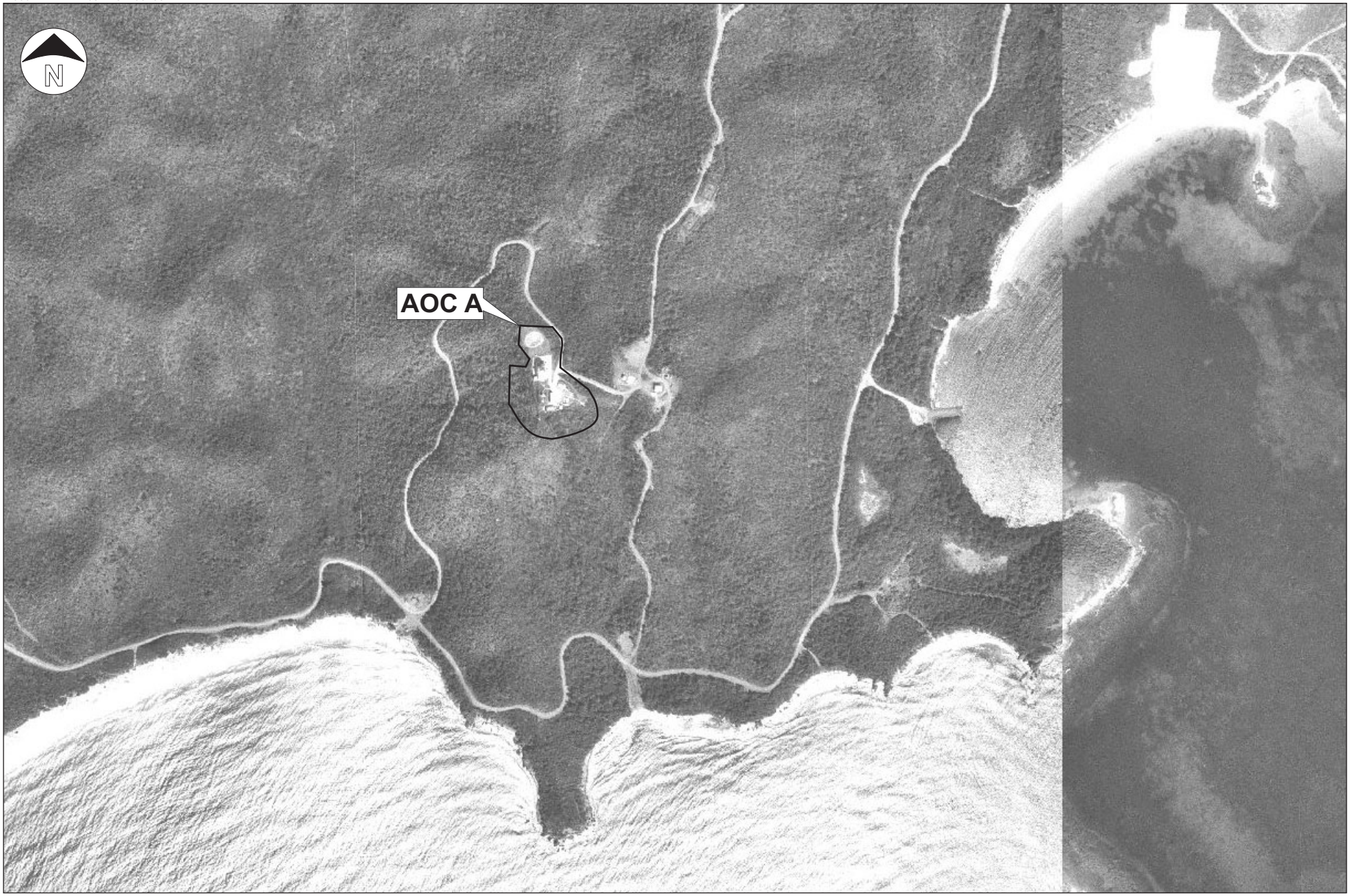
The UST, associated piping including the fill pipe, and surrounding soil were excavated and removed for disposal in 1997. Four confirmation soil samples were collected from the excavation and analyzed for petroleum-related constituents. No petroleum-related constituents were detected in any of the four soil samples. The UST was replaced with a new UST. The closure report describes where the four samples were collected, but does not include sample collection depths or actual collection locations. Appendix A provides the UST Removal Closure Report. The closure report was not prepared until April 2000 after comments were received from PREQB.

2.9.2 Previous Investigation Results

The confirmation soil sampling conducted during the 1997 UST replacement at the site did not indicate the presence of any petroleum-related constituents. Figure 2-15 shows the area of the tank replacement and excavation of soils.

2.9.3 Sampling Rationale

Because the soil surrounding the UST and associated piping, including the fill pipe, was excavated and removed for disposal during the 1997 tank replacement, and because the confirmation soil sampling conducted during the tank replacement did not indicate the presence of petroleum-related constituents, no further action is proposed for this site.



Base imagery is comprised of 1994 1-meter USGS Digital Ortho-imagery quarter quadrangles (DOQQs).

Scale in Feet

0 1000 2000

Figure 2-14
MAP ILLUSTRATING AERIAL EXTENT OF AOC A
DIESEL FUEL FILL PIPE AREA (OBSERVATION POST I)
Atlantic Fleet Weapons Training Facility, Vieques Island

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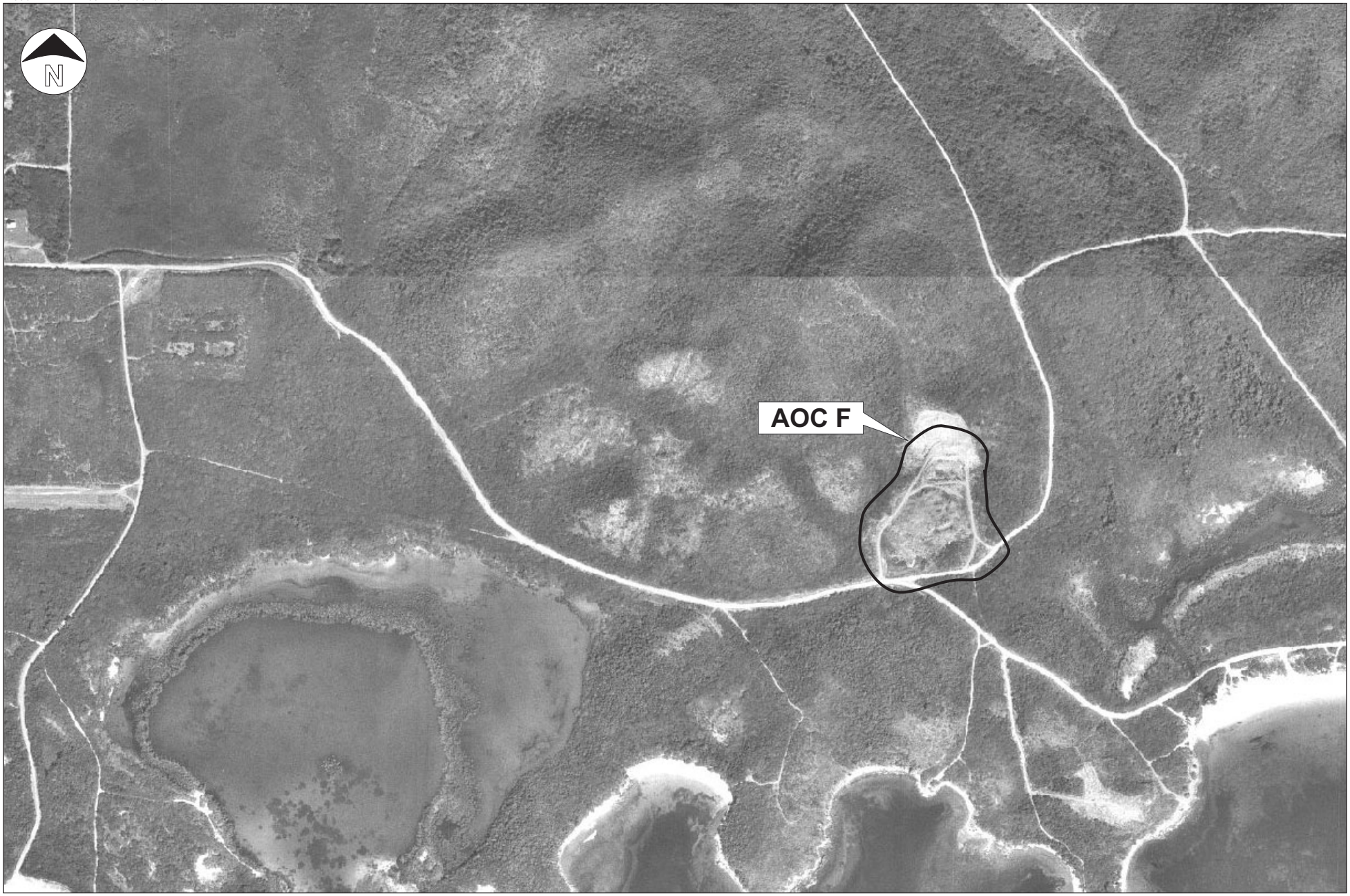
Figure 2-15
AOC A DIESEL FUEL FILL PIPE AREA
SOILS EXCAVATED DURING REPLACEMENT OF UST
(OBSERVATION POST 1, INNER RANGE, AFWTF)
Vieques Island, Puerto Rico



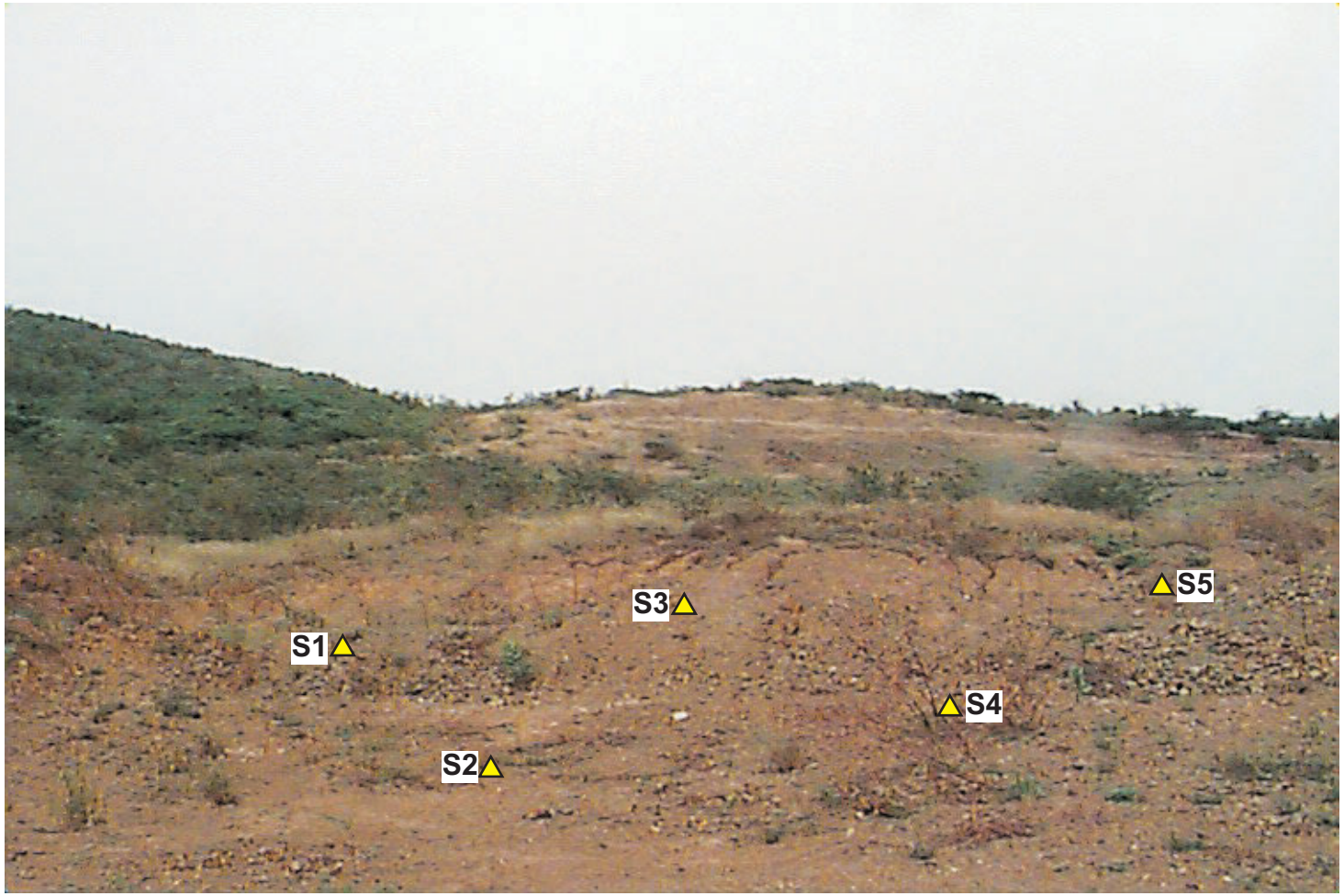
Base imagery is comprised of 1994 1-meter USGS Digital Ortho-imagery quarter quadrangles (DOQQs).

Scale in Feet

0 1000 2000

Figure 2-16
MAP ILLUSTRATING AERIAL EXTENT OF AOC F ROCK QUARRY (CAMP GARCIA)
Atlantic Fleet Weapons Training Facility, Vieques Island

CH2MHILL



△ Previous Surface Soil Sample Location

Figure 2-17
AOC F PREVIOUS SAMPLE LOCATIONS
ROCK QUARRY (CAMP GARCIA)
Vieques Island, Puerto Rico

CH2MHILL

139322.PP.WP 1/01 E012001001TPA

Base imagery is comprised of 1994 1-meter USGS Digital Ortho-imagery quarter quadrangles (DOQQs).

Scale in Feet

0 1000 2000

Figure 2-18

MAP ILLUSTRATING AERIAL EXTENT OF AOC G PUMP STATION AND CHLORINATION BUILDING AT SEWAGE LAGOONS

Atlantic Fleet Weapons Training Facility, Vieques Island

CH2MHILL

△ Proposed Surface Soil Sample Location

Figure 2-19
AOC G PROPOSED SAMPLE LOCATIONS
PUMP STATION AND CHLORINATION BUILDING
AT SEWAGE LAGOONS (CAMP GARCIA)
Vieques Island, Puerto Rico

△ Proposed Surface Soil Sample Location

Figure 2-20
AOC G PROPSED SAMPLE LOCATIONS
PUMP STATION AND CHLORINATION BUILDING
AT SEWAGE LAGOONS (CAMP GARCIA)
Vieques Island, Puerto Rico

2.12 Photo-Identified Site Investigation

2.12.1 Site Summary

An aerial photo analysis was completed in August 2000 (ERI, 2000). Aerial photographs dated 1937, 1959, 1962, 1964, 1967, mid-1970s, and 1985 were evaluated. This analysis documents activity in both the EMA and the AFWTF, including the nine known SWMUs, three known AOCs, and 23 other potential sites identified on the photographs. These sites are referred to as photo-identified areas or PIs. Figure 2-21 was developed as part of this investigation and shows the locations of all identified SWMUs, AOCS, and PIs within the EMA and AFWTF. Table 2-1 lists each site, years active, and a brief description of each site. Table 2-2 presents a detailed description of the aerial photographic analysis findings for each site by year.

2.12.2 Investigation Rationale

During the Phase I RFI, each PI will be visually inspected and Navy personnel will be interviewed to determine whether further investigation is warranted. Results of these investigations will be addressed in the Draft Final RFI Report.

2.13 Potential Areas of Concern (PAOC) Investigation

2.13.1 PAOCs Identified During Site Visit

During the June 2000 site visit with personnel from NASD, four PAOCs were identified. These PAOCs have been designated as PAOCs I, J, K, and L, respectively.

They are located either inside or near the Camp Garcia Compound:

- **PAOC I:** Former power plant and mechanics shop northeast of Bldg. 303 at Camp Garcia (structure still exists)
- **PAOC J:** Former vehicle maintenance area at Camp Garcia (all structures were demolished prior to 1980)
- **PAOC K:** Former wash rack area north of main road (structure demolished prior to 1980)
- **PAOC L:** Former paint and transformer storage area (structure still exists)

Figure 1-2 (presented previously) shows the vicinity of these PAOCs.

A preliminary literature search indicated that little or no information was available for these additional facilities.

FIGURE 2-21
Aerial Photographic Analysis

PI-23
PI-12
PI-22
PI-1
PI-16
PI-15
SWMU-5, 8, 12; AOC-A
PI-18
PI-3
CAMP GARCIA
PI-7
PI-2
PI-19
SWMU-1
SWMU-6, 7
PI-17
SWMU-10, AOC G
PI-8
AOC-F
PI-6
SWMU-4
PI-4
PI-5
PI-14
PI-11
PI-10
PI-21
SWMU-2
PI-20
PI-9
PI-13

SITE ID	ACRES	X_COORDINATE	Y_COORDINATE
AOC-F	83.644	246006.90067	2004683.62256
CAMP GARCIA	208.620	244616.95418	2005578.74392
PI-1	1.394	255888.43316	2007335.37133
PI-2	1.964	247756.99146	2005808.82902
PI-3	0.799	247628.22709	2006117.20247
PI-4	6.476	244743.31245	2005014.41170
PI-5	21.761	243149.04862	2004533.25895
PI-6	18.469	242652.85784	2005090.16597
PI-7	5.014	243394.16587	2006104.07391
PI-7	6.137	243470.70315	2005716.13394
PI-8	22.400	244051.14552	2005011.97563
PI-9	46.708	242286.36786	2003406.70099
PI-9	2.293	243123.29337	2003364.43276
PI-10	0.509	244514.00145	2004498.58101
PI-11	0.409	244820.39199	2004365.22870
PI-12	1.931	247538.11944	2008143.71053
PI-13	6.519	243022.91791	2002487.06392
PI-14	2.001	244287.03465	2004403.14332
PI-15	0.452	252778.84436	2007019.97748
PI-16	0.777	252562.17105	2006969.35477
PI-17	0.450	253601.70065	2005481.43231
PI-18	6.041	246048.83499	2006213.24017
PI-19	17.861	246654.06928	2005696.47828
PI-20	4.257	246770.47298	2003839.41371
PI-21	22.678	246745.50554	2004180.27565
PI-22	0.854	255553.57442	2007627.92747
PI-23	0.185	245469.83552	2008348.44808
SWMU-1	55.722	246470.10849	2005373.62886
SWMU-2	23.206	246182.48553	2004113.01615
SWMU-4 (BLDG 303)	0.834	244540.18347	2005159.82763
SWMU-5, 8, 12; AOC-A	8.879	254846.94217	2006230.37888
SWMU-6, 7	0.061	244541.84954	2005184.40757
SWMU-10, AOC G	23.160	245038.13846	2004836.58169

Environmental Research Inc. Aerial Photographic Analysis,
Atlantic Fleet Weapons Training Facility
and Eastern Maneuver Area, Vieques, Puerto Rico,
DRAFT - August 24, 2000

Aerial Photographic Analysis Findings

SWMU, AOC, PI Sites
1994
1985
1970
1967
1964
1962
1959
1936-37

Scale 1:25,000

1000 0 1000 2000 Meters

Base imagery is comprised of 1994 1-meter USGS Digital Ortho-imagery quarter quadrangles (DOQQs).
Map projection is Universal Transverse Mercator, Zone 20, NAD83, GRS1980.
White grid denotes UTM grid system in 1000 meter intervals.

2.11 AOC G – Pump Station and Chlorination Building at Sewage Lagoons (Camp Garcia)

2.11.1 Site Summary

This site, which is located adjacent to the sewage treatment lagoons at Camp Garcia, consists of a building that housed a pump station and chlorination equipment used in the past for the chlorination of the lagoon system effluent. These facilities were placed into operation in the 1950s and are no longer in service. Figure 2-18 provides an aerial view of AOC G.

The building is constructed of concrete, and is built partially below grade. During the 1995 RFA, stains were visible on the concrete floor in the building, reportedly as a result of wastewater overflows. However, no signs of vegetation stress or staining were apparent in the grassy area surrounding the building (PREQB, 1995).

During the CH2M HILL February 2000 site inspection, no staining was observed in the chlorination building, and the site was inactive and overgrown with vegetation.

2.11.2 Previous Investigation Results

No previous environmental sampling investigations have been performed at AOC G.

2.11.3 Sampling Rationale

Based on the review of the information available for the site, CH2M HILL will collect five surface soil samples in the area of the chlorination building and the nearby chlorine contact chamber as shown in Figures 2-19 and 2-20. The surface soil samples will be collected from a depth of 0 to 6 inches, and the results will be used to determine if a release of hazardous materials has occurred at the site. The surface soil samples will be analyzed for Appendix IX constituents and explosives. Although historical information for AOC G does not indicate the potential presence of explosives or related residues at this site, explosives are included in the sample analyses because of the use of explosives in the range areas of the AFWTF, and the public concern of explosives and related residues at the AFWTF.

TABLE 2-1
Aerial Photographic Analysis – Identified Sites
Camp Garcia/Vieques

Site	Year(s) Active	Brief Description
SWMU 1	1959-post 1964	Camp Garcia Landfill. Debris noted in trenches and fill areas from 1959 to 1964. Inactive by mid-70s.
SWMU 2	1959-mid-1970s	Fuels Off-Loading Site. Vertical tanks, containers, staining and light-toned material noted.
SWMU 4	Mid-1970s-1994	Waste Areas of Building 303. No significant findings were noted within the Building 303 Area (see Camp Garcia for other open storage areas and features noted within this vicinity).
SWMU 6 & 7	Mid-1970s-1994	Waste Oil and Paint Accumulation Areas. No significant findings were noted within this area (see Camp Garcia for other open storage areas and features noted within this vicinity).
Camp Garcia	1959-1994	Open storage, containers, debris, staining and a burn area were noted within Camp Garcia.
SWMU 5, 8, 12 & AOC A	1962-1994	Spent Battery Accumulation Area (SWMU 5), Waste Oil Accumulation Area (SWMU 8), Solid Waste Collection Unit (SWMU 12), and Diesel Fuel Fill Pipe (AOC-A). Dark-toned or burned area noted in 1962. Containers, possible debris and light-toned material noted within the site area. A probable pipeline, staining, ground scars, probable containers, a probable fill area and buildings were noted onsite.
SWMU 10 and AOC G	Mid-1970s-1985	Sewage Treatment Lagoons and Pump/Chlorination Building. Four lagoons (SWMU 10), Chlorination Building (AOC-G), piping and series of ditches noted in mid-1970. Area beginning to re-vegetate in 1985.
AOC F	1959-1994	An excavation with dark-toned staining visible in 1959. Probable debris, light-toned material and light-toned objects noted in 1962 and 1964. New excavation activity noted in 1994.
PI-1	1937-1985	Persistent ground scarred area.
PI-2	1959-1985	Persistent ground scar, discolored soil.
PI-3	1959-mid-1970s	Persistent ground scar. Re-vegetated by 1985.
PI-4	1959-1964	Series of trenches and disturbed ground. Trenches filled/covered by 1962. An area of disturbed ground is visible within the southeast corner of this area in 1964.
PI-5	1959-1964	Ditches from airfield lead to cleared areas and a possible fill area near and into Puerto Ferro.
PI-6	1959-1994	Vertical tanks, large surface impoundment and pump house at probable water treatment plant. Impoundment no longer visible by 1985.
PI-7	1959-1994	Persistent ground scarred areas.
PI-8	1959-mid-1970s	Open storage, vehicle and equipment maintenance area, staining.

TABLE 2-1 (CONTINUED)
Aerial Photographic Analysis – Identified Sites
Camp Garcia/Vieques

Site	Year(s) Active	Brief Description
PI-9	1959-1964 – storage area; 1959-1994 – fill area	Open storage of probable munitions/explosives. Fill with debris located east of storage area.
PI-10	1962-1964	Series of four impoundments with liquid.
PI-11	1962	Access road leading to probable fill area with possible containers.
PI-12	Mid-1970s-1994	Light-toned material in cleared area.
PI-13	Mid-1970s	Light-toned material in excavation. Re-vegetated by 1985.
PI-14	Mid-1970s	Two pits with light-toned material and possible debris.
PI-15	Mid-1970s – 1994	Pit with liquid. Access road leads to pit.
PI-16	1962	Access roads leading to circular area of disturbed ground and light-toned material, possible burial area.
PI-17	1962	Pits, possible fill area, debris.
PI-18	Mid-1970s	Excavation/possible fill area. Area re-vegetated by 1985.
PI-19	Mid-1970-1985	Disturbed ground. Filled/graded by 1985.
PI-20	1964-1985	Disturbed ground, possible fill area.
PI-21	1959-Mid-1970s, 1994	Vertical tank, pits, disturbed ground. Possible quarry activity; however, pits contained discolored liquid (brown, green). Re-vegetated by 1985. New clearing and grading activity noted in 1994.
PI-22	1994	Possible debris and excavations with liquid noted in 1994.
PI-23	1959-1967	Large pit that did not appear to be a foxhole-training pit noted from 1959 to 1967.

TABLE 2-2
Aerial Photograph Chronological Analysis of PIs
Camp Garcia/Vieques

Date	Frame #	Site	Description
1936-37	K-25-87	PI-1	Ground scarred area.
1959	23	PI-1	Ground scarred area and light-toned material.
1962	614	PI-1	Ground scarred area remains.
1967	22DD-189	PI-1	Ground scarred/stained area.
Mid-1970	126	PI-1	Ground scar remains.
1985	1-14	PI-1	Re-vegetating.
1959	25	PI-2	Ground scarred area.
1962	9789	PI-2	Area remains scarred. Ground surface is discolored (gray/black).
1964	13DD-156	PI-2	Ground scarred/disturbed ground remains.
Mid-1970	85	PI-2	Ground scar.
1985	1-11	PI-2	Ground scar remains.
1959	25	PI-3	Ground scarred area, probable pits.
1964	13DD-156	PI-3	Ground scar/disturbed ground remains.
Mid-1970	85	PI-3	Majority of ground scar re-vegetating.
1959	26	PI-4	Trench with possible debris. Several probable trench scars nearby (gone by 1962).
1964	13DD-158	PI-4	Trenches seen in 1959 are no longer visible. An area of disturbed ground (possibly a fill area) is visible south of the former trench area.
1959	26	PI-5	Airfield staining and associated ditch to Puerto Ferro. An access road leads to a cleared area at the edge of Puerto Ferro, just west of the ditch. An excavation with liquid is noted farther west.
1962	9783	PI-5	Stained area no longer present. Ditches to Puerto Ferro remain. Access road leads to cleared area at edge of Puerto Ferro.
1964	13DD-158	PI-5	Ditch to Puerto Ferro remains. Receives runoff from airfield and PI-8 (open storage area).
1959	26	PI-6	Probable treatment plant. Impoundment with liquid, vertical tanks and six buildings are present. One of the six buildings located in the eastern portion of the site appears to be a pump house.
1962	9783	PI-6	Impoundment empty. Tanks remain.
1964	13DD-158	PI-6	Tanks and impoundment remain.
1985	1-09	PI-6	Five vertical tanks and a building are visible. The impoundment area has completely re-vegetated.
1994	26	PI-6	Four vertical tanks and several small structures are visible.
1959	26	PI-7	Persistent ground scarred areas.
1964	13DD-158	PI-7	Ground scarred/disturbed ground.

TABLE 2-2 (CONTINUED)
Aerial Photograph Chronological Analysis of PIs
Camp Garcia/Vieques

Date	Frame #	Site	Description
1985	1-09	PI-7	Ground scarred areas remain.
1994	26	PI-7	Ground scar remains; however, is significantly smaller in size.
1959	26	PI-8	Vehicle and equipment storage, maintenance area, and staining.
1962	9785	PI-8	Open storage of vehicles, equipment and multi-colored materials (some probably metallic). Heavy staining noted south of probable maintenance buildings. Light-toned material and staining noted in eastern portion of site.
1964	13DD-158	PI-8	Vehicle and equipment storage remains. Probable metallic material remains to the south. Staining noted to east.
Mid-1970	83	PI-8	Only a small amount of open storage materials remain. Probable staining is noted on the north side of a probable maintenance building. The southern portion of the site appears inactive.
1985	1-09	PI-8	Inactive.
1959	26	PI-9	Open storage of probable explosives in partially bermed areas (see 1962 for details). Fill area with possible debris is noted at edge of Puerto Ferro and likely associated with the explosives storage area to the west.
1962	9783	PI-9	Open storage of probable explosives and containers in bermed areas. Disposal of white material noted in large trench at north end of site. Fill area to the east has increased in size since 1959. Debris is visible along the northern end of the fill area.
1964	13DD-158	PI-9	Open storage of containers and trailers are noted. Trench noted in 1962 has been covered. Fill area located to the east remains. Possible debris is visible on the northern end of the fill area.
Mid-1970	114	PI-9	Majority of storage area is re-vegetating. Fill area remains. Debris not discernible.
1985	1-09	PI-9	Majority of storage area remains vegetated. A probable pit is visible to the west. Fill area/possible debris visible to the east.
1994	26	PI-9	Ground scar. Fill area to the east remains. Vegetation growth healthy along northern end of fill area.
1962	9785	PI-10	Series of six lagoons containing brown to black liquid. Liquid is also visible outside the lagoons to the north.
1964	13DD-158	PI-10	Lagoons inactive – re-vegetating. Site still not completely re-vegetated by 1985. Completely re-vegetated by 1994.
1962	9785	PI-11	Disturbed ground/possible containers at the end of access road.
Mid-1970	23	PI-12	Light-toned material noted in cleared/disturbed area (still present in 1985).
1985	2-35	PI-12	Light-toned material in cleared area remains.
1994	26	PI-12	Cleared area remains. Light-toned residue (not annotated) is visible along the eastern portion of the site.
Mid-1970	114	PI-13	Light-toned material present in excavation. Linear excavations and/or pits line an access road to the southwest.

2.7 SWMU 10 – Sewage Treatment Lagoons

2.7.1 Site Summary

According to the 1988 RFA, the sewage treatment lagoons for Camp Garcia went into service in the early 1950s. There are four unlined lagoons; two served as equalization/treatment lagoons, and two provided polishing treatment. The effluent from the final two polishing lagoons was then chlorinated in a chlorine contact chamber and discharged to the sea.

In the past, the lagoons were not lined. In 1974, after the level of activity and associated domestic wastewater generation rate significantly decreased at Camp Garcia, the treatment lagoon system was modified to make it a no-discharge system. The lagoons were lined using a 2-foot compacted clay and plastic liner system, and served as evaporation lagoons for the wastewater.

Although the presence of hazardous constituents in the sanitary wastewater is unlikely, this has not been confirmed through sampling. No known releases of hazardous constituents have occurred at this site (PREQB, 1995).

Inspection of the sewage lagoon system during the CH2M HILL February 2000 site inspection revealed that the lagoon system was overgrown with vegetation and did not appear to be active. In October 2000, the lagoon system was abandoned and a new wastewater lagoon treatment system was built approximately 500 feet west of the old lagoon system.

2.7.2 Previous Investigation Results

Because of the transfer of NASD activities to Camp Garcia, increased use of the sewage treatment plant was expected. CH2M HILL conducted a preliminary investigation at SWMU 10 in June 2000. Four surface soil samples (0 to 6 inches) and four subsurface soil samples (4 to 5 feet) were collected in each of the four lagoon areas. Additionally, one sample of the raw sanitary wastewater discharge to the lagoon system was collected. Sample locations are shown in Figure 2-11. The soil samples were collected for the purpose of determining if the lagoon material would be classified as hazardous waste. Toxicity characteristic leaching procedure (TCLP) analyses were performed on the soil samples. The results of the TCLP analyses of the soil indicated that the soil was not classified as a hazardous waste, and the analytical results for the wastewater sample did not indicate the presence of significant contamination. Results of these analyses were provided in the August 1, 2000, Quarterly Report and will be presented in the Phase I RFI Report.

2.7.3 Sampling Rationale

Based on the review of the site information, CH2M HILL will install five monitoring wells and collect five groundwater samples, 16 surface soil samples, and 16 subsurface soil samples. One monitoring well will be installed up-gradient of the lagoons and four wells will be installed downgradient of the lagoons. The screened depth of the proposed monitoring wells will be less than 10 feet below the first encountered groundwater. In general, shallow monitoring wells will be installed at depths where the screened intervals

TABLE 2-2 (CONTINUED)
Aerial Photograph Chronological Analysis of PIs
Camp Garcia/Vieques

Date	Frame #	Site	Description
1985	1-09	PI-13	Re-vegetated.
Mid-1970	114	PI-14	Two pits with possible debris and light-toned material.
Mid-1970	90	PI-15	Pit with probable liquid is visible. An access road can be seen leading to pit.
1985	2-37	PI-15	A large pit with liquid is visible within the Maneuver Area. An access road is visible leading to the pit.
1994	22	PI-15	Majority of pit has re-vegetated. Light-toned material is noted in the eastern portion of the pit.
1962	616	PI-16	Disturbed ground, light-toned material. Possible burial area.
1962	9795	PI-17	Pits, possible fill area and debris. Re-vegetated by 1985.
Mid-1970	83	PI-18	Excavation, possible fill area
1985	1-11	PI-18	Area is re-vegetating.
Mid-1970	83	PI-19	Large ground scarred/disturbed area –graded/cleared by 1985.
1985	1-11	PI-19	Area is cleared and graded. Light vegetation growth is visible over the cleared area.
1964	13DD-156	PI-20	A possible fill area containing possible debris is visible.
Mid-1970	118	PI-20	Possible fill area.
1985	1-11	PI-20	Possible fill area remains.
1994	26	PI-20	Fill area re-vegetating.
1959	26	PI-21	Area of disturbed ground with two probable trenches.
1962	9787	PI-21	Disturbed ground with two pits. One of the pits contains brown liquid. The southern pit contains green liquid. A vertical tank and vehicles and equipment are also visible. A larger area of disturbed ground is visible northwest of the site; however, no debris or pits are visible.
1964	13DD-156	PI-21	Pits no longer visible. Vehicles and probable quarry equipment is visible.
Mid-1970	118	PI-21	Site appears inactive – re-vegetating.
1985	1-11	PI-21	Area appears inactive and re-vegetating.
1994	26	PI-21	New cleared/graded area visible.
1994	22	PI-22	Possible light-toned debris is evident in a wooded area near a launch point. Two excavations with light-toned liquid are visible south of possible debris.
1959	26	PI-23	Large pit with liquid noted near road intersection.
1962	599	PI-23	Large pit noted near road intersection. Does not appear to be foxhole or impact crater.
1967	22DD-195	PI-23	Pit remains.

2.13.2 Navy Records Search

The Navy conducted a review of the building construction and demolition records for the EMA in an effort to identify buildings or other structures that may have stored hazardous waste. No records of spills or releases of hazardous waste were identified during the records search.

The demolition records search identified several structures that could have posed a threat to the environment, including a filling station, several boilers, and firing ranges. However, the locations of these structures are uncertain. These identified non-range structures are considered PAOCs and will be investigated during the Phase I RFI. Table 2-3 summarizes demolition records search information as it pertains to designated PAOC sites.

TABLE 2-3
PAOCs Identified: from the Demolition Records Search
Camp Garcia/Vieques

Building Type	Facility Number	Date Built	Date Demolished	Description/Comments
Dispatch office/fuel (PAOC)	4503	1986	December 1991	Dispatch office, fuel facility, sleeping quarters
Filling station by Building 4503 (PAOC)	-	1985	November 1992	Fuel farm, filling station
Boiler Room (PAOC)	238CG	1953	September 1989	Heating Plant Building
Pump House (PAOC)	500CG	1953	September 1989	Water Treatment Facility Building
Boiler House (PAOC)	607	1963	September 1984	Heating Plant Building
Boiler House (PAOC)	617	1970	January 1984	Heating Plant Building
Petroleum, Oil, & Lubricants (POL) Pipeline (PAOC)	-	1969	September 1984	POL Pipeline
Mech. Shop – Grounds (GRDS) Contractor (PAOC)	305	1975	December 1991	Public Works (PW) storage shed

2.13.3 Site Evaluation

Additional record searches will be conducted during the Phase I RFI for each of the 12 identified PAOCs (four identified from a site visit, eight identified from the Navy records search). Each PAOC will be visually inspected during the Phase I RFI and Navy personnel will be interviewed regarding history, use, disposal, etc. A report of the PAOC inspections will be provided to EQB for review prior to finalizing the sample locations. The results of the visual inspections and sampling and analysis of all PAOCs required to be investigated under the Site-Specific Work Plan will be included in the Draft Phase I RFI Report, when developed. If additional interviews and site inspections verify that a release of hazardous material has occurred at a site, the site will be added as an AOC. Results of these investigations will be addressed in the Draft Final RFI Report.

The 12 Potential Areas of Concern (PAOCs) will be evaluated by the following: 1) conduct an archive review of historical documents and aerial photos; 2) if the site can be located conduct a site inspection to assess if there is any physical evidence of prior releases (i.e. soil staining, stressed vegetation); 3) at each POAC where the archive research or site inspection provides evidence of release of hazardous substances, then up to three surface soil samples will be collected at each potentially impacted site for analysis of RCRA Appendix IX constituents; 4) compare the soil analyses with background levels and risk-based screening criteria; and 5) present the results in the RFI Phase I Draft Final Report. If there is no evidence of either use or release of hazardous constituents then no additional sampling will be completed. If there is evidence of a release, then subsurface soil samples and groundwater samples will be collected.

2.10 AOC F – Rock Quarry (Camp Garcia)

2.10.1 Site Summary

The rock quarry is located southwest of the former Camp Garcia landfill. This site is used to obtain gravel used by the Navy for the construction of roads and other construction projects. During the 1995 RFA, used tires and some paper waste were visible at this location (PREQB, 1995). During the CH2M HILL February 2000 site inspection, no waste tires or other waste materials were observed at the quarry, and the quarry did not appear to be active. No additional historical usage information is available for this AOC. Figure 2-16 provides an aerial view of AOC F.

2.10.2 Previous Investigation Results

Because of the transfer of activities from NASD to Camp Garcia, the rock quarry may continue to be used for road maintenance activities. CH2M HILL conducted an investigation in June 2000 to determine if hazardous constituents existed in the surface soil where Navy personnel will remove quarry material. Five surface soil samples were collected from the areas illustrated in Figure 2-17. The samples were analyzed for Appendix IX parameters and explosives. Analytical results from this effort were provided in the August 1, 2000, Quarterly Report and will be included in the Phase I RFI Report. The surface soil sampling results indicated that only arsenic was detected above RBCs. As discussed throughout this document, the presence of arsenic in the soil is likely to be naturally occurring given the volcanic origin of the soils on the island.

2.10.3 Sampling Rationale

Results of the proposed background study will be used to determine the background levels of metals occurring naturally at the site. If arsenic is determined to be naturally occurring in site soils, no additional sampling will be performed at AOC F at this time. Risk-based screening and analytical results for the June 2000 sampling effort will be presented in the Phase I RFI Report along with the analytical results of the proposed background study. The results from both investigations will be used to determine whether additional investigations are warranted.

SECTION 3

Technical Approach and Investigation Procedures

As described in Section 2, the Phase I RFI will include the collection and analysis of environmental samples at seven SWMUs and one AOC as listed below:

SWMU 1 – Camp Garcia Landfill

SWMU 2 – Fuels Off-Loading Site (Camp Garcia)

SWMU 4 – Waste Areas of Bldg. 303, Camp Garcia

SWMU 5 – Spent Battery Accumulation Area (OP-1, Inner Range, AFWTF)

SWMU 8 – Waste Oil Accumulation Area (OP-1, Inner Range, AFWTF)

SWMU 10 – Sewage Treatment Lagoons (Camp Garcia)

SWMU 12 – Solid Waste Collection Unit Area (OP-1, Inner Range, AFWTF)

AOC-G – Pump Station and Chlorinating Building at Sewage Lagoons (Camp Garcia)

No field sampling is proposed for; SWMU 6 (Waste Oil and Paint Accumulation Area, Seabees Area, Camp Garcia); SWMU 7 (Waste Oil Accumulation Area, outside Building 303, Camp Garcia); AOC A (Diesel Fuel Fill Pipe Area, OP-1, Inner Range, AFWTF); and AOC F (Rock Quarry, Camp Garcia) because previous soil sampling conducted at these sites did not indicate the presence of significant contamination at these sites. The Phase I RFI Report will, however, present the risk-based screening results for the June 2000 sampling event for these sites. For SWMU 4, a total of eight (8) soil samples will be collected during the installation of borings and analyzed for Appendix X VOCs and SVOCs.

This section details the technical approach developed to perform the proposed Phase I RFI sampling activities. The goal of the sampling effort is to collect representative soil and groundwater samples at the sites listed above, and to make a recommendation for additional action or no further action (NFA) for each site based on the data interpretation. A review of the available analytical data collected during previous investigations was performed, and sampling locations were selected based on this review and on observations made during the CH2M HILL February 2000 site visit.

The tasks included in the technical approach are listed below. The remainder of this section provides detailed discussions of the investigation procedures.

- Task 1: Project Planning
- Task 2: Field Investigation
- Task 3: Sample Analysis and Validation

- Task 4: Data Evaluation
- Task 5: Investigation Reports

3.1 Task 1: Project Planning

This task consists of the preparation of Project Plans associated with the Phase I RFI.

3.1.1 Work Plan

The Master Work Plan for AFWTF (CH2M HILL, February 2001) will be used for guidance on the activities to be performed at each site for this investigation. The Master Work Plan includes the Master Project Plan, Master Sampling and Analysis Plan (SAP), and Master Health and Safety Plan (HASP). The Master SAP consists of three documents: the Master Field Sampling Plan (FSP), the Master Quality Assurance Project Plan (QAPP), and the Master Investigation-Derived Waste Management Plan (IDWMP). The Master Plans provide the approach to be used for investigations, and general types of activities to be accomplished.

This site-specific work plan supplements the Master Plan and presents site-specific information for each SWMU and AOC where sampling activities are proposed. The HASP, FSP, QAPP, and IDWMP are presented as checklists of items based on the existing Master Work Plans (including other supporting documentation, and additions or deviations from the Master Plan), and are submitted within this document, as Appendix B.

3.1.2 Meetings

During the course of the investigations and report development, meetings will be held to discuss the proposed project schedule and findings with Atlantic Division (LANTDIV), PREQB, EPA, and NSRR. CH2M HILL will provide minutes of the meetings to LANTDIV and NSRR. One site visit was performed during work plan preparation.

3.1.3 Project Management

The activities involved in project management include daily technical support and guidance, budget and schedule review and tracking, preparation and review of invoices, personnel resources planning and allocation, subcontractor coordination, preparation of monthly progress reports, and communication and coordination of events with LANTDIV, PREQB, EPA, and NSRR.

3.2 Field Investigation

This task involves efforts related to fieldwork support, the field investigation, and surveying.

3.2.1 Fieldwork Support

Fieldwork support includes subcontractor procurement, mobilization, and utility clearance, as described in the following subsections.

3.2.1.1 Subcontractor Procurement

As part of the initial field mobilization to the EMA and AFWTF, CH2M HILL will procure analytical laboratory and data validation services for work at the facility. The subcontracted analytical laboratory will meet EPA Level D quality control. For sites with potential ordnance and explosives, support services will be subcontracted as described in Appendix C.

3.2.1.2 Mobilization/Demobilization

Mobilization includes procurement of necessary field equipment, and initial transport to the site. Equipment and supplies will be brought to the site when the CH2M HILL field team mobilizes for field activities.

Demobilization activities include time for IDW sampling and general site restoration prior to the return transport of field equipment and crew. IDW generated during field activities will be containerized in 55-gallon drums. Equipment decontamination fluids will be containerized in 55-gallon drums for storage. The 55-gallon drums will be properly labeled and stored at a location designated by LANTDIV prior to disposal.

It is anticipated that the IDW generated will be disposed of as non-hazardous waste.

3.2.2 Field Sampling Activities

The goal of the sampling effort is to collect representative data at selected sites in the EMA and AFWTF and determine if either a full RFI investigation or NFA is necessary at each of the sites. A description of these activities with supporting rationale was provided in Section 2. The number of samples to be collected from each medium of concern at each unit is summarized in Table 3-1.

3.2.3 Soil Sampling Procedures

Table 3-2 presents the required containers, preservatives, and holding times for surface soil and subsurface soil samples.

3.2.3.1 Soil Sampling Techniques

The investigation involves the collection of both surface and subsurface soil samples. The applicable Standard Operating Procedures (SOPs) for the collection of soil samples from the AFWTF Master Work Plan (2001) are listed in the FSP checklist located in Appendix B of this Work Plan.

3.2.4 Groundwater Sampling Procedures

Table 3-3 presents the required containers, preservatives, and holding times for groundwater samples.

3.2.4.1 Groundwater Sampling Techniques

The investigation involves the collection of groundwater samples. The applicable SOPs for the collection of soil samples from the AFWTF Master work Plan (September 2001) are listed in the FSP checklist located in Appendix B of this Work Plan.

TABLE 3-1
Proposed Sampling, RCRA Facility Investigation, Camp Garcia – February 2001

Parameters[1]	SWMU 1	SWMU 2	SWMU 4	SWMU 5	SWMU 8	SWMU 10	SWMU 12	AOC G	Total
Surface Soil Samples									
Appendix IX VOCs	50	12	NA	4	5	16	5	5	97
Appendix IX SVOCs	50	12	NA	4	5	16	5	5	97
Appendix IX Metals	50	12	NA	4	5	16	5	5	97
Appendix IX Herbicides	50	12	NA	4	5	16	5	5	97
Appendix IX Pesticides/PCBs	50	12	NA	4	5	16	5	5	97
Explosives/Perchlorate	50	12	NA	4	5	16	5	5	97
Subsurface Soil Samples (at 5' Depth)									
Appendix IX VOCs	N/A	N/A	1	N/A	N/A	16	N/A	N/A	17
Appendix IX SVOCs	N/A	N/A	1	N/A	N/A	16	N/A	N/A	17
Appendix IX Metals	N/A	N/A	NA	N/A	N/A	16	N/A	N/A	16
Appendix IX Herbicides	N/A	N/A	NA	N/A	N/A	16	N/A	N/A	16
Appendix IX Pesticides/PCBs	N/A	N/A	NA	N/A	N/A	16	N/A	N/A	16
Explosives/Perchlorate	N/A	N/A	NA	N/A	N/A	16	N/A	N/A	16
Groundwater Samples									
Appendix IX VOCs	5	N/A	NA	N/A	N/A	5	N/A	N/A	10
Appendix IX SVOCs	5	N/A	NA	N/A	N/A	5	N/A	N/A	10
Appendix IX Metals	5	N/A	NA	N/A	N/A	5	N/A	N/A	10
Appendix IX Herbicides	5	N/A	NA	N/A	N/A	5	N/A	N/A	10
Appendix IX Pesticides/PCBs	5	N/A	NA	N/A	N/A	5	N/A	N/A	10
Explosives/Perchlorate	5	N/A	NA	N/A	N/A	5	N/A	N/A	10
Subsurface Soils (at 15' Depth)									
Appendix IX VOCs	NA	6	8 [2)]	NA	NA	NA	NA	NA	14
Appendix IX SVOCs	NA	6	8	NA	NA	NA	NA	NA	14
Appendix IX Metals	NA	NA	NA	NA	NA	NA	NA	NA	NA
Appendix IX Herbicides	NA	NA	NA	NA	NA	NA	NA	NA	NA
Appendix IX Pesticides/PCBs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives/Perchlorate	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1)] refer to Table 8-2 of the Master QAPP for a detailed list of constituents.

[2)] Contingent on finding degreasing basin and dry well

3) Previous surface soil samples were collected from SWMU 4, SWMU 6, SWMU 7, SWMU 10, and AOC F in June 2000

4) Table revised as per telephone conversation with Tim Gordon on August 14, 2003

TABLE 3-1a

Required QA/QC Samples

Parameters[1]	SWMU 1	SWMU 2	SWMU 4	SWMU 5	SWMU 8	SWMU 10	SWMU 12	AOC G	Total	FD	MS/ MSD	AB	EB	TB
Surface Soil Samples														
Appendix IX VOCs	50	24	NA	4	5	16	5	5	109	11	6	1	12	12
Appendix IX SVOCs	50	24	NA	4	5	16	5	5	109	11	6	1	12	
Appendix IX Metals	50	24	NA	4	5	16	5	5	109	11	6	1	12	
Appendix IX Herbicides	50	24	NA	4	5	16	5	5	109	11	6	1	12	
Appendix IX Pesticides/PCBs	50	24	NA	4	5	16	5	5	109	11	6	1	12	
Explosives	50	24	NA	4	5	16	5	5	109	11	6	1	12	
Subsurface Soil Samples (at 5' Depth)														
Appendix IX VOCs	N/A	N/A	1	N/A	N/A	16	N/A	N/A	17	2	1	1	2	2
Appendix IX SVOCs	N/A	N/A	1	N/A	N/A	16	N/A	N/A	17	2	1	1	2	
Appendix IX Metals	N/A	N/A	NA	N/A	N/A	16	N/A	N/A	16	2	1	1	2	
Appendix IX Herbicides	N/A	N/A	NA	N/A	N/A	16	N/A	N/A	16	2	1	1	2	
Appendix IX Pesticides/PCBs	N/A	N/A	NA	N/A	N/A	16	N/A	N/A	16	2	1	1	2	
Explosives	N/A	N/A	NA	N/A	N/A	16	N/A	N/A	16	2	1	1	2	
Groundwater Samples														
Appendix IX VOCs	5	N/A	NA	N/A	N/A	5	N/A	N/A	10	1	1	1	2	2
Appendix IX SVOCs	5	N/A	NA	N/A	N/A	5	N/A	N/A	10	1	1	1	2	
Appendix IX Metals	5	N/A	NA	N/A	N/A	5	N/A	N/A	10	1	1	1	2	
Appendix IX Herbicides	5	N/A	NA	N/A	N/A	5	N/A	N/A	10	1	1	1	2	
Appendix IX Pesticides/PCBs	5	N/A	NA	N/A	N/A	5	N/A	N/A	10	1	1	1	2	
Explosives	5	N/A	NA	N/A	N/A	5	N/A	N/A	10	1	1	1	2	
Subsurface Soils (at 15' Depth)														
Appendix IX VOCs	NA	3	8 [2)]	NA	NA	NA	NA	NA	11	1	1	1	1	1
Appendix IX SVOCs	NA	3	8	NA	NA	NA	NA	NA	11	1	1	1	1	
Appendix IX Metals	NA	NA	NA	NA	NA	NA	NA	NA	NA					
Appendix IX Herbicides	NA	NA	NA	NA	NA	NA	NA	NA	NA					
Appendix IX Pesticides/PCBs	NA	NA	NA	NA	NA	NA	NA	NA	NA					
Explosives	NA	NA	NA	NA	NA	NA	NA	NA	NA					

1) refer to Table 8-2 of the Master QAPP for a detailed list of constituents.
2) Contingent on finding degreasing basin and dry wall

NOTE: Field QC estimates are based on 12 field sampling days; same source water (thus 1 AB per method, per matrix) throughout the field effort for blanks; field duplicates at 1 in every 10 samples per matrix; MS/MSD pair at 1 in 20 samples per matrix; equipment blanks at 1 per sampling day per piece of equipment; trip blanks at 1 per cooler (assume 1 cooler of VOC's per sampling day)

TABLE 3-2
Required Containers, Preservatives, and Holding Times for Soil and Sediment

Analysis	Analytical Preparation/ Method Number	No. of Containers	Sample Container	Preservative	Holding Time	Volume of Sample
Appendix IX VOCs	SW-846 Method 5035/8260B Water for Extraction	3 to 4	3-4 each 5-g En Core™ sampler	4°C	48 hours to extraction and 14 days from extraction to analysis	Fill completely with no air bubbles
Appendix IX SVOCs	SW-846 Method 3550B/8270C	1	8-oz. Glass jar [1]	4°C	14 days to extraction and 40 days from extraction to analysis	Fill completely
Appendix IX PCBs	SW-846 Methods 3550B/8082	1	8-oz. Glass jar [1]	4°C	14 days to extraction and 40 days from extraction to analysis	Fill completely
Appendix IX Pesticides	SW-846 Method 3550B/8081A	1	8-oz. Glass jar [1]	4°C	14 days to extraction and 40 days from extraction to analysis	Fill completely
Appendix IX Herbicides	SW-846 Method 3550B/8051A	1	8-oz. Glass jar [1]	4°C	14 days to extraction and 40 days from extraction to analysis	Fill completely
Appendix IX Metals	SW-846 Methods 3050B/6010B 7000 series	1	4-oz. Glass jar [1]	4°C	6 months, 28 days for mercury	Fill to shoulder
Explosives Perchlorate	SW-846 Method 8330 EPA 314	1	4-oz. Glass jar [1]	4°C	14 days to extraction and 40 days from extraction to analysis	Fill completely
Acrolein/ Acrylonitrile	SW-846 5030B/8260B/ 8015	1	40 ml glass vial with Teflon-lined cap	HCL to pH 4-5 Cool to 4°C or unpreserved	14 days preserved or 7 days unpreserved	Fill completely No air bubbles

1- Teflon lined cap

TABLE 3-3
Required Containers, Preservatives, and Holding Times for Water Samples

Analysis	Analytical Preparation/ Method Number	No. of Containers	Sample Container	Preservative	Holding Time	Volume of Sample Collected
Appendix IX VOCs	SW-846 Method 5030B/ 8260B	3	Three 40-ml glass vials w/Teflon-lined cap	HCl to pH <2; Cool to 4ºC	14 days	Fill completely; no air bubbles
Appendix IX SVOCs	SW-846 Method 3510C/8270C	2	Two 1-liter bottles	Cool to 4ºC	7 days extraction/40 days to analysis	Fill to shoulder
Appendix IX PCBs	SW-846 Methods 3510C/8082	2	Two 1-liter bottles	Cool to 4ºC	7 days/ extraction/40 days to analysis	Fill to shoulder
Appendix IX Pesticides	SW-846 Methods 3510C/8081A	2	Two 1-liter bottles	Cool to 4ºC	7 days/ extraction/40 days to analysis	Fill to shoulder
Appendix IX Herbicides	SW-846 Methods 3510C/8051A	2	Two 1-liter bottles	Cool to 4ºC	7 days/ extraction/40 days to analysis	Fill to shoulder
Appendix IX Metals	SW-846 Methods 3010A/6010B and 3010A/7000 series	1	1-liter polyethylene bottle	HNO_3 to pH <2; Cool to 4oC	6 months (28 days for mercury)	Fill to shoulder
Explosives Perchlorate	SW-846 Method 8330 EPA 314	1	1-Liter Amber	Cool to 4ºC	7 days/ extraction/40 days to analysis	Fill to shoulder
Acrolein/ Acrylonitrile	SW-846 5030B/8260B/ 8015	1	40 ml glass vial with Teflon-lined cap	HCL to pH 4-5 Cool to 4°C or unpreserved	14 days preserved or 7 days unpreserved	Fill completely No air bubbles

3.2.5 Sampling Equipment Decontamination

All non-disposable sampling equipment will be decontaminated immediately after each use. The applicable SOPs for the decontamination of personnel and equipment are included in Attachment 2 of the Master Work Plan and highlighted in the checklist.

3.2.6 Sample Designation

Sampling locations and samples collected during the investigation will be assigned unique designations to allow the sampling information and analytical data to be entered into the existing GIS Data Management system. The existing designation scheme for AFWTF and EMA will be followed by field personnel. The following sections describe the sample designation specifications.

3.2.6.1 Specifications for Field Station Location Data

Field station data is information assigned to a physical location in the field at which some type of sample is collected. For example, a soil boring that has been installed will require a name that will uniquely identify it with respect to other soil boring locations, or other types of sampling locations. The station name provides for a key in the database to which any samples collected from that location can be linked to form a relational database.

A listing of the location identification numbers will be maintained by the field team leader, who will be responsible for enforcing the use of the standardized numbering system during all field activities. Each station will be designated by an alphanumeric code that will identify the stations location by facility, site type, site number, station type, and sequential station number. Table 3-4 documents the scheme that will be used to identify field station data.

TABLE 3-4
Field Station Location Scheme

First Segment	Second Segment	
Facility, Station Type, Site Number	**Station Type**	**Station Number, Qualifier**
AAANNN	**AA**	**NNNA**
Facility: CG = Camp Garcia, AFWTF, EMA Station Type: S = Site W = SWMU O = Operable Unit U = UST A = AOC Site Number: 1 = SWMU 1 2 = SWMU 2 4 = SWMU 4 5 = SWMU 5 8 = SWMU 8 10 = SWMU 10 12 = SWMU 12 G = AOC G	Station Type: SB = Subsurface Soil Sample Location SD = Sediment Sample Location SS = Surface Soil Sample Location SW = Surface Water Sample Location GW = Groundwater Sample Location Station Number: Sequential Station Number Qualifier: S = Shallow D = Deep K = Background	

Notes:
"A" = alphabetic
"N" = numeric

3.2.6.2 Specifications for Analytical Data

Analytical data will be generated through sampling of various media at AFWTF and EMA. Each analytical sample collected will be assigned a unique sample identifier. The scheme used as a guide for labeling analytical samples in the field is documented below. The format that will be used for electronic deliverables from the analytical laboratory and the data validator is documented below.

3.2.6.3 Sample Identification Scheme

A standardized numbering system will be used to identify all samples collected during water, soil, and sediment sampling activities. The numbering system will provide a tracking procedure to ensure accurate data retrieval of all samples collected. A listing of the sample identification numbers will be maintained by the field team leader, who will be responsible for enforcing the use of the standardized numbering system during all sampling activities. Sample identification for all samples collected during the investigations will use the following format.

Each sample will be designated by an alphanumeric code that will identify the facility, site, matrix sampled, and contain a sequential sample number. QA/QC samples will have a unique sample designation. The general guide for sample identification is documented in Table 3-5. If one qualifier is pertinent to the sample identification (ID) but another is not, only the Table 3-4 applicable qualifiers will be used. A non-utilized character space does not have to be maintained.

TABLE 3-5
Sample Identification Scheme

First Segment	Second Segment		Third Segment
Facility, Station, and Site Number	**Sample Type**	**Sample Location + Sample Qualifier**	**Additional Qualifiers (sample depth, sampling round, etc.)**
AAANN	**AA**	**NNNA or NNAA**	**ANN or NNNN**
Facility: CG= Camp Garcia, AFWTF, EMA Station Type: S = Site W = SWMU O = Operable Unit U = UST A = AOC Site Number: 1 = SWMU 1 2 = SWMU 2 4 = SWMU 4 5 = SWMU 5 8 = SWMU 8 10 = SWMU 10 12 = SWMU 12 G = AOC G	Sample Type: DS = Direct Push – Soil DW = Direct Push – Water SD = Sediment SS = Surface Soil TB = Trip Blank EB = Equipment Blank FB = Field Blank FD = Field Duplicate Sample Location: 1. Station Samples (NNA) NNA – refers to sequential station number NNA – letter qualifier for Deep, Shallow, or Composite, sample (if applicable). 2. QC Samples (NNN) NNN - numbered sequentially for each type of blank (i.e., 1, 2, etc.) collected for that day's sampling NNN – refers to month of sampling event Sample Qualifiers: F = filtered sample P = duplicate sample K = background sample		Additional Qualifiers: 1. Monitoring Well Groundwater Sample (refers to sampling round for that well): R01 - Round 1 R02 - Round 2 R03 - Round 3 2. Direct Push Subsurface Sample (refers to depth of sample): Enter depth of top of sample interval 3. QC Samples NNNN - refers to day and year of sampling event

Notes:
"A" = alphabetic
"N" = numeric

3.2.6.4 Electronic Deliverable File Format

An offsite laboratory will analyze the Phase I RFI investigation samples and tabulate the results in an electronic format specified by CH2M HILL. The data validator will add data validation qualifiers to the table of analytical results. In addition to the hard copy data package deliverable, CH2M HILL will receive an electronic file from the data validator in a table format that will facilitate downloading into a database. Table 3-6 documents the format that will be used for electronic deliverables.

TABLE 3-6
Analytical Data Electronic Deliverable Format

Analytical data must be delivered in a format compatible with Microsoft Access 2.0 or 7.0

Field Name	Field Type	Description
Sample_ID	A20	The CH2M HILL sample ID (taken from the Chain of Custody)
Sample_Analysis	A5	The analysis performed on the sample. We classify our samples into six main groups: VOA, SVOA, INORG, PEST, WCHEM, and FMETAL (for filtered samples).
Date_Analyzed	D	The date the sample was analyzed.
Date_Received	D	The date the sample was received in the lab.
Date_Collected	D	The date the sample was collected.
Lab_Sample_ID	A15	The lab sample ID.
Dilution_Factor	N	The dilution factor used, if applicable.
SDG_Number	A6	The SDG number.
CAS_Number	A6-A2-A1	CAS Number of the compound being analyzed (Note that the CAS number must consist of three number segments of defined length, separated by dashes).
Chem_Name	A50	The compound being analyzed.
Ana_Value	N	The analytical result.
Std_Qual	A5	The lab qualifiers, if any (e.g., U, UJ, B)
DV_Qual	A5	The data validation qualifier (e.g., J, R)
Units	A10	The unit of the result (e.g., MG/L)
Detect_Limit	N	The detection limit for the compound.
Method	A15	Analytical method used to analyze the sample fraction.

3.2.7 Surveying

Sampling locations at each SWMU and AOC will be horizontally located using a GPS following field activities. Elevations of monitoring wells will be surveyed to an accuracy of ± 0.01 feet. All survey data will be tied into the facility coordinate system. Latitude and longitude coordinates will also be presented.

3.3 Task 3: Sample Analysis and Validation

This task involves efforts related to the sample management and data validation. CH2M HILL will be responsible for tracking sample analysis and obtaining results from the laboratory. The analytical data generated during the SWMUs investigation field program will be validated by an independent data validation subcontractor according to EPA's *Functional Guidelines for Data Validation* (EPA, February 1994; EPA, September 1999).

3.3.1 Sample Analysis

All analyses of soil and groundwater will be conducted at a contracted laboratory that fulfills all requirements of the U.S. Navy's QA/QC Program Manual and EPA's Contract Laboratory Program (CLP) and SW 846 (for methods not covered by CLP). The laboratory must follow the scope of work prepared by the project team. A signed certificate of analysis will be provided with each laboratory data package, along with a certificate of compliance certifying that all work was performed in accordance with SW 846. All analyses will be performed following the highest level of EPA guidance. Analyses will include the proper ratio of field QC samples recommended by EPA guidance for the DQOs.

This task includes checking the data from the laboratory and converting it into an electronic format that can be readily incorporated into the GIS Data Management system for the AFWTF and EMA.

3.3.1.1 Field Quality Control Procedures

Quality control duplicate samples and blanks are used to provide a measure of the internal consistency of the samples and to provide an estimate of the components of variance and the bias in the analytical process. The QAPP provides details with regard to the number and frequency of field QC samples to be collected during the investigation.

3.3.1.2 Blanks

Blanks provide a measure of cross-contamination sources, decontamination efficiency, and other potential errors that can be introduced from sources other than the sample. American Society for Testing and Materials (ASTM) Type II water will be used for blanks. Four types of blanks can be generated during sampling activities: trip blanks, field blanks, equipment rinsate blanks, and temperature blanks.

One trip blank will be included in each cooler used for the daily shipment of VOC samples. If more than one cooler is being sent on a given day, all of the VOC samples should be placed in one cooler, if possible, to minimize the number of trip blanks needed. The trip blanks will be prepared before each sampling event, shipped or transported to the field with the sampling bottles, and returned unopened for analysis. Trip blanks will indicate if there is contamination during shipment to the field, from storage in the field, or from shipment from the field to the analytical laboratory.

One field blank will be collected per sampling event. If sampling events extend beyond 1 week (5 working days) or for windy and dusty field conditions, the number of field blanks should be increased. Field blanks are used to determine the chemical quality of water used for such procedures as decontamination and blank collection.

One equipment blank per sample medium will be obtained for each day of sampling. Equipment blanks will give an indication of the efficiency of decontamination procedures.

EPA has recently requested that a temperature blank be included in each cooler containing samples for analyses so that the laboratory can record the temperature without disturbing the samples. The temperature blank will be labeled, but will not be given a sample number nor will it be listed as a sample on the Chain-of-Custody (COC) form.

3.3.1.3 Duplicates

Field duplicate samples will be collected at a frequency of one field duplicate per 10 field samples per matrix. The locations from which the duplicates are taken will be selected randomly. Each duplicate sample will be split evenly into two sample containers and submitted for analysis as two independent samples.

3.3.1.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a frequency of 1 MS/MSD for every 20 field samples collected. Analytical results of these samples indicate the impact of the matrix (water, soil, sediment) on extracting the analyte for analysis. MS/MSD samples give an indication of the laboratory's analytical accuracy and precision within the sample matrix. Data validators will use these results to evaluate the accuracy of the analytical data.

3.3.2 Data Validation

Analytical results will be validated by CH2M HILL subcontractors approved by the Navy. Data validators will mostly use EPA Region II guidance (*Functional Guidelines*), but other validation guidelines may be used with prior EPA approval. Data validation will be pursuant to the requirements of Section X of the January 2000 consent Order, and all deviations from that have been, or will be, approved in writing by EPA.

The hardcopy data packages will be reviewed by the subcontractor chemists using the process outlined in EPA's *Functional Guidelines for Evaluating Data* (EPA, September 1999). Areas of review will include (when applicable to the method): holding time compliance, calibration verification, blank results, MS precision and accuracy, method accuracy as demonstrated by laboratory confirmation samples (LCSs), field duplicate results, surrogate recoveries, internal standard performance, and interference checks. A data review worksheet will be completed for each of these data packages and any non-conformance will be documented. This data review and validation process is independent of the laboratory's checks and focuses on the usability of the data to support the project data interpretation and decision-making processes.

Data that are not within the acceptance limits will be appended with a qualifying flag, which consists of a single or double-letter abbreviation that reflects a problem with the data. The following flags will be used in the evaluation:

> **U -** Undetected. Analyte was analyzed for but not detected above the method detection limit (MDL).

UJ - Detection limit estimated. Analyte was analyzed for, and qualified as not detected. The result is estimated.

J - Estimated. The analyte was present, but the reported value may not be accurate or precise.

R - Rejected. The data are unusable. (NOTE: Analyte/compound may or may not be present.)

Numerical sample results that are greater than the MDL but less than the laboratory reporting limit (RL) are qualified with a "J" for estimated as required by EPA's *Functional Guidelines* (EPA, 1994).

3.4 Task 4: Data Quality Evaluation

Analytical data will be collected during this investigation in the form of laboratory analytical results. The database will be populated with data validation qualifier results.

The data quality evaluation (DQE) is the quantitative and qualitative evaluation of overall trends in the project-specific database. The objective of the DQE process is to understand the effects of the overall analytical process on data usability to support project-specific data quality objectives (DQOs). The DQE includes an analysis of the effect of the specific sample matrix on the overall analytical process.

The DQE deliverable is a DQE Technical Memorandum (TM) that can be used by the project team to readily understand project-specific data usability. Topics to be addressed in the DQE TM include the following:

- *Potential blank contamination*—the effect on the usability of data for compounds detected in both the field or laboratory blank samples and the corresponding field samples
- *Laboratory performance*—evaluation of the recovery for blank spike samples such as the LCS, calibration criteria, etc.
- *Potential matrix interferences*—evaluation of the accuracy and precision for surrogates, spiked field samples, and duplicate field sample results
- *Assessment of PARCCs*—comparison of data validation findings with PARCCs (precision, accuracy, representativeness, comparability, and completeness)

This task also includes the evaluation of validated laboratory data and field-generated data. The data evaluation will include incorporation of historical data from the previous investigations, tabulation of the data, and generation of figures or tables associated with data (e.g., sampling location maps).

3.5 Task 5: Investigation Reports

A Draft Final Phase I RFI Report will be prepared for submittal to LANTDIV, NSRR, EPA, and PREQB. Based on the evaluation of the results presented in the Draft Final Phase I RFI Report, a Final Phase I RFI Report will be prepared. An outline of the draft Final Phase I RFI Report is presented in Exhibit 3-1.

EXHIBIT 3-1
Phase I RFI Report Outline
Final Site Specific Work Plan Phase I RFI

Section

SECTION 4

Project Management and Staffing

The CH2M HILL Task Manager designated for the oversight of this project is Mr. Marty Clasen. Mr. Clasen will be supported by Mr. John Tomik, who serves as Activity Manager for Vieques Island. Mr. Clasen will be responsible for such activities as technical support and oversight, budget and schedule review and tracking, preparation and review of invoices, personnel resources planning and allocation, and coordination with LANTDIV, NSRR, and subcontractors.

TABLE 4-1
Key Project Team Members

Phase I RFI, AFWTF, Vieques Island

Name	Role	Telephone Number	E-Mail Address
John Tomik	Activity Manager	(757) 460-0429 ext. 13	Jtomik@ch2m.com
Martin Clasen	Project Manager	(813) 874-6522 ext. 4307	Mclasen@ch2m.com
Russell Bowen	Senior QA Officer	(813) 874-6522 ext. 4300	Rbowen@ch2m.com
Vijaya Mylavarapu	Risk Assessor	(352) 335-5877 ext. 2224	Vmylavarapu@ch2m.com
Gary Webb	Health & Safety Officer	(425) 453-5000	Gwebb@ch2m.com
Kevin Sanders	Senior Project Chemist	(352) 335-5877 ext. 2436	Ksanders@ch2m.com
Erik Isern	Field Team Leader	(813) 874-6522 ext. 4146	Eisern@ch2m.com

The SWMU investigation field program (soil, groundwater, and wastewater sampling) will be performed by qualified CH2M HILL staff members. CH2M HILL will notify LANTDIV and NSRR which CH2M HILL personnel will mobilize to the site prior to initiating field activities. Subcontractors have not yet been established but will be reported to the EPA following their selection.

SECTION 5

Contractual Services

This section documents the anticipated subcontract services required for the completion of tasks documented in this work plan. The supplemental SWMU investigations will require subcontract services for the following:

- Geophysical Surveys
- Analytical Laboratory
- Data Validation
- Surveying
- Drilling Services (soil boring and monitoring well installation)

Ordnance and Explosives Support Services

SECTION 6

Project Schedule

This section documents the project schedule and the due dates of deliverables. Table 6-1 shows a breakdown on primary deliverables and assumed intervals for governmental review. Longer periods of review will result in an extended schedule.

TABLE 6-1
Proposed Project Milestones
Phase I RCRA Facility Investigation, AFWTF,
Vieques Island, Puerto Rico

Key Project Milestones	Duration
Draft Site-Specific Work Plan	30 days
EPA Review	90 days
Final Site-Specific Work Plan	75 days
EPA Approval of Final Site Specific Work Plan	30 days
Begin Implementation of Work Plan	60 days
Conduct Field Investigation	30 days
Laboratory Analyses	30 days
Data Validation/Management	30 days
Data Evaluation	30 days
Draft Phase I RFI Report	30 days
EPA Review	90 days
Final Phase I RFI Report	75 days

SECTION 7

References

CH2M HILL. Master Work Plan. February 2001.

Environmental Research, Inc. (ERI). 2000. Draft Air Photo Analysis of EMA/AFWTF. August 7, 2000.

EPA 2000. Administrative Order on Consent. Docket RCRA 02-2000-7301. AFWTF, Vieques Island, Puerto Rico. January 20, 2000.

EPA. Functional Guidelines for Data Validation. Sept. 1999.

EPA. Functional Guidelines for Evaluating Data. 1994.

Greenleaf/Telesca, Inc. Initial Assessment Study, Naval Station Roosevelt Roads, Puerto Rico. 1984.

Lockheed Martin, 1999. Aerial Photograph Study. 1999.

Puerto Rico Environmental Quality Board. *Revised RCRA Facility Assessment Report*. Land Pollution Control Area, Hazardous Waste Bureau. September 1995.

APPENDIX A

AOC A - UST Removal Closure Report

Closure Report

U.S. Naval Station
UST Tank Removal
Ceiba and Vieques, Puerto Rico

Tank 1005

Submitted by:

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

Prepared by IT and:

Pedro Panzardi & Associates
97 De Diego Avenue
San Juan, Puerto Rico 00926

Contract No.: N62470-96-B-6821
PPA Project 768251

April 2000

1.0 Introduction

The United States Naval Station removed underground storage tanks (UST) shown in Table 1-1 at its facilities at Roosevelt Roads in Ceiba, and in Vieques. Tanks at locations 1729, 2037, 2293, 1005, and 4703 were replaced with the aboveground storage tank (AST) and USTs shown in Table 1-2.

Table 1-1 - Tank Removals

Tank Number	Capacity (gallons)	Building	Location
UST 242	1000	242	R Roads, Ceiba
UST 386	550	386	R Roads, Ceiba
UST 860	1000	860	R Roads, Ceiba
UST 1729	1000	1729	R Roads, Ceiba
UST 2279	4000	2279	R Roads, Ceiba
UST 3175	550	3175	R Roads, Ceiba
UST 2037	600	2037	R Roads, Ceiba
UST 2293	4000	2293	R Roads, Ceiba
UST 1005	15000	1005	Vieques (OP 1
UST 4703 A	4000	4703	Vieques
UST 4703 B	4000	4703	Vieques
UST 4703 C	4000	4703	Vieques

The following new tanks were installed after receiving approval of from the Environmental Quality Board (EQB) number 02-86-1935 on June 24, 1996 for the UST installation.

Table 1-2 - New Tanks Installed

Tank Number	Capacity (gallons)	Building	Location
AST 1729	2000	1729	R Roads, Ceiba
UST 2037	500	2037	R Roads, Ceiba
UST 2293	4000	2293	R Roads, Ceiba
UST 1005	15000	1005	Vieques
UST 4703 A	4000	4703	Vieques
UST 4703 B	4000	4703	Vieques
UST 4703 C	4000	4703	Vieques

UST 2279:

Excavate and remove one 4,000-gallon waste oil tank and associated soil; cut and remove one set of strap and turnbuckle assembles; saw cut concrete slab and asphalt pavement, respectively; remove concrete and asphalt debris.

UST 3175:

Excavate and remove one 500-gallon No. 2 fuel tank and associated soil; cut and remove one set of strap and turnbuckle assembles and various piping; saw cut concrete sidewalk and remove concrete slab and containment debris.

UST 2037:

Excavate and remove one 600-gallon diesel tank and associated soil; cut and remove one set of strap and turnbuckle assembles and various piping; break and remove concrete hold-down slab debris.

UST 2293:

Excavate and remove one 4,000-gallon diesel tank and any associated soil; cut and remove one set of straps and turnbuckle assemblies. Break and remove concrete slab. Remove and replace gauge and various piping. Replace tank with another approved 4,000-gallon tank.

UST 1005:

Excavate and remove one 15,000-gallon diesel tank and associated soil; cut and remove one set of strap and turnbuckle assembles, gauge, and various piping; break and remove concrete slab debris.

Table 3-1 - Sample Summary Matrix

(Continued)

Roosevelt Roads Analytical						(mg/kg					
#	Date Smpl	Bldg.	S#	Type	TRPH	Benzene	Ethyl Benzene	Tol.	O-Xylene	M-Xylene	P-Xylene
8	1/11/97	2279	2279-TH-4	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
9	1/11/97	2279	2279-TH-5	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
10	1/11/97	2279	2279-TH-6	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
12	12/3/96	3175	3075-1-5	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
13	12/3/96	3175	3075-2-5	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
14	12/3/96	3175	3075-PT-3	Soil	9.2	<.5	<.5	<.5	<.5	<.5	<.5
15	12/3/96	3175	3075-5-5	Soil	72	<.5	<.5	<.5	<.5	<.5	<.5
16	1/9/97	2037	2037-TH-1	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
17	1/9/97	2037	2037-TH-2	Soil	<5.0	<.5	<.5	1.3	<.5	<.5	<.5
18	4/15/97	2293	2293-1	Soil	<5.0	<.5	<.5	3.6	<.5	<.5	<.5
19	4/15/97	2293	2293-2	Soil	9.7	<.5	<.5	0.89	<.5	<.5	<.5
20	4/15/97	2293	2293-3	Soil	16	<.5	<.5	0.79	<.5	<.5	<.5
21	4/15/97	2293	2293-4	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
22	4/15/97	2293	2293-5	Soil	9.8	<.5	<.5	2.7	<.5	<.5	<.5
23	3/16/97	1005	1005-1	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
24	3/16/97	1005	1005-2	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
25	3/16/97	1005	1005-3	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
26	3/16/97	1005	1005-4	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
27	3/5/97	4703	4703-A-4	Soil	<5.0	<.5	<.5	0.9	<.5	<.5	<.5
28	3/5/97	4703	4703-A-5	Soil	<5.0	<.5	<.5	1.1	<.5	<.5	<.5
29	3/5/97	4703	4703-A-6	Soil	<5.0	<.5	<.5	2.1	<.5	<.5	<.5
30	3/5/97	4703	4703-B-7	Soil	<5.0	<.5	<.5	2.1	<.5	<.5	<.5
31	3/7/97	4703	4703-B-8	Soil	<5.0	<.5	<.5	3.7	<.5	<.5	<.5
32	3/7/97	4703	4703-B-9	Soil	<5.0	<.5	<.5	<.5	<.5	<.5	<.5
33	3/3/97	4703	4703-C-1	Soil	84	<.5	<.5	<.5	<.5	<.5	<.5
34	3/3/97	4703	4703-C-2	Soil	<5.0	<.5	<.5	1	<.5	<.5	<.5
35	3/3/97	4703	4703-C-3	Soil	<5.0	<.5	<.5	2.2	<.5	<.5	<.5

3.1 General Procedure

Where applicable, as per instructions in drawings included in Appendix A, one temporary storage tank and connections were installed to continue operations while the removal and/or installation activities were being performed. The fuel in the existing storage tank was transferred to the temporary tank. Any sludge or slurry in the existing UST was to be removed for future disposal. There is no documentation of sludge or slurry being present in the tanks removed, cleaned, and disposed. Then the tank removal activities started. Once the tanks were removed, where applicable, a new tank was installed. The cleaning activities were all performed at the Roosevelt Roads facilities in Ceiba and on site at Vieques.

3.2 Tanks Removal

The Tank and Piping Removal and Disposal Plan was followed for the removal of the tanks UST 242, UST 386, UST 860, UST 1729, UST 2279, UST 3175, UST 2037, UST 2293 at Roosevelt Roads in Ceiba and UST 1005, UST 4703, UST 4703-B, and UST 4703-C in Vieques. The area around the tank and depicted as "Excavation Limits" in the drawings were surveyed to detect any underground utilities. In the meantime, the tank contents were removed and temporary tanks were installed if applicable. Once the area was surveyed, excavation started. Soil was placed in a plastic liner and removed where composite samples were taken. Once the tank was exposed, the lines were removed and the tank was removed. Soil samples were then taken. The area was either secured until results were obtained or backfilled immediately if it was a heavy traffic area. The tank hold was then closed by backfilling with uncontaminated soil and compacting or a replacement UST installed. See the photographs of tank removal and replacement activities in Appendix E.

3.3 Cleaning

All the cleaning activities were performed at the Roosevelt Roads facilities in Ceiba. The tanks were pressure cleaned; any residual material was to be removed by a vacuum truck and disposed.

Samples were taken at the two ends at approximately 10 feet deep. Results are in Appendix C. A new tank was then installed. Closure was then completed.

UST 2293:

A temporary tank was set up at Building 2293 on February 15, 1997 after poly was placed under the tank and a berm was placed around it. There were 550 gallons of diesel transferred from the old tank to the temporary tank on February 17, 1997. The concrete around UST 2293 was broken, hauled, and disposed of. The UST was removed and samples were taken on April 15, 1997 and sent to the laboratory. The laboratory results are in Appendix C.

UST 1005:

This closure involved the excavation and removal of one 15,000-gallon diesel tank and associated soil; cutting and removal of one set of strap and turnbuckle assembles, gauge, and various piping; breaking and removing concrete slab debris.

Work began on the Vieques Site in July 1997. The tank was removed and four samples were taken. The results are shown in Table 3-1 and Appendix C. The replacement tank was placed and clean soil was backfilled and compacted.

USTs 4703 A, B, and C:

This closure involved excavating and removing one 4,000-gallon diesel tank, two 4,000-gallon gasoline tanks, and 200-cubic yards of soil; cutting and removing three sets of straps and turnbuckle assembles, gauges, and various piping; transferring 7,960-gallon gasoline, 3,980-gallon diesel, and 60-gallon wastewater to temporary tanks; breaking and removing 23-cubic yards of concrete hold-down-tank slab debris.

The four tanks at this site were removed and three samples were taken at each tank hole. The results are shown in Table 3-1 and Appendix C.

MR. LARRY CRONK
IT CORPORATION
P.O. BOX 20002-154
CEIBA,PR 00735-2002

Drinking Water
HRS #83160
Environmental
HRS #E83079
ELAB, Inc.

ANALYTICAL REPORT

Submission Number: 9703000438
Date Received: 03/24/97
Date Reported: 04/03/97

Client's P.O. Number:
Project Number: 768251
Project Name: 768251

Lab Sample Number: 9703438 1
Client Sample Number: 1005-1
Sample Description: SOIL

Date Sampled: 03/16/97
Sample Matrix: SOLID

Method	Analyte	Result	Q	Unit	Reporting Limit	Analyst	Date Analyzed	Date Prepared
SM2540G	PERCENT SOLID	93.0		%	0.0	LL	03/28/97	
9073	TRPH	<5.0		mg/kg	5.0	EM	04/02/97	
	BTEX VOLATILE ORGANICS							
8020	BENZENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	ETHYLBENZENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	TOLUENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	o-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	m-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	p-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	

Lab Sample Number: 9703438 2
Client Sample Number: 1005-2
Sample Description: SOIL

Date Sampled: 03/16/97
Sample Matrix: SOLID

Method	Analyte	Result	Q	Unit	Reporting Limit	Analyst	Date Analyzed	Date Prepared
SM2540G	PERCENT SOLID	94.0		%	0.0	LL	03/28/97	
9073	TRPH	<5.0		mg/kg	5.0	EM	04/02/97	
	BTEX VOLATILE ORGANICS							
8020	BENZENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	ETHYLBENZENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	TOLUENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	o-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	m-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	p-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	

MR. LARRY CRONK
IT CORPORATION
P.O. BOX 20002-154
CEIBA,PR 00735-2002

Drinking Water
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ANALYTICAL REPORT

Submission Number: 9703000438
Date Received: 03/24/97
Date Reported: 04/03/97

Client's P.O. Number:
Project Number: 768251
Project Name: 768251

Lab Sample Number: 9703438 3
Client Sample Number: 1005-3
Sample Description: SOIL

Date Sampled: 03/16/97
Sample Matrix: SOLID

Method	Analyte	Result	Q	Unit	Reporting Limit	Analyst	Date Analyzed	Date Prepared
SM2540G	PERCENT SOLID	97.0		%	0.0	LL	03/28/97	
9073	TRPH	<5.0		mg/kg	5.0	EM	04/02/97	
	BTEX VOLATILE ORGANICS							
8020	BENZENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	ETHYLBENZENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	TOLUENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	o-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	m-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	p-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	

Lab Sample Number: 9703438 4
Client Sample Number: 1005-4
Sample Description: SOIL

Date Sampled: 03/16/97
Sample Matrix: SOLID

Method	Analyte	Result	Q	Unit	Reporting Limit	Analyst	Date Analyzed	Date Prepared
SM2540G	PERCENT SOLID	97.0		%	0.0	LL	03/28/97	
9073	TRPH	<5.0		mg/kg	5.0	EM	04/02/97	
	BTEX VOLATILE ORGANICS							
8020	BENZENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	ETHYLBENZENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	TOLUENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	o-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	m-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	
8020	p-XYLENE	<0.50		ug/kg	0.50	RM	03/28/97	

MR. LARRY CRONK
IT CORPORATION
P.O. BOX 20002-154
CEIBA,PR 00735-2002

Drinking Water
HRS #83160
Environmental
HRS #E83079
ELAB, Inc.

ANALYTICAL REPORT

Submission Number: 9703000438
Date Received: 03/24/97
Date Reported: 04/03/97

Client's P.O. Number:
Project Number: 768251
Project Name:, 768251

CERTIFICATION: All analytical data reported above were obtained using the specified methods and were validated by our laboratory quality control system. This laboratory follows an approved quality assurance program.

Respectfully submitted:

Francis Y. Huang, Ph.D. / Henry N. Ashby
Lab Director / President

P.O. Box 468 • 8 East Tower Circle • Ormond Beach, Florida 32175-0468
(904) 672-5668 • Fax (904) 673-4001

Puerto Rico: Mobile (809) 390-3505 • Beeper (809) 759-1255 • Unit #: 2148194

Drinking Water
HRS #83160
Environmental
HRS #E83079

ELAB, Inc.

QC REPORT

P.O. Box 468 • 8 East Tower Circle • Ormond Beach, Florida 32175-0468
(904) 672-5668 • Fax (904) 673-4001

Puerto Rico: Mobile (809) 390-3505 • Beeper (809) 759-1255 • Unit #: 2148194

Drinking Water
HRS #83160
Environmental
HRS #E83079

ELAB, Inc.

Quality Control Report

ient ID.:

IT CORP. **Submis.:** 9703000438 **DATE:** 4/2/97

	Precision				Accuracy					
Parameter	Sample I.D.	Rep A mg/L	Rep B mg/L	%RPD	Sample I.D.	Sample Conc. mg/L	MS Conc. mg/L	Spike Con. mg/L	%REC	Method blk mg/L
Alkalinity										
Ammonia										
BOD										
Silica										
Chloride										
COD										
Conductivity										
Cyanide										
Fluoride										
Hex. Chromium										
Kjeldahl Nitrogen										
Nitrate										
Nitrite										
*il and Grease										
*ho Phosphate										
pH										
Phenol										
Sulfate										
Hydrogen Sulfide										
TDS										
TOC										
Surfactants										
Total Phosphate										
Total Solids										
TRPH 418.1/9073	03557-1 MS	<5.00	<5.00	0.791	03557-1	<5.00	<5.00	<5.00	101.	<5.00
TSS										
Turbidity										
Oxidized Nitrogen										
Odor										
Flash Point										
Color										

%REC = [(MS Conc.-Sample Conc.)/Spike Conc.]

** = Insufficient Sample to perform QC.*

...DATA\WETCHEM\QC\03438WET.XLS

P.O. Box 468 • 8 East Tower Circle • Ormond Beach, Florida 32175-0468
(904) 672-5668 • Fax (904) 673-4001

Puerto Rico: Mobile (809) 390-3505 • Beeper (809) 759-1255 • Unit #: 2148194

Drinking Water
HRS #83160
Environmental
HRS #E83079
ELAB, Inc.

Surrogate Percent Recovery
Volatiles in Soil - 8020

Client Name: IT Corporation 97-03-438 *Date:* 3/28/97

Sample I.D.	*1,4-Difluorobenzene (80-120)*	*4-Bromofluorobenzene (72-120)*	*Comments*
BLANK	112	87.0	
97-03-438-1	105	87.0	
97-03-438-2	103	94.5	
97-03-438-3	104	91.5	
97-03-438-4	98.0	83.5	

Volatiles: *0* out of *10* ;outside QC limits

Water Matrix Spike/Matrix Spike Duplicate Recovery
Volatiles in Soil -

Sample I.D. 97-03-438-3 *(MS/MSD)*

Compound		*Conc. Spike Added(ug/L)*	*Sample Result*	*Conc. MS*	*%REC*	*Conc. MSD*	*%REC*	*% RPD*
RPD Limit	*REC Limit*							
Chlorobenzene								
20	*61-134*	25	ND	24.0	96.0	23.6	94.4	1.68
Toluene								
20	*62-135*	25	ND	25.5	102	24.8	99.2	2.78
Benzene								
20	*80-130*	25	ND	22.4	89.6	22.3	89.2	0.45

Volatiles: *0* out of *9* ;outside QC limits

Comments:

v:\data\admin\forms\qc\601 602qc

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Puerto Rico: Mobile (809) 390-3505 • Beeper (809) 759-1255 • Unit #: 2148194

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 517179
Page 1 of 1

Project Name/No.[1] 768251
Sample Team Members[2] L. CRONK
Profit Center No.[3] 3423510
Project Manager[4] PAUL ANDREAS
Purchase Order No.[6]
Required Report Date[11] ASAP

Samples Shipment Date[7] 3-20-97
Lab Destination[8] ENVIRODAB
Lab Contact[9] HANK ASHBY
Project Contact/Phone[12] 904-672-5468
Carrier/Waybill No.[13] FEDEX 400-9012-0100

Bill to:[5] I.T. CORP.
2925 BRIARPARK STE 500
HOUSTON, TX. 77042
ATTN: PAUL ANDREAS

Report to:[10] I.T. CORP.
P.O. BOX 20002-154
CEIBA, PUERTO RICO
ATTN: LARRY CRONK 00735-2002

ONE CONTAINER PER LINE

Sample Number[14]	Sample Description/Type[15]	Date/Time Collected[16]	Container Type[17]	Sample Volume[18]	Preservative[19]	Requested Testing Program[20]	Condition on Receipt[21]	Disposal Record No.[22]
1005-1	Soil	3-16-97@ 0835	500 ML GLASS	Full	ICE	TPH 418.1 MOD BTEX 8020	9703 — 438 — 1	
1005-2	↓	3-16-97@ 0915	↓	↓	↓	↓	FOR LAB USE ONLY -3	
1005-3		3-18-97@ 1230						
1005-4	↓	3-18-97@ 1300	↓	↓	↓	↓	↓ -4	
							FOR LAB USE ONLY	

Special Instructions:[23] PLEASE RUSH

Possible Hazard Identification:[24]
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☒

Sample Disposal:[25]
Return to Client ☐ Disposal by Lab ☒ Archive _____ (mos.)

Turnaround Time Required:[26]
Normal ☐ Rush ☒

QC Level:[27]
I. ☐ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by[28] (Signature/Affiliation) Larry W. Cronk — Date: 3-20-97 Time: 1330	1. Received by[28] (Signature/Affiliation) — Date: Time:
2. Relinquished by (Signature/Affiliation) — Date: Time:	2. Received by (Signature/Affiliation) — Date: Time:
3. Relinquished by (Signature/Affiliation) — Date: Time:	3. Received by (Signature/Affiliation) — Date: 3/24/97 Time: 16:30

Comments:[29]

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

PROJECT: Remove/Replace Various UST's at AFWTF Locations US Naval Station, Roosevelt Roads, Puerto Rico; Pico del Este, and Vieques, Puerto Rico

CONTRACT NUMBER: N62470-96-C-6821

LINE ITEM: Disposal of Fiberglass Fuel Storage Tanks and Piping

SITE: 1005

DESCRIPTION:

1. One (1) fifteen (15) thousand gallon fuel storage tank and piping were triple (3X) cleaned, rinsate water sampled and field FID tested. All tanks and piping were below acceptable levels afetr cleaning.

2. Tank were broken up into small manageable pieces, making the tank not re-useable.

3. The small pieces of the FG Tank and piping were loaded in the leased Leaseway Dump Truck and transported to the Viques landfill by Rich Hefferman, IT Employee, on March 27, 28, and 29, 1997.

Larry Cronk
QC Manager

The above mentioned materials were received at the Viques, Puerto Rico, landfill on the dates indicated.

Landfill Representative

File: Landfill.002

Drinking Water
HRS #83160
Environmental
HRS #E83079

ELAB, Inc.

QC REPORT

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Puerto Rico: Mobile (809) 390-3505 • Beeper (809) 759-1255 • Unit #: 2148194

Drinking Water
HRS #83160
Environmental
HRS #E83079

ELAB, Inc.

Quality Control Report

Client ID.:
IT CORP. *Submis.: 9703000438* *DATE:* *4/2/97*

	Precision				Accuracy					
Parameter	*Sample I.D.*	*Rep A mg/L*	*Rep B mg/L*	*%RPD*	*Sample I.D.*	*Sample Conc. mg/L*	*MS Conc. mg/L*	*Spike Con. mg/L*	*%REC*	*Method E mg/L*
Alkalinity										
Ammonia										
BOD										
Silica										
Chloride										
COD										
Conductivity										
Cyanide										
Fluoride										
Hex. Chromium										
Kjeldahl Nitrogen										
Nitrate										
Nitrite										
Oil and Grease										
Ortho Phosphate										
pH										
Phenol										
Sulfate										
Hydrogen Sulfide										
TDS										
TOC										
Surfactants										
Total Phosphate										
Total Solids										
TRPH 418.1 9073	03557-1 MS	<5.00	<5.00	0.791	03557-1	<5.00	<5.00	<5.00	101.	<5.00
TSS										
Turbidity										
Oxidized Nitrogen										
Odor										
Flash Point										
Color										

%REC = [(MS Conc.-Sample Conc.)/Spike Conc.]

** = Insufficient Sample to perform QC.*

I:\DATA\WETCHEM\QC\03438WET.XLS

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Puerto Rico: Mobile (809) 390-3505 • Beeper (809) 759-1255 • Unit #: 2148194

Drinking Water
HRS #83160
Environmental
HRS #E83079
ELAB, Inc.

Surrogate Percent Recovery
Volatiles in Soil - 8020

Client Name: IT Corporation 97-03-438 *Date:* 3/28/97

Sample I.D.	*1,4-Difluorobenzene (80-120)*	*4-Bromofluorobenzene (72-120)*	*Comments*
BLANK	112	87.0	
97-03-438-1	105	87.0	
97-03-438-2	103	94.5	
97-03-438-3	104	91.5	
97-03-438-4	98.0	83.5	

Volatiles: 0 out of 10 ;outside QC limits

Water Matrix Spike/Matrix Spike Duplicate Recovery
Volatiles in Soil -

Sample I.D. 97-03-438-3 *(MS/MSD)*

Compound		*Conc. Spike Added(ug/L)*	*Sample Result*	*Conc. MS*	*%REC*	*Conc. MSD*	*%REC*	*% RPD*
RPD Limit	*REC Limit*							
Chlorobenzene								
20	*61-134*	25	ND	24.0	96.0	23.6	94.4	1.68
Toluene								
20	*62-135*	25	ND	25.5	102	24.8	99.2	2.78
Benzene								
20	*80-130*	25	ND	22.4	89.6	22.3	89.2	0.45

Volatiles: 0 out of 9 ;outside QC limits

Comments:

v:\data\admin\forms\qc\601602qc

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Puerto Rico: Mobile (809) 390-3505 • Beeper (809) 759-1255 • Unit #: 2148194

GC and GC/MS ANALYSES

		STANDARDS I.D.	CONC. (ug/mL)	Trace #
te:	4/2/97	602/mixe/IDE	20	610
nent:	PE 8500 PID/FID			
it(s):	P.M.C	Unl Matrix Spk	35	595
ethod:	602/8020			
MS Data Run No.:	24040 for 3-557			
upervisor Review:	24076 for 4-031			
pproval Date:	MM 4/8/97	Internal Standard	20	619

Lab Sample #	Client Name	Date File	ALS#	Purg. Vol. (uL)	Dil. Factor	Int. Std. Vol. (uL)	Analyses *	Comments
3tl	ELIQC	604402		5.0	None	5 uL	602/8020	
Blk MS		BMS0402					602	
Dup Blk		BLK0402						
Dup Blk	Headspace	ABLK401	64284	Purge	None		method 18	
Air Ven Eff	4030-7	VESEFF	5					
Air VEW-1	4-031 1	AVEW1	6					
2	2	2	7					
3	3	3	8					
4	4	4	9					
5	5	5	4850					
6	6	6	1					
Air Dup	8	ADUP	2					
3-557-1		64893	4	5 mL	Alow		8020	
2		1	5					
3		5	6					
4		6	7					
4ms		7	8					
4msD		8	9					
~~5tl~~ 5tl		9	10	5mL			602	

pecify the analyses, if applicable

Output redirected to LPT1:
V/L FUL Processed: 04-02-1997 10:38:12. Segment 2. Cycle 2
DATA SAVED IN FILE D:\DMS04022.PTS Second Channel Stored in D:\CHS04022.PT

INTERNAL STANDARD TABLE

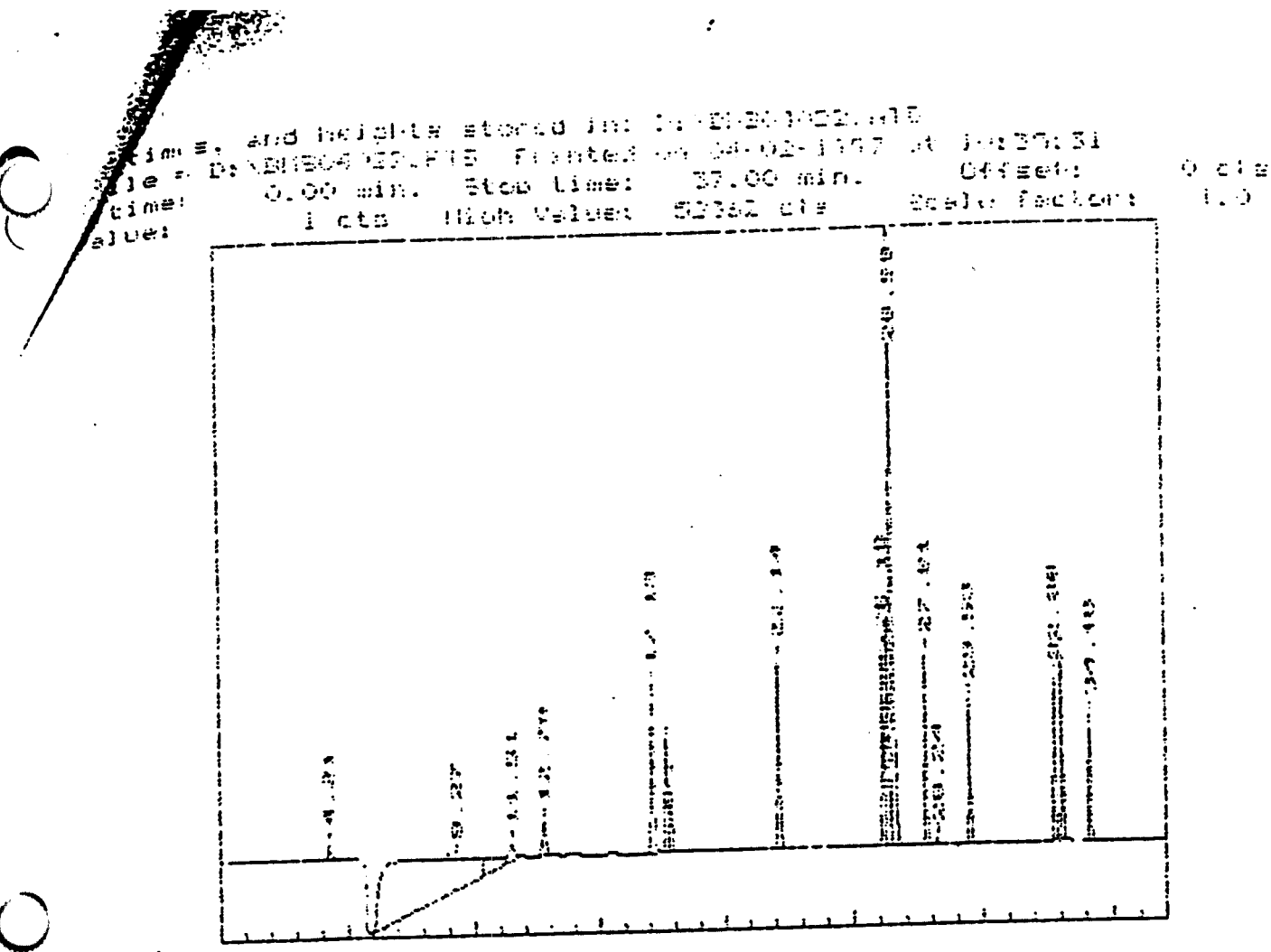
********** 04-02-1997 10:35:22 Version 5.2.0 **********
Sample Name: 20UG/L FULL BLK HS Data File: D:\DMS04022
Date: 04-02-1997 09:58:08 Method: B:\CFIDPID 02-27-1997 09:14:39 Version: 4
Interface: 1 Cycle#: 2 Operator: PMK Channel: A Vial#: N.A.
Starting Peak Width: 10 Threshold: .01 Area Threshold: 200
Instrument Type: PE 8500 GC FIDPID Column Type:
Solvent Description:
Conditions:
Detector 2: Detector 1:
Misc. Information: METHOD 502.2020 LPT1:

Starting Delay: 0.00 Ending retention time: 37.00
Area reject: 0 One sample per 1.002 sec.
Amount injected: 1.00 Dilution factor: 1.00
Internal Standard Amount: 20
Sample Weight: 1.00000

PEAK	RET TIME	PEAK NAME	CONCENTRATION in ug/l	NORMALIZED CONC	AREA	HEIGHT	AREA/ HEIGHT	BL	REF PEAK	INT.STD. PEAK	% DELTA RET TIME	CONC/AREA
1	4.309		4.5584	0.5641%	13416	1113	12.1	1		6		3.3978E-04
2	9.268		280.9462	43.5612%	826844	2528	327.1	2		6		3.3978E-04
3	11.506	MTBE	23.0470	4.0657%	26487	1345	19.7	2	6	6	0	8.7011E-04
4	12.792	Isopropylether	15.2054	2.2824%	18245	2496	11.3	1	6	6	0	5.3833E-04
5	17.134	Benzene	17.8547	3.1497%	52863	12663	7.4	2	6	6	0	1.9022E-04
6	17.685	Fluorobenzene	20.0000	0.0000%	58861	8422	7.0	2	6	6	0	3.3978E-04
7	17.852	1,4-Difluorobenzene	22.5746	3.9823%	66534	5511	7.4	2	6	6	0	5.5692E-04
8	22.144	Toluene	19.5437	3.2713%	96507	14184	6.4	1	6	6	0	2.0259E-04
9	26.186	Chlorobenzene	17.9439	3.1665%	86017	14863	5.8	2	6	6	.1579	2.0747E-04
10	26.353	Ethylbenzene	20.3854	3.5961%	106207	17580	6.0	2	6	6	0	1.9194E-04
11	26.586	1,3+1,4-Dimethylbe	47.5021	8.3798%	237575	40767	6.1	2	6	6	.1562	1.6518E-04
12	27.806	1,2-Dimethylbenzene	22.2730	3.9291%	94856	14460	6.0	1	6	6	0	2.5643E-04
13	28.249		1.5088	0.2662%	4441	416	10.7	2		6		3.3978E-04
14	29.526	MFB	16.9926	2.9966%	71033	10957	6.6	1	6	6	0	2.3918E-04
15	32.799	1,3-Dichlorobenzen	18.9214	3.3376%	65913	12283	5.4	2	6	6	0	2.8648E-04
16	33.099	1,4-Dichlorobenzen	20.7456	3.6586%	73483	14265	5.2	2	6	6	0	2.8223E-04
17	34.185	1,2-Dichlorobenzen	17.9484	3.1667%	61995	9417	6.5	1	6	6	0	3.4519E-04

TOTAL AMOUNT = 566.8472

GROUP NUMBER	GROUP AMOUNT	GROUP PERCENT
1	64.1972	9.8977%


and height stored in: D:\DATA\...
D:\DATA\...FID Printed on 24-02-1997 at 13:37:31
0.00 min. Stop time: 37.00 min. Offset: 0 cts
1 cts High Value: 62362 cts Scale factor: 1.0

...UENCE RECORDED IN E:\EFIDFID.SEQ

***** INTERNAL STANDARD TABLE *****

******************** 04-07-1997 09:40:40 Version 5.2.0 ********************
Sample Name: DOUBL FULL BLANK Data File: D:\DB[illegible]
Date: 04-02-1997 09:58:00 Method: E:\EFIDFID 04-07-1997 17:51:29 Version: 5[illegible]

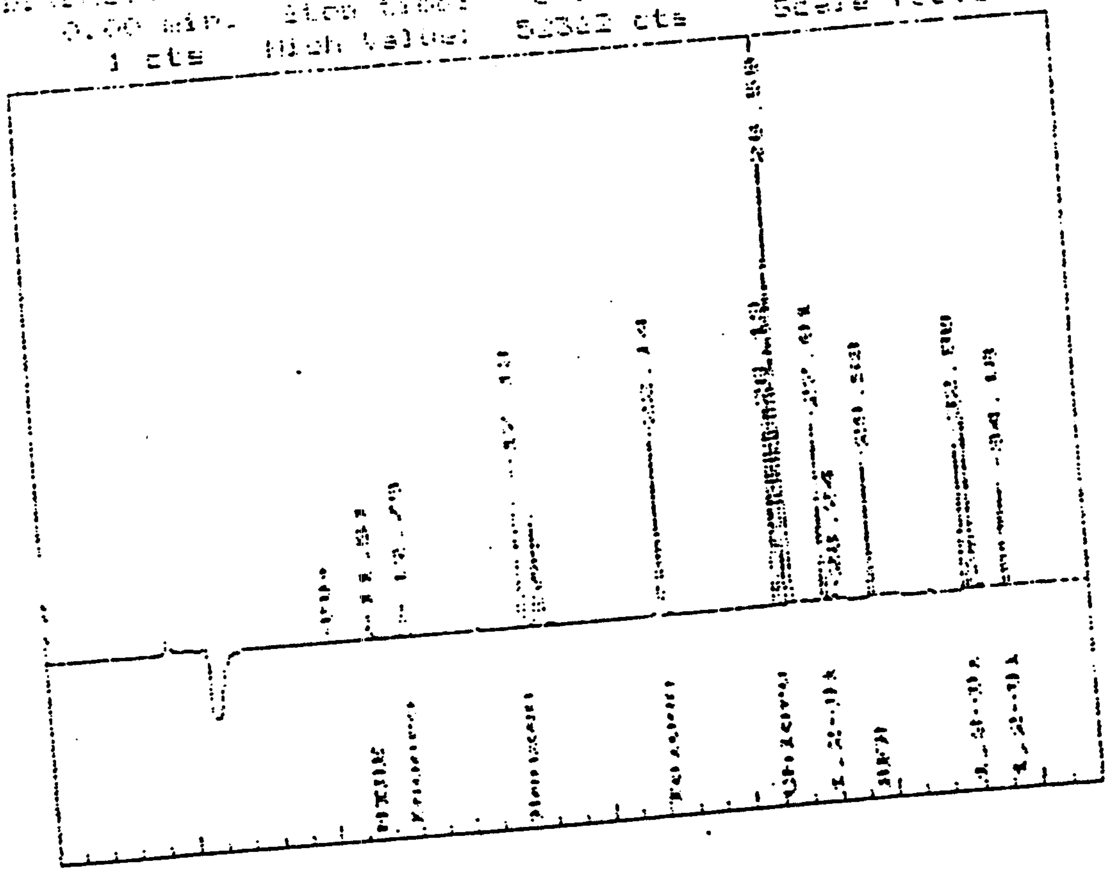
Interface: 1 Cycles: 2 Operator: [illegible] Channel: A Vial: N.A
Starting Peak Width: 10 Threshold: [illegible] Area Threshold: 800
****
Instrument Type: PE 8500 GC FID/FID Column Type:
Solvent Description:
Conditions:
Detector 0: Detector 1:
[illegible] FID
Misc. Information: METHOD 602/8020
****
Starting Q-level: 0.00 Ending retention time: 37.00
Area reject: [illegible] One sample per: 1.002 sec
Amount injected: 1.00 Dilution factor: 1.00
Internal Standard Amount: 20
Sample Weight: 1.00000

PEAK NUM	RET TIME	PEAK NAME	CONCENTRATION in ug/l	NORMALIZED CONC	AREA	HEIGHT	AREA/HEIGHT	BL	REF PEAK	INT.STD PEAK	% DELTA RET TIME	CONC/AREA
1	11.596	MTBE	10.1654	3.7863%	11239	941	11.9	1	4	4	0	9.0444E-04
2	12.792	Isopropylether	15.2054	5.6635%	28245	2496	11.3	1	4	4	0	5.3833E-04
3	17.124	Benzene	17.8547	6.6503%	93863	12663	7.4	2	4	4	0	1.9022E-04
4	17.685	Fluorobenzene	20.0000	8.0000%	59561	8422	7.0	2	4	4	0	3.3578E-04
5	17.852	1,4-Difluorobenzene	22.5746	8.4083%	40534	5311	7.4	2	4	4	0	5.5692E-04
6	22.144	Toluene	18.5437	6.9069%	90907	14184	6.4	1	4	4	0	2.0399E-04
7	26.186	Chlorobenzene	17.9479	6.6850%	86517	14863	5.8	2	4	4	.1579	2.0747E-04
8	26.353	Ethylbenzene	20.3854	7.5929%	104207	17520	6.0	2	4	4	0	1.9194E-04
9	26.596	1,3+1,4-Dimethylbe	47.5021	17.6929%	287575	46767	6.1	2	4	4	.1512	1.6518E-04
10	27.806	1,2-Dimethylbenze	22.2730	8.2958%	86856	14469	6.0	2	4	4	0	2.5643E-04
11	28.240		1.5083	0.5620%	4441	416	10.7	2		4		3.3970E-04
12	29.526	BFB	16.8726	6.2919%	61033	10957	5.6	1	4	4	0	2.7678E-04
13	32.799	1,3-Dichlorobenzen	18.8614	7.0327%	65913	12281	5.4	2	4	4	0	2.8646E-04
14	33.099	1,4-Dichlorobenzen	20.7956	7.7456%	73683	14265	5.2	2	4	4	0	2.8223E-04
15	34.165	1,2-Dichlorobenzen	17.9434	6.6832%	51995	9419	5.5	1	4	4	0	3.4519E-04

TOTAL AMOUNT = 268.4809

GROUP NUMBER	GROUP AMOUNT	GROUP PERCENT
1	43.2036	16.1[illegible]%

File = D:\...504022.RTB Printed on [illegible] 1997 at [illegible]
Start time: 0.00 min. Stop time: [illegible].00 min. Offset: [illegible]
Low Value: 1 cts High Value: 52322 cts Scale factor: 1.0



Output [illegible]
[illegible]-507-1 IT Processed: 04-02-1997 19:57:58. Segment [illegible] Cycle: 13
RAW DATA SAVED IN FILE D:\9489313.PTS Second Channel Stored in D: H4893[illegible]

***** INTERNAL STANDARD TABLE *****

******************** 04-02-1997 19:58:08 Version 5.2.0 ********************
* Sample Name: 3-507-1 IT Core   Data File: D:\9489313 *
* Date: 04-02-1997 19:20:36 Method: E:\CFIDFID 02-27-1997 09:14:39 Version: *

* Interface: 1   Cycle#: 13   Operator: RH   Channel: A   Vial#: N.A. *
* Starting Peak Width: 10   Threshold: [illegible]   Area Threshold: [illegible] *
****
* Instrument Type: PE 8500 GC FIDFID   Column Type: *
* Solvent Description: *
* Conditions: *
* Detector 0:   Detector 1. *
* Misc. Information: METHOD 8-2-80[illegible]   LF[illegible] *
****

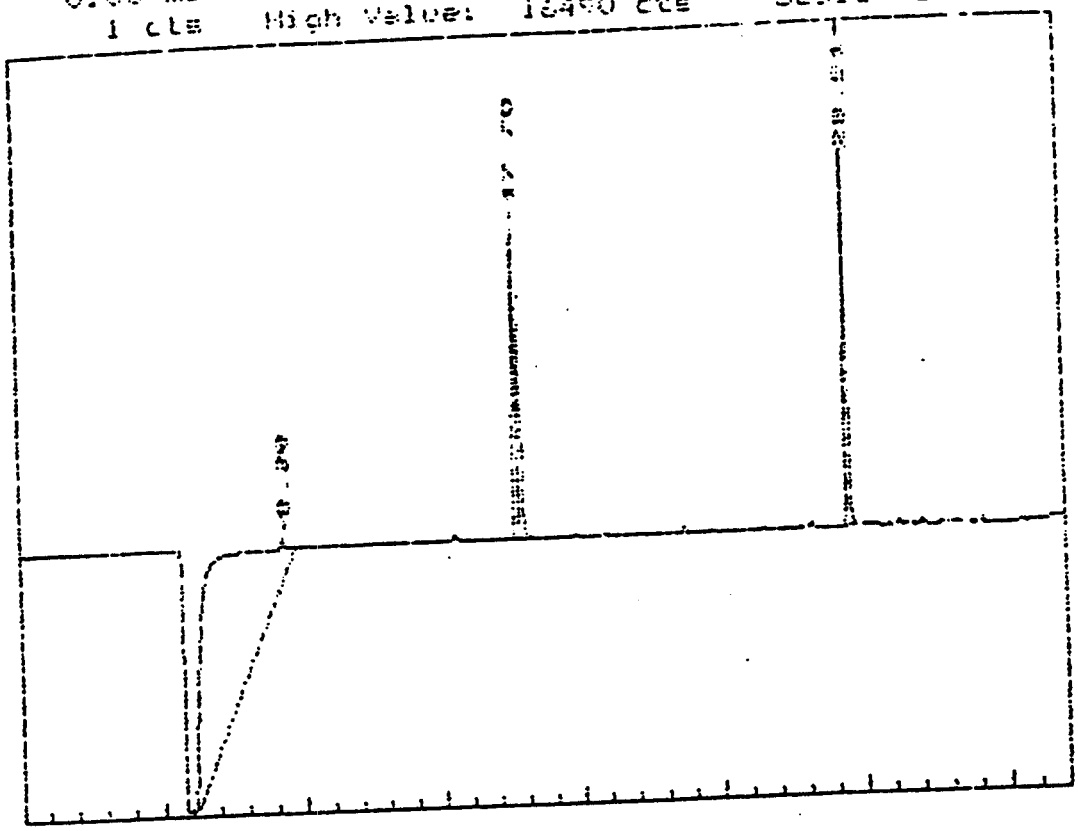
Starting Delay: 0.00   Ending retention time: 37.[illegible]
Area reject: 0   One sample per: 1.002 sec.
Amount injected: 1.00   Dilution factor: 1.00
Internal Standard Amount: 20
Sample Weight: 1.00000

PEAK NUM	RET TIME	PEAK NAME	CONCENTRATION in ug/l	NORMALIZED CONC	AREA	HEIGHT	AREA/ HEIGHT	BL	REF PEAK	INT.STD PEAK	% DELTA RET TIME	CONC/AREA
1	9.262		297.3406	86.68581	534847	1466	380.4	1		2		5.5594E-04
2	17.269	Fluorobenzene	20.0000	5.8308%	35975	5135	7.0	2	2	2	0	5.5594E-04
3	17.836	1,4-Dichlorobenzene	~~[illegible]~~ 16.05	7.25391	27366	3711	7.4	2	2	2	4	9.1122E-04
	28.723		2.2257	[illegible]	4063	390	10.3	1		2		5.5594E-04
	29.507	BFB	18.5615	5.4114%	40988	6995	5.9	1	2	2	.1316	4.5285E-04

TOTAL AMOUNT = 343.0095

GROUP NUMBER   GROUP AMOUNT   GROUP PERCENT

...s, times, and heights stored in: D:\DLK04023.RTP
...a File = D:\DLK04023.PTS Printed on 04-02-1993 at 11:24:06
...rt time: 0.00 min. Stop time: 37.00 min. Offset: 0 cts
...OW Value: 1 cts High Value: 16490 cts Scale factor: 1.0



put redirected to LPT1:
57-2 IT Processed: 04-02-1977 20:46:30. Segment 11. Cycle 14
DATA SAVED IN FILE D:\G469414.PTS Second Channel Stored in D:\H139414.PTS

INTERNAL STANDARD TABLE

04-02-1997 20:46:40 Version 5.2.0

Sample Name: 3-557-2 IT Conp Data File: D:\G469414

Date: 04-02-1997 20:09:29 Method: E:\CFIDPID 02-27-1997 09:14:39 Version: 40

Interface: 1 Cycle#: 14 Operator: RM Channel: A Vials: N.A

Starting Peak Width: 10 Threshold: .01 Area Threshold: 500

Instrument Type: PE 3500 GC FIDPID Column Type:

Solvent Description:

Conditions:

Detector 0: Detector 1:

Misc. Information: METHOD 602.B020 LPT1: X

Starting Delay: 0.00 Ending retention time: 31.00

Area reject: 0 One sample per 1.002 sec.

Amount injected: 1.00 Dilution factor: 1.00

Internal Standard Amount: 20

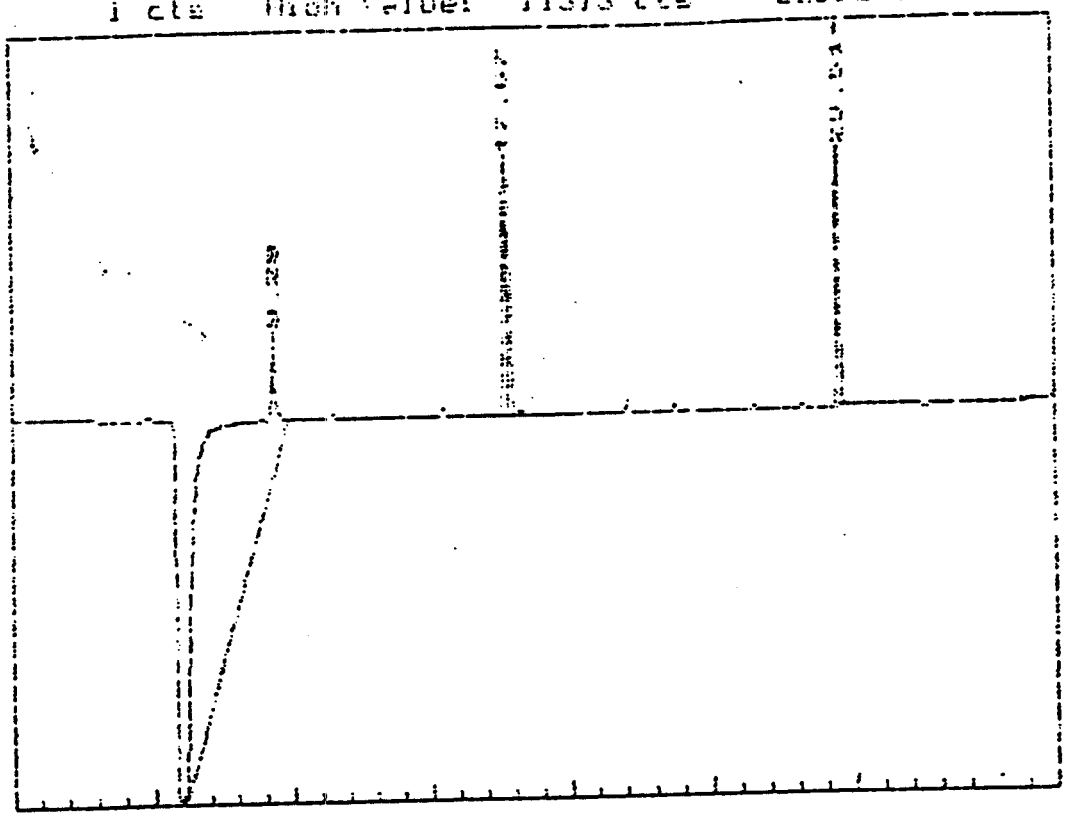
Sample Weight: 1.00000

	RET TIME	PEAK NAME	CONCENTRATION in ug/l	NORMALIZED CONC	AREA	HEIGHT	WIDTH HEIGHT	BL	REF PEAK	INT.STD PEAK	% DELTA RET TIME	CONC/AREA
1	9.285		334.7792	89.4614%	546641	1786	306.1	1		2		6.1243E-04
2	17.669	Fluorobenzene	20.0000	5.3440%	32657	4410	7.4	2	2	2	0	6.1243E-04
3	17.836	1,4-Difluorobenzene	12.6334	3.3762%	20627	3189	7.1	2	2	2	0	1.6038E-03
4	29.509	NF2	16.8036	4.4904%	33683	5716	5.9	1	2	2	.1310	4.9887E-04

TOTAL AMOUNT = 374.3161

GROUP NUMBER	GROUP AMOUNT	GROUP PERCENT

times and heights stored in: D:\040714.PTS
File name: 040414.PTS Printed on 04-02-1997 at 08:48:17
Start time: 0.00 min. Stop time: 37.00 min. Offset: 0 cts
Low value: 1 cts High value: 11313 cts Scale factor: 1.0



Output redirected to LPT1:
507-1 IT Processed: 04-02-1997 19:37:58, Segment 10, Cycle 13
DATA SAVED IN FILE D:\G4897313.PTS Second Channel Stored in D:\G4897313.PTS

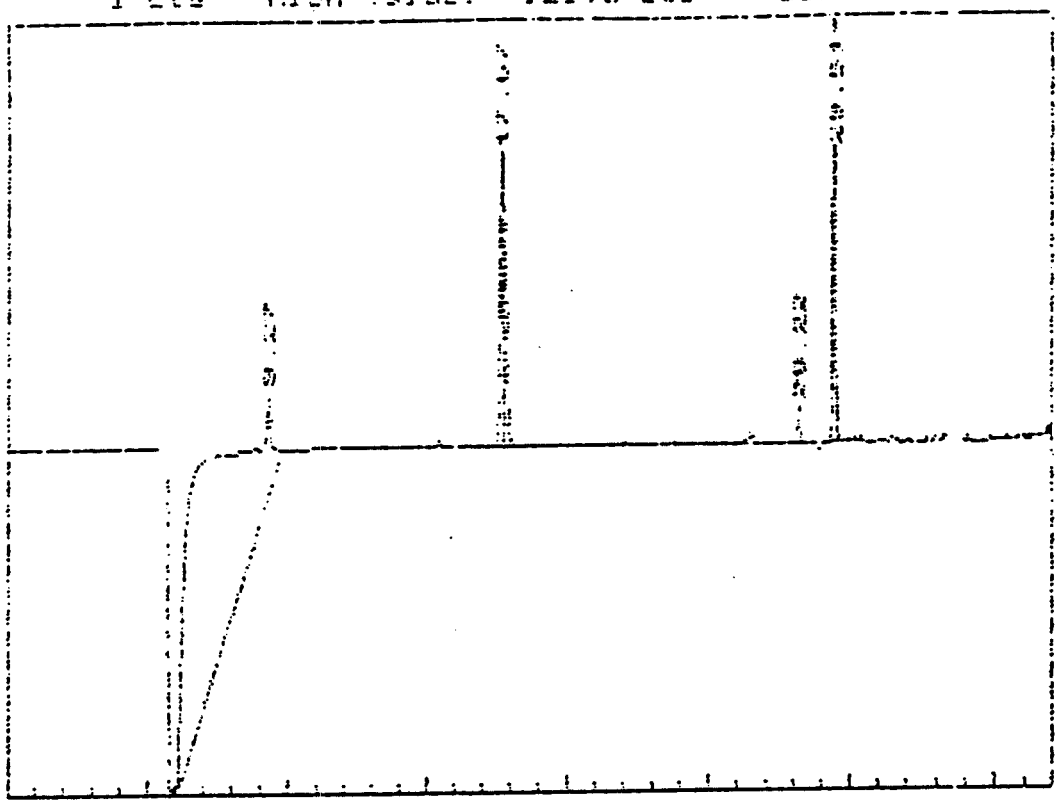
********** INTERNAL STANDARD TABLE **********

```
*************************** 04-02-1997 19:38:08 Version 5.2.0 ***********************
* Sample Name: 5-507-1 IT Corp      Data File: D:\G4897313                          *
* Date: 04-02-1997 19:20:36 Method: E:\CP11PID 02-27-1997 05:14:39 Version: 40      *
*                                                                                   *
* Interface: 3    Cycle#: 13    Operator: Bill   Channel: A   Vial#: N.A.           *
* Starting Peak Width: 10   Threshold: 1.01   Area Threshold: 800                   *
*************************************************************************************
* Instrument Type: PE 8500 GC PID/PID    Column Type:                               *
*                  Solvent Description:                                             *
*                                                                                   *
* Conditions:                                                                       *
*                 Detector 0:                    Detector 1:                       *
* Misc. Information: METHOD and Cycle:           LP11:                              *
*************************************************************************************
Starting Delay:    0.00                    Ending retention time:    37.00
Area reject:       0                       One sample per:       1.002 sec.
Amount Injected:        1.00               Dilution factor:         1.00
Internal Standard Amount:   20
Sample Weight:          1.000000
```

	RET TIME	PEAK NAME	CONCENTRATION in ug/l	NORMALIZED CONC	AREA	HEIGHT	AREA/ HEIGHT	BL	REF PEAK	INT.STD PEAK	% DELTA RET TIME	CONC/AREA
1	9.262		297.3404	88.68582	534847	1406	380.4	1		2		5.5594E-04
2	17.669	Fluorobenzene	30.0000	8.94966	35975	5135	7.0	2	2	2	0	8.5594E-04
3	17.836	1,4-Dichlorobenzene	24.3547	7.26351	27306	3711	7.4	2	2	2	0	9.1122E-04
4	28.223		2.2257	0.66391	4043	390	10.3	1		2		5.5594E-04
5	31.507	BFB	18.5615	5.53741	40488	4995	8.1	1	2	2	.1216	4.5865E-04

TOTAL AMOUNT = 143.0095

GROUP NUMBER	GROUP AMOUNT	GROUP PERCENT



Excavation of Tank 1005 July 1997

OP 1

AOC-A

AOC - A

APPENDIX B

Checklist For Field Sampling and Analysis Plan

Site-Specific Investigation-Derived Waste Plan Checklist

This checklist supplements the Master IDW Plan with site-specific information. Once completed for a specific project, it provides necessary IDW information for each investigation. It is to be taken into the field with the Master IDW Plan.

Site: AFWTF

1. IDW Media:
   - X_____Soil cuttings
   - X_____Well development or purge water
   - X_____Decontamination residual soil and wastewater
   - X_____PPE or disposable equipment
   - _____Other _____

2. Expected Regulatory Status:
   - _____Hazardous
   - _____Solid Waste
   - X_____Unknown
   - X_____Other Waste management activities regulated by OSHA Hazwoper standard (1910.120)

3. Site Location: Decontamination fluids and PPE will be generated at all SWMUs.

4. Nature of Contaminants Expected:
   - X_____Petroleum contamination
   - X_____Polyaromatic hydrocarbon
   - X_____Pesticides
   - X_____Herbicides
   - X_____PCBs
   - X_____Metals
   - X_____Other - Contaminant concentrations from previous analytical results were very low for all of the above.

5. Volume of IDW Expected:
   - X_____Drums - Maximum of 6. One for decontamination Fluids, four for drilling cuttings and one for PPE and other disposable items.
   - _____Cubic Yards
   - _____Tons
   - _____Gallons

6. Compositing Strategy for Sample Collection: No IDW sampling planned. Will base disposal decisions on analytical results from sampling.

7. IDW Storage

X_____As per Master IDW Plan _____Other_____

8. Waste Disposal

X_____As per Master IDW Plan _____Other_____

Site-Specific Quality Assurance Project Plan Checklist

This checklist supplements the Master QAPP with site-specific information. Once completed for a specific project, it provides necessary quality assurance information for each investigation. It is to be taken into the field with the Master QAPP.

Site: AFWTF

1. List sampling tasks: groundwater and subsurface soil sampling, surface soil sampling, and monitoring well installations.

2. List data quality objectives: The objective of the SWMU Investigation is to determine the need for further action at each of the SWMUs. Previous analytical data and the analytical data generated from the Investigation will be reviewed and a recommendation for no further action or additional investigation will be made based on the data.

3. Organization:

LANTDIV Navy Technical Representative	Chris Penny / LANTDIV
PREQB Federal Facilities Project Manager	Aissa Colon/ PREQB
CH2M HILL Activity Manager	John Tomik / CH2M HILL
Quality Control Senior Review	Kevin Sanders / CH2M HILL
Technical Project Manager	Marty Clasen/ CH2M HILL
Field Team Leader	Erik Isern/ CH2M HILL

4. Table of samples with analyses to be performed and associated QC samples included in the SWMU Investigation Work Plan.

5. Analytical Quantitation Limits:
   X_____As per Master QAPP

   _____Other

6. QA/QC Acceptance Criteria (e.g., precision, accuracy)
   X_____As per Master QAPP _____Other (attached)

7. Data reduction, validation, and reporting:
   X_____As per Master QAPP _____Other (attached)

8. Internal QC Procedures (field and laboratory):

X_____As per Master QAPP _____Other (attached)

9. Corrective Action:
X_____As per Master QAPP _____Other (attached)

10. Other deviations from Master QAPP - None

Site-Specific Field Sampling Plan Checklist

This checklist supplements the Master Field Sampling Plan with site-specific information. Once completed for a specific project, it provides necessary field sampling information for each investigation. It is to be taken into the field with the Master FSP.

Site: AFWTF

1. Tasks to be performed:

X Geophysical surveys
___ Soil gas surveys
X Surface water and sediment sampling
X Surface soil sampling
X Soil boring installation
X Subsurface soil sampling
X Monitoring well installation and development
___ Monitoring well abandonment
X Groundwater sampling
X In-situ groundwater sampling
___ Aquifer testing
X Hydrogeologic measurements
___ Biota sampling
___ Trenching
___ Land surveying
X Investigation derived waste sampling
X Decontamination
___ Other_____

2. Field measurements to be taken:

X temperature
X pH
X dissolved oxygen
X turbidity
X specific conductance
X organic vapor monitoring
X geophysical parameters (list):
X electromagnetic induction
___ ground-penetrating radar
X oxidation reduction potential
X surveying
X magnetometry
X global positioning system
___ soil gas parameters (list):
___ combustible gases
X water-level measurements
___ pumping rate
___ other_____

3. Sampling program (nomenclature, etc.):

X As per Master FSP ___ Other

4. Map of boring and sampling locations (attach to checklist): See Work Plan.
5. Table of field samples to be collected: See Investigation Work Plan.
6. Applicable SOPs or references to specific pages in Master FSP: The following SOPs from Attachment of the Master Project Plans are to be implemented.

- Shallow Soil Sampling
- General guidance for Monitoring Well Installation
- Homogenization of Soil and Sediment Samples

- VOC Sampling – Water
- Field Filtering
- Chain-of-Custody
- Packaging and Shipping Procedures
- Equipment blank and Field Blank Preparation
- Decontamination of Personnel and Equipment
- Disposal of Fluids and Solids
- Volatiles monitoring with an OVA
- Field Measurement of pH
- Field Measurement of pH and Eh
- Field Measurement of specific conductance
- Field Measurement of Dissolved Oxygen
- Field Measurement of pH, Specific conductance, turbidity, dissolved oxygen, and temperature using the Horiba®U-10 sampler
- Preserving Non-VOC Aqueous samples
- Groundwater sampling from monitoring wells
- Soil sampling for VOCs using the Encore® samples
- Soil sampling
- Soil boring drilling and abandonment
- Soil boring sampling-split spoon
- Logging of soil borings
- Water level measurements

Region II's SOP groundwater sampling procedures low stress (low flow) purging and sampling (March 16, 1998)

7. Site-specific procedures or updates to protocols established in the Master FSP:

   Described in the Work Plan.

Site-Specific Health and Safety Plan

This checklist must be used in conjunction with the Master HASP. This checklist is intended for use by CH2M HILL employees only. All CH2M HILL employees performing tasks under this checklist must read and sign both this checklist and the Master HASP and agree to abide by their provisions (see EMPLOYEE SIGNOFF attached to the checklist.

Site: AFWTF

Location(s): SWMU Location Map and Individual SWMU figures are included in the Work Plan.

This document shall be maintained on site with the Master Health and Safety Plan. It will include as attachments from the Work Plan a site map and the site characterization and objectives for this site.

The procedures described in the Master Health and Safety Plan will be followed unless otherwise specified in this Site-Specific Health and Safety Plan.

1. HAZWOPER-Regulated Tasks

_____Test pit and excavation
X_____Soil boring installation
X_____Geoprobe boring
X_____Geophysical surveys
_____Hand augering
X_____Subsurface soil sampling
X_____Surface soil sampling
_____Soil gas surveys
X_____Sediment sampling
X_____Monitoring well/drive point installation
_____Monitoring well abandonment
X_____Groundwater sampling
_____Aquifer testing
X_____Hydrologic measurements
X_____Surface water sampling
_____Biota sampling
X_____Investigation-derived waste (drum) sampling and disposal
_____Observation of loading of material for offsite disposal
_____Oversight of remediation and construction
_____Other_____

2. Hazards of Concern: (Check as many as are applicable. Refer to Section 3 of Master H&S Plan for control measures):

X_____Heat stress
_____Cold stress
_____Buried utilities, drums, tanks
_____Inadequate illumination
X_____Drilling
_____Heavy equipment
_____Working near water
_____Flying debris
_____Gas cylinders
X_____Noise
X_____Slip, trip, or fall hazards
X_____Back injury
_____Confined space entry
_____Trenches, excavations
_____Protruding objects
X_____Vehicle traffic
_____Ladders, scaffolds
_____Fire
_____Working on water
_____Snakes or insects
X_____Poison ivy, oak, sumac
X_____Ticks
_____Radiological
_____Other_____

3. Contaminants of Concern (List if known. Refer to Table 3.8 of the Master HASP contaminant-specific information

PCBs Metals VOCs

PNAs SVOCs

4. Personnel (List CH2M HILL field team members :

Field team leader(s) Erik Isern

Site safety coordinator(s) Erik Isern

Field team members Karen Karvazy, Emiliano Cabale, Hector Hernandez, Gabe Silva, Katie Swanson, Rick Gorsira

5. Contractors/Subcontractors

X Procedures as per Master HASP

X Other

Name: To be added

Contact: To be added

Telephone: To be added

6. Level of personal protective equipment (PPE) required: D
Refer to Table 5.1 of Master HASP, CH2M HILL SOPs HS-07 and HS-08, and Respiratory Protection, Section 2 of the Site Safety Notebook.

7. Air monitoring instruments to be used (refer to Master HSP for action levels):

X OVM 10.6 FID

CGI Dust monitor

O_2

8. Decontamination procedures:

As per Section 7 of Master HASP

X Other As described in the SWMU Investigation Work Plan.

_____Site

HASP Checklist Employee Signoff

The employees listed below have been given a copy of both this health and safety plan checklist and the Master HSP, have read and understood them, and agree to abide by their provisions.

EMPLOYEE NAME	EMPLOYEE SIGNATURE AND DATE

APPENDIX C

Standard Operating Procedures for OE Support Services

Standard Operating Procedures for Ordnance Explosives (OE) Support Services at AFWTF, Vieques Island, Puerto Rico

Introduction

CH2M HILL is under contract to conduct RFI activities in Eastern Vieques Island, Puerto Rico to provide data needed in support of these environmental remediation activities.

The OE firm (hereinafter referred to as the "subcontractor" will support CH2M HILL's brush clearing and sampling efforts for this project by providing onsite OE support during all field activities, which will include brush clearing, electromagnetic surveys (EM), surface and subsurface soil sampling, subsurface drilling, surveying of the sampling points/ wells, and access to these areas. The OE team will not remove, handle, or destroy any OE/UXO that is encountered. The subcontractor will comply with the health and safety requirements specified by CH2M HILL's Health & Safety Plan, at a minimum, as well as any H&S Procedures that are specified to the subcontractor's specialized services; these will be included in the subcontractor's UXO work plan described below.

UXO Support Services Required

Subcontractor Tasks - Ordnance Explosives (OE) Avoidance

The subcontractor shall provide a two-person OE team to provide on-site OE avoidance support during all brush clearance, sampling activities, which include surface and subsurface soil sampling, surveying of sampling points and installation and sampling of monitoring wells. The subcontractor OE team will be comprised of a minimum of a UXO Technician III as Team Leader and a UXO Technician II as team member. The OE team will not remove, handle, or destroy any OE or unexploded ordnance (UXO) encountered. The OE team will report all OE/UXO to CH2M HILL, who in turn will request assistance from the Roosevelt Roads Navy EOD Team, Todd Enders point of contact, for proper removal and disposal.

The subcontractor OE Team will be comprised of a minimum of a UXO Technician III and a UXO Technician II. Resumes, medical surveillance, and OSHA 40-hour training certificates of the OE Team personnel must be provided to the CH2M HILL UXO Safety Officer prior to mobilization.

OE Team Composition and Qualifications

- *1.1X0 Team Leader*. This individual will be a UXO Technician III and will be the technical lead directly responsible for all OE avoidance activities at each project site. This person must have documented experience in supervising range clearance operations and supervising personnel. This individual must be a graduate of the U.S. Army Bomb

Disposal School, Aberdeen Proving Ground, Maryland or the Naval Explosive Ordnance School at Indian Head, Maryland and have at least 10 years of combined military active duty EOD and contractor UXO experience.

- *LIXO Team Member*. This individual must be a UXO Technician II and a graduate of the U.S. Army Bomb Disposal School, Aberdeen Proving Ground, Maryland U.S. Naval Explosive Ordnance School at Indian Head, Maryland. As an exception, a UXO Technician II may be an UXO Technician I that is a graduate of the EOD Assistants Course, Redstone Arsenal, Alabama, the EOD Assistants Course Eglin Air Force Base, Florida, or a DOD certified equivalent course with at least five years (combined) active-duty military EOD and contractor UXO experience.

Responsibilities and Authority. The OE team will provide the explosive ordnance recognition, location, and safety function for all contractor personnel onsite. The OE Team Leader has final authority for onsite personnel regarding all matters pertaining to OE/ UXO.

Task 1- Work and Safety Plans. The OE team will follow their approved OE Safety and Health Plan which is appended as Appendix D in CH2M HILL's Work Plan for these 4 RI/FS activities. The UXO Team Leader will conduct safety briefings for all site personnel and visitors.

Task 2 - Mobilization/Demobilization.

Upon notice to proceed, provide all necessary personnel and equipment to accomplish the scope of work.

Task 3 - OE Avoidance

Clear Access Routes to Sampling Locations.

a. Prior to brush clearing, the OE Team shall conduct a reconnaissance of the area to be cleared. Only after this area has been inspected and approved for further activities by the UXO Team Leader, shall movement into the area, drilling or sampling activities commence.

b. Prior to sampling or well drilling crews going onsite, the OE Team shall conduct a reconnaissance of the sampling and drilling areas. The reconnaissance shall include locating a clear path for the sampling crews, vehicles and equipment to approach the site. The approach path, at a minimum will be twice the width of the widest vehicle. The contractor will clearly mark all boundaries of the cleared approach path to prevent personnel from straying into un-cleared areas. No personnel shall be allowed outside the cleared paths.

c. If OE/UXO is encountered on the surface, divert the approach around the OE/UXO, clearly, mark the area and report the OE/UXO.

d. A magnetometer shall be used to insure there is no subsurface UXO within the approach paths. If an magnetic anomaly is encountered, assume it to be a UXO and divert the path around the anomaly. Only UXO personnel shall identify UXO and operate the magnetometer.

Soil Sampling/Well Installation Sites.

a. The OE team shall locate magnetic anomaly areas for soil samples and well drilling. If a pre-selected area indicates magnetic anomalies, a new sampling site will be chosen.

b. The Contractor will clearly mark the boundaries of the cleared soil sampling. Personnel will not go outside the cleared area. As a minimum, the cleared area will be a. square, with a side dimension equal to twice the length of the largest vehicle or piece of equipment to be bought onsite.

c. Prior to drilling equipment being moved to the proposed well location, the OE Team shall locate a magnetic anomaly free site. This shall be accomplished using a magnetometer with down-hole monitoring capabilities. The OE Team will direct the beginning of the borehole, which will be started with a hand held or portable auger. At not more than a two foot depth, the auger will be withdrawn and the magnetometer will be lowered into the borehole. This procedure will be used to insure that smaller items of UXO, undetectable from the surface, can be detected. If no magnetic anomalies are found, the procedure will be repeated at two foot intervals to the maximum depth of the auger, but not less than 4 feet. If the proposed borehole site is free of magnetic anomalies, the drilling equipment may be bought onsite and utilized. Borehole monitoring with the magnetometer shall continue at two foot intervals, until the sampling is completed.

SAFETY and Quality Assurance

The subcontractor must provide the CH2M HILL UXO Safety Officer a current SAFETY EMR below industry averages to be eligible for this solicitation. The OA Health and Safety plan provided by the sub-contractor is appended as Appendix D.

The site is considered a hazardous waste site. Therefore, the subcontractor will comply with 29 CFR 1910.120; the OSHA regulations for the protection of hazardous waste workers. The subcontractor may refer to CH2M HILL's Health and Safety Plan for a description of site conditions at the project site, including safety of all personnel and property during performance of the work. Subcontractor personnel must be on a medical surveillance program and have current physicals.

Workmanship

The subcontractor will provide all necessary tools, support equipment, and ancillary materials needed to complete the work described herein. The subcontractor will perform all work necessary to move personnel and equipment in and out of the site, set up equipment, and restore the site to its original condition. To the extent possible, the site will be left in the condition in which it was found.

Task 4 - Report

The subcontractor shall prepare a final report that includes daily activities, UXO identified (complete description required: For example: 105rnm HE Projectile with M51 Point Detonating Fuze, Fired and Fuze Armed), any problems, and lessons learned.

References

DOD 6055.9-STD	DOD Ammunition and Explosives Safety Standards
OPNAVINST 8020.14	Department of the Navy Explosives Safety Policy
NAVSEA OP 5 Vol 1	Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation and Shipping
Interim Guidance Document 00-03	Basic Safety Concepts and Considerations for OE Operations, U.S. Army Corps of Engineers OE Center of Excellence