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Final
Site Specific Work Plan
U.S. Naval Ammunition Support Detachment
Vieques Island, Puerto Rico
Phase II, Seven Sites

Prepared for

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command

Under the
LANTDIV CLEAN II Program
Contract No. N62470-95-D-6007
CTO-031

Prepared by

CH2MHILL

Tampa, Florida

December 2000

CH2M HILL
4350 W Cypress Street
Suite 600
Tampa, FL
33607-4178
Tel 813.874.0777
Fax 813.874.3056

CH2MHILL

December 01, 2000

Helen Shannon
USEPA
RCRA Program Branch
290 Broadway 22nd Floor
New York, NY 10007

Re: Transmittal of Final Phase II Site Specific Work Plan for the Expanded PA/SI at Naval Ammunition Storage Detachment
Vieques, Puerto Rico

Dear Ms Shannon:

On behalf of LANTDIV, CH2M HILL is pleased to submit three copies of the Final Phase II Site Specific Work Plan for the Expanded PA/SI at the Naval Ammunition Storage Detachment, Vieques Island, Puerto Rico. Comments received from EPA via e-mail have been incorporated into this final work plan. Responses to comments will be included in the Appendix of the PA/SI report.

The number of copies varies for each person listed below.

Should you have any questions regarding the above, please do not hesitate to call me at 813-874-6522 ext. 4307.

Sincerely,

Martin J. Clasen

Martin J. Clasen, P.G.
CH2M HILL
Project Manager

c:	Mr. Jose Lajara, PREQB	2 copies
	Mr. John Tomik, CH2M HILL	1 copy
	Mr. Chris Penny, LANTDIV	1 copy
	Ms. Madeline Rivera, NSRR	1 copy

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SECTION 1

Introduction

This work plan describes the Phase II Expanded Preliminary Assessment/Site Investigation (PA/SI) to be completed at various Areas of Concern (AOCs) at the U.S. Naval Ammunition Support Detachment (NASD) in Vieques, Puerto Rico. This work plan is based on a scope of work provided by Naval Facilities Engineering Command (NAVFACENGCOM) LANTDIV as part of Navy Contract N62470-95-D-6007, Navy Comprehensive Long-Term Environmental Action Navy (CLEAN), District III, Contract Task Order-31.

The general background and physical setting of the NASD are described in Sections 3 and 4 of the Master Project Plan, prepared by CH2M HILL in March 2000. The following AOCs are addressed in this AOC Phase II Investigation Work Plan:

- AOC B – Wastewater Treatment Plant and Disposal Ground
- AOC H – Power Plant
- AOC I – Asphalt Plant
- AOC J – Former Staging Area Disposal Site
- AOC K – Water Well
- AOC L – Former Septic Vault
- AOC R – Construction Staging Area

Additionally, representative background soil, sediment, and groundwater samples will be collected for metals analysis. Background samples will be collected from areas unaffected by waste management activities. This background study will be conducted under a separate investigation as explained under section 2.10 of this document. A separate work plan will be prepared for the background study.

Figure 1-1 shows the locations of Vieques Island and Puerto Rico. Figure 1-2 shows the locations of the AOCs included in this investigation. Section 2 of this site-specific work plan presents an initial evaluation of each site, based upon the results of previous investigations (if any) and the rationale that supports the sampling. Section 3 describes the technical approach to sampling tasks. Section 4 presents general information regarding project management and staff organization. Section 5 documents the anticipated subcontract services required for completion of tasks documented in this work plan. Section 6 presents the schedule for the completion of these tasks.

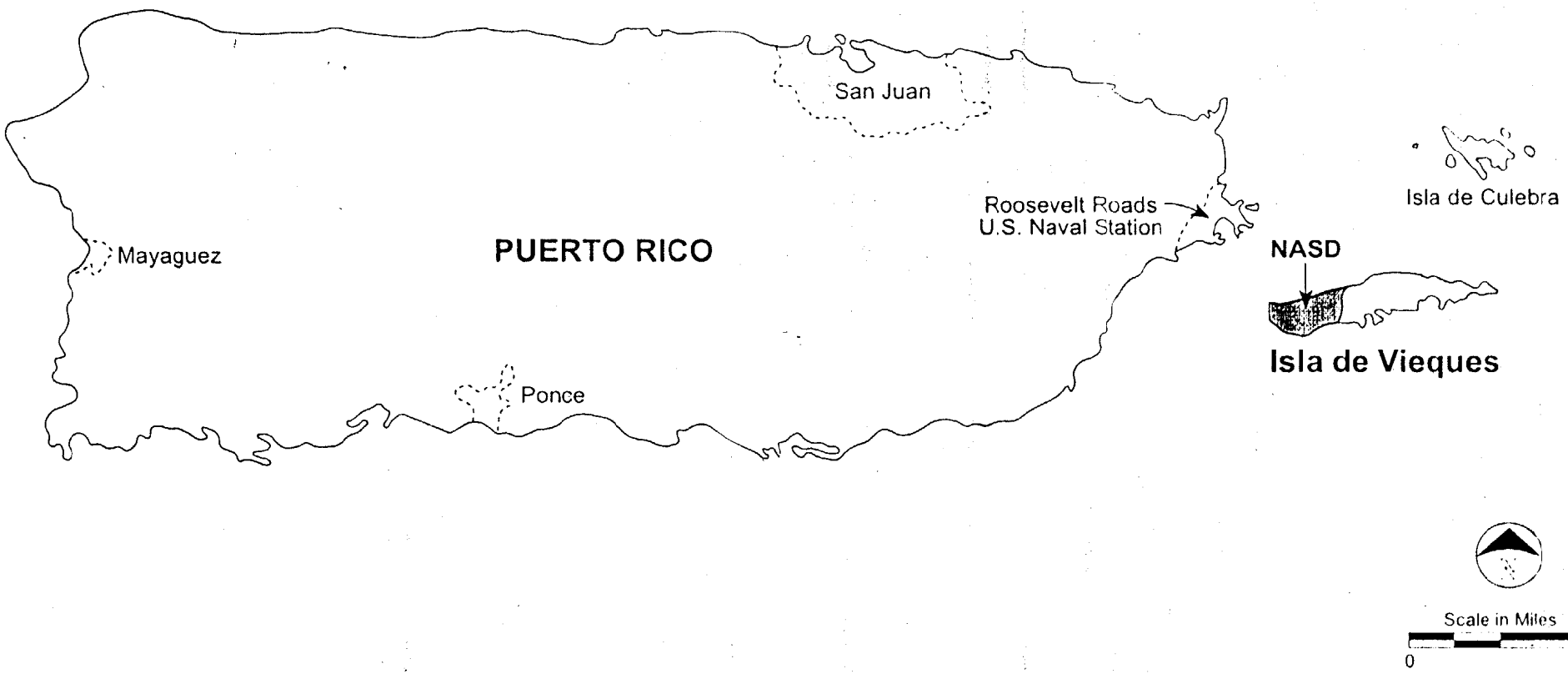

FIGURE 1-1
Site Location Map

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SECTION 2

Initial Evaluation and Sampling Rationale

This section presents an initial evaluation of available background information and existing conditions for the seven Phase II sites included in this investigation. These seven sites were identified during the Environmental Baseline Survey (ERM, August 2000). The rationale for execution of site sampling and background sampling is also documented. AOC-specific sampling techniques and analytical methods proposed for the AOC investigations are documented in Section 4.

Previous studies at these sites include preliminary environmental sampling at AOCs H, I, and J by ERM in April 2000, sampling at AOC B by CH2M HILL in June 2000, and sampling at AOC K by the U.S. Geological Survey (USGS) in 1996. No previous studies have been performed at AOCs L and R.

2.1 Qualitative Ecological Survey

A qualitative ecological survey will be performed at AOCs H, I, J, L, and R. The general area around the NASD public works building was already surveyed under the previous preliminary assessment/site investigation (PA/SI). Therefore, AOCs B and K will not be re-surveyed. The qualitative ecological survey is a walk-through survey that includes a description of the site features such as topography, drainage, plants, animals, habitat, and any endangered species.

2.2 Qualitative Risk Assessment

A qualitative risk assessment will be performed for each site. The validated laboratory data will be screened against risk-based criteria from U.S. Environmental Protection Agency (EPA) Region IV and background concentrations. EPA criteria will be used for all parameters except petroleum constituents, which will be compared to the Puerto Rico Environmental Quality Board (PREQB) criteria. Sites with values below screening criteria and/or background concentrations will be recommended for no further action. Sites with values above screening criteria and/or background concentrations will be recommended for further study through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Investigation (RI) process.

2.3 AOC B – Wastewater Treatment Plant and Disposal Ground

2.3.1 Site Summary

The wastewater treatment plant (WWTP), operating since 1983, is located at the southwest end of the main compound and serves as the main treatment system for the site. This WWTP, which is still in operation, is a secondary treatment plant. Sludge from the secondary clarifier is removed by a contractor for offsite disposal, and is typically used as fertilizer. Effluent from the WWTP is discharged to a lagoon system consisting of four evaporation/percolation cells. It is estimated that 50 people use this facility daily.

Effluent from the WWTP drains into a series of four lagoons with no discharge point (AOC B). According to the Environmental Baseline Survey report, it is suspected that hazardous waste may have been discharged to the wastewater treatment plant in the past.

On previous visits to the site, vegetation was observed growing inside the lagoons. No wastewater leaks were observed from the dikes.

2.3.2 Previous Investigation Results

A site investigation was performed at the WWTP by CH2M HILL in June 2000. To determine whether any industrial waste is present in the sludge or in the discharge to the lagoon , one sample was collected from the secondary clarifier sludge and one effluent sample was collected after the secondary clarifier, respectively. In addition, four soil samples were collected, one at the center of each of the four evaporation/percolation cells. The soil samples were collected at a depth of five feet, where the percolation pipes are located. Sample locations are shown in Figure 2-1.

Laboratory analysis was performed on the parameters listed in Table 2-1. These parameters were collected at Bldg. 2023 and the WWTP Lagoon UIF sites and were analyzed at the laboratory in accordance with SW-846 Methods.

TABLE 2-1
Analytical Parameter Listing

Arsenic	Zinc	Toluene
Cadmium	1, 1 dicloroethylene	Xylene
Cyanide	Phenolic substances	Ethylbenzene
Total Chromium	Tetrachloroethylene	Conductivity
Copper	Carbon tetrachloride	Nitrates and Nitrites
Nickel	Benzene	TPH
Silver	Vinyl Chloride	Temperature
Lead	Dichlorobenzene	Oil and Greases
Selenium	1, 2 dichloroethane	Sulfur (H_2S)
Barium	1, 1, 1 trichloroethane	Sulfates
Mercury	Trichloroethylene	pH

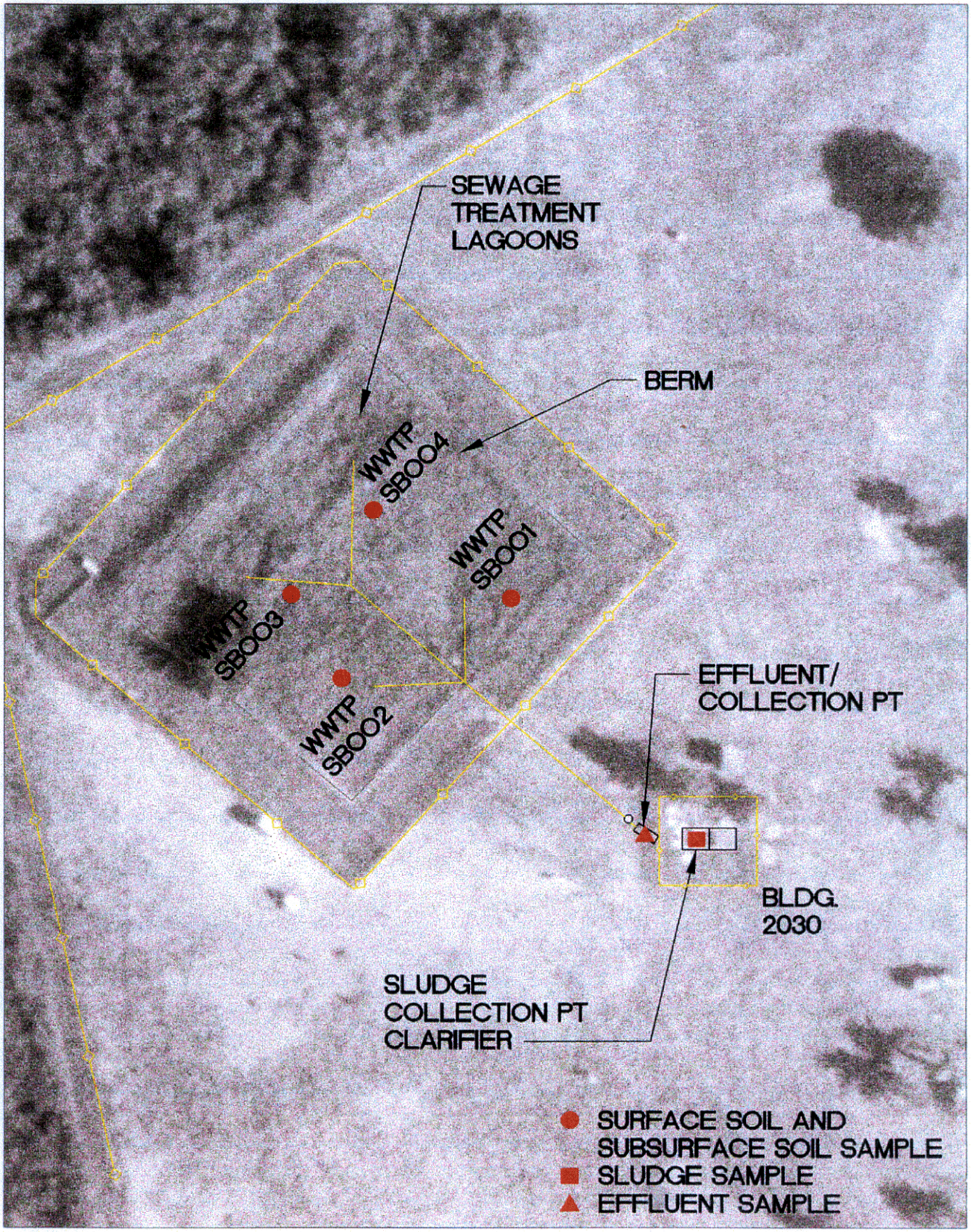

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Figure 2-1
AOC-B PREVIOUS SAMPLE LOCATIONS
NASD, Vieques Island

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Concentrations of detected chemicals were compared to the following current Region III USEPA screening and regulatory screening criteria for each sample matrix: risk-based concentrations (RBCs) for residential soil, and for groundwater migration (leachability) and USEPA tap water RBCs. The data were also compared to Puerto Rico's Maximum Contaminant Levels (MCLs) for groundwater (to protect the drinking water supply and human health) and to the USEPA Clean Water Act's Phase I of the risk-based regulations that govern the final use or disposal of sewage sludge (Table 1, 40 CFR Part 503).

Tables 2-2 and 2-3 present a summary of the compounds detected above the screening and regulatory criteria. No exceedances of the regulations for sewage sludge were found. For this reason, no additional sampling is proposed for this site. The validated data will, however, be included in the Phase II PA/SI report.

TABLE 2-2
Water Quality Criteria

Parameter	Drinking Water	RBC Standard (Tap Water)	Units	B2023 WW	B2023 DUP	WWTP WW	
Metals							
Copper	--	150	µg/L	208	214	--	
Volatiles							
1,4-Dichlorobenzene	75	0.47	µg/L	78	76	36	
Toluene	--	74.7	µg/L	--	--	332	E

Notes:
E – Indicates a compound whose concentration exceeds the upper level of the calibration range of the instrument for that specific analysis

TABLE 2-3
Soil RBC Criteria

Parameter	Soil Residential	Soil GW Migration	Units	WWTP PERC CELL SB002 SL	
Metals					
Arsenic	0.43	0.026	MG/KG	0.6	J

Notes:
J – Indicates an estimated value

2.4 AOC H – Power Plant

2.4.1 Site Summary

AOC H is an abandoned building that operated as a power plant from 1941 to 1943. The building is thought to have formerly stored power generation equipment, and housed large diesel generators to provide electricity. Associated aboveground fuel storage tanks (ASTs) were located on the western side of the building, and had an estimated capacity of 2,000 to 3,000 gallons.

From the 1960s to the 1980s, the building was used for fire-training operations by igniting diesel fuel over rubber tires inside the building to simulate a structure fire.

2.4.2 Previous Investigation Results

In June 2000, ERM conducted an Environmental Baseline Study to investigate possible contamination at different AOCs on NASD, Vieques, for the Atlantic Division, Naval Facilities Engineering Command. The objective of this Baseline Study was to determine whether specific toxic or hazardous materials had contaminated the environment as a result of Navy activities.

The ERM baseline survey included an investigation of potential polychlorinated biphenyl (PCB) contamination on the floor of the Power Plant. Five concrete wipe samples were collected and analyzed for PCBs. The study found no PCB contamination. No further investigations were carried out for other pollutants. No soil borings or wells were installed at this AOC during the Environmental Baseline Survey.

2.4.3 Sampling Rationale

CH2M HILL will collect 16 surface soil samples (0 to 6 inches) and 16 subsurface soil samples (4 to 6 feet) around the perimeter of the building; collect four surface soil samples (0 to 6 inches) from inside the building; and install four monitoring wells (one upgradient and three downgradient) as shown in Figure 2-2.

The purpose of the sampling is to determine whether a release of hazardous materials has occurred to the soil or the groundwater. Potential contaminant sources are PCBs from power plant transformers, fuel from the generators, and fuel and waste from fire training activities. Samples will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs, and metals.

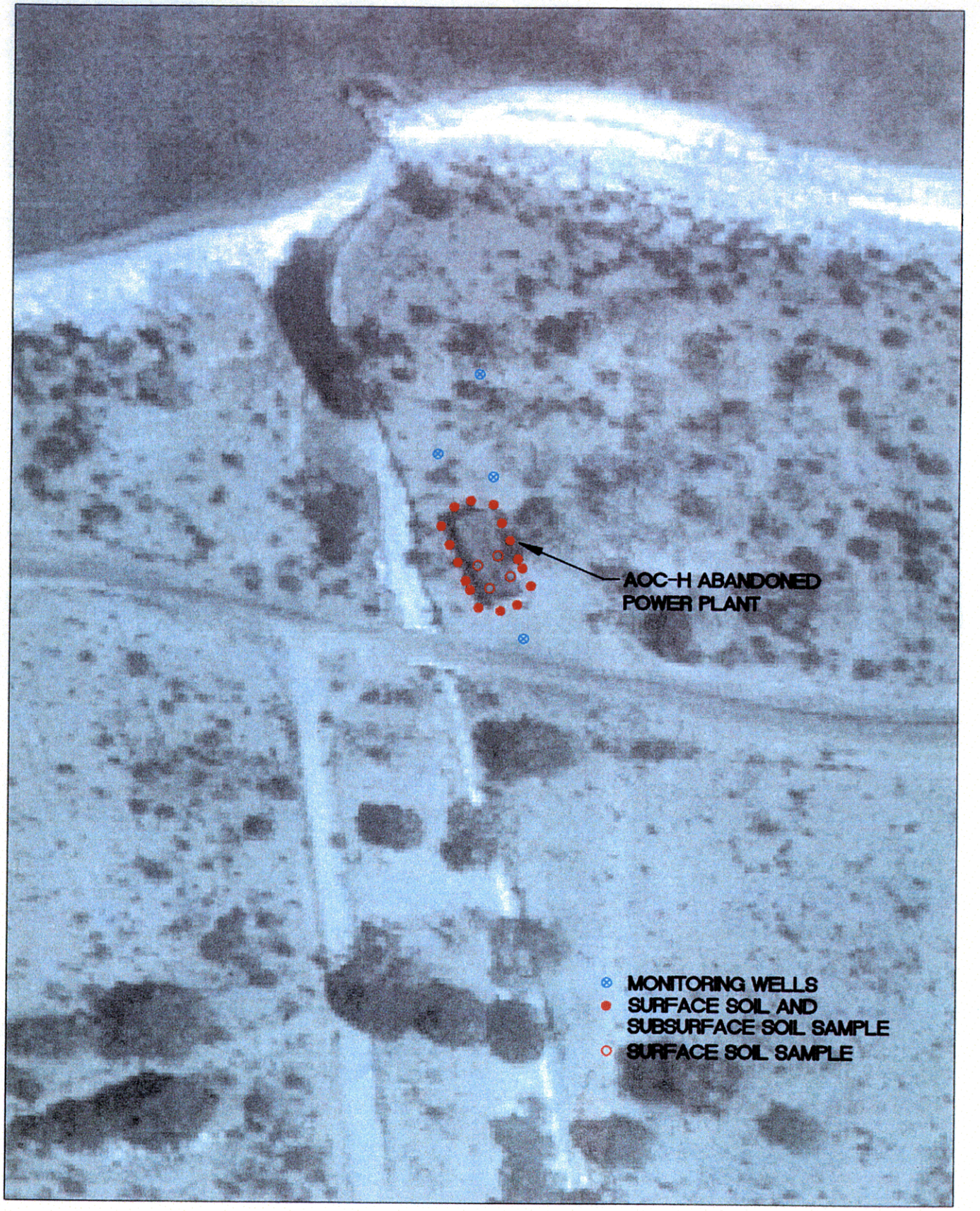

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Figure 2-2
AOC-H PROPOSED SAMPLE LOCATIONS
NASD, Vieques Island

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2.5 AOC I – Asphalt Plant

2.5.1 Site Summary

The asphalt plant area is located just south of the Mosquito Pier next to the quarry. The plant was in operation from the 1960s to 1988. The AOC includes two concrete-paved containment areas and an area formerly containing two diesel fuel ASTs. Both containment areas have sump pumps. Earlier site visits have recorded moderate quantities of wet or dry asphalt emulsion within the containment areas. ERM's baseline study estimated that 1.5 acres of the site was potentially contaminated.

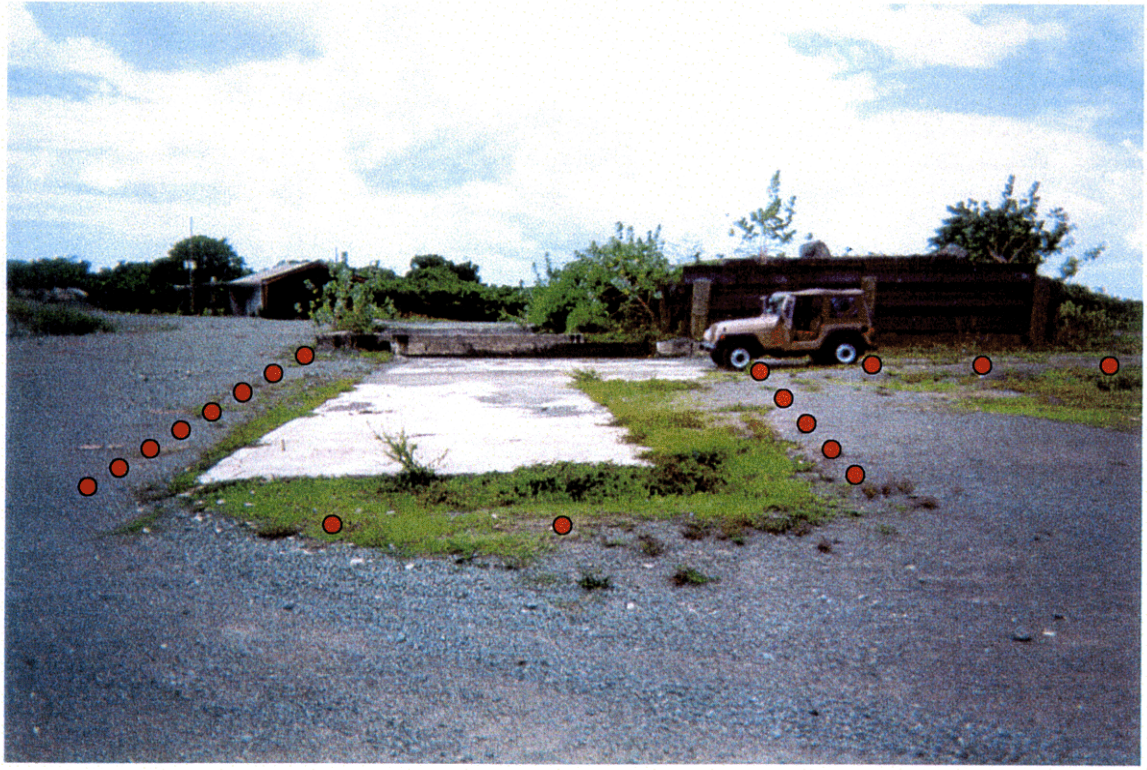
2.5.2 Previous Investigation Results

In April 2000, ERM collected surface soil samples from the areas around the AST and containment areas. No other sampling was conducted at this site. During the ERM soil sampling investigation, three surface soil samples and one duplicate sample were collected. The samples were collected from the area adjacent to the two containment areas at the location with the most staining of asphalt and from the former location of two ASTs where staining was evident. The samples were analyzed for TPH-DRO, TPH-GRO, and BTEX. TPH-DRO was detected in sample AOC-I-S2 at a concentration of 630 milligrams per kilogram (mg/kg), which is above the PREQB criterion of 100 mg/kg for TPH. The PREQB standards are used because PREQB has primacy for the underground storage tank (UST) program in Puerto Rico. EPA standards do not include TPH and BTEX.

2.5.3 Sampling Rationale

Figure 2-3 shows proposed locations for the collection of additional soil samples. A total of 26 surface soil samples (0 to 6 inches) and 26 subsurface samples (4 to 6 feet) will be collected around the perimeter of the containment area. The purpose of the soil sampling is to further investigate the previously detected TPH-DRO soil contamination and to determine whether a release of hazardous materials has occurred. Analyses will be conducted for metals, pesticides, PCBs, VOCs, SVOCs, TPH-DRO, TPH-GRO, and BTEX.

Looking East



Looking West

● Surface Soil and Subsurface Soil Sample Location

Figure 2-3
AOC-I
PROPOSED SAMPLE LOCATIONS
Vieques Island, Puerto Rico

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2.6 AOC J – Former Staging Area Disposal Site

2.6.1 Site Summary

This disposal site encompasses an area of approximately 1.2 acres by 2 to 4 feet in depth. The area was used as a solid waste disposal site associated with construction staging activities. It was used between the mid-1960s and 1973, after which the waste was removed from the site and placed in a municipal landfill off-base. No records were kept as to where the solid waste was taken, and the type of waste taken off site is unknown.

During a site visit conducted by CH2M HILL at the site on September 14, 2000, 106mm shell casings and 20mm ammunition boxes were observed. Previous visits by ERM indicated visible debris consisting of scrap metal from construction equipment, unexploded ordnance (UXO), shell casings, glass fragments, and wood waste. This site drains into a quebrada that leads to Vieques Sound.

2.6.2 Previous Investigation Results

In June 2000, ERM conducted an Environmental Baseline Study to investigate possible contamination at different AOCs on NASD, Vieques, for the Atlantic Division, Naval Facilities Engineering Command. The objective of this Baseline Study was to determine whether specific toxic or hazardous materials had contaminated the environment as a result of Navy activities. As part of the study, ERM collected two soil samples at 3 to 4 feet below ground surface adjacent to the visible remains of the disposal site. The pit was dug using a backhoe and the samples were collected with a stainless steel spoon. The samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Analytical results of soil samples showed no elevated levels of any constituents of concern for this site.

2.6.3 Sampling Rationale

The Phase II PA/SI includes the collection of five surface soil samples (0 to 6 inches) and five subsurface soil samples (4 to 6 feet) in the area of debris to determine whether a release of hazardous materials has occurred. Five surface water/sediment samples will be collected in the quebrada; one will be collected upstream of the disposal site, two will be collected adjacent to the debris pile, and two will be collected downstream of the disposal area. Four monitoring wells will be installed at the site. One upgradient well, one well west of the disposal area and two wells adjacent to the disposal area near the quebrada will be installed. Figure 2-4 shows the sampling locations. Analyses will be conducted for metals, VOCs, SVOCs, pesticides, PCBs, and explosives to verify previous study results at this site.

An UXO survey will be conducted to clear the soil boring and monitoring well drilling sites before any intrusive work. Any UXO recovered will be properly disposed of by U.S. Navy Explosive Ordnance Disposal (EOD) personnel.

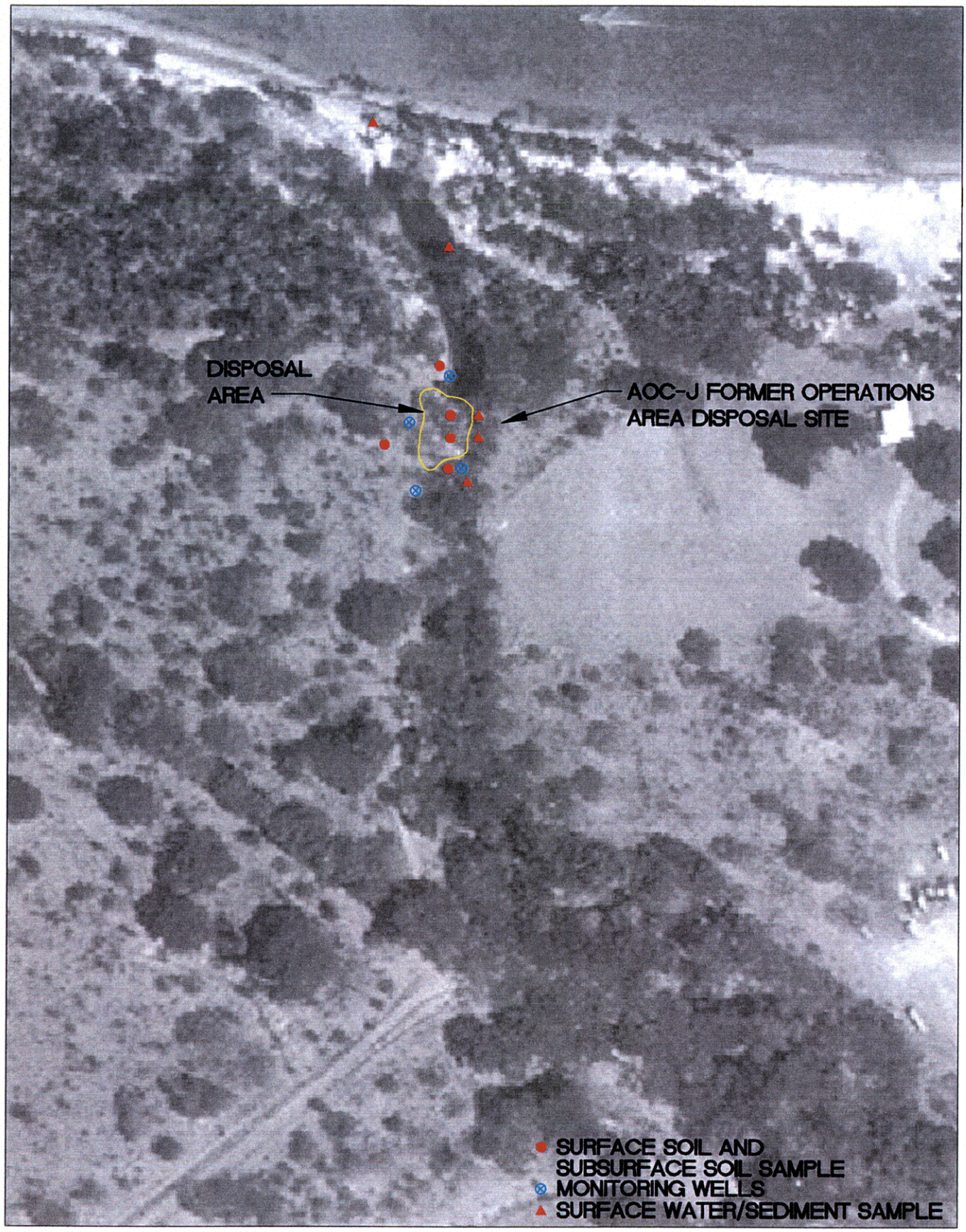

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Figure 2-4
AOC-J PROPOSED SAMPLE LOCATIONS
NASD, Vieques Island

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2.7 AOC K – Water Well

2.7.1 Site Summary

The water well is located next to a tree northeast of the barracks at the Public Works complex at NASD. It was used from approximately 1941 to 1979 as a potable water supply well. The well is not being used as a source of water for the facilities or for emergency purposes.

2.7.2 Previous Investigation Results

The USGS performed a study of 14 water wells in the NASD area in 1996, including the well at AOC K. The report indicated that among the reconditioned wells, only one well (AOC K) contained CERCLA hazardous compounds. Benzene was reported at a concentration of 21 micrograms per liter ($\mu g/L$), which is above the Federal maximum contaminant level (MCL) of 5 $\mu g/L$.

2.7.3 Sampling Rationale

A total of five groundwater monitoring wells will be installed in the vicinity of AOK K to identify the source of benzene contamination. Four wells will be installed upgradient of the supply well and one well will be installed downgradient of the supply well. The groundwater samples will be collected and analyzed for metals, VOCs, SVOCs, pesticides, and PCBs. Figure 2-5 shows the monitoring well locations.

Once the investigation is concluded, the well will be capped and abandoned by Navy personnel.

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Figure 2-5
AOC-K PREVIOUS SAMPLE LOCATIONS
NASD, Vieques Island

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2.8 AOC L – Former Septic Vault

2.8.1 Site Summary

AOC L consists of a 25-foot by 40-foot concrete vault with separate compartments, and is located north of the Main Operations Area. The time of use is unknown, but it has been dated circa 1940 for the treatment and disposal of the installation sewage. The site may have been used for disposal of hazardous waste at a later date. No drainage field that may have been associated with the septic vault is present. The potentially contaminated area was estimated by ERM to be 0.1 acres because the potential contamination is likely contained close to the vault itself.

2.8.2 Previous Investigation Results

No previous sampling has been conducted at this site.

2.8.3 Sampling Rationale

The area surrounding the vault consists of mostly impermeable soil. Any contamination resulting from possible past leaks would likely be contained near the structure. Four surface soil samples (0 to 6 inches) and four subsurface soil samples (4 to 6 ft) will be collected around the perimeter of the septic vault, as shown on Figure 2-6. Soil samples will be analyzed for metals, VOCs, SVOCs, pesticides, and PCBs.

● Surface Soil and Subsurface Soil Sample Location

Figure 2-6
AOC-L
PROPOSED SAMPLE LOCATIONS
Vieques Island, Puerto Rico

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2.9 AOC R – Former Construction Staging Area

2.9.1 Site Summary

AOC R was used as a construction staging area and public works operational area from about 1965 to 1971. The large concrete pad at the site was present before the Navy owned the area and can be seen in 1937 aerial photographs. In the late 1960s, a carpentry shop and enlisted club were located on the pad. Light vehicle maintenance activities, such as oil changes, were conducted near the pad to the northwest. Additionally, a large AST was once located near Building 401.

2.9.2 Previous Investigation Results

No previous sampling has been conducted at this site.

2.9.3 Sampling Rationale

A total of 34 surface soil samples will be collected at AOC R; 10 of these samples will be collected around the vehicle operations area, and 24 samples spaced approximately every 50 feet will be collected around the concrete pad. Soil samples will be analyzed for metals, VOCs, SVOCs, pesticides, and PCBs. Figure 2-7 shows the locations of surface soil samples for the concrete pad and around the vehicle operations area.

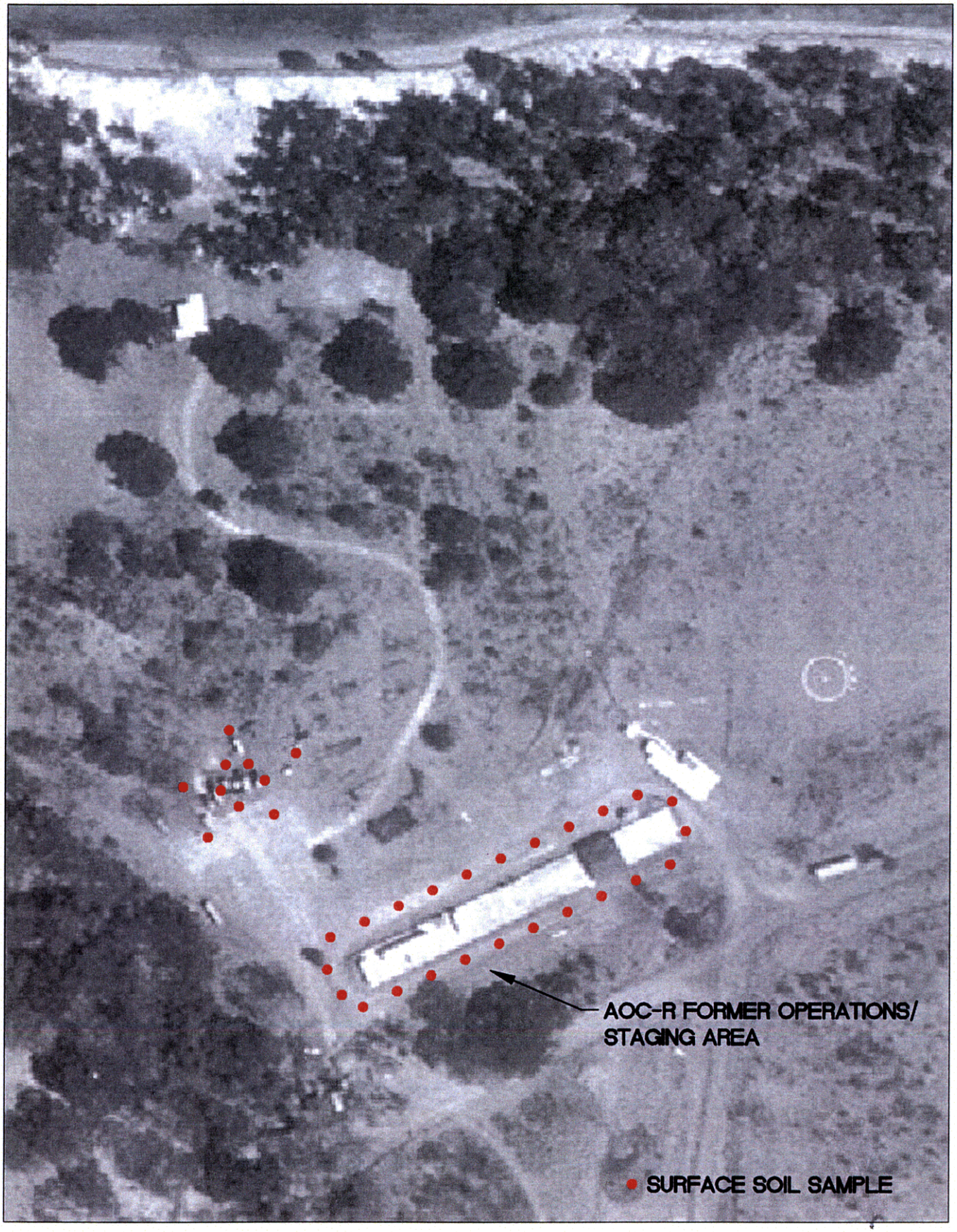

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Figure 2-7
AOC-R PROPOSED SAMPLE LOCATIONS
NASD, Vieques Island

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2.10 Background Sampling

Previous sampling results during the Phase I PA/SI work showed metals concentrations above risk-based screening levels in nearly all of the samples. The metal exceedances are probably the result of the naturally occurring high metal concentrations in the volcanic rocks on Vieques Island. To better document the high metals concentrations at the sites, additional background sampling will be conducted.

Representative background surface soil, subsurface soil, and groundwater samples will be collected from the public works area, SWMU 04, and SWMU 06 for metals analysis. The background site investigation will be conducted as part of a separate work plan titled, *Work Plan and Sampling Analysis Plan for Soil, Groundwater, Surface Water, and Sediment Background Investigation*, dated December 2000.

2.11 Other Site Activities

During the NASD Phase II site investigation, other site activities will be conducted. At SWMU-14, the existing wash rack and oil/water separator will be removed. Two existing UST located east of SWMU-14 will be removed. Also, a security fence will be installed around AOC-E, SWMU-14, SWMU-15, and the area of the removed UST. At AOCs H, J, L, and R, bollards, chains and signs will be installed to demarcate the site investigation areas.

SECTION 3

Technical Approach and Investigation Procedures

This section details the technical approach developed to perform the sampling activities included in this investigation. The goal of the sampling effort is to supplement data collected during previous investigations at NASD, and to make a recommendation for additional action or no further action 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 onsite visit.

The tasks included in the technical approach are listed below. The remainder of this section provides detailed discussions of 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 Site Investigations. Meetings and project management activities are also included in this task.

3.1.1 Work Plan

A Master Work Plan (Master Work Plan, Naval Ammunitions Support Detachment Vieques, Puerto Rico, May 2000), Master Sampling and Analysis Plan (SAP), and Master Health and Safety Plan (HASP) were prepared for guidance on the activities to be performed at each site location 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 will provide the background information needed to understand base-wide site conditions, the approach to be used for investigations, and general types of activities to be accomplished. Comments from the EPA and PREQB on the draft Master Work Plan have been incorporated into this Site Specific Work Plan.

This Site Specific Work Plan supplements the Master Work Plan and presents site-specific information for each SWMU and AOC. 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/deviations from the Master Plan), and are presented within this document.

3.1.2 Meetings

During the course of the investigations, meetings will be held to discuss the proposed project schedule and findings with LANTDIV, PREQB, 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, and NSRR.

3.2 Field Investigation

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

3.2.1 Field Work 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 NASD, CH2M HILL will procure drilling services for of soil borings and monitoring well installations, analytical laboratory services, and data validation services for work at the Base. The subcontracted analytical laboratory is Progress Environmental Labs from Tampa, Florida. Laboratory work will be performed as per the guidance in the Master Work Plan.

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 and NASD prior to disposal.

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

3.2.1.3 Utility Clearance

Utility clearances will be performed prior to the start of any subsurface investigation activities at the site. CH2M HILL will coordinate subsurface utility clearances with the Public Works Center (PWC) at the Base. CH2M HILL will be responsible for insuring that all appropriate contacts have been made with Base personnel and that clearances have been given for proposed subsurface sampling locations, including marking of utilities near the areas of proposed subsurface sampling locations, prior to the initiation of field operations.

3.2.2 Field Sampling Activities

The goal of the sampling effort is to supplement data collected during previous investigations conducted at NASD and determine whether either additional action is necessary or no further action is necessary at each of the sites. Section 2 describes these proposed activities and provides supporting rationale. Table 3-1 summarizes the number of samples to be collected from each medium of concern at each site. QA/QC samples are included in the table.

3.2.3 Soil Sampling Procedures

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 Master Work Plan are included with the Field Sampling Plan checklist located in Appendix B of this work plan. Table 3-2 presents the required containers, preservatives, and holding times for soil samples.

3.2.4 Groundwater Sampling Procedures

The investigation sampling involves the collection of groundwater samples at several AOCs. The applicable SOPs for the collection of groundwater samples from the Master Work Plan are included with the Field Sampling Plan checklist located in Appendix B of this work plan. Table 3-2 presents the required containers, preservatives, and holding times for groundwater samples.

3.2.5 Surface Water and Sediment Sampling Techniques

The investigation sampling involves the collection of surface water and sediment samples at AOC J. The applicable SOPs for the collection of groundwater samples from the Master Work Plan are included with the Field Sampling Plan checklist located in Appendix B of this work plan. Table 3-2 presents the required containers, preservatives, and holding times for groundwater samples.

3.2.6 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 from the Master Work Plan are included with the Field Sampling Plan checklist in Appendix B.

TABLE 3-1
Analytical Sample Summary for Supplemental AOCs Sampling November/December 2000

Media	Analysis	Method	WWPT AOC B	POWER PLANT AOC H	ASPHALT PLANT AOC I	DISPOSAL SITE AOC J	WATER WELL AOC K	SEPTIC VAULT AOC L	STAGING AREA AOC R	BACKGROUND SAMPLES	Field QC	Total Number of Samples
Groundwater	TCL VOCs	CLP SOW	-	4	-	4	5	-	-	-	12	25
	TAL metals	CLP SOW	-	4	-	4	5	-	-	2	12	27
	SVOCs	CLP SOW	-	4	-	4	5	-	-	-	12	25
	PCBs	CLP SOW	-	4	-	4	5	-	-	-	12	25
	Chlorinated Pesticides	CLP SOW	-	4	-	4	5	-	-	-	12	25
	Explosives (perchlorate)	SW846 8330	-	-	-	4	-	-	-	-	5	9
Surface Water	TCL VOCs	CLP SOW	-	-	-	5	-	-	-	-	3	8
	TAL metals	CLP SOW	-	-	-	5	-	-	-	-	3	8
	SVOCs	CLP SOW	-	-	-	5	-	-	-	-	3	8
	PCBs	CLP SOW	-	-	-	5	-	-	-	-	3	8
	Chlorinated Pesticides	CLP SOW	-	-	-	5	-	-	-	-	3	8
	Explosives	SW846 8330	-	-	-	5	-	-	-	-	3	8
Sediment	TCL VOCs	CLP SOW	-	-	-	5	-	-	-	-	5	10
	TAL metals	CLP SOW	-	-	-	5	-	-	-	-	5	10
	SVOCs	CLP SOW	-	-	-	5	-	-	-	-	5	10
	PCBs	CLP SOW	-	-	-	5	-	-	-	-	5	10
	Chlorinated Pesticides	CLP SOW	-	-	-	5	-	-	-	-	5	10
	Explosives	SW846 8330	-	-	-	5	-	-	-	-	5	10
Surface Soil	TCL VOCs	CLP SOW	-	20	26	5	-	4	34	-	32	121
	TAL metals	CLP SOW	-	20	26	5	-	4	34	18	32	139
	SVOCs	CLP SOW	-	20	26	5	-	4	34	-	32	121
	PCBs	CLP SOW	-	20	26	5	-	4	34	-	32	121
	Chlorinated Pesticides	CLP SOW	-	20	26	5	-	4	34	-	32	121
	Explosives	SW846 8330	-	-		5	-	-	-	-	4	9
Subsurface Soil	TCL VOCs	CLP SOW	-	16	26	5	-	4	-	-	27	78
	TAL metals	CLP SOW	-	16	26	5	-	4	-	18	27	96
	SVOCs	CLP SOW	-	16	26	5	-	4	-	-	27	78
	PCBs	CLP SOW	-	16	26	5	-	4	-	-	27	78
	Chlorinated Pesticides	CLP SOW	-	16	26	5	-	4	-	-	27	78
	Explosives	SW846 8330	-	-		5	-	-	-	-	4	9

SOIL SAMPLES FOR VOCS WILL BE COLLECTED WITH THE ENCORE SAMPLER AND PRESERVED BY THE LAB

TABLE 3-2
Required Containers, Preservatives, And Holding Times For Soil, Sediment, and Groundwater Samples

Analysis	Matrix	Method	Container	Preservation	Maximum Hold Time
VOC	Soil/Sediment	CLP SOW	4 each 5-g En Core™ sampler	4°C (2)	48 hours to preservation and 14 days from preservation to analysis
SVOC	Soil/Sediment	CLP SOW	8-oz. Glass jar [1]	4°C	7 days to extraction and 40 days from extraction to analysis
Organochlorine Pesticides	Soil/Sediment	CLP SOW	8-oz. Glass jar [1]	4°C	7 days to extraction and 40 days from extraction to analysis
PCB	Soil/Sediment	CLP SOW	8-oz. Glass jar [1]	4°C	7 days to extraction and 40 days from extraction to analysis
Explosives	Soil/Sediment	SW-846 8330	4-oz. Glass jar [1]	4°C	7 days to extraction and 40 days from extraction to analysis
TAL Metals	Soil/Sediment	CLP SOW	4-oz. Glass jar [1]	4°C	6 months, 28 days for mercury
TAL Metals	Water	CLP SOW	1000 mL poly	HNO_3 to pH<2, 4°C	6 months, 28 days for mercury
VOC	Water	CLP SOW	3x40 mL vials [1]	HCl to pH<2, 4°C	14 days
Organochlorine Pesticides	Water	CLP SOW	2X1000 mL amber [1]	4°C	7 days to extraction and 40 days from extraction to analysis
Explosives	Water	SW-846 8330	1 Liter Amber	4°C	7 days to extraction and 40 days from extraction to analysis
SVOC3-	Water	CLP SOW	1 Liter Amber	4°C	7 days to extraction and 40 days from extraction to analysis
PCB	Water	CLP SOW	2X1000 mL amber [1]	4°C	7 days to extraction and 40 days from extraction to analysis

1) Use Teflon-lined caps.

2) Lab preservation method includes methanol and chill to 4°C or the addition of water and freezing.

3.2.7 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 Geographic Information System (GIS) Data Management system. The existing designation scheme for NASD will be followed by field personnel. The following sections describe the sample designation specifications.

3.2.7.1 Specifications for Field 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 3-3 documents the scheme that will be used to identify field station data.

TABLE 3-3
Field Station Scheme

First Segment	Second Segment	
Facility, Station Type, Site Number	Station Type	Station Number, Qualifier
AAANNN	AA	NNNA
Facility: ND = NASD Station Type: S = Site O = Operable Unit U = UST A = AOC Site Number: 04 AOC B 05 AOC H 06 AOC I 07 AOC J 10 AOC K 14 AOC L 15 AOC R	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

3.2.7.2 Specifications for Analytical Data

Analytical data will be generated through sampling of various media at NASD. 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.

3.2.7.3 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 taken. 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. Table 3-4 documents the general guide for sample identification. If one qualifier is pertinent to the sample ID but another is not, only the Table 3-3 applicable qualifiers will be used. A non-utilized character space does not have to be maintained.

TABLE 3-4
Sample Designation 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: ND = NASD Station Type: S = Site W = SWMU O = Operable Unit U = UST A = AOC Site Number: 04 AOC B 05 AOC H 06 AOC I 07 AOC J 10 AOC K 14 AOC L 15 AOC R	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

3.2.7.4 Electronic Deliverable File Format

An offsite laboratory will analyze the supplemental AOC 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 3-5 tabulates the format that will be used for electronic deliverables.

TABLE 3-5
Analytical Data Electronic Deliverable

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.

3.2.8 Surveying

Sampling locations at each AOC will be horizontally located using a global positioning system (GPS) following field activities. All survey data will be tied in to a coordinate system compatible with local Puerto Rican requirements.

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 AOC investigation field program will be validated by an independent data validation subcontractor according to EPA's *Functional Guidelines for Data Validation* (EPA, 1994).

3.3.1 Sample Analysis

All analyses of soil, sediment, surface water, and groundwater will be conducted at a contracted laboratory that fulfills all requirements of the U.S. Navy's Quality Assurance/Quality Control (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 the CLP SOW. All analyses will be performed following the highest level of Navy guidance. Analyses will include the proper ratio of field QC samples recommended by NFESC guidance for the Data Quality Objectives (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 NASD.

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. 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.

A temperature blank will be included in each cooler containing samples for CLP 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 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 one MS/MSB 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 use EPA Region II guidance (Functional Guidelines).

The hardcopy data packages will be reviewed by the subcontractor chemists using the process outlined in EPA's *Functional Guidelines for Evaluating Data* (EPA, 1994). Areas of review included (when applicable to the method) holding time compliance, calibration verification, blank results, matrix spike 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. Raw data will be provided for at least 10 to 25 percent of the data.

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 and 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 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 will 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 DV 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 and/or tables associated with data (e.g., sampling location maps).

3.5 Task 5: Investigation Reports

A Draft Phase II Expanded PA/SI Report will be prepared for submittal to LANTDIV, U.S. Naval Station, Roosevelt Roads (NSRR), and PREQB. Based on the evaluation of the results presented in the Draft Report, a Final Report will be prepared.

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.

The AOC investigation field program (soil and groundwater 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.

The Navy Technical Representative (NTR) is Mr. Chris Penny. Mr. Penny is the LANTDIV representative and provides technical direction on the project and coordinates funding and overall interaction with other agencies and interested parties. Mr. Penny can be contacted at the address and phone number listed below.

Ms. Madeline Rivera is the Installation Restoration Program Coordinator for NSRR. Ms. Rivera is responsible for the coordination of all naval environmental activities at NSRR and Vieques Island. Ms. Rivera can be contacted at the address and phone number listed below.

Mr. Chris Penny
Remedial Project Manager
Installation Restoration Section
Environmental Programs Branch
Environmental Division
Atlantic Division (LANTDIV) Code 1822
Naval Facilities Engineering Command
1510 Gilbert Street
Norfolk, VA 23511-2699
(757) 322-4815

Ms. Madeline Rivera Ruiz
U.S. Naval Station Roosevelt Roads
Environmental Engineering Division
Public Works Dept. Bldg. 31
Ceiba, Puerto Rico 00735
(787) 865-5337

SECTION 5

Contractual Services

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

- Hollow Stem Auger and Air Rotary Drilling
- Analytical Laboratory
- Data Validation
- Surveying

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 II Expanded PA/SI Investigation, Contract Task Order 0031

Key Project Milestones	Date From Notice to Proceed		Duration
	Start	End	
Notice to Proceed	0	0	0
Prepare Draft Site Specific Work Plan	9/14	9/29	15
Submit Draft Site Specific Work Plan	10/2	10/2	0
Navy, EPA and PREQB Review of Draft Work Plan	10/2	11/17	45
Prepare Final Work Plan	11/17	11/24	7
Submit Final Work Plan	12/12	12/12	0
Procure Subcontractors/Mobilize	11/13	11/24	15
Conduct Field Investigation	11/27	12/22	26
Laboratory Analyses	11/30	1/31	60
Data Validation/Management	1/31	2/29	30
Data Evaluation	3/1	3/15	15
Prepare Draft Reports	3/15	4/15	30
Submit Draft Reports	4/15	4/15	0
Navy, EPA and PREQB Review of Draft Reports	4/15	5/15	30
Prepare Final Reports	5/15	5/30	15
Submit Final Reports	5/30	5/30	0

APPENDIX A

Site Photographs

AOC-B Wastewater Treatment Plant looking west.

AOC-H Power Plant looking north.

02113AB8Y

AOC-I Asphalt Plant looking east.

AOC-I Asphalt Plant looking west.

AOC-I Asphalt Plant looking west.

AOC-K Water Well looking north.

AOC-J Disposal Site looking east.

AOC-J Disposal Site.

AOC-L Septic Vault looking north.

AOC-L Septic Vault looking south.

APPENDIX

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: NASD

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_____

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: NASD

1. Tasks to be performed:

_____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
_____dissolved oxygen
X_____turbidity
X_____specific conductance
X_____organic vapor monitoring
X_____geophysical parameters (list):
X_____electromagnetic induction
_____ground-penetrating radar
X_____surveying
_____magnetometry
X_____global positioning system
_____soil gas parameters (list):
_____combustible gases
X_____water-level measurements
_____pumping rate
_____other_____

3. Sampling program (nomenclature, etc.):

_____As per Master FSP X_____Other As presented in the PA/SI Investigation Workplan

4. Map of boring and sampling locations (attach to checklist): See Workplan.

5. Table of field samples to be collected: See Investigation Workplan.

6. Applicable SOPs or references to specific pages in Master FSP: The following SOPs from the Master Project Plans are to be implemented.

- Shallow Soil Sampling
- Soil Sampling
- Soil Boring Sampling Split-Spoon
- Surface Water Sampling
- Sediment Sampling
- Groundwater Sampling From Monitoring Wells
- Low-flow Groundwater Sampling from Monitoring Wells
- Monitoring Well Installation
- Homogenization of Soil and Sediment Samples
- VOC Sampling – Water
- Field Filtering
- Chain-of-Custody
- Packaging and Shipping Procedures
- Field Rinse Blank Preparation
- Soil Boring Drilling and Abandonment
- Water Level Measurements
- Logging of Soil Borings
- Decontamination of Personnel and Equipment
- Decontamination of Drilling Rigs and Equipment
- Disposal of Fluids and Solids

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

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: NASD

Location(s) SWMU Location Map and Individual SWMU figures are included in the Workplan.

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_____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, Joshua Hayes, Allyie Chang, Mike Weatherby

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 Workplan.

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.

_____ 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