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FINAL REMEDIAL ACTION IMPLEMENTATION, OPERATIONS AND MAINTENANCE, LAND USE CONTROL, AND LONG TERM MONITORING WORK PLAN SOLID WASTE MANAGMENT UNIT 1 (SWMU 1) FORMER VIEQUES NAVAL TRAINING RANGE VIEQUES ISLAND PUERTO RICO

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CH2M HILL

Final

Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan Solid Waste Management Unit 1 (SWMU 1)

Former Vieques Naval Training Range
Vieques, Puerto Rico

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Executive Summary

Solid Waste Management Unit 1 (SWMU 1), covering approximately 41 acres, is located at the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico. SWMU 1 is an unlined landfill in use from 1954 to 1978 for the disposal of municipal waste from Camp García. Approximately 1,800 to 3,120 tons of municipal waste were disposed in the landfill, but no hazardous materials reportedly were placed in the disposal area. During operation, materials were disposed in trenches, which were then covered with about 6 inches of soil to control blowing of litter. A final 2-foot-thick soil cover, consisting of compacted native soils, was placed over the trenches. The Navy and United States Environmental Protection Agency (EPA) Region 2 jointly selected the remedial action for SWMU 1, with the concurrence of the Puerto Rico Environmental Quality Board (PREQB). The proposed remedial action was documented in the Proposed Remedial Action Plan (PRAP), which was offered for public comment between August 1 and September 15, 2011. The selected remedial action for SWMU 1, documented in the Record of Decision (ROD), is Enhanced Native Soil Cover and Institutional Controls. The components of the remedial action include inspecting the landfill cover conditions, adding soil cover in any areas of exposed debris, implementing physical barriers and institutional controls, long-term monitoring of groundwater, and operation and maintenance.

This Work Plan describes how each component of the remedial action will be implemented in order to meet the Remedial Action Objectives (RAOs) for SWMU 1:

- RAO 1 - Prevent direct contact with surface and subsurface landfill debris and associated contamination that would potentially pose an unacceptable risk to exposed receptors.
- RAO 2- Minimize the potential for erosion of landfill debris.
- RAO 3 - Ensure land use (including the use of groundwater) within the landfill boundaries is controlled, unless or until additional action is implemented that mitigates potentially unacceptable risks associated with unrestricted land use.

As such, the Work Plan is divided into the following four main sections:

Soil Cover and Operations and Maintenance Plan

The Soil Cover and Operations and Maintenance Plan describes how the site reconnaissance will be conducted to determine any areas on the landfill that require native soil cover enhancement (in other words, where additional soil cover is needed) and how the native soil cover enhancement will be installed. This plan also describes the operation and maintenance activities that will be implemented to ensure the native soil and vegetative cover remain in place over the landfill debris. Operation and maintenance activities will include periodic inspections of the soil and vegetative cover conditions and implementation of additional cover soil, if necessary.

Land Use Control Plan

The Land Use Control Plan describes the mechanisms that will be implemented for and at SWMU 1. These mechanisms include fences and signs, as well as notations in the property deed, that restrict site access and certain uses in order to ensure the remedial action implemented remains protective of human health and the environment.

Groundwater Long-Term Monitoring

The Groundwater Long-Term Monitoring section describes the approach for long-term monitoring of groundwater to determine if a future release from the landfill occurs that results in groundwater contamination that may necessitate a groundwater remedial action.

Reporting

The Reporting section describes the following type of reporting that will be conducted in accordance with the remedial action at SWMU 1:

- **Remedial Action Construction Completion Report**

  This report summarizes the activities and results of the remedial action implementation.

- **Annual Operation and Maintenance Inspection Logs and Status Report**

  These annual reports detail the routine inspection and maintenance activities and document the findings and any necessary corrective actions taken.

- **Five-Year Review Reports**

  These reports document detailed evaluation of the effectiveness of the remedial action and include such things as identification of issues that may affect the remedy protectiveness, evaluation of long-term monitoring results, conclusions on the remedy effectiveness, and recommendations for modifications or follow-up actions.

Resumen Ejecutivo

La Unidad de Manejo de Desperdicios Sólidos 1 (SWMU 1 por sus siglas en ingles), que cubre aproximadamente 41 acres se localiza en al Antiguo Campo de Adiestramiento Naval (VNTR por sus siglas en ingles) en Vieques, Puerto Rico. SWMU 1 es un vertedero sin forro que fue usado desde 1954 a 1978 para la disposición de desperdicios domestico de Camp García. En el vertedero se dispusieron aproximadamente 1,800 a 3,120 toneladas de desperdicios domésticos, pero no se reporto que en el área de disposición se colocaron materiales peligrosos of municipal. Durante las actividades de operación, los materiales se dispusieron en zanjas, que luego fueron cubiertas con 6 pulgadas de tierra para controlar que los desperdicios se dispersaran con el viento. Una cubierta final gruesa de 2 pies de tierra, compuesta de suelos nativos fue colocada sobre la zanjas. La Marina y la Agencia de Protección Ambiental de los EE.UU (EPA por sus siglas en ingles) seleccionaron conjuntamente a acción de remediación para SWMU 1, la Junta de Calidad Ambiental de Puerto Rico (JCA) estuvo de acuerdo con esta selección. La acción de remediación propuesta fue documentada en el Plan de la Acción de Remediación Propuesta (PRAP por sus siglas en inglés), que fue sometido para comentario público entre el 1ro de agosto al 15 de septiembre, 2011. La acción de remediación seleccionada para SWMU 1, que se documentó en el Récord de Decisión (ROD por sus siglas en inglés) es Cubierta Mejorada con Suelo Nativo y Controles Institucionales. Los componentes de la acción de remediación incluyen inspeccionar de las condiciones del vertedero, añadir una cubierta de suelo en las áreas con escombros descubiertos, implementar barreras físicas y controles institucionales, monitoreo a largo plazo del agua subterránea, y actividades de operación y mantenimiento.

Este Plan de Trabajo describe la manera en que cada componente de la acción de remediación será implementado para poder alcanzar los Objetivos de la Acción de Remediación (RAOs por sus siglas en ingles) para SWMU 1:

- RAO 1 – Prevenir el contacto directo con los escombros del vertedero que están sobre la superficie y debajo de la superficie y con la contaminación asociada que potencialmente podrían presentar un riesgo inaceptable para receptores que entren al área.
- RAO 2- Minimizar el potencial de erosión de los escombros del vertedero.
- RAO 3 – Asegurar que el uso de los terrenos (incluyendo el agua subterránea) dentro de los límites del vertedero esté controlado, a menos que y hasta que se implemente una acción adicional que mitigue los riesgos inaceptables potenciales asociados con un uso no restringido de los terrenos.

Como tal, el Plan de Trabajo se divide en las siguientes cuatro secciones principales:

Cubierta de Suelos y Plan de Operación y Mantenimiento

La Cubierta de Suelo y el Plan de Operación y Mantenimiento describe la manera en la que se llevará a cabo un inspección del sitio para determinar las áreas dentro del vertedero que requieran una cubierta mejorada de suelo nativo (en otras palabras, donde se necesita una cubierta adicional de suelo), y como se instalará la cubierta de suelo nativo. Este plan también describe las actividades de operación y mantenimiento que serán implementadas para asegurar que la cubierta de suelo nativo y la vegetación permanecen en el sitio cubriendo los escombros del vertedero. Las actividades de operación y mantenimiento incluirán inspecciones periódicas de las condiciones de la cubierta de suelo y vegetación y la implementación de una cubierta de tierra adicional, de ser necesario.

Plan de Control de Uso de los Terrenos

El Plan de Control de Uso de los Terrenos describe los mecanismos que serán implementados para SWMU 1. Estos mecanismos incluyen verjas y letreros, así como clausulas en el título de propiedad, que restringen el acceso y ciertos usos para asegurar que la acción de remediación implementada sigua protegiendo la salud humana y el ambiente.

Monitoreo a Largo Plazo del Agua Subterránea

La sección de Monitoreo a Largo Plazo del Agua Subterránea describe el alcance del monitoreo a largo plazo del agua subterránea para determinar, de ocurrir filtraciones en el futuro que resulten en la contaminación del agua subterránea, si se necesita una acción de remediación del agua subterránea.

Documentación

La sección de Documentación describe el siguiente tipo de documentación que se llevará a cabo de acuerdo con la acción de remediación en SWMU 1:

- **Informe de Terminación de la Construcción de la Acción de Remediación**

  Este informe resume las actividades y los resultados de la implementación de la acción de remediación.

- **Informe Anual de los Registros de Operación y Mantenimiento e Informe de Estado**

  Estos informes anuales detallan la inspección de rutina y las actividades de mantenimiento y documentan los resultados y cualquier acción de corrección que se ha tomado.

- **Informe de Revisión de Cinco Años**

  Estos informes documentan la evaluación detallada de la efectividad de la acción de remediación e incluyen actividades como la identificación de problemas que pudieran afectar el nivel de protección del remedio, la evaluación de los resultados de monitoreo a largo plazo, las conclusiones de la efectividad del remedio, y las recomendaciones para realizar modificaciones y acciones de seguimiento.

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A Background Detected Soils Analytical Results

B LUC Site Inspection Checklist

C LUC Sign Design and Sign Language

D SWMU 1 LTM SAP

E Erosion Control Plan

F Final Response to USEPA, PREQB, and USFWS Comments

Acronyms and Abbreviations

bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long-term Environmental Action—Navy
CSM	conceptual site model
DOI	Department of the Interior
EMA	Eastern Maneuver Area
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
GPS	global positioning system
IC	institutional control
LTM	long-term monitoring
LUC	land use control
MCL	maximum contaminant level
MEC	munitions and explosives of concern
MOV	Municipality of Vieques
MW	Monitoring Well
Navy	U.S. Department of the Navy
O&M	operation and maintenance
PCBs	polychlorinated biphenyls
PRAP	Proposed Remedial Action Plan
PREQB	Puerto Rico Environmental Quality Board
RA	remedial action
RA/LTM	Remedial Action and Long-Term Monitoring
RAOs	remedial action objectives
RI/FS Report	Streamlined Remedial Investigation/Feasibility Study report
ROD	Record of Decision
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SOW	Scope of Work
SSL	soil screening level
SVOC	semivolatile organic compounds
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
UXO	unexploded ordnance
VNTR	Vieques Naval Training Range
VOC	volatile organic compounds
yr	year

SECTION 1

Introduction

Solid Waste Management Unit 1 (SWMU 1), covering approximately 41 acres, is located at the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico. The former VNTR is part of the Atlantic Fleet Weapons Training Area - Vieques, which was placed on the National Priorities List on February 11, 2005. The U.S. Department of the Navy (Navy) (Naval Facilities Engineering Command Atlantic Division), U.S. Environmental Protection Agency (EPA) Region 2, Puerto Rico Environmental Quality Board (PREQB), and the U.S. Fish and Wildlife Service (USFWS) of Department of Interior [DOI]) entered into a Federal Facility Agreement (FFA) for the former VNTR in 2007, as a result of the National Priorities List listing and pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The FFA establishes the procedural framework and schedule for implementing the CERCLA response actions for Vieques. The Navy is the lead agency and responsible for ensuring the appropriate CERCLA response alternatives are developed and implemented as necessary to protect public health, welfare, and the environment.

SWMU 1 is located within the Eastern Maneuver Area (EMA) portion of the former VNTR and is approximately 4,000 feet north-northwest of Blue Beach (**Figure 1-1**). SWMU 1 is an unlined landfill in use from 1954 to 1978 for the disposal of municipal waste from Camp García.

Approximately 1,800 to 3,120 tons of municipal waste were disposed in the landfill, but no hazardous materials reportedly were placed in the disposal area. During operation, materials were disposed in trenches, which were then covered with about 6 inches of soil to control blowing of litter. A final 2-foot (ft) thick soil cover, consisting of compacted native soils, was placed over the trenches. During the investigation, a small quantity of landfill debris was observed on the surface in few locations, from soil erosion, incomplete placement of the initial cover, or mechanized vegetation clearance to allow access during investigations.

A detailed description of site background, types of waste disposed, physical setting, previous investigations, conceptual site model (CSM), and site geology and hydrogeology can be found in the Streamlined Remedial Investigation and Feasibility Study report (RI/FS Report) (CH2M HILL, 2011a).

The Navy and EPA Region 2 jointly selected the Remedial Action (RA) for SWMU 1, with the concurrence of PREQB. USFWS also supported the selected remedy. The proposed RA, documented in the Proposed Remedial Action Plan (PRAP) (CH2M HILL, 2011b), is Enhanced Native Soil Cover, Institutional Controls (ICs), and Long-Term Monitoring (LTM). The selected RA for SWMU 1, documented in the Record of Decision (ROD) (CH2M HILL, 2011c), is Enhanced Native Soil Cover and Institutional Controls (ICs). The components of the RA include inspecting the landfill cover conditions, adding soil cover in any areas of exposed debris, implementing physical barriers and ICs, long-term monitoring (LTM) of groundwater and operation and maintenance (O&M), and statutory Five-Year Reviews and reporting.

This Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring (RA/LTM) Work Plan was prepared following signature of the ROD for submittal to EPA, PREQB, and USFWS. The RA/LTM Work Plan contains the soil cover and maintenance actions, ICs implementation, periodic inspections, and a long-term groundwater monitoring. This plan satisfies the requirement stated in the ROD to submit a remedial design work plan. The following subsections present the purpose, major elements, and reporting structure for this RA/LTM Work Plan.

1.1 Purpose

The purpose of this RA/LTM Work Plan is to describe the activities, reporting requirements, and schedule for implementing the RA, O&M, LUCs, and LTM to ensure the remedial action objectives (RAOs) contained within the ROD for SWMU 1 are met.

1.2 Remedial Action Objectives

Three RAOs were developed for the landfill debris, associated contamination, and potential exposure routes and receptors at SWMU 1 (CH2M HILL, 2011c):

- RAO 1 - Prevent direct contact with surface and subsurface landfill debris and associated contamination that would potentially pose an unacceptable risk to exposed receptors.
- RAO 2- Minimize the potential for erosion of landfill debris.
- RAO 3 - Ensure land use (including the use of groundwater) within the landfill boundaries is controlled, unless or until additional action is implemented that mitigates potentially unacceptable risks associated with unrestricted land use.

1.3 Scope of Work

The scope of work for the selected RA consists of the following major components:

- Soil Cover and Operations and Maintenance Plan to meet RAOs 1 and 2.
- Land Use Control (LUC) plan to meet RAO 3.
- Groundwater LTM Sampling and Analysis Plan (SAP) to determine if a future release from the landfill occurs that results in groundwater contamination that may necessitate a groundwater RA.
- Five-Year-Reviews.
- Reporting requirements and anticipated RA schedule.

1.4 Work Plan Organization

This RA/LTM Work Plan is organized as follows:

- Section 1 – Introduction
- Section 2 – Soil Cover and Operations and Maintenance Plan
- Section 3 – Land Use Control Plan
- Section 4 – Groundwater Long-Term Monitoring
- Section 5 – Reporting Requirements
- Section 6 – Project Schedule
- Section 7 – References

Tables and figures are provided at the end of each respective section.

FIGURE 1-1
SWMU 1 Location Map
Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan - SWMU 1
Former Naval Training Range
Vieques, Puerto Rico

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SECTION 2

Soil Cover and Operations and Maintenance Plan

The objective of enhancing the native soil cover is to prevent direct contact with surface and subsurface landfill debris and associated soil contamination. This section describes the soil cover and O&M plan, including site reconnaissance and soil cover installation, as well as O&M activities that will take place following remedy implementation. The soil cover and O&M plan is developed to meet RAOs 1 and 2.

2.1 Current Site Conditions

SWMU 1 is situated in a valley that gently slopes from the northwest to the southeast at a slope of approximately 0.5 to 1 percent, with an approximate 55-foot elevation change. **Figure 2-1** shows the site map including the site topographic contour features. SWMU 1 is bounded by steep hills to the west and an ephemeral stream and steep hills to the east. Surface water occurs within the ephemeral stream only during periods of heavy and prolonged rainfall.

The landfill debris is primarily municipal in nature, such as waste paper, corrugated containers, cans and food packaging material, rags, wood, scrap metal, and yard waste, that was disposed in trenches between 1954 and 1978. The depth of the landfill debris is variable across the site; however, it was observed to a depth of 10.5 feet below ground surface (bgs) (CH2M HILL, 2011a). Landfill debris was observed on the surface in few locations, from soil erosion, incomplete placement of the initial cover, or mechanized vegetation clearance to allow access during investigations.

Several munitions-related items (i.e., spent ammunition, small arms cartridges, and practice items) were also observed. The amount of small arms cartridges/spent ammunition items found was minimal and scattered, as would be expected in a military, municipal-type landfill. Disposing of live munitions in a landfill is and always has been prohibited. However, disposing of completely inert munitions-related items, such as those discovered at SWMU 1, was not an uncommon practice and is not indicative of MEC being present at the site.

On July 8, 2011, CH2M HILL conducted a site visit to verify the current site conditions at the landfill area, for the purpose of developing approaches to be used in the Site Reconnaissance Plan. One inactive 15-foot-wide access road crossing the SMWU 1 site from southwest to northwest (labeled Center Access Road in **Figure 2-2**) is currently overgrown with grass and sparse low shrubs. Another active dirt/gravel road, approximately 25 feet wide, passes north through the southern portion of SWMU 1 and then turns east. The site visit confirmed that SMWU 1 is densely vegetated with thick thorn scrub, as high as 10 to 30 feet tall. **Figure 2-1** presents the site map showing the current site conditions, including the locations of the inactive and active roads. Photographs included in **Figure 2-1** show examples of the vegetative cover on the landfill. The dense vegetation provides an effective phyto-cover, minimizing erosion during heavy storms, and providing a partial physical barrier that restricts trespassing.

2.2 Site Reconnaissance Plan

The RI/FS Report assumed that the exposed landfill debris areas would be less than 0.5 acre, based on visual observations made during site visits and investigations relative to the estimated footprint of the total debris disposal area. The RI/FS Report recommended that the exact locations and sizes of the exposed landfill debris areas be verified in the field during the remedial action implementation. A site-wide vegetation clearance is not preferred because the current dense vegetation provides various benefits, such as serving as an efficient phytocover, minimizing erosion and infiltration, and acting as a partial natural barrier for trespassing.

The primary purpose of the Site Reconnaissance Plan is to describe the approach to visually identify areas with exposed landfill debris using limited and localized vegetation clearance rather than site-wide vegetation clearance.

2.2.1 Site Reconnaissance Approach

Due to access difficulty and potential inadequate global positioning system (GPS) coverage associated with the dense vegetation at SWMU 1, the site reconnaissance field program will be designed to work outward from the existing inactive Center Access Road at SWMU 1. The proposed Site Reconnaissance Plan is shown on **Figure 2-2**, with the detailed reconnaissance approach described below:

Vegetation Removal

Vegetation removal on the landfill for site reconnaissance will consist of conducting minor trimming using hand clearance tools in order to visually inspect the 41 acres. Areas which are so heavily vegetated that visual observation cannot be made without a significant amount of vegetation removal will not be cleared; in this case, the existing vegetation will provide sufficient cover and significantly inhibit or prevent access, thereby eliminating the potential for contact and/or erosion.

Vegetation removal by hand and potentially mechanical means will be conducted along the Center Access Road to facilitate site access for the reconnaissance and associated remedy implementation and along an approximate 5-ft-wide buffer along the fence line to permit fence installation (**Figure 2-2**). Where mechanical vegetation clearance is performed, the cut vegetation will be chipped and spread, the extent practicable, to avoid creating brush piles. The Center Access Road is approximately 3,000 feet long and 15 feet wide (total of about 1 acre) and the fence line buffer is approximately 11,000 feet long by 5 feet wide (total of about 1.3 acres). UXO on-call support will be used if any suspected munitions-related item is identified.

- Appropriate temporary erosion control measures (i.e., silt fence and hay bales) will be implemented before land-disturbing activities begin in areas where the potential for erosion is a concern.

Site Reconnaissance

Site reconnaissance likely will be conducted by multiple two-person field teams. It is unlikely that munitions and explosives of concern (MECs) are present in SWMU 1. However, before site reconnaissance activities begin, an onsite training and safety orientation will be conducted by a UXO technician.

The field teams will walk the entire landfill, where accessible with no or minimal hand vegetation clearance, to identify exposed waste areas. When exposed debris is identified, field teams will delineate the boundary of the exposed debris areas, including areas with soil cover less than approximately 6 inches thick. This boundary of the area will be measured, the coordinates will be recorded on a geographic information system (GIS)-based map, and will constitute an area where soil cover enhancement will take place. If a particular area does not have adequate GPS coverage, physical measurements will be made based an adjacent area where GPS coverage is adequate and the manually-gathered information will be entered into the GIS-based map. The map will serve as the basis for estimating the quantities of soil fill material and topsoil required for soil covering. Depending on the findings of the site reconnaissance, the potential path forward will be:

- No additional native soil cover will be necessary if no exposed landfill debris areas are identified.
- For areas with exposed debris, implement soil cover enhancement in accordance with the Soil Cover Installation Plan described in Section 2.3 below.

2.3 Soil Cover Installation Plan

An approximate 2-foot soil cover will be installed at identified exposed waste areas to prevent direct contact with landfill debris and minimize erosion potential. Since the exact locations of exposed waste areas, if any, are not known at this time, they will be identified by site reconnaissance, as described in Section 2.2. The soil cover installation plan has been prepared to describe the soil cover process. The plan provides for adaptability during the implementation based on observed conditions. Once the site reconnaissance is completed, the details of soil cover will be included in a bid package with scope of work (SOW) statements, engineering specification, and supporting drawings, to solicit bids and select construction contractors for installation of the soil cover.

2.3.1 Cover Installation

The soil cover, where required, will consist of approximately 2 feet of native soil and an erosion control vegetation layer using native vegetation. The native soil material will be obtained from the followings sources:

- The soil intended for use as the cover is from a soil stockpile provided by USFWS. The soil was excavated from the entrance of the Vieques National Wildlife Refuge and not from a site. This soil has an existing seed bed that will allow native vegetation to germinate at the site. Note that vegetation growth on Vieques is very fast.
- If that is not possible, an attempt will be made to obtain the material from the location where previous soil sampling has been conducted and the data indicate the soil is appropriate for use as cover (e.g., site closed out without land use restrictions).
- If that is not possible, one composite and one discrete soil sample will be collected per 500 cubic yards from the identified cover material source area to determine its suitability. In this case, each composite soil sample will be collected from the cover material source area from up to five depths from ground surface to the anticipated depth of excavation. The five "subsamples" will be homogenized to create one composite sample per 500 cubic yards of cover material. The discrete soil sample(s) will be collected from mid-depth. The composite soil sample(s) will be analyzed for semivolatile organic compounds (SVOCs) by SW846 8270D, pesticides by SW846 8081B, and metals by SW846 6020A, 7470B, and 9012B (as applicable), and the discrete sample(s) for volatile organic compounds (VOCs) by SW846 8260B to determine if the material is suitable for use as cover. The results of the analyses will be compared to most current EPA Regional Screen Levels (RSLs), ecological screening levels appropriate for the site, background values (for metals), and the range of pesticide concentrations found across multiple Vieques sites and deemed representative of normal pesticide use. Appendix A contains tables listing the aforementioned background metals concentrations and range of pesticide concentrations that will be used to help assess whether the metals and pesticides detected in the composite sample(s) are attributable to background (metals) or representative of normal use (pesticides).

Once suitable cover material is obtained, the major tasks required to construct the soil cover are:

- Site preparation (localized vegetation clearance in the area of exposed debris and along a temporary access road(s) to the area(s) requiring cover,) and installation of erosion control measures (silt fence, hay bales, etc.)
- Transport of fill material from fill source(s) to the site
- Placement and compaction of lower 16-inch fill material in 8-inch lifts with compaction sufficient to inhibit erosion, and placement of the upper 8-inch native soil to support native vegetation growth.
- Planting of native vegetation to help re-vegetate the cleared areas and control erosion. Additional erosion control measures such as temporary cover (e.g., straw mats) will be implemented while the newly-planted vegetation becomes established, if warranted, based on physical characteristics such as the size of area covered, the topography, surrounding vegetation, etc. Appropriate native species, and sources of these plants, will be determined in collaboration with USFWS staff prior to implementation of the remedial action.

The existing active gravel road and inactive center access road at the site, and EMA Range Access Road to the east of the site will be used as haul routes, as necessary. Control of construction traffic will be made throughout the field RA activities. **Figure 2-3** shows the soil cover installation plan.

Based on the site topography (relatively flat area within the landfill boundary, sloping from about 0.5 to 1.5 percent) and dense vegetation cover for infiltration control, erosion and ponding do not appear to be an issue at SMWU 1. Appropriate temporary erosion control measures (silt fence/hay bales) will be implemented, if necessary, before land-disturbing activities begin and will remain in place until re-vegetated areas are well established. Due to anticipated small areas that require soil covering, regrading beyond the area of soil cover is not anticipated.

Revegetation will be conducted in areas where fill is added within the landfill boundary (other than the center access road). As warranted, USFWS input will be solicited for plants used to revegetate cleared/covered areas. At the completion of RA activities, the perimeter fence line 5-foot vegetation buffer zone will be allowed to naturally

re-vegetate. The Center Access Road will be mowed periodically to provide access during site inspection activities conducted as part of O&M.

Once the soil cover source area is identified, necessary erosion control measures will be implemented there. As necessary, regarding and re-vegetation of the soil source area will be conducted.

2.3.2 O&M Activities

Immediately following RA implementation, O&M activities will comprise quarterly inspections of the disturbed areas for an estimated 1 year to ensure vegetation becomes established and erosion is not occurring such that landfill debris is likely to become re-exposed. Quarterly inspections will continue beyond 1 year if necessary to achieve the stated objective. After the establishment of vegetation, the frequency of the site inspections for the long-term O&M activities will be reduced to annually. If inspections show that the erosion control measures are not sufficient, additional erosion control measures will be taken in accordance with the Erosion and Sediment Control Plan (ESCP). If inspections show that vegetation is not re-establishing, the Navy will consult with USFWS and conduct additional re-planting activities.

Long-term O&M activities will include, at a minimum, annual visual inspection of landfill soil cover, gravel road passing through the southern portion of SWMU 1, erosion and drainage, monitoring wells, and fencing/ signage/ gates (see Section 3 – Land Use Control Plan for a description of fence installation). Routine inspections are required to ensure proper LUC and landfill cover maintenance. Additional inspections will be conducted if events occur that may threaten the integrity of the remedy (e.g., hurricanes, fires, etc.). Given their permanent presence on the refuge, USFWS personnel may be the first to become aware of these types of events and can help the Navy determine if an additional inspection is warranted.

All inspection findings, along with corrective actions taken or recommended and the date of reinspection, will be documented on the site-specific inspection checklist presented in Appendix B. Following each annual inspection, a summary report will be provided to EPA, PREQB, and USFWS documenting routine maintenance tasks, inspection findings, and, as applicable, corrective actions taken. A summary of all annual inspections and activities taken to maintain the soil cover according to this work plan will be included in the Five-Year Review Reports.

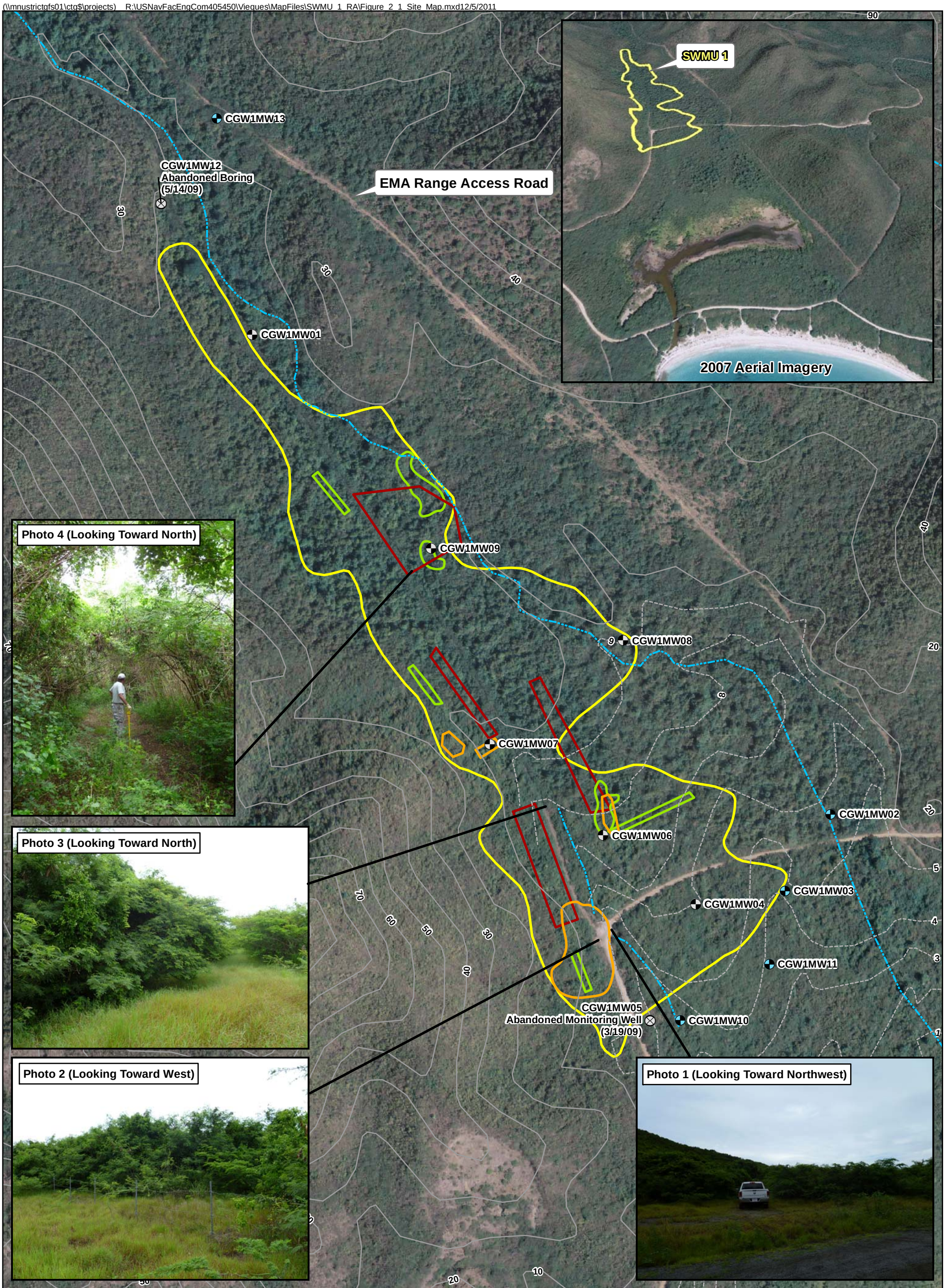
Routine maintenance of SWMU 1 RA and associated O&M elements will include the following:

- Cover: Landfill soil cover and vegetation will be maintained to minimize the potential for erosion and exposure of debris. Visual inspections of the landfill cover will be performed in general accordance with Section 2.2. Waste visually observed noted during inspections will be covered as defined in Section 2.3.
- Southern Road: The active gravel road that passes through the southern portion of SWMU 1 will be maintained to minimize the potential for erosion and exposure of debris, since it is possible for debris to be present beneath the road.
- Center Access Road and Perimeter Fence: Center access road will be periodically (annually), but minimally, cleared to provide access for site O&M activities. Perimeter vegetation buffer (along fence line) will be allowed to re-vegetate naturally to minimize potential trespassing, so periodic vegetation clearance is not required. Subsequent inspection of the fence line will be done based on accessibility. If any particular portion of the fence cannot be accessed because the vegetation is too dense, then trespassers would also not be able to cross the boundary at that location, so the intent of the fence will still be met in those locations, even if the fence condition cannot be verified.

2.3.3 Performance Criteria

The completion of the RA implementation will be presented in a Remedial Action Completion Report (RACR). Performance measures for the proposed soil cover will include thickness measurements for the soil fill, at frequency of one measurement per 2,500 square feet of soil covering area, with photo documentation to help ensure that the soil cover meets RAO 1 and RAO 2. It will also include re-establishment of a viable vegetative cover on disturbed areas. Annual O&M activities will ensure the soil cover remains intact, waste is not exposed, or erosion is not occurring to a degree that will likely expose debris.

(\\mnustrictqfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\SWMU_1_RA\Figure_2_1_Site_Map.mxd12/5/2011



Legend

- Monitoring Wells
- Long Term Monitoring Wells
- Abandoned Boring or Monitoring Well
- Topographic Contour (1 Meter Interval)
- Topographic Contour (10 Meter Interval)
- Stream
- Apparent Landfill trench/cell evident in 1959 Aerial Photograph
- Apparent Landfill trench/cell evident in 1962 Aerial Photograph
- Apparent Landfill trench/cell evident in 1964 Aerial Photograph
- Approximate Extent of Landfill Debris

Note: The current site conditions as shown on the photos are based on site visit conducted on July 8, 2011.

N W E S

0 175 350 Feet

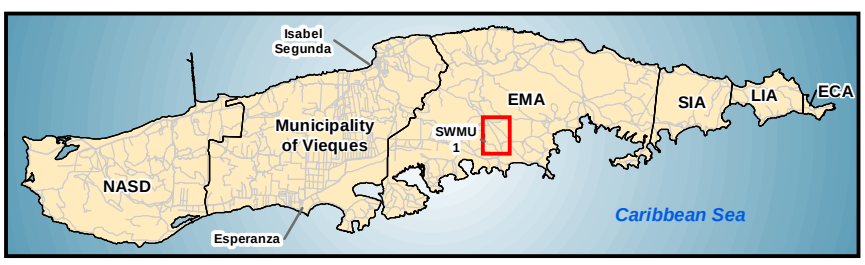
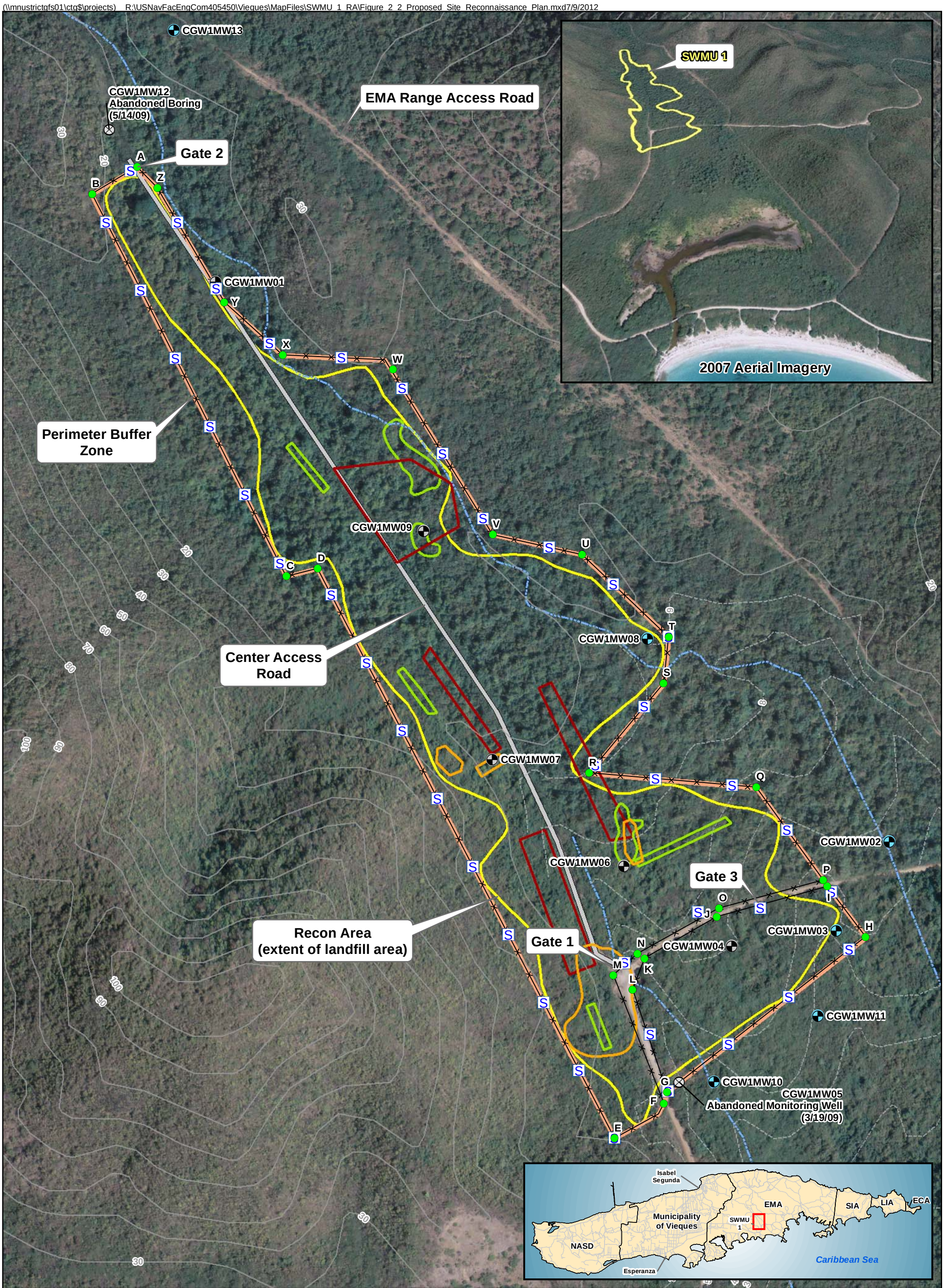


Figure 2-1
Site Map

Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan - SWMU 1
Former Vieques Naval Training Range
Vieques, Puerto Rico

CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\SWMU_1_RA\Figure_2_2_Proposed_Site_Reconnaissance_Plan.mxd7/9/2012



Legend

- Fence Corners
- Sign Location
- Monitoring Well
- Long Term Monitoring Well
- Abandoned Boring or Monitoring Well
- 3-Wire Fence
- Topographic Contour (1 Meter Interval)
- Topographic Contour (10 Meter Interval)
- Ephemeral Stream
- Apparent Landfill trench/cell evident in 1959 Aerial Photograph
- Apparent Landfill trench/cell evident in 1962 Aerial Photograph
- Apparent Landfill trench/cell evident in 1964 Aerial Photograph
- LUC Boundary (To Be Surveyed by professional Surveyor)
- Existing 15-ft-Wide Access Road
- Recon Area (approximate extent of landfill)

N W E S

0 125 250 Feet

2007 Aerial Imagery

Figure 2-2
Proposed Site Reconnaissance Plan
Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan - SWMU 1
Former Vieques Naval Training Range
Vieques, Puerto Rico

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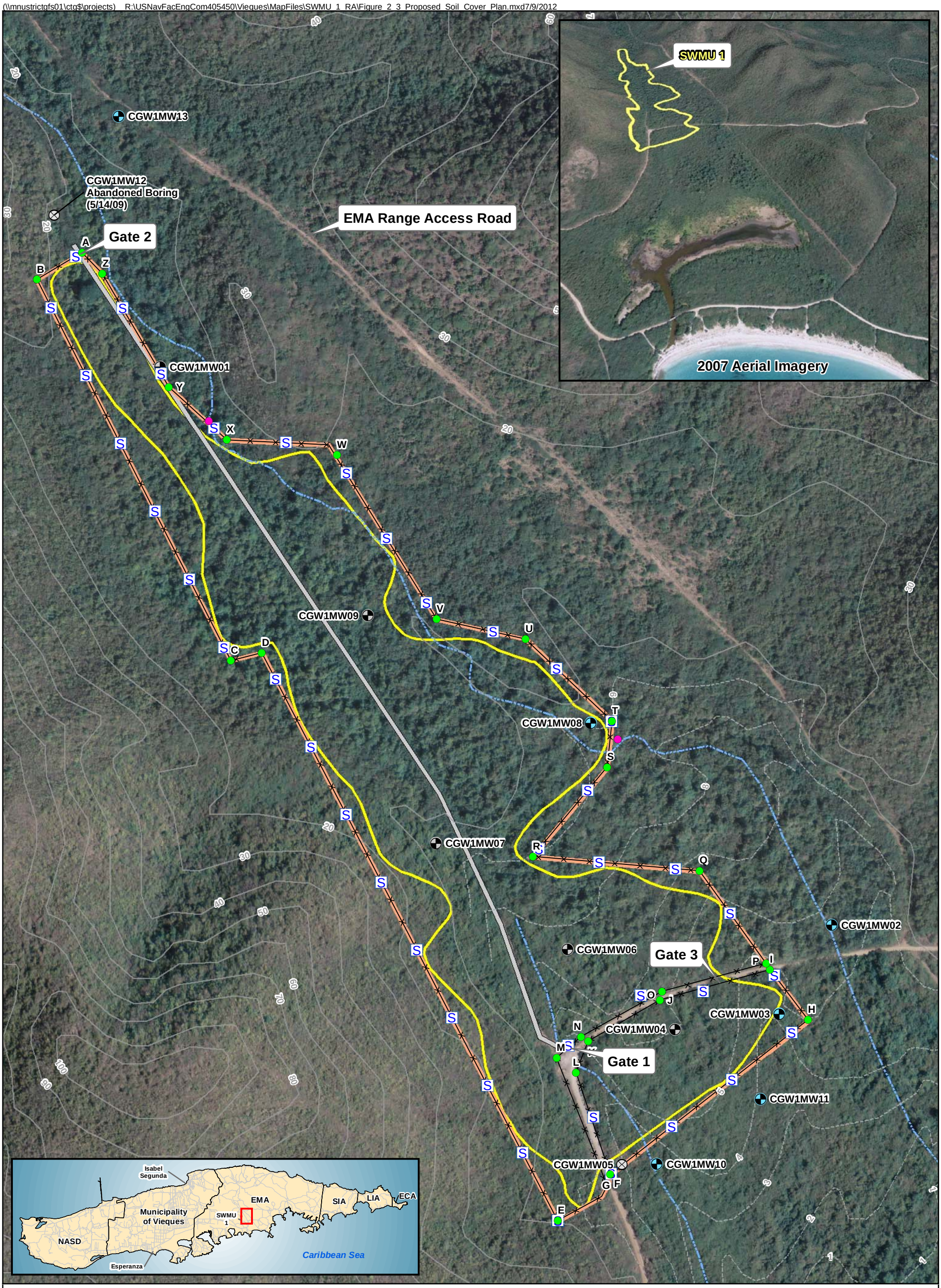
(\\mnustrictqfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\SWMU_1_RA\Figure_2_3_Proposed_Soil_Cover_Plan.mxd7/9/2012



Legend

- Haybale/Silt Fence (as needed)
- Fence Corners
- Sign Location
- Monitoring Well
- Long Term Monitoring Well
- Abandoned Boring or Monitoring Well
- 3-Wire Fence
- Topographic Contour (1 Meter Interval)
- Topographic Contour (10 Meter Interval)
- Ephemeral Stream
- LUC Boundary (To Be Surveyed by professional Surveyor)
- Existing 15-ft-Wide Access Road
- Approximate Extent of Landfill Debris

Notes: The areas requiring soil covering of minimum 24 inches of native soil are to be determined by the Site Reconnaissance findings (See Figure 2-2 Site Recon Plan); The long-term landfill inspection for erosion, fencing, signs, and soil cover condition etc. will be conducted annually.

N W E S

0 125 250 Feet

2007 Aerial Imagery

Figure 2-3
Proposed Soil Cover Plan
Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan - SWMU 1
Former Vieques Naval Training Range
Vieques, Puerto Rico

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SECTION 3

Land Use Control Plan

This LUC plan is developed to satisfy the ROD requirement for LUCs and for implementation, operation, maintenance, and enforcement of the LUCs component of the RA. The Navy will be responsible for performing all short- and long-term implementation actions at SMWU 1 as per *The Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions* (2003), the FFA, the ROD, and applicable Navy directives. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity and will continue to maintain responsibility for implementing, monitoring, and enforcing LUCs in accordance with the Memorandum of Agreement dated 04-30-2003. Future land use at SWMU 1 is anticipated to remain the same as current land use (i.e., wildlife refuge) (see **Figure 3-1**). However, if a different use is planned in the future by DOI or USFWS at SWMU 1 that may necessitate a modification to the RA, including LUCs, the modification(s) will be coordinated with the Navy and approved by EPA and PREQB prior to implementation.

3.1 Land Use Control Objectives

LUCs will be implemented to restrict unauthorized soil and debris disturbance, construction, human presence, and potable use of groundwater. The LUC is a legal mechanism that restricts the use of or limits access to prevent or reduce risks to human health and the environment. The LUC will prevent unauthorized and uncontrolled excavation and groundwater use within the boundaries of the landfill, which will result in no uncontrolled exposure to debris, contaminated subsurface soil, or groundwater at the site. LUCs will be maintained within the LUC boundary at SWMU 1 indefinitely or as long as debris remains in place for which exposure would result in potentially unacceptable risk. The LUCs will ensure the RAO to control land use (including the use of groundwater) within the landfill boundaries is met.

3.2 Implementation and O&M Actions

Figure 3-2 illustrates the conceptual plan for LUC implementation. Specific implementation details are listed below.

- Maintain warning signs in English and Spanish for SWMU 1. Signs will be installed approximately every 500 feet around the entire fence line, at gate locations, and where the southern road passes into and out of the LUC area. The signs will warn against trespassing and prohibit unauthorized and uncontrolled disturbance of the land surface that may expose landfill debris. Appendix C contains a schematic drawing showing the information and imagery that will be included on the signs. The actual signs produced may vary slightly in terms of dimensions and format, but will convey the information shown in the schematic drawing. At each sign location, two side-by-side signs will be affixed to the fence: one in English and one in Spanish.
- Maintain the approximate 11,000-foot barbed wire fence (galvanized, three strands of No. 12-1/2 gauge or comparable), which will be installed after the completion of an approximate 5-foot vegetation buffer clearance during the site reconnaissance activities.
- The center road of the landfill will not be maintained and vegetation will be allowed to re-grow following the remedial action implementation.
- The LUC boundary encompassing the landfill waste area (i.e., along the three-wire fence line) will be documented in a Vieques Master LUC Plan, to be prepared following the SWMU 1 LUC implementation. The plan will include a metes and bounds survey map prepared by a professional land surveyor. A deed notation, with a surveyed LUC boundary map, which restricts any intrusive activities on the landfill and potential groundwater use without Navy's approval, will be filed at the MOV.

- Indicate for DOI where LUCs have been imposed and annotate LUC objectives in the Navy geographic information system database.
- The Navy will communicate its schedule for conducting inspections and O&M. Similarly, USFWS refuge personnel will communicate any planned activities within the SWMU 1 boundary to ensure they are consistent with the remedial action, LUCs, and ICs.
- Conduct annual inspections of the LUCs, in accordance with the checklist in Appendix B. Additional inspections will be conducted if events occur that may threaten the integrity of the LUCs (e.g., hurricanes, fires, etc.). Following each annual inspection, a summary report will be provided to EPA, PREQB, and DOI, and USFWS documenting routine maintenance tasks, inspection findings, and, as applicable, corrective actions taken. A summary of all annual inspections, activities taken to maintain LUCs according to this work plan, LUC infractions, and corrective actions taken or proposed will be included in the Five-Year Reviews (see below).
- Security Devices: Gates, fences, signs, and locks will be kept in operating condition. Operational defects in gates, fences, signs, and locks noted during inspections will be repaired.
- Conduct Five-Year Reviews of the RA effectiveness and prepare a report that provides the results to EPA, PREQB, DOI, and USFWS.
- The Navy shall not modify or terminate LUCs, implementation actions, or modify land use without concurrence by EPA and PREQB. The Navy shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs. Prior to seeking concurrence from the EPA and PREQB, the DOI must notify and obtain approval from the Navy of any proposals for a land use change that is inconsistent with the use restrictions and assumptions described in the ROD and detailed herein.
- The Navy shall notify EPA and PREQB as soon as practicable, presumptively within 10 days of the discovery of activity at SWMU 1 inconsistent with the LUC objectives stated above, and then promptly investigate and take appropriate corrective action. Such notice will also outline the steps to be taken to: (1) investigate the cause and outcomes and/or potential outcomes of the activity inconsistent with the LUC objectives; (2) develop appropriate corrective action; and (3) evaluate the effectiveness of LUCs and assess lessons learned and prevent recurrence. For cases in which such inconsistent activity does not create an imminent and substantial threat to human health or the environment, investigation will normally commence within 60 days.

3.2.1 Performance Criteria

The completion of LUC implementation actions will be presented in the RACR and performance of the LUC component of the selected remedy will be measured as part of annual inspections, maintenance and corrective actions, and reporting as outlined herein.

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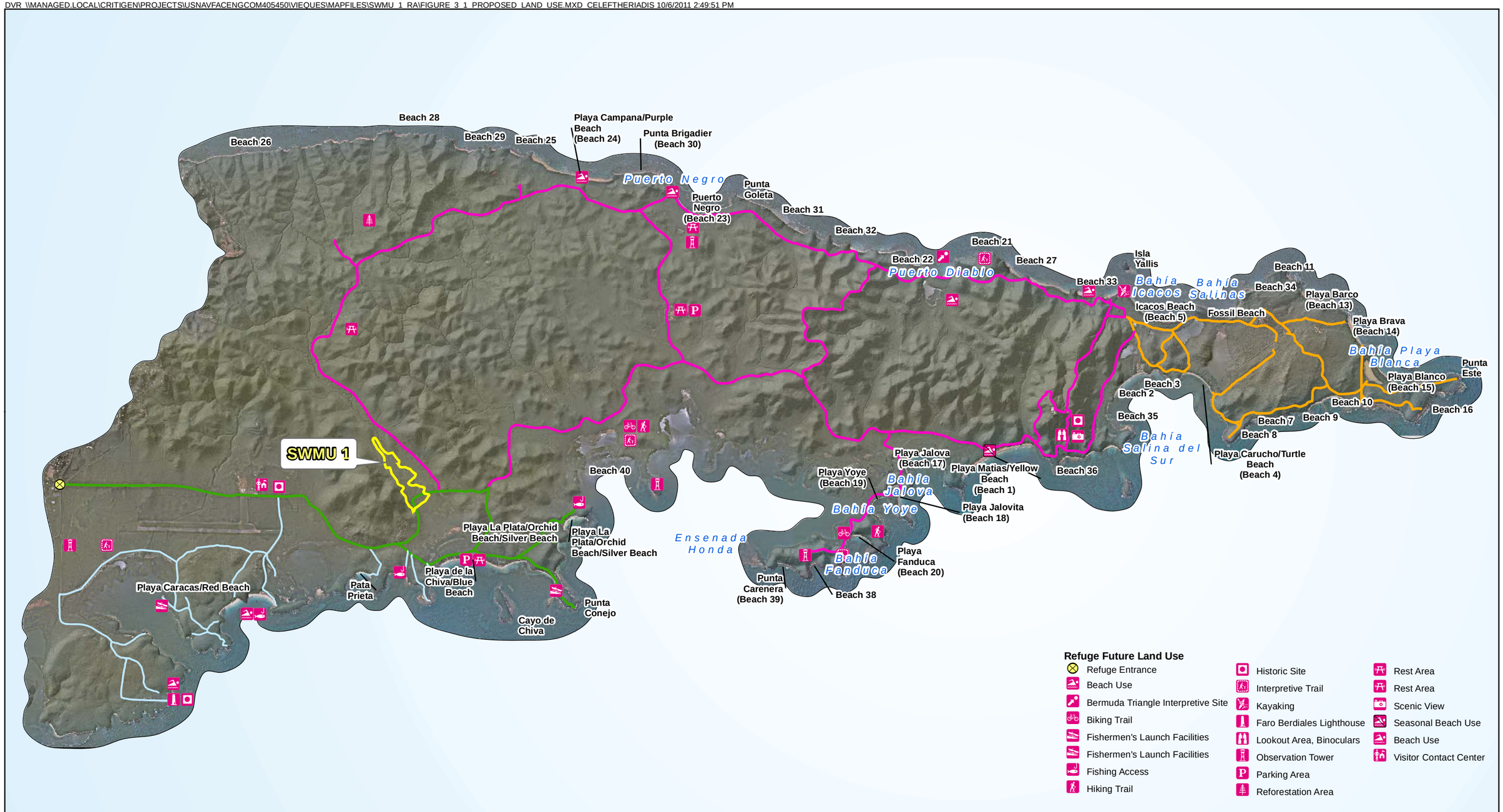
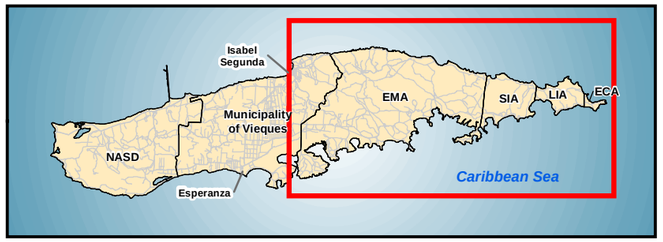


Legend

- Management Access Roads
- Vehicle Public Use Road Open
- Proposed Hiking/Biking Interpretive Trail
- Vehicle Public Use Road Proposed
- Vieques National wildlife Refuge Boundary
- SWMU 1



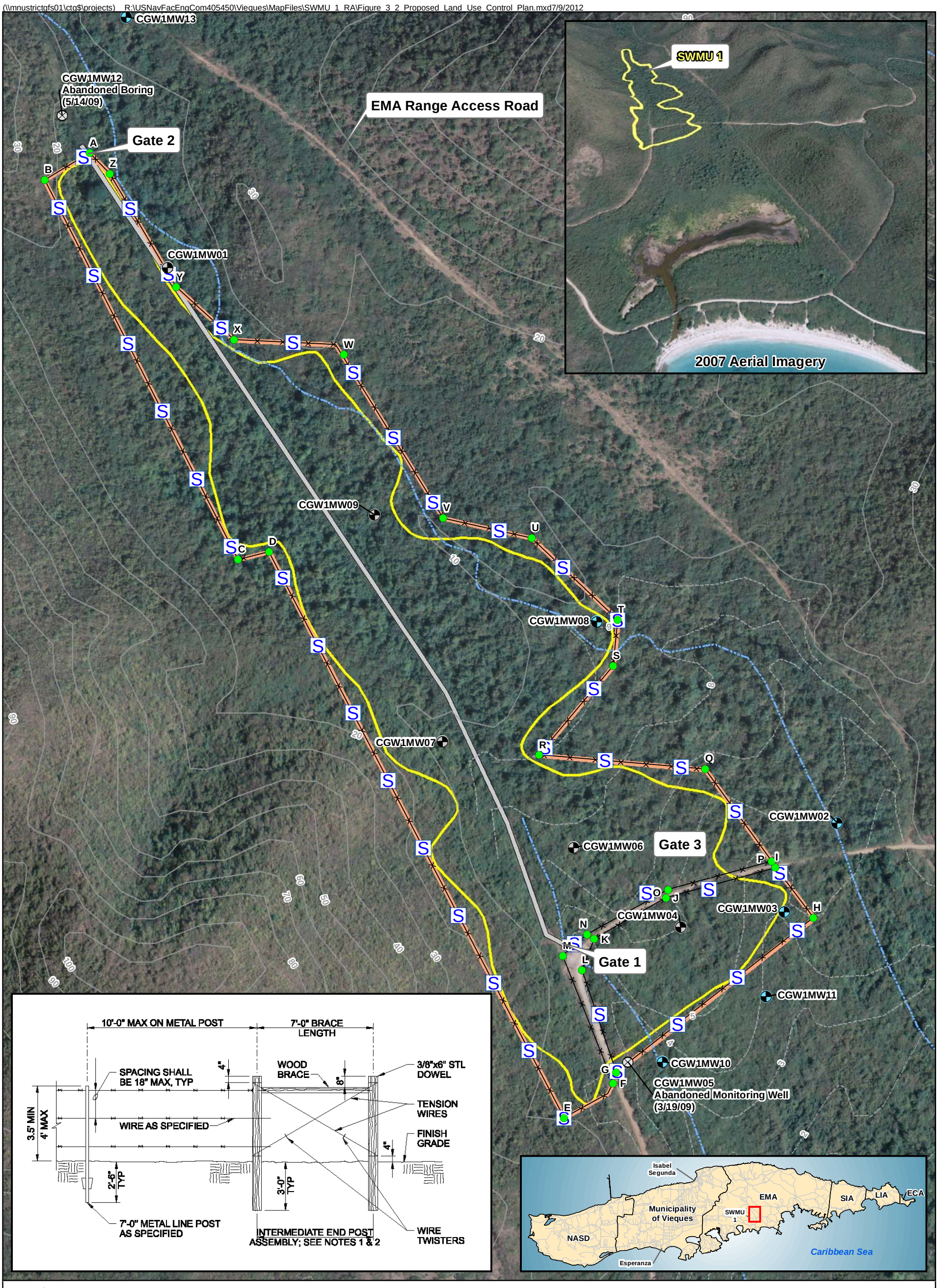
N
W E
S

0 2,000 4,000 8,000 Feet

Figure 3-1
Proposed Land Use for the Former VNTR
Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan - SWMU 1
Former Vieques Naval Training Range
Vieques, Puerto Rico

CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\SWMU_1_RA\Figure_3_2_Proposed_Land_Use_Control_Plan.mxd7/9/2012



Legend

- Fence Corners
- Sign Location
- Monitoring Well
- Long Term Monitoring Well
- Abandoned Boring or Monitoring Well
- 3-Wire Fence
- Topographic Contour (1 Meter Interval)
- Topographic Contour (10 Meter Interval)
- Ephemeral Stream
- LUC Boundary (To Be Surveyed by professional Surveyor)
- Existing 15-ft-Wide Access Road
- Approximate Extent of Landfill Debris

Notes:
1. Spacing for intermediate end post assembles shall be 400 ft maximum.
2. 6" x 6" x 8' wood posts to be treated with preservative.

N W E S

0 125 250 Feet

2007 Aerial Imagery

Figure 3-2
Proposed Land Use Control Plan
Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan - SWMU 1
Former Vieques Naval Training Range
Vieques, Puerto Rico

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SECTION 4

Groundwater Long-Term Monitoring

As noted in the RI/FS Report (CH2M HILL, 2011a), a groundwater assessment was conducted by comparing groundwater concentration data against maximum contaminant levels (MCLs), Puerto Rico water quality standards, risk-based screening criteria, and background concentrations. Groundwater data collected from beneath and downgradient of the landfill indicate no groundwater contamination is present requiring remediation and that leaching from the landfill to groundwater has been insignificant during the past 30 to 55 years that the landfill debris has been in place. Therefore, an RAO for groundwater is not necessary. In addition, Soil Screening Remediation Goals (SSRG) model calculations show that the potential for leaching to groundwater is negligible and provides additional evidence that no groundwater contaminant plume exists, as discussed in the *Final Streamlined Remedial Investigation/Feasibility Study Report Solid Waste Management Unit 1* (CH2M HILL, 2011a). However, long-term groundwater monitoring at SWMU 1 will be conducted to determine if a future release from the landfill occurs that results in groundwater contamination that may necessitate a groundwater RA.

4.1 Sampling Rationale and Approach

This subsection contains a summary of the sampling rationale and approach. Groundwater LTM will be conducted in accordance with the SWMU 1 LTM Sampling and Analysis Plan (SAP), provided in Appendix D. Based on the average hydraulic conductivities (12.2 and 2.3 feet/day) observed within the saprolite and alluvial aquifer at other sites (such as SWMU 4 and Area of Concern R in the western portion of Vieques), an effective porosity (0.30), and the average hydraulic gradients observed at SWMU 1, the estimated groundwater flow velocity at SWMU 1 likely ranges from 17 to 158 feet/year (CH2M HILL, 2011a). Based on the relatively slow groundwater velocity (relative to the size of the site), groundwater sampling at a frequency of once every year for the first five years (corresponding to the statutory Five-Year-Review) will be sufficient to monitor any potential chemical releases that reach groundwater and are transported with groundwater flow. Therefore, groundwater monitoring will be initiated following completion of the soil cover enhancement activities with an initial post-ROD event and will occur every year for the first five years unless trend data suggest more or less frequent monitoring is warranted. The frequency of groundwater sampling will be evaluated during the statutory Five Year Review and changes in the frequency of sampling, if necessary, will be made as part of the Five Year Review recommendations.

Following the initial event (subsequent to soil cover enhancement), the groundwater sampling will be scheduled every year and approximately 6 months before the due date of each Five-Year Review report, or what is determined to be sufficient time to allow for sample results to be analyzed and evaluated so any recommendations regarding modifications to the long-term groundwater monitoring can be made in the Five-Year Review report.

For the first five years of post-ROD sampling events, six wells (five downgradient wells MW02, MW03, MW08, MW10, MW11, and one upgradient well MW13) as shown in **Figure 4-1**, will be sampled and analyzed for constituents on the TCL/TAL from EPA CLP SOM01.2 and ILM05.4 for which there is an MCL and/or Puerto Rico Water Quality Class SG standard. As constituents are added or removed from the Federal Safe Drinking Water Act list of primary drinking water standards or Puerto Rico groundwater quality standards, they will be added or removed from the suite of analyses for SWMU 1 groundwater.

4.2 Performance Criteria

Groundwater sample results will be compared against the following performance criteria and background levels:

- Federal Safe Drinking Water Act (Title 40 of the Code of Federal Regulations, Part 141) primary MCLs and secondary MCLs.
- Puerto Rico Water Quality Standards Regulation, March 2010.

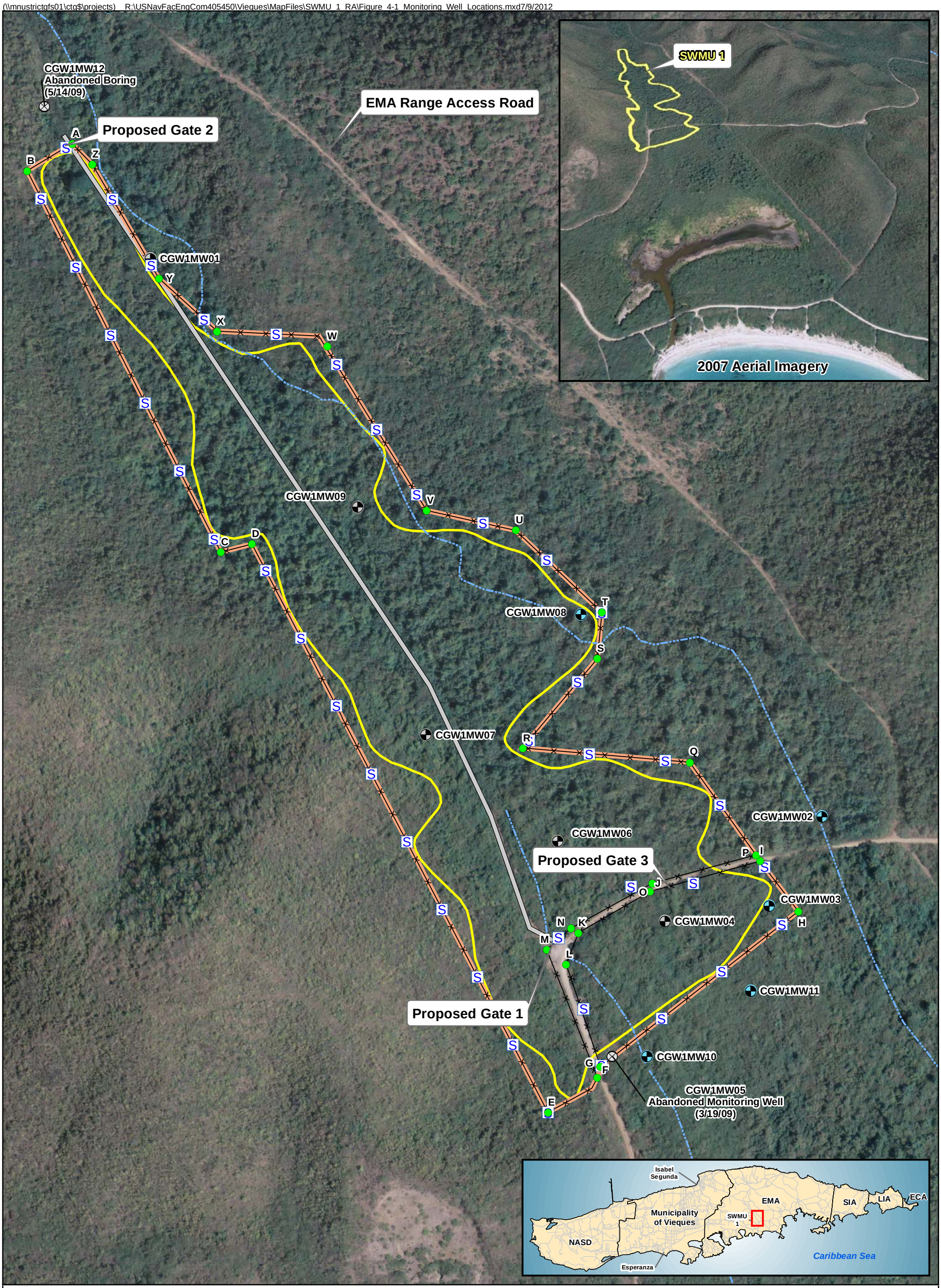
- Background concentrations measured from upgradient SWMU 1 monitoring well MW13.

The groundwater sampling results, conclusions, and recommendations will provide the basis for 5-Year reviews of the groundwater component of the ROD and will be documented in an appendix to the 5-Year ROD Review report. A minimum of six groundwater monitoring reports will be prepared, because groundwater sampling will be performed once every 5 years for 30 years (unless a release is identified requiring a groundwater RA). Thirty years is deemed an adequate timeframe for post-closure monitoring of landfills that are closed with waste in place. Depending on the findings of the groundwater LTM program, the potential path forward could be:

- At the end of 30-year post-closure period, the groundwater sampling program will be discontinued, if no groundwater contamination warranting an RA is observed.
- If LTM indicates a groundwater RA is warranted in the future, the ROD will be amended, a groundwater RAO(s) will be developed, and a remedy (and associated LTM) will be implemented.

As noted previously, the details of the groundwater LTM are included in the Groundwater LTM SAP, which is provided in Appendix D, and was prepared in general accordance with the *Uniform Federal Policy for Quality Assurance Project Plans* and Navy guidance.

(\\mnustrictqfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\SWMU_1_RA\Figure_4-1_Monitoring_Well_Locations.mxd7/9/2012



Legend

- Proposed Fence Corners
- Sign Location
- Monitoring Well
- Long Term Monitoring Well
- Abandoned Boring or Monitoring Well
- Proposed 3-Wire Fence
- Ephemeral Stream
- Proposed LUC Boundary (To Be Surveyed by professional Surveyor)
- Existing 15-ft-Wide Access Road
- Approximate Extent of Landfill Debris

Notes:
1. Spacing for intermediate end post assembles shall be 400 ft maximum.
2. 6" x 6" x 8' wood posts to be treated with preservative.

N W E S

0 250 500 Feet

2007 Aerial Imagery

Figure 4-1
Monitoring Well Locations
SWMU 1 Groundwater Long Term Monitoring SAP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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SECTION 5

Reporting

5.1 Remedial Action Construction Completion Report

Following the implementation of the RA (including LUCs), a RACR will be prepared to summarize the activities and results. The RACR will be prepared in accordance with the applicable guidance documents:

- *Joint Guidance on Streamlined Site Closeout and NPL Deletion Process for DoD Facilities, August 2006* (DOD and EPA, 2006);
- *Guidance to Documenting Milestones Through the Site Closeout Process, March 2006* (Navy, 2006);
- *Close Out Procedures for National Priorities List Sites, Office of Superfund Remediation and Technology Innovation 9320.2-22, US EPA, May, 2011* (EPA, 2011).

The report will provide detail to the site reconnaissance, vegetation clearance, fence/sign installation, and soil cover installation activities. The report will document that the scope of work is complete.

5.2 Annual O&M Inspection Logs and Status Report

Inspection checklists will be completed for each annual inspection and included in an annual status report. The status reports will provide detail to routine maintenance tasks and inspection of the soil cover and LUCs, inspection findings, and corrective actions taken.

5.3 Five-Year Review Report

The first Vieques statutory Five-Year Review period will be triggered by the start of the SWMU 1 RA, which is the mobilization date for site reconnaissance. Completion of the first Five-Year Review Report will be required 5 years from the mobilization date. After the completion of the first Five-Year Review, the trigger for subsequent reviews is the signature date of the previous Five-Year-Review report.

There are six components to the Five-Year Review process: 1) community involvement and notification, 2) document review, 3) data review and analysis (including groundwater), 4) site inspection, 5) interviews and 6) protectiveness determination.

The conclusions of the Five-Year Review will include:

- Identification of issues, as applicable
- Evaluation and recommendation on the monitoring period timeline
- Recommendations and follow-up actions
- A determination as to whether the RA is, or is expected to be, protective of human health and the environment

The Five-Year Review report will also include the most recent LTM groundwater sampling results and evaluation.

The Five-Year Review report will generally follow the template included in the Appendix E of *Comprehensive Five-Year Review Guide (EPA 540-R-01-007)* (EPA, 2001 or most recent guidance, as applicable) unless an alternate format is concurred upon by the Navy and regulatory agencies.

SECTION 6

Project Schedule

The general schedule for completing the RA activities outlined in this RA/LTM Work Plan is shown in Table 6-1. Key milestones in the project schedule are the completion of the site reconnaissance activities, implementation of LUCs, soil cover construction, preparation of the RACR, landfill O&M, inspections, groundwater LTM, and Five-Year Reviews and reports.

TABLE 6-1

SWMU 1 Remedial Action Schedule

Remedial Action and Long-Term Monitoring Work Plan Solid Waste Management Unit 1 (SWMU 1)

Former Vieques Naval Training Range, Vieques, Puerto Rico

Task	**Estimated Start Date**	**Estimated End Date**
Remedial Action Implementation		
Reconnaissance (trigger for five-year reviews)	7/23/12	9/07/12
LUC Implementation (metes bounds survey, fencing/gate, signage installation)	9/10/12	12/14/12
Native Soil Cover Enhancement (if necessary)	9/10/12	2/22/13
Construction Completion Report		
Draft		4/26/12
Draft Final		9/27/12
Final		11/08/12
O&M and LTM (1st 5 years shown)		
Baseline Groundwater Sampling		2/22/13
Year 1 Inspection and Groundwater Sampling		2/22/14
Year 2 Inspection and Groundwater Sampling		2/22/15
Year 3 Inspectoin and Groundwater Sampling		2/22/16
Year 4 Inspection and Groundwater Sampling		2/22/17
Five-Year Review Report		
Draft		7/23/17
Draft Final		12/24/17
Final		2/04/17

SECTION 7

References

CH2M HILL, 2011a. *Streamlined Remedial Investigation/Feasibility Study Report, SWMU 1, Former Vieques Naval Training Range, Vieques, Puerto Rico.* April

CH2M HILL, 2011b. *Proposed Remedial Action Plan, SWMU 1, Atlanta Fleet Weapons Training Area, Former Vieques Naval Training Range, Vieques, Puerto Rico.* July

CH2M HILL, 2011c. *Record of Decision, SWMU 1, Former Vieques Naval Training Range, Vieques, Puerto Rico.* September.

DoD and EPA. 2006. *Joint Guidance on Streamlined Site Closeout and NPL Deletion Process for DoD Facilities, August.*

Navy. 2006. *Guidance to Documenting Milestones Through the Site Closeout Process, March.*

U.S. Department of Energy. 2000. *Institutional Controls in CERCLA and RCRA Response Actions.* DOE/EH-413-0004. August.

EPA. 2000. *Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups.* EPA 540-F-00-005. September.

EPA, 2001. *Comprehensive Five-Year Review Guide, EPA 540-R-01-007.* June.

EPA, 2003. *The Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions*. October.

EPA, 2005. *Uniform Federal Policy for Quality Assurance Project Plans*. EPA-505-B-04-900A. March.

EPA, 2011. *Close Out Procedures for National Priorities List Sites,*
Office of Superfund Remediation and Technology Innovation 9320.2-22, US EPA, May.

Appendix A
Background Detected Soils Analytical Results

Appendix A-1
Vieques Soil Sample Background Concentration Estimates
Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan SWMU 1

		Combined Soil Data								QS Soil Type								KTD Soil Type								QA Soil Type							
Parameter	**Units**	**Dist**	**N**	**Min**	**Max**	**Mean**	**UTL**		**UCL**	**Dist**	**N**	**Min**	**Max**	**Mean**	**UTL**		**UCL**	**Dist**	**N**	**Min**	**Max**	**Mean**	**UTL**		**UCL**	**Dist**	**N**	**Min**	**Max**	**Mean**	**UTL**		**UCL**
Aluminum	mg/kg	L	37	1,600	29,000	9,573	**29,000**	*	**12,821**	L	12	1,600	11,000	3,875	11,000		5,416	N	13	6,900	18,000	11,346	18,000	*	13,053	N	12	5,000	29,000	13,350	29,000	*	17,291
Antimony	mg/kg	NP	37	0.35	2.3	0.67	**2.3**		**0.8**	N	12	0.35	1.0	0.53	1.0	*	0.6	N	13	0.52	1.4	0.68	1.4	*	0.8	L	12	0.59	2.3	0.81	2.3		1.0
Arsenic	mg/kg	L	37	0.57	2.5	0.93	**2.5**	*	**1.1**	N	12	0.70	2.5	1.3	2.5	*	1.6	N	13	0.57	1.2	0.72	1.2	*	0.9	L	12	0.66	2.2	0.78	2.2		1.7
Arsenic (SUBSURFACE SOIL)	mg/kg	N	11	0.71	2.5	1.0	**2.5**		**1.4**	N	4	1.1	2.5	1.7	2.5	*	NA	NP	3	0.87	1.0	0.96	1.0		NA	N	4	0.71	0.71	0.43	0.7	*	NA
Arsenic (SURFACE SOIL)	mg/kg	L	26	0.57	2.2	0.89	**2.2**		**1.0**	N	8	0.70	2.1	1.1	2.1	*	NA	N	10	0.57	1.2	0.65	1.2	*	0.9	N	8	0.66	2.2	0.95	2.2	*	NA
Barium	mg/kg	L	37	6.4	320	65	**320**	*	**104**	N	12	6.4	24	15	24	*	18	L	13	20	190	84	190		129	L	12	30	320	94	320		145
Beryllium	mg/kg	N	37	0.13	0.46	0.21	**0.45**		**0.24**	N	12	0.13	0.41	0.23	0.41	*	0.30	N	13	0.13	0.27	0.17	0.27	*	0.02	N	12	0.13	0.46	0.24	0.46	*	0.29
Cadmium	mg/kg	NP	37	ND	ND	0.033	**0.040**		**0.017**	NP	12			0.036	0.040	*	0.019	*	NP	13	--	--	0.031	0.036	*	0.016	*	NP	12	--	--	0.033	0.036	*	0.017
Calcium	mg/kg	NP	35	1,700	210,000	29,849	**210,000**		**44,232**	L	10	25,000	210,000	84,000	210,000		102,366	N	13	2,800	9,100	4,838	9,100	*	5,742	L	12	1,700	45,000	11,817	45,000		31,602
Chromium, TOTAL	mg/kg	NP	37	2.2	74	16	**74**		**21**	NP	12	2.6	48	9.4	48		15	L	13	2.2	52	13	52		29	L	12	4.5	74	26	74		65
Cobalt	mg/kg	NP	37	1.0	25	8.2	**25**		**10**	NP	12	1.0	13	2.9	13		5	N	13	6.7	13	9.1	13	*	10	N	12	4.3	25	13	33	*	16
Copper	mg/kg	NP	37	1.8	68	23	**68**		**27**	L	12	1.8	35	9.8	35		20	N	13	15	47	28	47	*	34	N	12	9.1	68	31	68	*	40
Iron	mg/kg	N	37	2,500	39,000	16,884	**37,531**		**19,549**	L	12	2,500	18,000	6,475	18,000		9,350	N	13	14,000	28,000	20,692	28,000	*	23,118	N	12	12,000	39,000	23,167	39,000	*	27,755
Lead	mg/kg	L	36	0.30	6.9	3.3	**6.9**	*	**4**	N	12	0.30	6.9	2.8	6.9	*	4	N	13	1.1	5.7	3.2	5.7	*	4	N	11	1.4	6	3.96	6	*	4.76
Magnesium	mg/kg	L	37	1,200	16,000	4,146	**12,834**		**5,087**	L	12	1,300	11,000	3,842	11,000		6,192	N	13	1,500	7,200	3,985	7,200	*	4,810	L	12	1,200	16,000	4,625	16,000		8,354
Manganese	mg/kg	N	37	48	1,200	478	**1,167**		**0,567**	L	12	48	360	132	360		202	N	13	290	1,200	626	1,200	*	738	N	12	260	1,200	663	1,200	*	808
Mercury	mg/kg	L	37	0.0037	0.031	0.013	**0.031**	*	**0.014**	N	12	0.0037	0.016	0.0091	0.016	*	0.011	N	13	0.0037	0.024	0.011	0.024	*	0.014	N	12	0.0048	0.031	0.018	0.031	*	0.022
Nickel	mg/kg	NP	37	0.67	40	7.2	**40**		**10**	NP	12	0.67	26	3.9	26		7	L	13	1.3	18	5.1	18		10	L	12	1.8	40	13	40		38
Potassium	mg/kg	L	37	380	1,700	918	**1,700**	*	**1,031**	L	12	380	1,700	859	1,700		1,150	N	13	520	1,400	875	1,400	*	1,019	N	12	570	1,400	1,023	1,400	*	1,174
Selenium	mg/kg	NP	37	0.68	2.0	0.66	**2.0**		**0.5**	NP	12			0.61	0.68	*	0.32	*	NP	13	0.73	0.73	0.54	0.73		0.35	L	12	0.68	2.0	0.85	2.0		0.99
Silver	mg/kg	NP	37	ND	ND	0.069	**0.084**		**0.036**	NP	12			0.075	0.084	*	0.040	*	NP	13			0.065	0.076	*	0.034	*	NP	12	--	--	0.069	0.077	*	0.036
Sodium	mg/kg	NP	37	25	6,300	1,069	**6,300**		**1,519**	N	12	300	6,300	2,803	6,300	*	3,836	L	13	25	310	116	310		0,204	L	12	50	1,200	367	1,200		0,881
Thallium	mg/kg	NP	37	0.45	0.67	0.42	**0.67**		**0.26**	NP	12			0.45	0.50	*	0.23	*	N	13	0.45	0.46	0.39	0.46	*	0.28	NP	12	0.67	0.67	0.43	0.67		0.30
Vanadium	mg/kg	L	37	9.0	130	50	**130**	*	**66**	L	12	9.0	63	22	63		33	N	13	29	80	53	80	*	61	N	12	34	130	73	130	*	90
Zinc	mg/kg	N	37	3.5	71	29	**65**		**33**	L	12	3.5	31	12	31		19	N	13	23	53	36	53	*	40	N	12	17	71	38	71	*	47

Note:
* Value exceeds the maximum detected value, it is the detection limit value when all samples are non-detects
NA = not available -- sample size too small
ND-- Not detected in background soil media
Range of detection limits for pooled samples without detects:
Cadmium: 0.028-0.04 mg/kg
Silver: 0.059-0.084 mg/kg
Dist = type of data distribution
95th UTL(UCL) = 95th percentile Upper Tolerance Limit (95% upper confidence limit)
NP = nonparametric
N = normal
L = lognormal

Appendix A-2

East Vieques Surface Soil Sample Background Concentration Estimates

SWMU 1 Work Plan

Site ID	**Range**		SWMU 2	SWMU 2	SWMU 2	SWMU 2	SWMU 2	SWMU 2	SWMU 2
Station ID	**Lowest**	**Highest**	CGW2SS01	CGW2SS02	CGW2SS03	CGW2SS04	CGW2SS05	CGW2SS06	CGW2SS07
Sample ID	**Detected**	**Detected**	CGW2SS01-R01	CGW2SS02-R01	CGW2SS03-R01	CGW2SS04-R01	CGW2SS05-R01	CGW2SS06-R01	CGW2SS07-R01
Sample Date	**Concentration**	**Concentration**	01/21/04	01/21/04	01/21/04	01/21/04	01/21/04	01/21/04	01/21/04
Chemical Name									
Pesticides (UG/KG)									
4,4'-DDD	0.16 J	26 J	3.7 U	3.9 U	3.9 U	3.7 U	3.7 U	3.8 U	3.9 U
4,4'-DDE	0.08 J	1,200	3.7 U	3.9 U	0.40 J	0.28 J	0.73 J	3.8 U	0.16 J
4,4'-DDT	0.30 J	990	3.7 U	3.9 U	3.9 U	3.7 U	3.7 U	3.8 U	3.9 U
beta-BHC	1.9 J	1.9 J	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U	2.0 U	2.0 U
Chlordane	14	14	4.7 U	4.9 U	4.9 U	4.7 U	4.7 U	4.8 U	5.0 U
delta-BHC	0.41 J	0.84 J	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U	2.0 U	2.0 U
Dieldrin	0.37 J	0.74 J	3.7 U	3.9 U	3.9 U	3.7 U	3.7 U	3.8 U	3.9 U
Endosulfan I	0.44 J	0.44 J	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U	2.0 U	2.0 U
Endrin	2.4 J	2.4 J	3.7 U	3.9 U	3.9 U	3.7 U	3.7 U	3.8 U	3.9 U
Endrin ketone	1.3 J	1.3 J	3.7 U	3.9 U	3.9 U	3.7 U	3.7 U	3.8 U	3.9 U
gamma-Chlordane	0.52 J	1.9 J	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U	2.0 U	2.0 U
Heptachlor	0.76 J	0.76 J	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U	2.0 U	2.0 U
Herbicides (UG/KG)									
2,4,5-T	5.2 J	5.2 J	11 UJ	12 UJ	12 U	11 U	11 UJ	12 U	12 U
2,4,5-TP (Silvex)	60	87	11 UJ	12 UJ	12 U	11 U	11 UJ	12 U	12 U
2,4-D	14 J	14 J	11 UJ	12 UJ	12 U	11 U	11 UJ	12 U	12 U

Notes:

Shading indicates detections

NA - Not Analyzed

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R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UG/KG - Micrograms per kilogram

Appendix A-2

East Vieques Surface Soil Sample Background Concentration Estimates

SWMU 1 Work Plan

Site ID	SWMU 2		SWMU 2	SWMU 2	SWMU 2	SWMU 2	SWMU 4
Station ID	CGW2SS08		CGW2SS09	CGW2SS10	CGW2SS11	CGW2SS12	CGSWMU4SS001
Sample ID	CGW2FD01P-R01	CGW2SS08-R01	CGW2SS09-R01	CGW2SS10-R01	CGW2SS11-R01	CGW2SS12-R01	NDD021
Sample Date	01/21/04	01/21/04	01/21/04	01/21/04	01/21/04	01/21/04	06/13/00
Chemical Name							
Pesticides (UG/KG)							
4,4'-DDD	3.9 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	3.4 UJ
4,4'-DDE	3.9 U	3.9 U	0.59 J	0.50 J	0.13 J	0.080 J	1.1 J
4,4'-DDT	3.9 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	1.2 J
beta-BHC	2.0 U	2.0 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 UJ
Chlordane	5.0 U	5.0 U	4.4 U	4.4 U	4.5 U	4.4 U	15 UJ
delta-BHC	2.0 U	2.0 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 UJ
Dieldrin	3.9 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	1.7 UJ
Endosulfan I	2.0 U	2.0 U	1.8 U	1.8 U	1.8 U	1.8 U	343 UJ
Endrin	3.9 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	3.4 UJ
Endrin ketone	3.9 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	NA
gamma-Chlordane	2.0 U	2.0 U	1.8 U	1.8 U	1.8 U	1.8 U	NA
Heptachlor	2.0 U	2.0 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 UJ
Herbicides (UG/KG)							
2,4,5-T	12 U	12 U	10 U	10 UJ	11 UJ	10 U	75 UJ
2,4,5-TP (Silvex)	12 U	12 U	10 U	10 UJ	11 UJ	10 U	75 UJ
2,4-D	12 U	12 U	10 U	10 UJ	11 UJ	10 U	14 J

Notes:

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UG/KG - Micrograms per kilogram

Appendix A-2

East Vieques Surface Soil Sample Background Concentration Estimates

SWMU 1 Work Plan

Site ID	SWMU 4	SWMU 4	SWMU 4	SWMU 4	SWMU 4	SWMU 4	SWMU 4	SWMU 4
Station ID	CGSWMU4SS002	CGSWMU4SS003	CGSWMU4SS004	CGSWMU4SS005	CGSWMU4SS006	CGSWMU4SS007	CGSWMU4SS008	CGSWMU4SS009
Sample ID	NDD022	NDD023	NDD024	NDD025	NDD026	NDD027	NDD028	NDD029
Sample Date	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00
Chemical Name								
Pesticides (UG/KG)								
4,4'-DDD	34 UJ	3.7 UJ	36 UJ	32 UJ	3.6 UJ	3.2 UJ	3.0 UJ	3.2 UJ
4,4'-DDE	17 UJ	4.3 J	18 UJ	16 UJ	1.8 UJ	2.3 J	3.2 J	4.5 J
4,4'-DDT	34 UJ	2.2 J	36 UJ	4.1 J	4.3 J	0.59 J	1.8 J	3.4 J
beta-BHC	17 UJ	1.9 UJ	18 UJ	16 UJ	1.8 UJ	1.6 UJ	1.5 UJ	1.6 UJ
Chlordane	150 UJ	16 UJ	159 UJ	142 UJ	16 UJ	14 UJ	13 UJ	14 UJ
delta-BHC	17 UJ	1.9 UJ	18 UJ	16 UJ	1.8 UJ	1.6 UJ	1.5 UJ	1.6 UJ
Dieldrin	17 UJ	1.9 UJ	18 UJ	16 UJ	1.8 UJ	1.6 UJ	1.5 UJ	1.6 UJ
Endosulfan I	3,400 UJ	372 UJ	3,620 UJ	3,230 UJ	356 UJ	320 UJ	297 UJ	322 UJ
Endrin	34 UJ	3.7 UJ	36 UJ	32 UJ	3.6 UJ	3.2 UJ	3.0 UJ	3.2 UJ
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	17 UJ	1.9 UJ	18 UJ	16 UJ	1.8 UJ	1.6 UJ	1.5 UJ	1.6 UJ
Herbicides (UG/KG)								
2,4,5-T	755 UJ	79 UJ	79 UJ	71 UJ	78 UJ	69 UJ	69 UJ	70 UJ
2,4,5-TP (Silvex)	755 UJ	79 UJ	79 UJ	71 UJ	78 UJ	69 UJ	69 UJ	70 UJ
2,4-D	3,780 UJ	397 UJ	393 UJ	354 UJ	392 UJ	345 UJ	345 UJ	351 UJ

Notes:

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UJ - Analyte not detected, quantitation limit may be inaccurate

UG/KG - Micrograms per kilogram

Appendix A-2

East Vieques Surface Soil Sample Background Concentration Estimates

SWMU 1 Work Plan

Site ID	SWMU 4	SWMU 4	SWMU 4		SWMU 5	SWMU 5	SWMU 5	SWMU 5	SWMU 6/7
Station ID	CGSWMU4SS010	CGSWMU4SS011	CGSWMU4SS012		CGW5SS01	CGW5SS02	CGW5SS03	CGW5SS04	CGSWMU6/7SS001
Sample ID	NDD030	NDD031	NDD032	NDD033FD1	CGW5SS01-R01	CGW5SS02-R01	CGW5SS03-R01	CGW5SS04-R01	NDD034
Sample Date	06/13/00	06/13/00	06/13/00	06/13/00	01/19/04	01/19/04	01/19/04	01/19/04	06/13/00
Chemical Name									
Pesticides (UG/KG)									
4,4'-DDD	3.8 UJ	3.9 UJ	3.8 UJ	3.9 UJ	3.5 U	3.6 U	3.6 U	3.6 U	3.2 U
4,4'-DDE	3.8 J	1.9 UJ	1.9 UJ	2.0 UJ	3.5 U	3.6 U	3.6 U	3.6 U	98
4,4'-DDT	0.66 J	3.9 UJ	3.8 UJ	3.9 UJ	3.5 U	3.6 U	3.6 U	3.6 U	24
beta-BHC	1.9 UJ	1.9 UJ	1.9 UJ	2.0 UJ	1.8 U	1.9 U	1.8 U	1.8 U	1.6 U
Chlordane	17 UJ	17 UJ	17 UJ	17 UJ	4.4 U	4.6 U	4.5 U	4.5 U	14 U
delta-BHC	1.9 UJ	1.9 UJ	1.9 UJ	2.0 UJ	1.8 U	1.9 U	1.8 U	1.8 U	1.6 UJ
Dieldrin	1.9 UJ	1.9 UJ	1.9 UJ	2.0 UJ	3.5 U	3.6 U	3.6 U	3.6 U	1.6 U
Endosulfan I	378 UJ	387 UJ	379 UJ	393 UJ	1.8 UJ	1.9 UJ	1.8 UJ	1.8 UJ	319 U
Endrin	3.8 UJ	3.9 UJ	3.8 UJ	3.9 UJ	3.5 UJ	3.6 UJ	3.6 UJ	3.6 UJ	3.2 U
Endrin ketone	NA	NA	NA	NA	3.5 U	3.6 U	3.6 U	3.6 U	NA
gamma-Chlordane	NA	NA	NA	NA	1.8 U	1.9 U	1.8 U	1.8 U	NA
Heptachlor	1.9 UJ	1.9 UJ	1.9 UJ	2.0 UJ	1.8 U	1.9 U	1.8 U	1.8 U	1.6 U
Herbicides (UG/KG)									
2,4,5-T	84 UJ	84 UJ	82 UJ	86 UJ	11 U	11 U	11 UJ	11 U	691 U
2,4,5-TP (Silvex)	84 UJ	84 UJ	82 UJ	86 UJ	11 U	11 U	11 UJ	11 U	691 U
2,4-D	418 UJ	420 UJ	408 UJ	431 UJ	11 U	11 U	11 UJ	11 U	3,450 U

Notes:

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UG/KG - Micrograms per kilogram

Appendix A-2

East Vieques Surface Soil Sample Background Concentration Estimates

SWMU 1 Work Plan

Site ID	SWMU 6/7	SWMU 6/7	SWMU 6/7	SWMU 6/7
Station ID	CGSWMU6/7SS002	CGSWMU6/7SS003	CGSWMU6/7SS004	CGSWMU6/7SS005
Sample ID	NDD035	NDD036	NDD037	NDD038
Sample Date	06/13/00	06/13/00	06/13/00	06/13/00
Chemical Name				
Pesticides (UG/KG)				
4,4'-DDD	3.2 U	3.4 U	3.9 U	3.3 U
4,4'-DDE	22	136	3.3	5.7
4,4'-DDT	7.5	146	0.81 J	4.8
beta-BHC	1.6 U	1.7 U	2.0 U	1.6 U
Chlordane	14 U	15 U	17 U	14 U
delta-BHC	1.6 UJ	1.7 UJ	2.0 UJ	1.6 UJ
Dieldrin	1.6 U	1.7 U	2.0 U	1.6 U
Endosulfan I	324 U	344 U	391 U	329 U
Endrin	3.2 U	3.4 U	3.9 U	3.3 U
Endrin ketone	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA
Heptachlor	1.6 U	1.7 U	2.0 U	1.6 U
Herbicides (UG/KG)				
2,4,5-T	702 U	752 U	833 U	709 U
2,4,5-TP (Silvex)	702 U	752 U	833 U	709 U
2,4-D	3,510 U	3,760 U	4,160 U	3,550 U

Notes:

Shading indicates detections

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J - Analyte present, value may or may not be accurate or precise

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UG/KG - Micrograms per kilogram

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East Vieques Surface Soil Sample Background Concentration Estimates

SWMU 1 Work Plan

Site ID	SWMU 6/7		SWMU 6/7	SWMU 6/7	SWMU 6/7	SWMU 6/7
Station ID	CGSWMU6/7SS006		CGSWMU6/7SS007	CGSWMU6/7SS008	CGSWMU6/7SS009	CGSWMU6/7SS010
Sample ID	NDD039	NDD043FD1	NDD058	NDD040	NDD041	NDD042
Sample Date	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00
Chemical Name						
Pesticides (UG/KG)						
4,4'-DDD	3.8 UJ	6.6 J	3.2 U	3.8 U	3.1 U	26 J
4,4'-DDE	6.1 J	31 J	8.2	3.2	22	3.5
4,4'-DDT	3.2 J	54 J	4.8 J	3.8 U	3.1	3.1 U
beta-BHC	1.9 U	1.9 U	1.6 U	1.9 U	1.6 U	1.6 U
Chlordane	17 U	17 U	14 U	17 U	14 U	14
delta-BHC	0.84 J	1.9 UJ	1.6 UJ	1.9 UJ	1.6 UJ	1.6 UJ
Dieldrin	1.9 U	1.9 U	1.6 U	1.9 U	1.6 U	1.6 U
Endosulfan I	380 U	382 U	318 U	384 U	313 U	312 U
Endrin	3.8 U	3.8 U	3.2 U	3.8 U	3.1 U	3.1 U
Endrin ketone	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA
Heptachlor	1.9 U	1.9 U	1.6 U	1.9 U	1.6 U	0.76 J
Herbicides (UG/KG)						
2,4,5-T	835 U	840 U	702 U	826 U	678 U	688 U
2,4,5-TP (Silvex)	835 R	840 U	702 U	826 U	678 U	688 U
2,4-D	4,180 U	4,200 U	3,510 U	4,130 U	3,390 U	3,440 U

Notes:

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UG/KG - Micrograms per kilogram

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East Vieques Surface Soil Sample Background Concentration Estimates

SWMU 1 Work Plan

Site ID	SWMU 8		SWMU 8	SWMU 8	SWMU 8	SWMU 8	SWMU 10	SWMU 10
Station ID	CGW8SS01		CGW8SS02	CGW8SS03	CGW8SS04	CGW8SS05	CGW10SS05	CGW10SS06
Sample ID	CGW8FD01P-R01	CGW8SS01-R01	CGW8SS02-R01	CGW8SS03-R01	CGW8SS04-R01	CGW8SS05-R01	CGW10SS05-R01	CGW10SS06-R01
Sample Date	01/19/04	01/19/04	01/19/04	01/19/04	01/19/04	01/19/04	01/22/04	01/20/04
Chemical Name								
Pesticides (UG/KG)								
4,4'-DDD	3.6 U	3.6 U	4.0 U	3.5 U	3.4 U	3.4 U	0.26 J	0.19 J
4,4'-DDE	3.6 U	3.6 U	4.0 U	3.5 U	3.4 U	3.4 U	110 J	74 J
4,4'-DDT	3.6 U	3.6 U	0.46 J	0.31 J	3.4 U	3.4 U	0.92 J	0.97 J
beta-BHC	1.8 U	1.9 U	2.0 U	1.8 U	1.8 U	1.8 U	1.9 U	2.0 U
Chlordane	4.6 U	4.6 U	5.0 U	4.5 U	4.3 U	4.4 U	4.7 U	5.1 U
delta-BHC	1.8 UJ	1.9 UJ	2.0 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 U	2.0 UJ
Dieldrin	3.6 U	3.6 U	4.0 U	3.5 U	3.4 U	3.4 U	3.7 U	4.0 U
Endosulfan I	1.8 UJ	1.9 UJ	2.0 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 U	2.0 U
Endrin	3.6 U	3.6 U	4.0 U	3.5 U	3.4 U	3.4 U	3.7 U	4.0 U
Endrin ketone	3.6 U	3.6 U	4.0 U	3.5 U	3.4 U	3.4 U	3.7 U	4.0 U
gamma-Chlordane	1.8 U	1.9 U	2.0 U	1.8 U	1.8 U	1.8 U	1.9 U	2.0 U
Heptachlor	1.8 U	1.9 U	2.0 U	1.8 U	1.8 U	1.8 U	1.9 U	2.0 U
Herbicides (UG/KG)								
2,4,5-T	11 U	11 U	12 U	11 U	10 U	114 U	11 UJ	12 U
2,4,5-TP (Silvex)	11 U	11 U	12 U	11 U	10 U	114 U	11 UJ	12 U
2,4-D	11 U	11 U	12 U	11 U	10 U	114 U	11 UJ	12 U

Notes:

Shading indicates detections

NA - Not Analyzed

J - Analyte present, value may or may not be accurate or precise

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UG/KG - Micrograms per kilogram

Appendix A-2

East Vieques Surface Soil Sample Background Concentration Estimates

SWMU 1 Work Plan

Site ID	SWMU 10	SWMU 10	SWMU 10	SWMU 10	SWMU 10
Station ID	CGW10SS07	CGW10SS08	CGW10SS09	CGW10SS10	CGW10SS11
Sample ID	CGW10SS07-R01	CGW10SS08-R01	CGW10SS09-R01	CGW10SS10-R01	CGW10SS11-R01
Sample Date	01/20/04	01/22/04	01/20/04	01/20/04	01/20/04
Chemical Name					
Pesticides (UG/KG)					
4,4'-DDD	3.9 U	0.30 J	11 J	0.44 J	0.50 J
4,4'-DDE	28 J	47 J	120 J	70 J	100 J
4,4'-DDT	3.9 U	4.0 U	3.8 U	4.0 U	3.7 U
beta-BHC	2.0 U	2.1 U	1.9 U	2.1 U	1.9 U
Chlordane	5.0 U	5.1 U	4.8 U	5.1 U	4.8 U
delta-BHC	2.0 UJ	2.1 U	1.9 UJ	2.1 UJ	1.9 UJ
Dieldrin	3.9 U	4.0 U	0.37 J	4.0 U	3.7 U
Endosulfan I	2.0 U	2.1 U	1.9 U	2.1 U	1.9 U
Endrin	3.9 U	4.0 U	3.8 U	4.0 U	3.7 U
Endrin ketone	3.9 U	4.0 U	3.8 U	4.0 U	3.7 U
gamma-Chlordane	2.0 U	2.1 U	1.9 U	2.1 U	1.9 U
Heptachlor	2.0 U	2.1 U	1.9 U	2.1 U	1.9 U
Herbicides (UG/KG)					
2,4,5-T	12 U	12 UJ	11 UJ	12 UJ	11 UJ
2,4,5-TP (Silvex)	12 U	12 UJ	11 UJ	12 UJ	11 UJ
2,4-D	12 U	12 UJ	11 UJ	12 UJ	11 UJ

Notes:

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UG/KG - Micrograms per kilogram

Appendix A-2

East Vieques Surface Soil Sample Background Concentration Estimates

SWMU 1 Work Plan

Site ID	SWMU 10	SWMU 10	SWMU 10	SWMU 10	SWMU 10	SWMU 10
Station ID	CGW10SS12		CGW10SS13	CGW10SS14	CGW10SS15	CGW10SS16
Sample ID	CGW10FD01P-R01	CGW10SS12-R01	CGW10SS13-R01	CGW10SS14-R01	CGW10SS15-R01	CGW10SS16-R01
Sample Date	01/20/04	01/20/04	01/20/04	01/20/04	01/20/04	01/22/04
Chemical Name						
Pesticides (UG/KG)						
4,4'-DDD	0.56 J	0.60 J	3.8 U	3.8 U	0.23 J	3.8 U
4,4'-DDE	20 J	40 J	5.8 J	12 J	17 J	4.8 J
4,4'-DDT	3.6 U	3.6 U	3.8 U	3.8 U	3.8 U	0.30 J
beta-BHC	1.9 U	1.8 U	1.9 U	2.0 U	2.0 U	2.0 U
Chlordane	4.6 U	4.6 U	4.8 U	4.9 U	4.8 U	4.9 U
delta-BHC	1.9 UJ	1.8 UJ	1.9 UJ	2.0 UJ	2.0 UJ	2.0 U
Dieldrin	3.6 U	0.74 J	3.8 U	3.8 U	3.8 U	3.8 U
Endosulfan I	1.9 U	1.8 U	1.9 U	2.0 U	2.0 U	2.0 U
Endrin	3.6 U	3.6 U	3.8 U	3.8 U	3.8 U	3.8 U
Endrin ketone	3.6 U	3.6 U	3.8 U	3.8 U	3.8 U	3.8 U
gamma-Chlordane	1.9 U	1.8 U	1.9 U	2.0 U	2.0 U	2.0 U
Heptachlor	1.9 U	1.8 U	1.9 U	2.0 U	2.0 U	2.0 U
Herbicides (UG/KG)						
2,4,5-T	11 UJ	11 UJ	11 UJ	12 U	11 U	12 UJ
2,4,5-TP (Silvex)	11 UJ	11 UJ	11 UJ	12 U	11 U	12 UJ
2,4-D	11 UJ	11 UJ	11 UJ	12 U	11 U	12 UJ

Notes:

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UG/KG - Micrograms per kilogram

Appendix A-2

East Vieques Surface Soil Sample Background Concentration Estimates

SWMU 1 Work Plan

Site ID	SWMU 10	SWMU 10	SWMU 10	SWMU 10	SWMU 12	SWMU 12
Station ID	CGW10SS17	CGW10SS18	CGW10SS19	CGW10SS20	CGW12SS01	CGW12SS02
Sample ID	CGW10SS17-R01	CGW10SS18-R01	CGW10SS19-R01	CGW10SS20-R01	CGW12SS01-R01	CGW12SS02-R01
Sample Date	01/22/04	01/22/04	01/20/04	01/22/04	01/19/04	01/19/04
Chemical Name						
Pesticides (UG/KG)						
4,4'-DDD	10 J	0.16 J	0.54 J	0.33 J	3.5 U	3.5 U
4,4'-DDE	73 J	19 J	66 J	20 J	3.5 U	3.5 U
4,4'-DDT	84	0.39 J	3.8 U	0.44 J	3.5 U	3.5 U
beta-BHC	1.9 U	2.0 U	2.0 U	1.9 U	1.8 U	1.8 U
Chlordane	4.8 U	5.0 U	4.9 U	4.8 U	4.5 U	4.5 U
delta-BHC	1.9 U	2.0 U	2.0 UJ	1.9 U	1.8 U	1.8 U
Dieldrin	3.8 U	3.9 U	3.8 U	3.7 U	3.5 U	3.5 U
Endosulfan I	1.9 U	NA	2.0 U	1.9 U	1.8 UJ	1.8 UJ
Endrin	3.8 U	3.9 U	3.8 U	3.7 U	3.5 UJ	3.5 UJ
Endrin ketone	3.8 U	3.9 U	3.8 U	3.7 U	3.5 U	3.5 U
gamma-Chlordane	1.9 U	2.0 U	2.0 U	1.9 U	1.8 U	1.8 U
Heptachlor	1.9 U	2.0 U	2.0 U	1.9 U	1.8 U	1.8 U
Herbicides (UG/KG)						
2,4,5-T	11 UJ	12 UJ	12 UJ	11 UJ	11 UJ	11 U
2,4,5-TP (Silvex)	11 UJ	12 UJ	12 UJ	11 UJ	11 UJ	11 U
2,4-D	11 UJ	12 UJ	12 UJ	11 UJ	11 UJ	11 U

Notes:

Shading indicates detections

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U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentration Estimates
SWMU 1 Work Plan

Site ID	SWMU 12		SWMU 12	SWMU 12	AOC G	AOC G	AOC G	AOC G	AOC G	
Station ID	CGW12SS03		CGW12SS04	CGW12SS05	CGAGSS01	CGAGSS02	CGAGSS03	CGAGSS04	CGAGSS05	
Sample ID	CGW12FD01P-R01	CGW12SS03-R01	CGW12SS04-R01	CGW12SS05-R01	CGAGSS01-R01	CGAGSS02-R01	CGAGSS03-R01	CGAGSS04-R01	CGAGSS05-R01	CGAGSSFD01P-R01
Sample Date	01/19/04	01/19/04	01/19/04	01/19/04	01/22/04	01/22/04	01/22/04	01/22/04	01/22/04	01/22/04
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	3.4 U	3.5 U	3.5 U	3.5 U	0.17 J	0.31 J	0.33 J	0.93 J	0.72 J	0.56 J
4,4'-DDE	3.4 U	3.5 U	3.5 U	3.5 U	13 J	5.8 J	9.2 J	31 J	12 J	15 J
4,4'-DDT	3.4 U	3.5 U	3.5 U	3.5 U	2.4 J	1.4 J	1.4 J	2.0 J	1.2 J	0.96 J
beta-BHC	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	2.1 U	2.0 U	2.0 U	2.0 U
Chlordane	4.3 U	4.4 U	4.4 U	4.4 U	4.6 U	4.7 U	5.1 U	4.8 U	4.9 U	4.9 U
delta-BHC	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	2.1 U	2.0 U	2.0 U	2.0 U
Dieldrin	3.4 U	3.5 U	3.5 U	3.5 U	3.6 U	3.7 U	4.0 U	3.8 U	3.9 U	3.8 U
Endosulfan I	1.7 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 U	1.9 U	2.1 U	2.0 U	2.0 U	2.0 U
Endrin	3.4 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.6 U	3.7 U	4.0 U	3.8 U	3.9 U	3.8 U
Endrin ketone	3.4 U	3.5 U	3.5 U	3.5 U	3.6 U	3.7 U	4.0 U	3.8 U	3.9 U	3.8 U
gamma-Chlordane	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	2.1 U	2.0 U	2.0 U	2.0 U
Heptachlor	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	2.1 U	2.0 U	2.0 U	2.0 U
Herbicides (UG/KG)										
2,4,5-T	10 U	10 U	10 UJ	10 U	11 UJ	11 UJ	12 U	12 U	12 UJ	12 UJ
2,4,5-TP (Silvex)	10 U	10 U	10 UJ	10 U	11 UJ	11 UJ	12 U	12 U	12 UJ	12 UJ
2,4-D	10 U	10 U	10 UJ	10 U	11 UJ	11 UJ	12 U	12 U	12 UJ	12 UJ

Notes:

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UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	AOC F	AOC F	AOC F	AOC F	AOC F		PI 4	PI 4	PI 4	PI 4
Station ID	CGAOCFSS001	CGAOCFSS002	CGAOCFSS003	CGAOCFSS004	CGAOCFSS005		EPI04-SO01	EPI04-SO02	EPI04-SO03	EPI04-SO04
Sample ID	NDD044	NDD045	NDD046	NDD047	NDD048	NDD049FD1	EPI04-SS01-0001	EPI04-SS02-0001	EPI04-SS03-0001	EPI04-SS04-0001
Sample Date	06/14/00	06/14/00	06/14/00	06/14/00	06/14/00	06/14/00	01/26/06	01/26/06	01/26/06	01/26/06
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	3.6 UJ	3.1 UJ	4.2 UJ	3.5 UJ	3.9 UJ	3.4 UJ	3.7 U	3.6 U	3.5 U	3.5 U
4,4'-DDE	1.8 UJ	1.5 UJ	2.1 UJ	1.7 UJ	2.0 UJ	1.7 UJ	3.8	2.2 J	12	1.2 J
4,4'-DDT	3.6 UJ	3.1 UJ	4.2 UJ	3.5 UJ	3.9 UJ	3.4 UJ	1.4 J	3.6 U	3.1 J	3.5 U
beta-BHC	1.8 UJ	1.5 UJ	2.1 UJ	1.7 UJ	2.0 UJ	1.7 UJ	1.9 U	1.8 U	1.8 U	1.8 U
Chlordane	16 UJ	14 UJ	18 UJ	15 UJ	17 UJ	15 UJ	NA	NA	NA	NA
delta-BHC	1.8 UJ	1.5 UJ	2.1 UJ	1.7 UJ	2.0 UJ	0.73 J	1.9 U	1.8 U	1.8 U	1.8 U
Dieldrin	1.8 UJ	1.5 UJ	2.1 UJ	1.7 UJ	2.0 UJ	1.7 UJ	3.7 U	3.6 U	3.5 U	3.5 U
Endosulfan I	362 UJ	307 UJ	420 UJ	346 UJ	395 UJ	339 UJ	1.9 U	1.8 U	1.8 U	1.8 U
Endrin	3.6 UJ	3.1 UJ	4.2 UJ	3.5 UJ	3.9 UJ	3.4 UJ	3.7 U	3.6 U	3.5 U	3.5 U
Endrin ketone	NA	NA	NA	NA	NA	NA	3.7 U	3.6 U	3.5 U	3.5 U
gamma-Chlordane	NA	NA	NA	NA	NA	NA	0.69 J	1.8 U	1.8 U	1.8 U
Heptachlor	1.8 UJ	1.5 UJ	2.1 UJ	1.7 UJ	2.0 UJ	1.7 UJ	1.9 U	1.8 U	1.8 U	1.8 U
Herbicides (UG/KG)										
2,4,5-T	79 UJ	67 UJ	5.2 J	75 UJ	86 UJ	73 UJ	NA	NA	NA	NA
2,4,5-TP (Silvex)	79 UJ	67 UJ	92 UJ	75 UJ	86 UJ	73 UJ	NA	NA	NA	NA
2,4-D	394 UJ	336 UJ	460 UJ	376 UJ	432 UJ	366 UJ	NA	NA	NA	NA

Notes:
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UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	PI 4		PI 4	PI 4	PI 4		PI 4	PI 4	PI 4	PI 4	PI 4
Station ID	EPI04-SO05		EPI04-SO06	EPI04-SO07	EPI04-SO08		EPI04-SO09	EPI04-SO10	EPI04-SO11	EPI04-SO12	EPI04-SO13
Sample ID	EPI04-SS05-0001	EPI04-SS05P-0001	EPI04-SS06-0001	EPI04-SS07-0001	EPI04-SS08-0001	EPI04-SS08P-0001	EPI04-SS09-0001	EPI04-SS10-0001	EPI04-SS11-0001	EPI04-SS12-0001	EPI04-SS13-0001
Sample Date	01/26/06	01/26/06	01/26/06	01/25/06	01/25/06	01/25/06	01/24/06	01/24/06	01/25/06	01/24/06	01/25/06
Chemical Name											
Pesticides (UG/KG)											
4,4'-DDD	3.5 U	3.5 U	2.1 J	3.1 J	3.5 U	3.5 U	3.7 U	3.6 U	3.6 U	3.6 U	3.7 U
4,4'-DDE	2.7 J	4.7	620	36	29	27	9.1	84	26	180	5.9
4,4'-DDT	1.4 J	27	100	7.8	3.1 J	5.3	1.4 J	2.8 J	3.6	22	3.7 U
beta-BHC	1.8 U	1.8 U	3.7 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	1.8 U	1.8 U	0.75 J	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U
Dieldrin	3.5 U	3.5 U	7.3 U	3.7 U	3.5 U	3.5 U	3.7 U	3.6 U	3.6 U	3.6 U	3.7 U
Endosulfan I	1.8 U	1.8 U	3.7 U	1.9 U	1.8 U	1.8 U	1.9 U	0.44 J	1.8 U	1.8 U	1.9 U
Endrin	3.5 U	3.5 U	7.3 U	3.7 U	3.5 U	3.5 U	3.7 U	3.6 U	3.6 U	3.6 U	3.7 U
Endrin ketone	3.5 U	3.5 U	7.3 U	3.7 U	3.5 U	3.5 U	3.7 U	3.6 U	3.6 U	3.6 U	3.7 U
gamma-Chlordane	1.8 U	1.8 U	1.0 J	1.9 U	1.8 U	1.8 U	0.79 J	1.8 U	1.8 U	1.8 U	0.57 J
Heptachlor	1.8 U	1.8 U	3.7 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U
Herbicides (UG/KG)											
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

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UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	PI 6	PI 6	PI 6		PI 6	PI 6	PI 6	PI 7	PI 7	PI 7	PI 7
Station ID	VNTR-PI6-1	VNTR-PI6-2	VNTR-PI6-3		VEP6-SO04	VEP6-SO05	VEP6-SO06	VNTR-PI7-1	VNTR-PI7-2	VNTR-PI7-3	VNTR-PI7-4
Sample ID	VNTR-PI6-1	VNTR-PI6-2	VNTR-PI6-3	VNTR-PI6-3D	VEP6-SS04-0H-0309	VEP6-SS05-01-0309	VEP6-SS06-01-0309	VNTR-PI7-1	VNTR-PI7-2	VNTR-PI7-3	VNTR-PI7-4
Sample Date	12/12/02	12/12/2002	12/12/2002	12/12/2002	03/05/09	03/11/09	03/11/09	12/16/02	12/16/02	12/16/02	12/16/02
Chemical Name											
Pesticides (UG/KG)											
4,4'-DDD	3.3 U	3.3 U	3.3 U	3.3 U	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U
4,4'-DDE	3.3 U	5.9	6.9	7.3	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U
4,4'-DDT	3.3 U	3.3 U	3.3 U	3.3 U	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U
beta-BHC	1.7 U	1.7 U	1.7 U	1.7 U	NA	NA	NA	1.7 U	1.7 U	1.7 U	1.7 U
Chlordane	17 U	17 U	17 U	17 U	NA	NA	NA	17 U	17 U	17 U	17 U
delta-BHC	1.7 U	1.7 U	1.7 U	1.7 U	NA	NA	NA	1.7 U	1.7 U	1.7 U	1.7 U
Dieldrin	3.3 U	3.3 U	3.3 U	3.3 U	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U
Endosulfan I	1.7 U	1.7 U	1.7 U	1.7 U	NA	NA	NA	1.7 U	1.7 U	1.7 U	1.7 U
Endrin	3.3 U	3.3 U	3.3 U	3.3 U	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U
Endrin ketone	NA	NA			NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA			NA	NA	NA	NA	NA	NA	NA
Heptachlor	1.7 U	1.7 U	1.7 U	3.3 U	NA	NA	NA	1.7 U	1.7 U	1.7 U	1.7 U
Herbicides (UG/KG)											
2,4,5-T	10 U	13	27	27	NA	NA	NA	10 U	10 U	10 U	10 U
2,4,5-TP (Silvex)	10 U	60	87	10 U	NA	NA	NA	10 U	10 U	10 U	10 U
2,4-D	40 U	40 U	40 U	40 U	NA	NA	NA	40 U	40 U	40 U	40 U

Notes:
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UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	PI 7		PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7
Station ID	EPI07-SO01		EPI07-SO02	EPI07-SO03	EPI07-SO04	EPI07-SO05	EPI07-SO06	EPI07-SO07	EPI07-SO08	EPI07-SO09	EPI07-SO10
Sample ID	EPI07-SS01-0001	EPI07-SS01-0001P	EPI07-SS02-0001	EPI07-SS03-0001	EPI07-SS04-0001	EPI07-SS05-0001	EPI07-SS06-0001	EPI07-SS07-0001	EPI07-SS08-0001	EPI07-SS09-0001	EPI07-SS10-0001
Sample Date	03/13/06	03/13/06	03/13/06	03/13/06	03/13/06	03/14/06	03/14/06	03/14/06	03/14/06	03/14/06	03/14/06
Chemical Name											
Pesticides (UG/KG)											
4,4'-DDD	3.5 U	3.5 U	3.7 U	3.6 U	3.4 U	3.5 U	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U
4,4'-DDE	7.5	6.4	4.9	12	3.4 U	22	13	1.7 J	3.4 U	1.7 J	6.6
4,4'-DDT	3.5 U	3.5 U	1.3 J	2.5 J	3.4 U	3.5 U	3.5 U	3.5 U	3.4 U	3.5 U	1.6 J
beta-BHC	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	1.8 U	1.8 U	1.9 U	0.41 J	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Dieldrin	3.5 U	3.5 U	3.7 U	3.6 U	3.4 U	3.5 U	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U
Endosulfan I	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Endrin	3.5 U	3.5 U	3.7 U	3.6 U	3.4 U	3.5 U	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U
Endrin ketone	3.5 U	3.5 U	3.7 U	3.6 U	3.4 U	3.5 U	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U
gamma-Chlordane	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Heptachlor	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Herbicides (UG/KG)											
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

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UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7		PI 7	PI 7	PI 7	PI 7
Station ID	EPI07-SO11	EPI07-SO12	EPI07-SO13	EPI07-SO14	EPI07-SO15	EPI07-SO16		EPI07-SO17	EPI07-SO18	EPI07-SO19	EPI07-SO20
Sample ID	EPI07-SS11-0001	EPI07-SS12-0001	EPI07-SS13-0001	EPI07-SS14-0001	EPI07-SS15-0001	EPI07-SS16-0001	EPI07-SS16P-0001	EPI07-SS17-0001	EPI07-SS18-0001	EPI07-SS19-0001	EPI07-SS20-0001
Sample Date	03/14/06	03/14/06	03/14/06	03/14/06	03/16/06	03/16/06	03/16/06	03/15/06	03/15/06	03/15/06	03/16/06
Chemical Name											
Pesticides (UG/KG)											
4,4'-DDD	3.4 U	3.4 U	3.4 U	3.5 U	3.6 U	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	3.5 U
4,4'-DDE	0.90 J	3.4 U	3.4 U	3.5 U	3.6 U	3.5 U	3.5 U	3.4 U	150	1.4 J	3.5 U
4,4'-DDT	3.4 U	3.4 U	3.4 U	3.5 U	3.6 U	3.5 U	3.5 U	3.4 U	31	1.7 J	3.5 U
beta-BHC	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 J	1.7 U	1.8 U	1.7 U	1.8 U
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.7 U	1.8 U
Dieldrin	3.4 U	3.4 U	3.4 U	3.5 U	3.6 U	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	3.5 U
Endosulfan I	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.7 U	1.8 U
Endrin	3.4 U	3.4 U	3.4 U	3.5 U	3.6 U	3.5 U	2.4 J	3.4 U	3.4 U	3.4 U	3.5 U
Endrin ketone	3.4 U	3.4 U	3.4 U	3.5 U	3.6 U	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	3.5 U
gamma-Chlordane	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 J	1.7 U	1.8 U	1.7 U	1.8 U
Heptachlor	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.7 U	1.8 U
Herbicides (UG/KG)											
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

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UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	PI 7	PI 7	PI 8	PI 8	PI 8		PI 8	PI 8	PI 8	PI 8	
Station ID	EPI07-SO21	EPI07-SO22	VNTR-PI8-1	VNTR-PI8-2	VNTR-PI8-3		VNTR-PI8-4	VEP8-SO05	VEP8-SO06	VEP8-SO07	
Sample ID	EPI07-SS21-0001	EPI07-SS22-0001	VNTR-PI8-1	VNTR-PI8-2	VNTR-PI8-3	VNTR-PI8-3D	VNTR-PI8-4	VEP8-SS05-01-0209	VEP8-SS06-01-0209	VEP8-SS07-01-0209	VEP8-SS07P-01-0209
Sample Date	03/16/06	03/16/06	12/12/02	12/12/02	12/12/02	12/12/02	12/12/02	02/19/09	02/19/09	02/20/09	02/20/09
Chemical Name											
Pesticides (UG/KG)											
4,4'-DDD	3.5 U	3.5 U	66 U	33 U	17 U	17 U	17 U	NA	NA	NA	NA
4,4'-DDE	3.5 U	3.5 U	363	634	159	62	147	NA	NA	NA	NA
4,4'-DDT	3.5 U	3.5 U	411	772	59	59	57	NA	NA	NA	NA
beta-BHC	1.8 U	1.8 U	34 U	17 U	8.5 U	8.5 U	8.5 U	NA	NA	NA	NA
Chlordane	NA	NA	334 U	167 U	84 U	84 U	84 U	NA	NA	NA	NA
delta-BHC	1.8 U	1.8 U	34 U	17 U	8.5 U	8.5 U	8.5 U	NA	NA	NA	NA
Dieldrin	3.5 U	3.5 U	66 U	33 U	17 U	17 U	17 U	NA	NA	NA	NA
Endosulfan I	1.8 U	1.8 U	34 U	17 U	8.5 U	8.5 U	8.5 U	NA	NA	NA	NA
Endrin	3.5 U	3.5 U	66 U	112	17 U	17 U	17 U	NA	NA	NA	NA
Endrin ketone	3.5 U	3.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	1.8 U	1.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	1.8 U	1.8 U	34 U	17 U	8.5 U	8.5 U	8.5 U	NA	NA	NA	NA
Herbicides (UG/KG)											
2,4,5-T	NA	NA	23	10 U	10 U	57	10 U	NA	NA	NA	NA
2,4,5-TP (Silvex)	NA	NA	73	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2,4-D	NA	NA	40 U	40 U	40 U	40 U	40 U	NA	NA	NA	NA

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UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	PI 8	PI 8	PI 8	PI 10	PI 10		PI 10	PAOC I	PAOC I	PAOC I	
Station ID	VEP8-SO08	VEP8-SO09	VEP8-SO14	VNTR-PI10-1	VNTR-PI10-2		VNTR-PI10-3	VEPI-SO01	VEPI-SO02	VEPI-SO03	
Sample ID	VEP8-SS08-01-0209	VEP8-SS09-01-0209	VEP8-SS14-01-0209	VNTR-PI10-1	VNTR-PI10-2	VNTR-PI10-2D	VNTR-PI10-3	VEPI-SS01-01-0209	VEPI-SS02-01-0209	VEPI-SS03-01-0209	VEPI-SS03P-01-0209
Sample Date	02/19/09	02/20/09	02/23/09	12/12/02	12/12/02	12/12/02	12/12/02	02/24/09	02/24/09	02/24/09	02/24/09
Chemical Name											
Pesticides (UG/KG)											
4,4'-DDD	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U	NA	NA	NA	NA
beta-BHC	NA	NA	NA	1.7 U	1.7 U	1.7 U	1.7 U	NA	NA	NA	NA
Chlordane	NA	NA	NA	17 U	17 U	17 U	17 U	NA	NA	NA	NA
delta-BHC	NA	NA	NA	1.7 U	1.7 U	1.7 U	1.7 U	NA	NA	NA	NA
Dieldrin	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	1.7 U	1.7 U	1.7 U	1.7 U	NA	NA	NA	NA
Endrin	NA	NA	NA	3.3 U	3.3 U	3.3 U	3.3 U	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	1.7 U	1.7 U	1.7 U	1.7 U	NA	NA	NA	NA
Herbicides (UG/KG)											
2,4,5-T	NA	NA	NA	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2,4,5-TP (Silvex)	NA	NA	NA	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2,4-D	NA	NA	NA	40 U	40 U	40 U	40 U	NA	NA	NA	NA

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UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	PAOC I	PAOC I	PAOC J	PAOC J	PAOC J	PAOC J	PAOC J		PAOC J	PAOC K
Station ID	VEPI-SO04	VEPI-SO05	EPAJ-SO01	EPAJ-SO02	EPAJ-SO03	EPAJ-SO04	EPAJ-SO05		EPAJ-SO06	EPAK-SO01
Sample ID	VEPI-SS04-01-0209	VEPI-SS05-01-0209	EPAJ-SS01-0001	EPAJ-SS02-0001	EPAJ-SS03-0001	EPAJ-SS04-0001	EPAJ-SS05-0001	EPAJ-SS05P-0001	EPAJ-SS06-0001	EPAK-SS01-0001
Sample Date	02/24/09	02/24/09	03/02/06	03/01/06	03/01/06	03/01/06	03/02/06	03/02/06	03/01/06	03/01/06
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	NA	NA	2.0 J	3.6 U	4.0	6.8 J	3.5 U	3.6 U	3.8 U	3.8 U
4,4'-DDE	NA	NA	92	51	420	1,200	49	3.0 J	1.2 J	25
4,4'-DDT	NA	NA	28	8.5	46	990	11	21	1.7 J	8.7
beta-BHC	NA	NA	1.8 U	1.9 U	1.8 U	8.9 U	1.8 U	1.9 U	1.9 U	2.0 U
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	1.8 U	1.9 U	1.8 U	8.9 U	1.8 U	1.9 U	1.9 U	2.0 U
Dieldrin	NA	NA	3.6 U	3.6 U	3.4 U	17 U	3.5 U	3.6 U	3.8 U	3.8 U
Endosulfan I	NA	NA	1.8 U	1.9 U	1.8 U	8.9 U	1.8 U	1.9 U	1.9 U	2.0 U
Endrin	NA	NA	3.6 U	3.6 U	3.4 U	17 U	3.5 U	3.6 U	3.8 U	3.8 U
Endrin ketone	NA	NA	3.6 U	3.6 U	3.4 U	17 U	3.5 U	3.6 U	3.8 U	3.8 U
gamma-Chlordane	NA	NA	1.8 U	1.9 U	1.8 U	8.9 U	1.8 U	1.9 U	1.9 U	2.0 U
Heptachlor	NA	NA	1.8 U	1.9 U	1.8 U	8.9 U	1.8 U	1.9 U	1.9 U	2.0 U
Herbicides (UG/KG)										
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	PAOC K	PAOC K	PAOC K		PAOC K	PAOC S		PAOC S	PAOC S	PAOC S
Station ID	EPAK-SO02	EPAK-SO03	EPAK-SO04		EPAK-SO05	EPAS-SO01		EPAS-SO02	EPAS-SO03	EPAS-SO04
Sample ID	EPAK-SS02-0001	EPAK-SS03-0001	EPAK-SS04-0001	EPAK-SS04P-0001	EPAK-SS05-0001	EPAS-SS01-0001	EPAS-SS01P-0001	EPAS-SS02-0001	EPAS-SS03-0001	EPAS-SS04-0001
Sample Date	02/28/06	03/02/06	02/28/06	02/28/06	02/28/06	02/02/06	02/02/06	02/02/06	02/02/06	02/02/06
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	3.9 U	3.5 U	6.1 J	7.9	3.4 U	7.9	4.6	1.8 J	3.4 U	3.8 U
4,4'-DDE	3.3 J	110	1,200	830	50	550	650	270	330	17
4,4'-DDT	3.9 U	27	490	320	16	110	100	70	15	5.4
beta-BHC	2.0 U	1.8 U	8.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	2.0 U
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	2.0 U	1.8 U	8.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	2.0 U
Dieldrin	3.9 U	3.5 U	17 U	3.4 U	3.4 U	3.8 U	3.6 U	3.7 U	3.4 U	3.8 U
Endosulfan I	2.0 U	1.8 U	8.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	2.0 U
Endrin	3.9 U	3.5 U	17 U	3.4 U	3.4 U	3.8 U	3.6 U	3.7 U	3.4 U	3.8 U
Endrin ketone	3.9 U	3.5 U	17 U	3.4 U	3.4 U	3.8 U	3.6 U	3.7 U	3.4 U	3.8 U
gamma-Chlordane	2.0 U	1.8 U	8.8 U	1.3 J	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	2.0 U
Heptachlor	2.0 U	1.8 U	8.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	2.0 U
Herbicides (UG/KG)										
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	PAOC S	PAOC U	PAOC U	PAOC U	PAOC U		PAOC U	PAOC U	PAOC U	PAOC U
Station ID	EPAS-SO05	EPAU-SO01	EPAU-SO02	EPAU-SO03	EPAU-SO04		EPAU-SO05	EPAU-SO06	EPAU-SO07	EPAU-SO08
Sample ID	EPAS-SS05-0001	EPAU-SS01-0001	EPAU-SS02-0001	EPAU-SS03-0001	EPAU-SS04-0001	EPAU-SS04P-0001	EPAU-SS05-0001	EPAU-SS06-0001	EPAU-SS07-0001	EPAU-SS08-0001
Sample Date	02/02/06	03/01/06	03/03/06	03/03/06	03/03/06	03/03/06	03/03/06	03/03/06	03/03/06	03/01/06
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	6.9	3.6 U	3.4 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.4 U
4,4'-DDE	580	23	54	82	4.5 J	4.7	51	3.5 U	53	37
4,4'-DDT	270	31	8.0	10	1.7 J	2.1 J	3.7	3.5 U	18	2.9 J
beta-BHC	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Dieldrin	3.6 U	3.6 U	3.4 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.4 U
Endosulfan I	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Endrin	3.6 U	3.6 U	3.4 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.4 U
Endrin ketone	3.6 U	3.6 U	3.4 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	1.3 J
gamma-Chlordane	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	0.52 J	1.8 U
Heptachlor	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Herbicides (UG/KG)										
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Appendix A-2
East Vieques Surface Soil Sample Background Concentratic
SWMU 1 Work Plan

Site ID	PAOC U	PAOC X	PAOC X	PAOC X	PAOC X
Station ID	EPAU-SO09	VNTR-X-1	VNTR-X-2	VNTR-X-3	VNTR-X-4
Sample ID	EPAU-SS09-0001	VNTR-X-1	VNTR-X-2	VNTR-X-3	VNTR-X-4
Sample Date	03/03/06	12/12/02	12/12/02	12/12/02	12/12/02
Chemical Name					
Pesticides (UG/KG)					
4,4'-DDD	3.8 U	14	3.3 U	33 U	5.5
4,4'-DDE	3.8 U	19	8.3	310	45
4,4'-DDT	3.8 U	38	3.3 U	76	8.0
beta-BHC	3.2 R	1.7 U	1.7 U	17 U	1.7 U
Chlordane	NA	17 U	17 U	167 U	17 U
delta-BHC	1.9 U	1.7 U	1.7 U	17 U	1.7 U
Dieldrin	3.8 U	3.3 U	3.3 U	33 U	3.3 U
Endosulfan I	1.9 U	1.7 U	1.7 U	17 U	1.7 U
Endrin	3.8 U	3.3 U	3.3 U	33 U	3.3 U
Endrin ketone	3.8 U	NA	NA	NA	NA
gamma-Chlordane	1.9 U	NA	NA	NA	NA
Heptachlor	1.9 U	1.7 U	1.7 U	17 U	1.7 U
Herbicides (UG/KG)					
2,4,5-T	NA	10 U	10 U	10 U	10 U
2,4,5-TP (Silvex)	NA	10 U	10 U	10 U	10 U
2,4-D	NA	40 U	40 U	40 U	40 U

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Appendix A-2
East Vieques Subsurface Soil Sample Background Concentration Estimates
SWMU 1 Work Plan

Site ID	**Range**		SWMU 2	SWMU 2	SWMU 4		SWMU 10	SWMU 10	SWMU 10	SWMU 10
Station ID	**Lowest**	**Highest**	CGW2SB01	CGW2SB02	CGW4SB01		CGW10SB05	CGW10SB06	CGW10SB07	CGW10SB08
Sample ID	**Detected**	**Detected**	CGW2SB01-R01-10	CGW2SB02-R01-5	CGW4FD01P-R01-5	CGW4SB01-R01-5	CGW10SB05-R01-5	CGW10SB06-R01-5	CGW10SB07-R01-5	CGW10SB08-R01-5
Sample Date	**Concentration**	**Concentration**	01/21/04	01/22/04	01/21/04	01/21/04	01/22/04	01/20/04	01/20/04	01/22/04
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	0.89 J	44	NA	NA	NA	NA	44 U	3.8 U	3.9 U	3.9 UJ
4,4'-DDE	0.076 J	540	NA	NA	NA	NA	140 J	2.9 J	12 J	6.1 J
4,4'-DDT	0.31 J	950	NA	NA	NA	NA	44 U	3.8 U	3.9 U	3.9 UJ
beta-BHC	0.77 J	2.2 JN	NA	NA	NA	NA	22 U	2.0 U	2.0 U	2.0 UJ
Endrin aldehyde	1.5 J	1.5 J	NA	NA	NA	NA	44 U	3.8 U	3.9 U	3.9 UJ
Endrin ketone	0.82 J	0.82 J	NA	NA	NA	NA	44 U	3.8 U	3.9 U	3.9 UJ
gamma-Chlordane	0.45 J	1.1 J	NA	NA	NA	NA	22 U	2.0 U	2.0 U	2.0 UJ
Methoxychlor	11 J	11 J	NA	NA	NA	NA	220 U	20 U	20 U	20 UJ
Herbicides (UG/KG)										
No Detections	--	--	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

Shading indicates detections

NA - Not Analyzed
J - Analyte present, value may or may not be accurate or precise
JN - Analyte present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Subsurface Soil Sample Background Concentratior
SWMU 1 Work Plan

Site ID	SWMU 10	SWMU 10	SWMU 10	SWMU 10	SWMU 10	SWMU 10	SWMU 10	SWMU 10		SWMU 10
Station ID	CGW10SB09	CGW10SB10	CGW10SB11	CGW10SB12	CGW10SB13	CGW10SB14	CGW10SB15	CGW10SB16		CGW10SB17
Sample ID	CGW10SB09-R01-5	CGW10SB10-R01-5	CGW10SB11-R01-5	CGW10SB12-R01-5	CGW10SB13-R01-5	CGW10SB14-R01-5	CGW10SB15-R01-5	CGW10FD02P-R01	CGW10SB16-R01-5	CGW10SB17-R01-5
Sample Date	01/20/04	01/20/04	01/20/04	01/20/04	01/20/04	01/20/04	01/20/04	01/22/04	01/22/04	01/22/04
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	3.8 U	3.8 U	3.7 U	3.8 U	4.0 U	3.6 U	3.7 U	4.0 U	41 U	3.8 U
4,4'-DDE	13 J	18 J	2.4 J	9.4 J	0.076 J	2.0 J	1.4 J	0.21 J	2.5 J	4.6 J
4,4'-DDT	3.8 U	3.8 U	3.7 U	3.8 U	4.0 U	3.6 U	3.7 U	4.0 U	41 U	0.31 J
beta-BHC	1.9 U	2.0 U	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U	2.0 U	21 U	1.9 U
Endrin aldehyde	3.8 U	3.8 U	3.7 U	3.8 U	4.0 U	3.6 U	3.7 U	4.0 U	41 U	3.8 U
Endrin ketone	3.8 U	3.8 UJ	3.7 U	3.8 U	4.0 U	3.6 U	3.7 U	4.0 U	41 U	3.8 U
gamma-Chlordane	1.9 U	2.0 U	1.9 U	2.0 U	2.0 U	1.9 U	1.9 U	2.0 U	21 U	1.9 U
Methoxychlor	19 U	20 U	19 U	20 U	20 U	19 U	19 U	20 U	210 U	19 U
Herbicides (UG/KG)										
No Detections	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

Shading indicates detections

NA - Not Analyzed
J - Analyte present, value may or may not be accurate or precise
JN - Analyte present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Subsurface Soil Sample Background Concentratior
SWMU 1 Work Plan

Site ID	SWMU 10	SWMU 10	SWMU 10		PI 4	PI 4	PI 4	PI 4	PI 4	PI 4
Station ID	CGW10SB18	CGW10SB19	CGW10SB20		EPI04-SO01	EPI04-SO02	EPI04-SO03	EPI04-SO04	EPI04-SO05	EPI04-SO06
Sample ID	CGW10SB18-R01-5	CGW10SB19-R01-5	CGW10FD04P-R01	CGW10SB20-R01-5	EPI04-SB01-0406	EPI04-SB02-0406	EPI04-SB03-0406	EPI04-SB04-0406	EPI04-SB05-0406	EPI04-SB06-0406
Sample Date	01/22/04	01/20/04	01/22/04	01/22/04	01/26/06	01/26/06	01/26/06	01/26/06	01/26/06	01/26/06
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	3.7 U	3.7 U	3.8 UJ	3.8 U	3.5 U	3.4 U	3.5 U	3.8 U	3.5 U	3.7 U
4,4'-DDE	4.5 J	2.2 J	1.5 J	0.87 J	3.5 U	3.4 U	1.5 J	3.8 U	3.5 U	2.7 J
4,4'-DDT	3.7 U	3.7 U	3.8 UJ	3.8 U	3.5 U	3.4 U	3.5 U	3.8 U	3.5 U	2.2 J
beta-BHC	1.9 U	1.9 U	1.9 UJ	2.0 U	1.8 U	1.8 U	1.8 U	2.0 U	1.8 U	1.9 U
Endrin aldehyde	3.7 U	3.7 U	3.8 UJ	3.8 U	3.5 U	3.4 U	3.5 U	3.8 U	3.5 U	3.7 U
Endrin ketone	3.7 U	3.7 U	3.8 UJ	3.8 U	3.5 U	3.4 U	3.5 U	3.8 U	3.5 U	3.7 U
gamma-Chlordane	1.9 U	1.9 U	1.9 UJ	2.0 U	0.49 J	0.45 J	1.8 U	2.0 U	0.65 J	0.50 J
Methoxychlor	19 U	19 U	19 UJ	20 U	18 U	18 U	18 U	20 U	18 U	19 U
Herbicides (UG/KG)										
No Detections	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not Analyzed
J - Analyte present, value may or may not be accurate or precise
JN - Analyte present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Subsurface Soil Sample Background Concentratior
SWMU 1 Work Plan

Site ID	PI 4	PI 4		PI 4	PI 4	PI 4	PI 4	PI 4	PI 6	
Station ID	EPI04-SO07	EPI04-SO08		EPI04-SO09	EPI04-SO10	EPI04-SO11	EPI04-SO12	EPI04-SO13	VEP6-SO05	
Sample ID	EPI04-SB07-0406	EPI04-SB08-0406	EPI04-SB08P-0406	EPI04-SB09-0406	EPI04-SB10-0406	EPI04-SB11-0406	EPI04-SB12-0406	EPI04-SB13-0406	VEP6-SB05-46-0309	VEP6-SB05P-46-0309
Sample Date	01/25/06	01/25/06	01/25/06	01/24/06	01/24/06	01/25/06	01/24/06	01/25/06	03/11/09	03/11/09
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	1.2 J	3.5 U	3.5 U	0.89 J	3.6 U	3.8 U	3.5 U	3.8 U	NA	NA
4,4'-DDE	1.1 J	71	47	44	50	0.79 J	220	3.8 U	NA	NA
4,4'-DDT	3.7 U	8.5	11	56	1.9 J	3.8 U	6.1	3.8 U	NA	NA
beta-BHC	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	2.0 U	NA	NA
Endrin aldehyde	3.7 U	1.5 J	3.5 U	3.5 U	3.6 U	3.8 U	3.5 U	3.8 U	NA	NA
Endrin ketone	3.7 U	3.5 U	3.5 U	3.5 U	3.6 U	3.8 U	3.5 U	3.8 U	NA	NA
gamma-Chlordane	0.48 J	1.8 U	1.8 U	1.8 U	1.1 J	1.9 U	1.8 U	2.0 U	NA	NA
Methoxychlor	19 U	18 U	18 U	18 U	18 U	19 U	18 U	20 U	NA	NA
Herbicides (UG/KG)										
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not Analyzed
J - Analyte present, value may or may not be accurate or precise
JN - Analyte present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Subsurface Soil Sample Background Concentratior
SWMU 1 Work Plan

Site ID	PI 6	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7
Station ID	VEP6-SO06	EPI07-SO01	EPI07-SO02	EPI07-SO03	EPI07-SO04	EPI07-SO05	EPI07-SO06	EPI07-SO07	EPI07-SO08
Sample ID	VEP6-SB06-46-0309	EPI07-SB01-0406	EPI07-SB02-0406	EPI07-SB03-0406	EPI07-SB04-0406	EPI07-SB05-0406	EPI07-SB06-0406	EPI07-SB07-0406	EPI07-SB08-0406
Sample Date	03/11/09	03/13/06	03/13/06	03/13/06	03/13/06	03/14/06	03/14/06	03/14/06	03/14/06
Chemical Name									
Pesticides (UG/KG)									
4,4'-DDD	NA	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U
4,4'-DDE	NA	3.6 U	4.2	3.7 U	3.6 U	0.98 J	3.7 U	3.7 U	130
4,4'-DDT	NA	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U
beta-BHC	NA	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
Endrin aldehyde	NA	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U
Endrin ketone	NA	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U
gamma-Chlordane	NA	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
Methoxychlor	NA	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
Herbicides (UG/KG)									
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not Analyzed
J - Analyte present, value may or may not be accurate or precise
JN - Analyte present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Subsurface Soil Sample Background Concentratior
SWMU 1 Work Plan

Site ID	PI 7		PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7
Station ID	EPI07-SO09		EPI07-SO10	EPI07-SO11	EPI07-SO14	EPI07-SO15	EPI07-SO16	EPI07-SO17	EPI07-SO18	EPI07-SO19
Sample ID	EPI07-SB09-0406	EPI07-SB09P-0406	EPI07-SB10-0406	EPI07-SB11-0102	EPI07-SB14-0406	EPI07-SB15-0204	EPI07-SB16-0204	EPI07-SB17-0102	EPI07-SB18-0204	EPI07-SB19-0204
Sample Date	03/14/06	03/14/06	03/14/06	03/14/06	03/14/06	03/16/06	03/16/06	03/15/06	03/15/06	03/15/06
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	3.7 U	3.6 U	3.7 U	3.4 U	3.5 U	3.6 U	3.7 U	3.4 U	3.4 U	3.4 U
4,4'-DDE	0.76 J	3.6 U	3.7 U	3.4 U	3.5 U	3.6 U	3.7 U	3.4 U	19	3.4 U
4,4'-DDT	3.7 U	3.6 U	3.7 U	3.4 U	3.5 U	3.6 U	3.7 U	3.4 U	2.2 J	3.4 U
beta-BHC	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.7 U	1.7 U	1.7 U
Endrin aldehyde	3.7 U	3.6 U	3.7 U	3.4 U	3.5 U	3.6 U	3.7 U	3.4 U	3.4 U	3.4 U
Endrin ketone	3.7 U	3.6 U	3.7 U	3.4 U	3.5 U	3.6 U	3.7 U	3.4 U	3.4 U	3.4 U
gamma-Chlordane	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.7 U	1.7 U	1.7 U
Methoxychlor	19 U	18 U	19 U	18 U	18 U	18 U	19 U	17 U	17 U	17 U
Herbicides (UG/KG)										
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not Analyzed
J - Analyte present, value may or may not be accurate or precise
JN - Analyte present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Subsurface Soil Sample Background Concentratior
SWMU 1 Work Plan

Site ID	PI 7	PI 8	PI 8	PI 8	PI 8	PI 8	PAOC I	PAOC I	PAOC I	PAOC I
Station ID	EPI07-SO21	VEP8-SO05	VEP8-SO06	VEP8-SO07	VEP8-SO08	VEP8-SO14	VEPI-SO01	VEPI-SO02	VEPI-SO03	VEPI-SO04
Sample ID	EPI07-SB21-0103	VEP8-SB05-46-0209	VEP8-SB06-46-020	VEP8-SB07-46-020	VEP8-SB08-46-020	VEP8-SB14-46-020	VEPI-SB01-46-0209	VEPI-SB02-46-0209	VEPI-SB03-46-0209	VEPI-SB04-46-020
Sample Date	03/16/06	02/19/09	02/19/09	02/20/09	02/19/09	02/23/09	02/24/09	02/24/09	02/24/09	02/24/09
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	3.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	3.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	3.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	1.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin aldehyde	3.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	3.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	1.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	18 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Herbicides (UG/KG)										
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not Analyzed
J - Analyte present, value may or may not be accurate or precise
JN - Analyte present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Subsurface Soil Sample Background Concentratior
SWMU 1 Work Plan

Site ID	PAOC I	PAOC J	PAOC J	PAOC J	PAOC J	PAOC J		PAOC J	PAOC K
Station ID	VEPI-SO05	EPAJ-SO01	EPAJ-SO02	EPAJ-SO03	EPAJ-SO04	EPAJ-SO05		EPAJ-SO06	EPAK-SO01
Sample ID	/EPI-SB05-46-0209	EPAJ-SB01-0405	EPAJ-SB02-0406	EPAJ-SB03-0406	EPAJ-SB04-0406	EPAJ-SB05-0406	EPAJ-SB05P-0406	EPAJ-SB06-0406	EPAK-SB01-0406
Sample Date	02/24/09	03/02/06	03/01/06	03/01/06	03/02/06	03/02/06	03/02/06	03/01/06	03/01/06
Chemical Name									
Pesticides (UG/KG)									
4,4'-DDD	NA	3.4 U	3.7 U	3.5 U	3.7 U	3.7 U	3.7 U	3.4 U	3.8 U
4,4'-DDE	NA	3.1 J	3.7 U	2.1 J	48	2.5 J	3.1 J	1.3 J	0.89 J
4,4'-DDT	NA	1.7 J	3.7 U	3.5 U	27	1.3 J	1.3 J	27	3.8 U
beta-BHC	NA	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	2.2 JN	1.8 U	2.0 U
Endrin aldehyde	NA	3.4 U	3.7 U	3.5 U	3.7 U	3.7 U	3.7 U	3.4 U	3.8 U
Endrin ketone	NA	3.4 U	3.7 U	3.5 U	3.7 U	3.7 U	3.7 U	3.4 U	3.8 U
gamma-Chlordane	NA	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	2.0 U
Methoxychlor	NA	18 U	19 U	18 U	19 U	19 U	19 U	18 U	20 U
Herbicides (UG/KG)									
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not Analyzed
J - Analyte present, value may or may not be accurate or precise
JN - Analyte present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Subsurface Soil Sample Background Concentratior
SWMU 1 Work Plan

Site ID	PAOC K	PAOC K	PAOC K	PAOC K	PAOC S	PAOC S	PAOC S		PAOC S	PAOC S
Station ID	EPAK-SO02	EPAK-SO03	EPAK-SO04	EPAK-SO05	EPAS-SO01	EPAS-SO02	EPAS-SO03		EPAS-SO04	EPAS-SO05
Sample ID	EPAK-SB02-0406	EPAK-SB03-0406	EPAK-SB04-0406	EPAK-SB05-0406	EPAS-SB01-0406	EPAS-SB02-0406	EPAS-SB03-0406	EPAS-SB03P-0406	EPAS-SB04-0406	EPAS-SB05-0406
Sample Date	02/28/06	03/02/06	03/08/06	02/28/06	02/02/06	02/02/06	02/02/06	02/02/06	02/02/06	02/02/06
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	3.6 U	3.3 U	44	4.3 U	3.9 U	3.5 U	3.8 U	3.8 U	3.8 U	3.6 U
4,4'-DDE	3.6 U	21	540	4.6	35	29	3.8 U	3.8 U	3.8 U	2.8 J
4,4'-DDT	3.6 U	7.5	950	4.3 U	6.7	13	3.8 U	3.8 U	3.8 U	1.8 J
beta-BHC	1.9 U	1.7 U	1.8 U	2.2 U	2.0 U	1.8 U	2.0 U	2.0 U	1.9 U	1.9 U
Endrin aldehyde	3.6 U	3.3 U	3.6 U	4.3 U	3.9 U	3.5 U	3.8 U	3.8 U	3.8 U	3.6 U
Endrin ketone	3.6 U	0.82 J	3.6 U	4.3 U	3.9 U	3.5 U	3.8 U	3.8 U	3.8 U	3.6 U
gamma-Chlordane	1.9 U	1.7 U	0.76 J	2.2 U	2.0 U	1.8 U	2.0 U	2.0 U	1.9 U	1.9 U
Methoxychlor	19 U	17 U	18 U	22 U	20 U	18 U	20 U	20 U	19 U	11 J
Herbicides (UG/KG)										
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not Analyzed
J - Analyte present, value may or may not be accurate or precise
JN - Analyte present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/KG - Micrograms per kilogram

Appendix A-2
East Vieques Subsurface Soil Sample Background Concentratior
SWMU 1 Work Plan

Site ID	PAOC U	PAOC U	PAOC U	PAOC U	PAOC U	PAOC U	PAOC U	PAOC U	PAOC U	
Station ID	EPAU-SO01	EPAU-SO02	EPAU-SO03	EPAU-SO04	EPAU-SO05	EPAU-SO06	EPAU-SO07	EPAU-SO08	EPAU-SO09	
Sample ID	EPAU-SB01-0406	EPAU-SB02-0406	EPAU-SB03-0406	EPAU-SB04-0406	EPAU-SB05-0406	EPAU-SB06-0406	EPAU-SB07-0406	EPAU-SB08-0406	EPAU-SB09-0406	EPAU-SB09P-0406
Sample Date	03/01/06	03/03/06	03/03/06	03/03/06	03/03/06	03/03/06	03/03/06	03/01/06	03/03/06	03/03/06
Chemical Name										
Pesticides (UG/KG)										
4,4'-DDD	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.8 U	3.5 U	3.4 U	3.5 U	3.5 U
4,4'-DDE	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.8 U	3.5 U	3.4 U	3.5 U	3.5 U
4,4'-DDT	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.8 U	3.5 U	3.4 U	3.5 U	3.5 U
beta-BHC	1.8 U	0.77 J	1.8 U	1.8 U	1.8 U	2.0 U	1.8 U	1.8 U	1.8 U	1.8 U
Endrin aldehyde	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.8 U	3.5 U	3.4 U	3.5 U	3.5 U
Endrin ketone	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.8 U	3.5 U	3.4 U	3.5 U	3.5 U
gamma-Chlordane	1.8 U	1.8 U	2.3 R	1.8 U	1.8 U	2.0 U	1.8 U	1.8 U	1.8 U	1.8 U
Methoxychlor	18 U	18 U	18 U	18 U	18 U	20 U	18 U	18 U	18 U	18 U
Herbicides (UG/KG)										
No Detections	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not Analyzed
J - Analyte present, value may or may not be accurate or precise
JN - Analyte present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/KG - Micrograms per kilogram

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	Range		W-AOC-B												W-AOC-B (continued)					
Station ID	**Lowest**	**Highest**	AB-SB05	AB-SB06	AB-SB07	AB-SB08	AB-SB09	AB-SB10		AB-SB11	AB-SB12	AB-SB13	AB-SB14	AB-SB15	AB-SB15	AB-SB16	WWTPSB001	WWTPSB002	WWTPSB003	WWTPSB004
Sample ID	**Detected**	**Detected**	NDE239	NDE241	NDE243	NDE245	NDE247	NDE249	NDE250	NDE252	NDE254	NDE256	NDE258	NDE260	NDE261	NDE263	NDE188	NDE190	NDE192	NDE194
Sample Date	**Concentration**	**Concentration**	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	12/04/00	12/04/00	12/04/00	12/04/00
Chemical Name																				
Pesticide/Polychlorinated Biphenyls (UG_KG)																				
4,4'-DDD	0.33 J	40	3.80 U	4 U	4 U	4.30 U	5.10 U	4.10 U	4.40 U	4.40 U	3.70 U	4.40 U	4 U	3.90 U	4 U	4 U	3.70 UJ	3.90 UJ	3.80 UJ	4.20 UJ
4,4'-DDE	0.16 J	3,990 J	3.80 U	4 U	4 U	4.30 U	5.10 U	4.10 U	0.880 J	1.80 J	3.70 U	0.570 J	0.680 J	0.900 J	1.10 J	1.20 J	3.70 UJ	3.90 UJ	3.80 UJ	4.20 UJ
4,4'-DDT	0.26 J	2,190 J	3.80 U	4 U	4 U	4.30 U	5.10 U	4.10 U	4.40 U	4.40 U	3.70 U	4.40 U	4 U	3.90 U	4 U	4 U	3.70 UJ	3.90 UJ	3.80 UJ	4.20 UJ
Aldrin	0.2 J	0.87 J	2 U	2.10 U	2.10 U	2.20 U	2.60 U	2.10 U	2.30 U	2.30 U	1.90 U	2.30 U	2.10 U	2 U	2.10 U	2.10 U	1.90 UJ	2 UJ	1.90 UJ	2.20 UJ
Aroclor-1254	43 J	56	38 U	40 U	40 U	43 U	51 U	41 U	44 U	44 U	37 U	44 U	40 U	39 U	40 U	40 U	37 UJ	39 UJ	38 UJ	42 UJ
Aroclor-1260	10 J	27 J	38 U	10 J	14 J	19 J	51 U	12 J	12 J	44 U	37 U	44 U	40 U	39 U	40 U	40 U	37 UJ	39 UJ	38 UJ	42 UJ
Dieldrin	0.18 J	3.90	3.90	4 U	4 U	4.30 U	5.10 U	4.10 U	4.40 U	1.80 J	0.770 J	4.40 U	4 U	3.90 U	4 U	4 U	3.70 UJ	3.90 UJ	3.80 UJ	4.20 UJ
Endosulfan I	3.5 J	3.5 J	2 U	2.10 U	2.10 U	2.20 U	2.60 U	2.10 U	2.30 U	2.30 U	1.90 U	2.30 U	2.10 U	2 U	2.10 U	2.10 U	1.90 UJ	2 UJ	1.90 UJ	2.20 UJ
Endosulfan II	0.65 J	0.65 J	3.80 U	4 U	4 U	4.30 U	5.10 U	4.10 U	4.40 U	4.40 U	3.70 U	4.40 U	4 U	3.90 U	4 U	4 U	3.70 UJ	3.90 UJ	3.80 UJ	4.20 UJ
Endosulfan sulfate	0.22 J	90 J	3.80 U	4 U	4 U	4.30 U	5.10 U	4.10 U	4.40 U	4.40 U	3.70 U	4.40 U	4 U	3.90 U	4 U	4 U	3.70 UJ	3.90 UJ	3.80 UJ	4.20 UJ
Endrin	0.22 J	16 JN	3.80 U	4 U	4 U	4.30 U	5.10 U	4.10 U	4.40 U	4.40 U	3.70 U	4.40 U	4 U	3.90 U	4 U	4 U	3.70 UJ	3.90 UJ	3.80 UJ	4.20 UJ
Endrin aldehyde	0.21 J	11	3.80 U	4 U	4 U	4.30 U	5.10 U	4.10 U	4.40 U	4.40 U	3.70 U	4.40 U	4 U	3.90 U	4 U	4 U	3.70 UJ	3.90 UJ	3.80 UJ	4.20 UJ
Heptachlor	0.43 J	1.5 J	2 U	2.10 U	2.10 U	2.20 U	2.60 U	2.10 U	2.30 U	2.30 U	1.90 U	2.30 U	2.10 U	2 U	2.10 U	2.10 U	1.90 UJ	2 UJ	1.90 UJ	2.20 UJ
Heptachlor epoxide	0.2 J	1.7 J	2 U	2.10 U	2.10 U	2.20 U	2.60 U	2.10 U	2.30 U	2.30 U	1.90 U	2.30 U	2.10 U	2 U	2.10 U	2.10 U	1.90 UJ	2 UJ	1.90 UJ	2.20 UJ
Methoxychlor	0.49 J	240 J	20 U	21 U	21 U	22 U	26 U	21 U	23 U	23 U	19 U	23 U	21 U	20 U	21 U	21 U	19 UJ	20 UJ	19 UJ	22 UJ
alpha-Chlordane	0.30 J	4.6 J	2 U	2.10 U	2.10 U	2.20 U	2.60 U	2.10 U	2.30 U	2.30 U	1.90 U	2.30 U	2.10 U	2 U	2.10 U	2.10 U	1.90 UJ	2 UJ	1.90 UJ	2.20 UJ
beta-BHC	0.59 J	1.4 J	2 U	2.10 U	2.10 U	2.20 U	2.60 U	2.10 U	2.30 U	2.30 U	1.90 U	2.30 U	2.10 U	2 U	2.10 U	2.10 U	1.90 UJ	2 UJ	1.90 UJ	2.20 UJ
delta-BHC	0.54 J	0.59 J	2 U	2.10 U	2.10 U	2.20 U	2.60 U	2.10 U	2.30 U	2.30 U	1.90 U	2.30 U	2.10 U	2 U	2.10 U	2.10 U	1.90 UJ	2 UJ	1.90 UJ	2.20 UJ
gamma-BHC (Lindane)	0.66 J	0.66 J	2 U	2.10 U	2.10 U	2.20 U	2.60 U	2.10 U	2.30 U	2.30 U	1.90 U	2.30 U	2.10 U	2 U	2.10 U	2.10 U	1.90 UJ	2 UJ	1.90 UJ	2.20 UJ
gamma-Chlordane	0.2 J	270 J	2 U	2.10 U	2.10 U	2.20 U	2.60 U	2.10 U	2.30 U	2.30 U	1.90 U	2.30 U	2.10 U	2 U	2.10 U	2.10 U	1.90 UJ	2 UJ	1.90 UJ	2.20 UJ

Notes:
NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-C											
Station ID	AC-SB01		AC-SB02	AC-SB03	AC-SB04	AC-SB05	AC-SB06	AC-SB07	AC-SB08		AC-SB09	AC-SB10
Sample ID	NDA196	NDA197FD1	NDA198	NDA199	NDA200	NDA201	NDA202	NDA203	NDA204	NDA205FD1	NDA206	NDA207
Sample Date	04/10/00	04/10/00	04/10/00	04/10/00	04/10/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.6 U	3.6 U	4.3 U	4.3 U	3.5 U	3.3 U	3.8 U	2.1 J	4.3 UJ	3.8 U	3.4 U	3.8 U
4,4'-DDE	3.6 U	3.6 U	4.3 U	4.3 U	0.53 J	3.3 U	0.58 J	6.4	0.8 J	0.84 J	3.4 U	0.48 J
4,4'-DDT	3.6 UJ	3.6 UJ	4.3 UJ	4.3 UJ	3.5 UJ	3.3 U	3.8 U	16	4.3 U	0.53 J	3.4 U	3.8 U
Aldrin	1.8 U	1.8 U	2.2 U	2.2 U	1.8 U	1.7 U	1.9 U	2.1 U	2.2 U	1.9 U	1.8 U	1.9 U
Aroclor-1254	36 U	35 U	43 U	33 U	35 U	33 U	38 U	41 U	43 U	37 U	34 U	37 U
Aroclor-1260	36 U	35 U	43 U	33 U	35 U	33 U	38 U	41 U	43 U	37 U	34 U	37 U
Dieldrin	3.6 U	3.6 U	4.3 U	4.3 U	3.5 U	3.3 U	3.8 U	4.2 U	4.3 U	3.8 U	3.4 U	3.8 U
Endosulfan I	1.8 U	1.8 U	2.2 U	2.2 U	1.8 U	1.7 U	1.9 U	2.1 U	2.2 U	1.9 U	1.8 U	1.9 U
Endosulfan II	3.6 U	3.6 U	4.3 U	4.3 U	3.5 U	3.3 U	3.8 U	4.2 U	4.3 U	3.8 U	3.4 U	3.8 U
Endosulfan sulfate	3.6 U	3.6 U	4.3 U	4.3 U	3.5 U	3.3 U	3.8 U	4.2 U	4.3 U	3.8 U	3.4 U	3.8 U
Endrin	3.6 U	3.6 U	4.3 U	4.3 U	3.5 U	3.3 U	3.8 U	4.2 U	4.3 U	3.8 U	3.4 U	3.8 U
Endrin aldehyde	3.6 U	3.6 U	4.3 U	4.3 U	3.5 U	3.3 U	3.8 U	4.2 U	4.3 U	3.8 U	3.4 U	3.8 U
Heptachlor	1.8 U	1.8 U	2.2 U	2.2 U	1.8 U	1.7 U	1.9 U	2.1 U	2.2 U	1.9 U	1.8 U	1.9 U
Heptachlor epoxide	1.8 U	1.8 U	2.2 U	2.2 U	1.8 U	1.7 U	1.9 U	2.1 U	2.2 U	1.9 U	1.8 U	1.9 U
Methoxychlor	18 UJ	18 UJ	22 UJ	22 UJ	18 UJ	17 U	19 U	21 U	22 U	19 U	18 U	19 U
alpha-Chlordane	1.8 U	1.8 U	2.2 U	2.2 U	1.8 U	1.7 U	1.9 U	2.1 U	2.2 U	1.9 U	1.8 U	1.9 U
beta-BHC	1.8 U	1.8 U	2.2 U	2.2 U	1.8 U	1.7 U	1.9 U	2.1 U	2.2 U	1.9 U	1.8 U	1.9 U
delta-BHC	1.8 UJ	1.8 UJ	2.2 UJ	2.2 UJ	1.8 UJ	1.7 U	1.9 U	2.1 U	2.2 U	1.9 U	1.8 U	1.9 U
gamma-BHC (Lindane)	1.8 UJ	1.8 UJ	2.2 UJ	2.2 UJ	1.8 UJ	1.7 U	1.9 U	2.1 U	2.2 U	1.9 U	1.8 U	1.9 U
gamma-Chlordane	1.8 U	1.8 U	2.2 U	2.2 U	1.8 U	1.7 U	1.9 U	2.1 U	2.2 U	1.9 U	1.8 U	1.9 U

Notes:

NA - Not analyzed

J - Reported value is estimated

JN - Analyte present at approximate quantity

R - Unreliable result

U - Analyte not detected

UJ - Analyte not detected; quantitation limit may be imprecise

Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-C					W-AOC-E					
Station ID	AC-SB11	AC-SB12	AC-SB13	AC-SB14	AC-SB15	WAE-SO13	WAE-SO14	WAE-SO15	WAE-SO16	WAE-SO17	
Sample ID	NDA208	NDA209	NDA210	NDA211	NDA212	WAE-SS13-0002	WAE-SS14-0002	WAE-SS15-0002	WAE-SS16-0002	WAE-SS17-0002	WAE-SS17P-0002
Sample Date	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	11/30/05	11/30/05	12/01/05	12/01/05	11/30/05	11/30/05
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.4 U	4.7 U	3.4 U	3.3 U	3.7 U	3.5 U	3.6 U	2.1 J	3.7 U	3.6 U	3.6 U
4,4'-DDE	3.4 U	1.4 J	0.94 J	0.58 J	0.7 J	3.5 U	3.6 U	3.6 U	3.7 U	8.4	8
4,4'-DDT	0.47 J	0.82 J	0.81 J	0.81 J	3.7 U	3.5 U	3.6 U	3.6 U	3.7 U	3.5 J	3.6
Aldrin	1.7 U	2.4 U	1.7 U	1.7 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
Aroclor-1254	33 U	46 U	33 U	33 U	37 U	35 U	36 U	36 U	37 U	36 U	36 U
Aroclor-1260	33 U	46 U	33 U	33 U	0.07 J	35 U	36 U	36 U	37 U	36 U	36 U
Dieldrin	3.4 U	4.7 U	3.4 U	3.3 U	3.7 U	3.5 U	3.6 U	3.6 U	3.7 U	3.6 U	3.6 U
Endosulfan I	1.7 U	2.4 U	1.7 U	1.7 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
Endosulfan II	3.4 U	4.7 U	3.4 U	3.3 U	3.7 U	3.5 U	3.6 U	3.6 U	3.7 U	3.6 U	3.6 U
Endosulfan sulfate	3.4 U	4.7 U	3.4 U	3.3 U	3.7 U	3.5 U	3.6 U	3.6 U	3.7 U	3.6 U	3.6 U
Endrin	3.4 U	4.7 U	3.4 U	3.3 U	3.7 U	3.5 U	3.6 U	3.6 U	3.7 U	3.6 U	3.6 U
Endrin aldehyde	3.4 U	4.7 U	3.4 U	3.3 U	3.7 U	3.5 U	3.6 U	3.6 U	3.7 U	3.6 U	3.6 U
Heptachlor	1.7 U	2.4 U	1.7 U	1.7 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
Heptachlor epoxide	1.7 U	2.4 U	1.7 U	1.7 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
Methoxychlor	17 U	24 U	17 U	17 U	19 U	18 U	18 U	18 U	19 U	18 U	18 U
alpha-Chlordane	1.7 U	2.4 U	1.7 U	1.7 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
beta-BHC	1.7 U	2.4 U	1.7 U	1.7 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
delta-BHC	1.7 U	2.4 U	1.7 U	1.7 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
gamma-BHC (Lindane)	1.7 U	2.4 U	1.7 U	1.7 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
gamma-Chlordane	1.7 U	2.4 U	1.7 U	1.7 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U

Notes:

NA - Not analyzed

J - Reported value is estimated

JN - Analyte present at approximate quantity

R - Unreliable result

U - Analyte not detected

UJ - Analyte not detected; quantitation limit may be imprecise

Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-E		W-AOC-H									
Station ID	WAE-SO18	WAE-SO19	AOCHSB001		AOCHSB002	AOCHSB003	AOCHSB004	AOCHSB005	AOCHSB006	AOCHSB007	AOCHSB008	AOCHSB009
Sample ID	WAE-SS18-0002	WAE-SS19-0002	NDE004	NDE005FD1	NDE007	NDE009	NDE011	NDE013	NDE015	NDE017	NDE019	NDE021
Sample Date	11/30/05	11/30/05	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.5 U	3.7 U	3.5 UJ	3.6 UJ	3.5 UJ	2.4 J	2.9 J	3.4 UJ	3.4 UJ	3.6 UJ	3.6 UJ	3.7 UJ
4,4'-DDE	3.5 U	3.7 U	3,990 J	3,440 J	2,660 J	50 J	41 J	14 J	10 J	126 J	1.6 J	7.8 J
4,4'-DDT	3.5 U	3.7 U	1,940 J	2,190 J	1,090 J	14 UJ	17 J	10 J	11 J	75 J	3.6 UJ	6.7 J
Aldrin	1.8 U	1.9 U	1.8 UJ	1.8 UJ	1.8 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ
Aroclor-1254	35 U	37 U	35 UJ	36 UJ	35 UJ	38 UJ	36 UJ	34 UJ	34 UJ	36 UJ	36 UJ	37 UJ
Aroclor-1260	12 J	37 U	35 UJ	36 UJ	35 UJ	38 UJ	36 UJ	34 UJ	34 UJ	36 UJ	36 UJ	37 UJ
Dieldrin	3.5 U	3.7 U	3.5 UJ	3.6 UJ	3.5 UJ	3.8 UJ	3.6 UJ	3.4 UJ	3.4 UJ	3.6 UJ	3.6 UJ	3.7 UJ
Endosulfan I	1.8 U	1.9 U	1.8 UJ	1.8 UJ	1.8 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ
Endosulfan II	3.5 U	3.7 U	3.5 UJ	3.6 UJ	3.5 UJ	3.8 UJ	3.6 UJ	3.4 UJ	3.4 UJ	3.6 UJ	3.6 UJ	3.7 UJ
Endosulfan sulfate	3.5 U	3.7 U	3.5 UJ	3.6 UJ	3.5 UJ	3.8 UJ	3.6 UJ	3.4 UJ	3.4 UJ	3.6 UJ	3.6 UJ	3.7 UJ
Endrin	3.5 U	3.7 U	3.5 UJ	3.6 UJ	3.5 UJ	3.8 UJ	3.6 UJ	3.4 UJ	3.4 UJ	3.6 UJ	3.6 UJ	3.7 UJ
Endrin aldehyde	3.5 U	3.7 U	3.5 UJ	3.6 UJ	3.5 UJ	3.8 UJ	3.6 UJ	3.4 UJ	3.4 UJ	3.6 UJ	3.6 UJ	3.7 UJ
Heptachlor	1.8 U	1.9 U	1.8 UJ	1.8 UJ	1.8 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ
Heptachlor epoxide	1.8 U	1.9 U	1.8 UJ	1.8 UJ	1.8 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ
Methoxychlor	18 U	19 U	18 UJ	18 UJ	18 UJ	20 UJ	18 UJ	18 UJ	18 UJ	18 UJ	19 UJ	19 UJ
alpha-Chlordane	1.8 U	1.9 U	1.8 UJ	1.8 UJ	1.8 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ
beta-BHC	1.8 U	1.9 U	1.8 UJ	1.8 UJ	1.8 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ
delta-BHC	1.8 U	1.9 U	1.8 UJ	1.8 UJ	1.8 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ
gamma-BHC (Lindane)	1.8 U	1.9 U	1.8 UJ	1.8 UJ	1.8 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ
gamma-Chlordane	1.8 U	1.9 U	1.8 UJ	1.8 UJ	1.8 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ

Notes:

NA - Not analyzed

J - Reported value is estimated

JN - Analyte present at approximate quantity

R - Unreliable result

U - Analyte not detected

UJ - Analyte not detected; quantitation limit may be imprecise

Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-H											
Station ID	AOCHSB010		AOCHSB011	AOCHSB012	AOCHSB013	AOCHSB014	AOCHSB015	AOCHSB016	AOCHSS001	AOCHSS002	AOCHSS003	AOCHSS004
Sample ID	NDE023	NDE024FD1	NDE026	NDE028	NDE030	NDE032	NDE034	NDE037	NDE176	NDE177	NDE178	NDE179
Sample Date	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.5 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.9 UJ	3.5 UJ	4.8 J	3.6 UJ	3.6 UJ	3.7 UJ	3.5 UJ
4,4'-DDE	3.5 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.9 UJ	3.5 UJ	41 J	3.6 UJ	3.6 UJ	3.7 UJ	3.5 UJ
4,4'-DDT	3.5 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.9 UJ	3.5 UJ	29 J	3.6 UJ	3.6 UJ	3.7 UJ	3.5 UJ
Aldrin	1.8 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ
Aroclor-1254	35 UJ	38 UJ	37 UJ	37 UJ	37 UJ	39 UJ	35 UJ	35 UJ	36 UJ	36 UJ	37 UJ	35 UJ
Aroclor-1260	35 UJ	38 UJ	37 UJ	37 UJ	37 UJ	39 UJ	35 UJ	35 UJ	36 UJ	36 UJ	37 UJ	35 UJ
Dieldrin	3.5 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.6 UJ	3.6 UJ	3.7 UJ	3.5 UJ
Endosulfan I	1.8 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ
Endosulfan II	3.5 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.6 UJ	3.6 UJ	3.7 UJ	3.5 UJ
Endosulfan sulfate	3.5 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.6 UJ	3.6 UJ	3.7 UJ	3.5 UJ
Endrin	3.5 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.6 UJ	3.6 UJ	3.7 UJ	3.5 UJ
Endrin aldehyde	3.5 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.6 UJ	3.6 UJ	3.7 UJ	3.5 UJ
Heptachlor	1.8 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ
Heptachlor epoxide	1.8 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ
Methoxychlor	18 UJ	20 UJ	19 UJ	19 UJ	19 UJ	20 UJ	18 UJ	18 UJ	18 UJ	18 UJ	19 UJ	18 UJ
alpha-Chlordane	1.8 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ
beta-BHC	1.8 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ
delta-BHC	1.8 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ
gamma-BHC (Lindane)	1.8 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ
gamma-Chlordane	1.8 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ

Notes:

NA - Not analyzed

J - Reported value is estimated

JN - Analyte present at approximate quantity

R - Unreliable result

U - Analyte not detected

UJ - Analyte not detected; quantitation limit may be imprecise

Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-H											
Station ID	NDAHSS17	NDAHSS18	NDAHSS19	NDAHSS20	NDAHSS20	NDAHSS21	NDAHSS22	NDAHSS23	NDAHSS24	NDAHSS25	NDAHSS26	NDAHSS27
Sample ID	NDAHSS17-R01	NDAHSS18-R01	NDAHSS19-R01	NDAHFD04P-R01	NDAHSS20-R01	NDAHSS21-R01	NDAHSS22-R01	NDAHSS23-R01	NDAHSS24-R01	NDAHSS25-R01	NDAHSS26-R01	NDAHFD06P-R01
Sample Date	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	0.52 J	2.1 J	20 R	6.6 J	3.5 R	3.6 U	10 J	3.6 J	3.6 U	0.62 J	2.3 J	3 J
4,4'-DDE	40	95 J	23	69 J	3.5 R	1.4 J	190	16 J	5 J	2.5 J	16 J	7.5
4,4'-DDT	18 J	25 J	8.6 J	4.6	3.5 R	3.6 U	9.2 J	8.3 J	5.5 J	1.3 J	10 J	2.2 J
Aldrin	2 U	1.8 U	2.1 U	1.8 U	1.8 R	1.9 U	1.8 U	1.8 UJ	1.8 U	1.9 U	1.9 U	1.9 U
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	3.8 U	3.5 U	4.1 U	3.5 U	3.5 R	3.6 U	3.6 U	3.6 UJ	3.6 U	3.6 U	3.8 U	3.6 U
Endosulfan I	2 U	1.8 U	2.1 U	1.8 U	1.8 R	1.9 U	1.8 U	1.8 UJ	1.8 U	1.9 U	1.9 U	1.9 U
Endosulfan II	3.8 U	3.5 U	4.1 U	3.5 U	0.073 R	3.6 U	3.6 U	3.6 UJ	3.6 U	3.6 U	3.8 U	3.6 U
Endosulfan sulfate	3.8 U	3.5 U	4.1 U	3.5 U	3.5 R	3.6 U	3.6 U	3.6 UJ	3.6 U	3.6 U	3.8 U	3.6 U
Endrin	3.8 U	3.5 U	4.1 U	3.5 U	3.5 R	3.6 U	3.6 U	3.6 UJ	3.6 U	3.6 U	3.8 U	3.6 U
Endrin aldehyde	3.8 U	3.5 U	4.1 U	3.5 U	3.5 R	3.6 U	3.6 U	3.6 UJ	3.6 U	3.6 U	3.8 U	3.6 U
Heptachlor	2 U	1.8 U	2.1 U	1.8 U	1.8 R	1.9 U	1.8 U	1.8 UJ	1.8 U	1.9 U	1.9 U	1.9 U
Heptachlor epoxide	2 U	1.8 U	2.1 U	1.8 U	1.8 R	1.9 U	1.8 U	1.8 UJ	1.8 U	1.9 U	1.9 U	1.9 U
Methoxychlor	20 U	18 U	0.74 J	18 U	18 R	19 U	18 U	18 UJ	18 U	19 U	19 U	19 U
alpha-Chlordane	2 U	1.8 U	2.1 U	1.8 U	1.8 R	1.9 U	1.8 U	1.8 UJ	1.8 U	1.9 U	1.9 U	1.9 U
beta-BHC	2 U	1.8 U	2.1 U	1.8 U	1.8 R	1.9 U	1.8 U	1.8 UJ	1.8 U	1.9 U	1.9 U	1.9 U
delta-BHC	2 UJ	1.8 UJ	2.1 UJ	1.8 U	1.8 R	1.9 U	1.8 U	1.8 UJ	1.8 U	1.9 U	1.9 U	1.9 U
gamma-BHC (Lindane)	2 U	1.8 U	2.1 U	1.8 U	1.8 R	1.9 U	1.8 U	1.8 UJ	1.8 U	1.9 U	1.9 U	1.9 U
gamma-Chlordane	2 U	1.8 U	2.1 U	1.8 U	1.8 R	1.9 U	1.8 U	1.8 UJ	1.8 U	1.9 U	1.9 U	1.9 U

Notes:

NA - Not analyzed

J - Reported value is estimated

JN - Analyte present at approximate quantity

R - Unreliable result

U - Analyte not detected

UJ - Analyte not detected; quantitation limit may be imprecise

Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-H			W-AOC-I							
Station ID	NDAHSS27	NDAHSS28	NDAHSS29	AOCISB001	AOCISB002	AOCISB003	AOCISB004	AOCISB005	AOCISB006	AOCISB007	AOCISB008
Sample ID	NDAHSS27-R01	NDAHSS28-R01	NDAHSS29-R01	NDE043	NDE045	NDE047	NDE049	NDE051	NDE053	NDE055	NDE057
Sample Date	08/26/03	08/26/03	08/26/03	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/30/00	11/30/00	11/30/00
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	1.9 J	1.1 J	4.4	3.6 U	3.4 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	3.5 U
4,4'-DDE	8.8 J	92 J	35	3.6 U	3.4 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	3.5 U
4,4'-DDT	11 J	160 J	7.7 J	3.6 U	3.4 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	3.5 U
Aldrin	1.9 U	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U
Aroclor-1254	NA	NA	NA	36 U	34 U	35 U	34 U	34 U	37 U	36 U	35 U
Aroclor-1260	NA	NA	NA	36 U	34 U	35 U	34 U	34 U	37 U	36 U	35 U
Dieldrin	3.6 U	3.7 U	3.5 U	3.6 U	3.4 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	3.5 U
Endosulfan I	1.9 U	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U
Endosulfan II	3.6 U	3.7 U	3.5 U	3.6 U	3.4 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	3.5 U
Endosulfan sulfate	3.6 U	3.7 U	3.5 U	3.6 U	3.4 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	3.5 U
Endrin	3.6 U	3.7 U	3.5 U	3.6 U	3.4 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	3.5 U
Endrin aldehyde	3.6 U	3.7 U	3.5 U	3.6 U	3.4 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	3.5 U
Heptachlor	1.9 U	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U
Heptachlor epoxide	1.9 U	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U
Methoxychlor	19 U	19 U	18 U	19 U	17 U	18 U	18 U	18 U	19 U	19 U	18 U
alpha-Chlordane	1.9 U	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U
beta-BHC	1.9 U	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U
delta-BHC	1.9 U	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U
gamma-BHC (Lindane)	1.9 U	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U
gamma-Chlordane	1.9 U	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U

Notes:

NA - Not analyzed

J - Reported value is estimated

JN - Analyte present at approximate quantity

R - Unreliable result

U - Analyte not detected

UJ - Analyte not detected; quantitation limit may be imprecise

Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-I										
Station ID	AOCISB009	AOCISB010	AOCISB011		AOCISB012	AOCISB013	AOCISB014	AOCISB015	AOCISB016	AOCISB017	AOCISB018
Sample ID	NDE059	NDE061	NDE062FD1	NDE064	NDE066	NDE068	NDE070	NDE072	NDE075	NDE077	NDE074FD1
Sample Date	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/01/00
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.7 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U
4,4'-DDE	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.7 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U
4,4'-DDT	3.5 U	3.5 U	3.5 U	3.5 U	3.5 UJ	3.7 UJ	3.7 UJ	3.6 UJ	3.5 U	3.5 U	3.5 U
Aldrin	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U
Aroclor-1254	35 U	35 U	35 U	35 U	35 U	37 U	37 U	36 U	35 U	35 U	35 U
Aroclor-1260	35 U	35 U	35 U	35 U	35 U	37 U	37 U	36 U	35 U	35 U	35 U
Dieldrin	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.7 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U
Endosulfan I	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U
Endosulfan II	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.7 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U
Endosulfan sulfate	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.7 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U
Endrin	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.7 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U
Endrin aldehyde	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.7 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U
Heptachlor	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U
Heptachlor epoxide	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U
Methoxychlor	18 U	18 U	18 U	18 U	18 U	19 U	19 U	18 U	18 U	18 U	18 U
alpha-Chlordane	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U
beta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U
delta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U
gamma-BHC (Lindane)	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U
gamma-Chlordane	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U

Notes:

NA - Not analyzed

J - Reported value is estimated

JN - Analyte present at approximate quantity

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UJ - Analyte not detected; quantitation limit may be imprecise

Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-I											
Station ID	AOCISB018	AOCISB019	AOCISB020		AOCISB021	AOCISB022	AOCISB023		AOCISB024	AOCISB025	AOCISB026	
Sample ID	NDE079	NDE081	NDE083	NDE084FD1	NDE086	NDE088	NDE090	NDE091FD1	NDE093	NDE095	NDE097	NDE099FD1
Sample Date	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.5 U	3.5 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4 UJ	3.7 U	3.8 U	3.4 U	3.3 U	3.3 U	3.3 U
4,4'-DDE	3.5 U	3.5 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4 UJ	3.7 U	3.8 U	3.4 U	3.3 U	3.3 U	3.3 U
4,4'-DDT	3.5 U	3.5 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4 UJ	3.7 U	3.8 U	3.4 U	3.3 UJ	3.3 UJ	3.3 UJ
Aldrin	1.8 U	1.8 UJ	2.1 UJ	2.2 UJ	1.9 UJ	2 UJ	1.9 U	2 U	1.8 U	1.7 U	1.7 U	1.7 U
Aroclor-1254	35 U	35 UJ	41 UJ	43 UJ	36 UJ	40 UJ	37 U	38 U	34 U	33 U	33 U	33 U
Aroclor-1260	35 U	35 UJ	41 UJ	43 UJ	36 UJ	40 UJ	37 U	38 U	34 U	33 U	33 U	33 U
Dieldrin	3.5 U	3.5 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4 UJ	3.7 U	3.8 U	3.4 U	3.3 U	3.3 U	3.3 U
Endosulfan I	1.8 U	1.8 UJ	2.1 UJ	2.2 UJ	1.9 UJ	2 UJ	1.9 U	2 U	1.8 U	1.7 U	1.7 U	1.7 U
Endosulfan II	3.5 U	3.5 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4 UJ	3.7 U	3.8 U	3.4 U	3.3 U	3.3 U	3.3 U
Endosulfan sulfate	3.5 U	3.5 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4 UJ	3.7 U	3.8 U	3.4 U	3.3 U	3.3 U	3.3 U
Endrin	3.5 U	3.5 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4 UJ	3.7 U	3.8 U	3.4 U	3.3 U	3.3 U	3.3 U
Endrin aldehyde	3.5 U	3.5 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4 UJ	3.7 U	3.8 U	3.4 U	3.3 U	3.3 U	3.3 U
Heptachlor	1.8 U	1.8 UJ	2.1 UJ	2.2 UJ	1.9 UJ	2 UJ	1.9 U	2 U	1.8 U	1.7 U	1.7 U	1.7 U
Heptachlor epoxide	1.8 U	1.8 UJ	2.1 UJ	2.2 UJ	1.9 UJ	2 UJ	1.9 U	2 U	1.8 U	1.7 U	1.7 U	1.7 U
Methoxychlor	18 U	18 UJ	21 UJ	22 UJ	19 UJ	20 UJ	19 U	20 U	18 U	17 UJ	17 UJ	17 UJ
alpha-Chlordane	1.8 U	1.8 UJ	2.1 UJ	2.2 UJ	1.9 UJ	2 UJ	1.9 U	2 U	1.8 U	1.7 U	1.7 U	1.7 U
beta-BHC	1.8 U	1.8 UJ	2.1 UJ	2.2 UJ	1.9 UJ	2 UJ	1.9 U	2 U	1.8 U	1.7 U	1.7 U	1.7 U
delta-BHC	1.8 U	1.8 UJ	2.1 UJ	2.2 UJ	1.9 UJ	2 UJ	1.9 U	2 U	1.8 U	1.7 U	1.7 U	1.7 U
gamma-BHC (Lindane)	1.8 U	1.8 UJ	2.1 UJ	2.2 UJ	1.9 UJ	2 UJ	1.9 U	2 U	1.8 U	1.7 U	1.7 U	1.7 U
gamma-Chlordane	1.8 U	1.8 UJ	2.1 UJ	2.2 UJ	1.9 UJ	2 UJ	1.9 U	2 U	1.8 U	1.7 U	1.7 U	1.7 U

Notes:

NA - Not analyzed

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JN - Analyte present at approximate quantity

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Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-J									
Station ID	AOCJSB001	AOCJSB002	AOCJSB003	AOCJSB004	AOCJSB005	NDAJSS06	NDAJSS07	NDAJSS08	NDAJSS09	NDAJSS10
Sample ID	NDE102	NDE104	NDE106	NDE108	NDE110	NDAJSS06-R01	NDAJSS07-R01	NDAJSS08-R01	NDAJSS09-R01	NDAJSS10-R01
Sample Date	12/08/00	12/08/00	12/08/00	12/08/00	12/08/00	08/25/03	08/25/03	08/25/03	08/25/03	08/25/03
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG_KG)										
4,4'-DDD	3.4 UJ	3.4 UJ	3.9 UJ	4.9 UJ	4.1 UJ	4 U	3.9 U	3.9 UJ	4.2 U	3.8 UJ
4,4'-DDE	3.4 UJ	3.4 UJ	3.9 UJ	4.9 UJ	4.1 UJ	4 U	3.9 U	3.9 UJ	0.22 J	3.8 UJ
4,4'-DDT	3.4 UJ	3.4 UJ	3.9 UJ	4.9 UJ	4.1 UJ	4 U	0.26 J	3.9 UJ	1.1 J	3.8 UJ
Aldrin	1.8 UJ	1.8 UJ	0.73 J	2.5 UJ	2.1 UJ	2.1 U	2 U	2 UJ	2.1 U	2 UJ
Aroclor-1254	34 UJ	34 UJ	39 UJ	49 UJ	41 UJ	40 U	39 U	39 U	42 U	38 UJ
Aroclor-1260	34 UJ	34 UJ	39 UJ	49 UJ	41 UJ	40 U	39 U	39 U	42 U	38 UJ
Dieldrin	3.4 UJ	3.4 UJ	3.9 UJ	4.9 UJ	4.1 UJ	4 U	0.18 J	3.9 UJ	4.2 U	3.8 UJ
Endosulfan I	1.8 UJ	1.8 UJ	2 UJ	2.5 UJ	2.1 UJ	2.1 U	2 U	2 UJ	2.1 U	2 UJ
Endosulfan II	3.4 UJ	3.4 UJ	3.9 UJ	4.9 UJ	4.1 UJ	4 U	3.9 U	3.9 UJ	4.2 U	3.8 UJ
Endosulfan sulfate	3.4 UJ	3.4 UJ	3.9 UJ	4.9 UJ	4.1 UJ	4 U	3.9 U	3.9 UJ	4.2 U	3.8 UJ
Endrin	3.4 UJ	3.4 UJ	3.9 UJ	4.9 UJ	4.1 UJ	4 U	3.9 U	3.9 UJ	4.2 U	3.8 UJ
Endrin aldehyde	3.4 UJ	3.4 UJ	3.9 UJ	4.9 UJ	4.1 UJ	4 U	3.9 U	3.9 UJ	4.2 U	3.8 UJ
Heptachlor	1.8 UJ	1.8 UJ	2 UJ	2.5 UJ	2.1 UJ	2.1 U	2 U	2 UJ	2.1 U	2 UJ
Heptachlor epoxide	1.8 UJ	1.8 UJ	2 UJ	2.5 UJ	2.1 UJ	2.1 U	2 U	2 UJ	2.1 U	2 UJ
Methoxychlor	18 UJ	18 UJ	20 UJ	25 UJ	21 UJ	21 U	20 U	20 UJ	21 U	20 UJ
alpha-Chlordane	1.8 UJ	1.8 UJ	2 UJ	2.5 UJ	2.1 UJ	2.1 U	2 U	2 UJ	2.1 U	2 UJ
beta-BHC	1.8 UJ	1.8 UJ	2 UJ	2.5 UJ	2.1 UJ	2.1 U	2 U	2 UJ	2.1 U	2 UJ
delta-BHC	1.8 UJ	1.8 UJ	2 UJ	2.5 UJ	2.1 UJ	2.1 U	2 U	2 UJ	2.1 U	2 UJ
gamma-BHC (Lindane)	1.8 UJ	1.8 UJ	2 UJ	2.5 UJ	2.1 UJ	2.1 UJ	2 U	2 UJ	2.1 U	2 UJ
gamma-Chlordane	1.8 UJ	1.8 UJ	2 UJ	2.5 UJ	2.1 UJ	2.1 U	2 U	2 UJ	2.1 U	2 UJ

Notes:

NA - Not analyzed

J - Reported value is estimated

JN - Analyte present at approximate quantity

R - Unreliable result

U - Analyte not detected

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Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-L		W-AOC-L		
Station ID	AOCLSB001	AOCLSB002	AOCLSB003	AOCLSB004	
Sample ID	NDE121	NDE123	NDE125	NDE127	NDE128FD1
Sample Date	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00
Chemical Name					
Pesticide/Polychlorinated Biphenyls (UG_KG)					
4,4'-DDD	3.8 U	3.8 U	3.8 U	3.7 U	3.7 U
4,4'-DDE	3.8 U	1.6 J	3.8 U	2.3 J	0.74 J
4,4'-DDT	3.8 U	9.1	3.8 U	1.2 J	0.59 J
Aldrin	2 U	1.9 U	2 U	1.9 U	1.9 U
Aroclor-1254	38 U	38 U	38 U	37 U	37 U
Aroclor-1260	38 U	38 U	38 U	37 U	37 U
Dieldrin	3.8 U	3.8 U	3.8 U	3.7 U	3.7 U
Endosulfan I	2 U	1.9 U	2 U	1.9 U	1.9 U
Endosulfan II	3.8 U	3.8 U	3.8 U	3.7 U	3.7 U
Endosulfan sulfate	3.8 U	3.8 U	3.8 U	3.7 U	3.7 U
Endrin	3.8 U	3.8 U	3.8 U	3.7 U	3.7 U
Endrin aldehyde	3.8 U	3.8 U	3.8 U	3.7 U	3.7 U
Heptachlor	2 U	1.9 U	2 U	1.9 U	1.9 U
Heptachlor epoxide	2 U	1.9 U	2 U	1.9 U	1.9 U
Methoxychlor	20 U	19 U	20 U	19 U	19 U
alpha-Chlordane	2 U	1.9 U	2 U	1.9 U	1.9 U
beta-BHC	2 U	1.9 U	2 U	1.9 U	1.9 U
delta-BHC	2 U	1.9 U	2 U	1.9 U	1.9 U
gamma-BHC (Lindane)	2 U	1.9 U	2 U	1.9 U	1.9 U
gamma-Chlordane	2 U	1.9 U	2 U	1.9 U	1.9 U

Notes:

NA - Not analyzed

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JN - Analyte present at approximate quantity

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-R										
Station ID	AOCRSS001	AOCRSS002	AOCRSS003	AOCRSS004	AOCRSS005	AOCRSS006	AOCRSS007	AOCRSS008	AOCRSS009	AOCRSS010	
Sample ID	NDE133	NDE134	NDE135	NDE136	NDE137	NDE138	NDE139	NDE140	NDE141	NDE142	NDE143FD1
Sample Date	11/28/00	11/28/00	11/28/00	11/28/00	11/28/00	11/28/00	11/28/00	11/28/00	11/28/00	11/28/00	11/28/00
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	12 J	4 U	4 U	3.7 U	7.4 J	3.7 U	4 U	0.8 J	2.1 J	2.2 J	2.6 J
4,4'-DDE	46	0.66 J	4 U	1.5 J	43	3.7 U	0.85 J	1.1 J	22	49	52
4,4'-DDT	34 J	4 UJ	4 UJ	0.7 J	19 J	3.7 UJ	4 UJ	0.5 J	7.6 J	9.2 J	11 J
Aldrin	1.9 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	2.1 U	2 U	2 U	1.9 U	1.9 U
Aroclor-1254	37 U	40 U	40 U	37 U	38 U	37 U	40 U	38 U	38 U	36 U	37 U
Aroclor-1260	37 U	40 U	40 U	37 U	38 U	37 U	40 U	38 U	38 U	36 U	37 U
Dieldrin	3.7 U	4 U	4 U	3.7 U	3.8 U	3.7 U	4 U	3.8 U	3.8 U	3.6 U	3.7 U
Endosulfan I	1.9 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	2.1 U	2 U	2 U	1.9 U	1.9 U
Endosulfan II	3.7 U	4 U	4 U	3.7 U	3.8 U	3.7 U	4 U	3.8 U	3.8 U	3.6 U	3.7 U
Endosulfan sulfate	3.7 U	4 U	4 U	3.7 U	3.8 U	3.7 U	4 U	3.8 U	3.8 U	3.6 U	3.7 U
Endrin	3.7 U	4 U	4 U	3.7 U	3.8 U	3.7 U	4 U	3.8 U	3.8 U	3.6 U	3.7 U
Endrin aldehyde	3.7 U	4 U	4 U	3.7 U	3.8 U	3.7 U	4 U	3.8 U	3.8 U	3.6 U	3.7 U
Heptachlor	1.9 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	2.1 U	2 U	2 U	1.9 U	1.9 U
Heptachlor epoxide	1.9 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	2.1 U	2 U	2 U	1.9 U	1.9 U
Methoxychlor	19 UJ	21 UJ	21 UJ	19 UJ	20 UJ	19 UJ	21 UJ	20 UJ	20 UJ	19 UJ	19 UJ
alpha-Chlordane	1.9 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	2.1 U	2 U	2 U	1.9 U	1.9 U
beta-BHC	1.9 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	2.1 U	2 U	2 U	1.9 U	1.9 U
delta-BHC	1.9 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	2.1 U	2 U	2 U	1.9 U	1.9 U
gamma-BHC (Lindane)	1.9 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	2.1 U	2 U	2 U	1.9 U	1.9 U
gamma-Chlordane	1.9 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	2.1 U	2 U	2 U	1.9 U	1.9 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-R										
Station ID	AOCRSS011	AOCRSS012	AOCRSS013	AOCRSS014	AOCRSS015	AOCRSS016	AOCRSS017	AOCRSS018	AOCRSS019	AOCRSS020	
Sample ID	NDE144	NDE145	NDE146	NDE147	NDE148	NDE149	NDE150	NDE151	NDE152	NDE153	NDE154FD1
Sample Date	11/28/00	11/28/00	11/28/00	11/28/00	11/28/00	11/28/00	11/28/00	11/29/00	11/29/00	11/29/00	11/29/00
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.5 J	14 J	6.4 J	3.8 U	9.4 J	4 U	3.8 U	4 J	3.7 U	3.7 U	3.7 U
4,4'-DDE	50	83	48	2.4 J	57	54	10	70	18	48 J	89 J
4,4'-DDT	22 J	48 J	44 J	3.8 UJ	32	19 J	6.6 J	34	12	32 J	27
Aldrin	1.9 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
Aroclor-1254	36 U	35 U	37 U	38 U	41 U	40 U	38 U	37 U	37 U	37 U	37 U
Aroclor-1260	36 U	35 U	37 U	38 U	41 U	54	38 U	37 U	37 U	37 U	37 U
Dieldrin	3.6 U	3.5 U	3.7 U	3.8 U	4.1 U	19 J	3.8 U	3.7 U	3.7 U	3.7 U	3.7 U
Endosulfan I	1.9 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
Endosulfan II	3.6 U	3.5 U	3.7 U	3.8 U	4.1 U	4 U	3.8 U	3.7 U	3.7 U	3.7 U	3.7 U
Endosulfan sulfate	3.6 U	3.5 U	3.7 U	3.8 U	4.1 U	4 U	3.8 U	3.7 U	3.7 U	3.7 U	3.7 U
Endrin	3.6 U	3.5 U	3.7 U	3.8 U	4.1 U	4 U	3.8 U	3.7 U	3.7 U	3.7 U	3.7 U
Endrin aldehyde	3.6 U	3.5 U	3.7 U	3.8 U	4.1 U	4 U	3.8 U	3.7 U	3.7 U	3.7 U	3.7 U
Heptachlor	1.9 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
Heptachlor epoxide	1.9 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
Methoxychlor	19 UJ	18 UJ	19 UJ	20 UJ	21 UJ	21 UJ	19 UJ	19 U	19 U	19 U	19 U
alpha-Chlordane	1.9 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
beta-BHC	1.9 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
delta-BHC	1.9 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
gamma-BHC (Lindane)	1.9 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
gamma-Chlordane	1.9 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-R										
Station ID	AOCRSS021	AOCRSS022	AOCRSS023	AOCRSS024	AOCRSS025	AOCRSS026	AOCRSS027	AOCRSS028	AOCRSS029	AOCRSS030	
Sample ID	NDE155	NDE156	NDE157	NDE158	NDE159	NDE160	NDE161	NDE162	NDE163	NDE164	NDE165FD1
Sample Date	11/29/00	11/29/00	11/29/00	11/29/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	18	3.7 U	3.5 U	3.7 U	3.6 U	3.7 U	7.7 UJ	3.5 UJ	4.2 U	3.6 UJ	3.8 UJ
4,4'-DDE	328	45	161	3.7 U	3.6 U	19 J	9.4 J	1 J	4.2 U	83 J	85 J
4,4'-DDT	111 J	46	42	3.7 U	3.6 U	8.9 J	8.7 J	3.5 J	4.2 U	82 J	61 J
Aldrin	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	3.9 UJ	1.8 UJ	2.1 U	1.9 UJ	2 UJ
Aroclor-1254	37 U	37 U	35 U	37 U	36 U	37 U	77 UJ	35 UJ	42 U	36 UJ	38 UJ
Aroclor-1260	37 U	37 U	35 U	37 U	36 U	37 U	77 UJ	35 UJ	42 U	36 UJ	38 UJ
Dieldrin	3.7 U	3.7 U	3.5 U	3.7 U	3.6 U	3.7 U	7.7 UJ	3.5 UJ	4.2 U	3.6 UJ	3.8 UJ
Endosulfan I	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	3.9 UJ	1.8 UJ	2.1 U	1.9 UJ	2 UJ
Endosulfan II	3.7 U	3.7 U	3.5 U	3.7 U	3.6 U	3.7 U	7.7 UJ	3.5 UJ	4.2 U	3.6 UJ	3.8 UJ
Endosulfan sulfate	3.7 U	3.7 U	3.5 U	3.7 U	3.6 U	3.7 U	7.7 UJ	3.5 UJ	4.2 U	3.6 UJ	3.8 UJ
Endrin	3.7 U	3.7 U	3.5 U	3.7 U	3.6 U	3.7 U	7.7 UJ	3.5 UJ	4.2 U	3.6 UJ	3.8 UJ
Endrin aldehyde	3.7 U	3.7 U	3.5 U	3.7 U	3.6 U	3.7 U	7.7 UJ	3.5 UJ	4.2 U	3.6 UJ	3.8 UJ
Heptachlor	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	3.9 UJ	1.8 UJ	2.1 U	1.9 UJ	2 UJ
Heptachlor epoxide	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	3.9 UJ	1.8 UJ	2.1 U	1.9 UJ	2 UJ
Methoxychlor	19 U	19 U	18 U	19 U	18 U	19 U	39 UJ	18 UJ	21 U	19 UJ	20 UJ
alpha-Chlordane	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	3.9 UJ	1.8 UJ	2.1 U	1.9 UJ	2 UJ
beta-BHC	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	3.9 UJ	1.8 UJ	2.1 U	1.9 UJ	2 UJ
delta-BHC	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	3.9 UJ	1.8 UJ	2.1 U	1.9 UJ	2 UJ
gamma-BHC (Lindane)	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	3.9 UJ	1.8 UJ	2.1 U	1.9 UJ	2 UJ
gamma-Chlordane	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	3.9 UJ	1.8 UJ	2.1 U	1.9 UJ	2 UJ

Notes:

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Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-R										
Station ID	AOCRSS031	AOCRSS032	AOCRSS033	AOCRSS034	WAR-SO35		WAR-SO36	WAR-SO37	WAR-SO38	WAR-SO39	WAR-SO40
Sample ID	NDE166	NDE167	NDE168	NDE169	WAR-SS35-0002	WAR-SS35P-0002	WAR-SS36-0002	WAR-SS37-0002	WAR-SS38-0002	WAR-SS39-0002	WAR-SS40-0002
Sample Date	12/01/00	12/01/00	12/01/00	12/01/00	03/03/06	03/03/06	03/03/06	03/03/06	12/08/05	12/08/05	12/08/05
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	4 UJ	3.9 UJ	3.6 UJ	3.9 UJ	4 U	3.8 U	4 JN	7.3	7.8	40	6.2 U
4,4'-DDE	76 J	157 J	4.9 J	6 J	4 U	3.8 U	13	8 J	180	230	98 JN
4,4'-DDT	89 J	54 J	3.6 J	3.9 UJ	4 U	3.8 U	8.6 J	51 J	110	180	200
Aldrin	2.1 UJ	2 UJ	1.8 UJ	2 UJ	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	3.2 U
Aroclor-1254	40 UJ	39 UJ	36 UJ	39 UJ	40 U	38 U	39 U	38 U	37 U	38 U	62 U
Aroclor-1260	40 UJ	39 UJ	36 UJ	39 UJ	40 U	38 U	39 U	38 U	37 U	38 U	62 U
Dieldrin	4 UJ	3.9 UJ	3.6 UJ	3.9 UJ	4 U	3.8 U	3.9 U	3.8 U	3.7 U	3.8 U	6.2 U
Endosulfan I	2.1 UJ	2 UJ	1.8 UJ	2 UJ	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	3.2 U
Endosulfan II	4 UJ	3.9 UJ	3.6 UJ	3.9 UJ	4 U	3.8 U	3.9 U	3.8 U	3.7 U	3.8 U	6.2 U
Endosulfan sulfate	4 UJ	3.9 UJ	3.6 UJ	3.9 UJ	4 U	3.8 U	3.9 U	3.8 U	63 R	61 R	90 JN
Endrin	4 UJ	3.9 UJ	3.6 UJ	3.9 UJ	4 U	2.5 J	3.9 U	3.8 U	26 R	28 R	16 JN
Endrin aldehyde	4 UJ	3.9 UJ	3.6 UJ	3.9 UJ	4 U	3.8 U	12 R	3.8 U	3.7 U	3.8 U	6.2 U
Heptachlor	2.1 UJ	2 UJ	1.8 UJ	2 UJ	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	3.2 U
Heptachlor epoxide	2.1 UJ	2 UJ	1.8 UJ	2 UJ	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	3.2 U
Methoxychlor	21 UJ	20 UJ	18 UJ	20 UJ	21 U	19 U	230 JN	210 R	140 R	170 R	240 J
alpha-Chlordane	2.1 UJ	2 UJ	1.8 UJ	2 UJ	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	3.2 U
beta-BHC	2.1 UJ	2 UJ	1.8 UJ	2 UJ	2.1 U	1.9 U	3.2 R	2.7 R	3.8 R	6.8 R	3.2 U
delta-BHC	2.1 UJ	2 UJ	1.8 UJ	2 UJ	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	3.2 U
gamma-BHC (Lindane)	2.1 UJ	2 UJ	1.8 UJ	2 UJ	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	3.2 U
gamma-Chlordane	2.1 UJ	2 UJ	1.8 UJ	2 UJ	2.1 U	1.9 U	2 U	1.9 U	19 U	270	270 J

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Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-R										
Station ID	WAR-SO41	WAR-SO42	WAR-SO43	WAR-SO44	WAR-SO45		WAR-SO46	WAR-SO47	WAR-SO48	WAR-SO49	WAR-SO50
Sample ID	WAR-SS41-0002	WAR-SS42-0002	WAR-SS43-0002	WAR-SS44-0002	WAR-SS45-0002	WAR-SS45P-0002	WAR-SS46-0002	WAR-SS47-0002	WAR-SS48-0002	WAR-SS49-0002	WAR-SS50-0002
Sample Date	12/07/05	12/07/05	12/05/05	12/07/05	12/07/05	12/07/05	12/15/05	12/16/05	12/15/05	12/15/05	12/15/05
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.7 U	4 U	2.6 J	3.9 U	3.6 U	3.6 U	3.6 U	4.9	3.8 U	3.8 U	3.7 U
4,4'-DDE	13	4 U	84	1.9 J	8 J	6.8	34	6.6	21	15	7.2
4,4'-DDT	8	4 U	76	3.9 U	3.6 U	2.3 J	24 J	4.6	8.8	3.9	5.5
Aldrin	1.9 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U
Aroclor-1254	37 U	40 U	36 U	39 U	36 U	36 U	56	35 U	38 U	38 U	37 U
Aroclor-1260	37 U	40 U	36 U	39 U	36 U	36 U	27 J	35 U	38 U	38 U	37 U
Dieldrin	3.7 U	4 U	3.6 U	3.9 U	3.6 U	3.6 U	3.6 U	3.5 U	3.8 U	3.8 U	3.7 U
Endosulfan I	1.9 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U
Endosulfan II	3.7 U	4 U	3.6 U	3.9 U	3.6 U	3.6 U	3.6 U	3.5 U	3.8 U	3.8 U	3.7 U
Endosulfan sulfate	3.7 U	4 U	3.6 U	3.9 U	3.6 U	3.6 U	3.6 U	3.5 U	3.8 U	3.8 U	3.7 U
Endrin	3.7 U	4 U	3.9 R	3.9 U	3.6 U	3.6 U	3.6 U	3.5 U	3.8 U	3.8 U	3.7 U
Endrin aldehyde	3.7 U	4 U	3.6 U	3.9 U	3.6 U	3.6 U	3.6 U	3.5 U	3.8 U	3.8 U	3.7 U
Heptachlor	1.9 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U
Heptachlor epoxide	1.9 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U
Methoxychlor	19 U	21 U	19 U	20 U	19 U	19 U	19 U	18 U	19 U	19 U	19 U
alpha-Chlordane	1.9 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U
beta-BHC	1.8 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U	0.64 J	1.8 U	1.9 U	1.9 U	1.9 U
delta-BHC	1.9 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U
gamma-BHC (Lindane)	1.9 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U
gamma-Chlordane	1.9 U	2.1 U	1.9 U	2 U	1.9 U	0.38 J	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-R										
Station ID	WAR-SO51	WAR-SO52	WAR-SO53	WAR-SO54	WAR-SO55		WAR-SO56	WAR-SO57	WAR-SO58	WAR-SO59	WAR-SO60
Sample ID	WAR-SS51-0002	WAR-SS52-0002	WAR-SS53-0002	WAR-SS54-0002	WAR-SS55-0002	WAR-SS55P-0002	WAR-SS56-0002	WAR-SS57-0002	WAR-SS58-0002	WAR-SS59-0002	WAR-SS60-0002
Sample Date	12/15/05	12/15/05	12/15/05	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05	12/15/05
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.7 U	3.8 U	3.8 U	3.6 U	3.8 U	3.9 U	3.6 U	3.9 U	2.1 J	4 U	3.9 U
4,4'-DDE	6.4	14	14	13	4.5	1.8 J	3.6 U	7.8	4.2 J	4 U	1.7 J
4,4'-DDT	3.8	11	5.7	4.7	2.9 J	3.9 U	3.6 U	6.4	4.2 U	4 U	5.2
Aldrin	1.9 U	2 U	2 U	1.9 U	2 U	2 U	1.8 U	2 U	2.2 U	2.1 U	2 U
Aroclor-1254	37 U	38 U	38 U	36 U	38 U	39 U	36 U	39 U	42 U	40 U	39 U
Aroclor-1260	37 U	38 U	38 U	36 U	38 U	39 U	36 U	39 U	42 U	40 U	39 U
Dieldrin	3.7 U	3.8 U	3.8 U	3.6 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	4 U	3.9 U
Endosulfan I	1.9 U	2 U	2 U	1.9 U	2 U	2 U	1.8 U	2 U	2.2 U	2.1 U	2 U
Endosulfan II	3.7 U	3.8 U	3.8 U	3.6 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	4 U	3.9 U
Endosulfan sulfate	3.7 U	3.8 U	3.8 U	3.6 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	4 U	3.9 U
Endrin	3.7 U	3.8 U	3.8 U	3.6 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	4 U	3.9 U
Endrin aldehyde	3.7 U	3.8 U	3.8 U	3.6 U	3.8 U	3.9 U	3.6 U	3.9 U	4.2 U	4 U	3.9 U
Heptachlor	1.9 U	2 U	2 U	1.9 U	2 U	2 U	1.8 U	2 U	2.2 U	2.1 U	2 U
Heptachlor epoxide	1.9 U	2 U	2 U	1.9 U	2 U	2 U	1.8 U	2 U	2.2 U	2.1 U	2 U
Methoxychlor	19 U	20 U	20 U	19 U	20 U	20 U	18 U	20 U	22 U	21 U	20 U
alpha-Chlordane	1.9 U	2 U	2 U	1.9 U	2 U	2 U	3.3	2 U	2.2 U	2.1 U	2 U
beta-BHC	1.9 U	2 U	2 U	1.9 U	2 U	2 U	1.8 U	0.59 J	2.2 U	2.1 U	2 U
delta-BHC	1.9 U	2 U	2 U	1.9 U	2 U	2 U	1.8 U	2 U	2.2 U	2.1 U	2 U
gamma-BHC (Lindane)	1.9 U	2 U	2 U	1.9 U	2 U	2 U	1.8 U	2 U	2.2 U	2.1 U	2 U
gamma-Chlordane	1.9 U	0.51 J	2 U	1.9 U	2 U	2 U	1.8 U	2 U	2.2 U	2.1 U	2 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-R			W-SWMU-10									
Station ID	WAR-SO61	WAR-SO62	WAR-SO63	W10-SB01	W10-SB02		W10-SB03	W10-SB04	W10-SB05	W10-SB06	W10-SB07	W10-SB08	W10-SB09
Sample ID	WAR-SS61-0002	WAR-SS62-0002	WAR-SS63-0002	NDA125	NDA127	NDA128FD1	NDA131	NDA133	NDA135	NDA137	NDA139	NDA141	NDA143
Sample Date	12/15/05	12/15/05	12/15/05	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00
Chemical Name													
Pesticide/Polychlorinated Biphenyls (UG_KG)													
4,4'-DDD	4 U	3.8 U	4.1 U	3.9 U	3.6 U	4.2 U	3.8 U	3.9 U	0.77 J	0.8 J	0.43 J	4.2 U	3.4 U
4,4'-DDE	4 U	3.8 U	4.1 U	190	2.7 J	3.8 J	16	13	50	55	10	1.2 J	14
4,4'-DDT	4 U	3.8 U	4.1 U	125 J	4.4	4.2	10 J	9.4 J	44	26	5.7 J	0.82 J	7.1 J
Aldrin	2 U	2 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	2 U	2.1 U	1.8 U	1.8 U	2.1 U	1.7 U
Aroclor-1254	40 U	38 U	41 U	39 U	36 U	41 U	37 U	38 U	40 U	35 U	35 U	42 U	34 U
Aroclor-1260	40 U	38 U	41 U	39 U	36 U	41 U	37 U	38 U	40 U	35 U	35 U	42 U	34 U
Dieldrin	4 U	3.8 U	4.1 U	3.9 U	3.6 U	4.2 U	3.8 U	3.9 U	4.1 U	3.5 U	3.5 U	4.2 U	3.4 U
Endosulfan I	2 U	2 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	2 U	2.1 U	1.8 U	1.8 U	2.1 U	1.7 U
Endosulfan II	4 U	3.8 U	4.1 U	3.9 U	3.6 U	4.2 U	3.8 U	3.9 U	4.1 U	3.5 U	3.5 U	4.2 U	3.4 U
Endosulfan sulfate	4 U	3.8 U	4.1 U	3.9 U	3.6 U	4.2 U	3.8 U	3.9 U	4.1 U	3.5 U	3.5 U	4.2 U	3.4 U
Endrin	4 U	3.8 U	4.1 U	3.9 U	3.6 U	4.2 U	3.8 U	3.9 U	4.1 U	3.5 U	3.5 U	4.2 U	3.4 U
Endrin aldehyde	4 U	3.8 U	4.1 U	3.9 U	3.6 U	4.2 U	3.8 U	3.9 U	4.1 U	3.5 U	3.5 U	4.2 U	3.4 U
Heptachlor	2 U	2 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	2 U	2.1 U	1.8 U	1.8 U	2.1 U	1.7 U
Heptachlor epoxide	2 U	2 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	2 U	2.1 U	1.8 U	1.8 U	2.1 U	1.7 U
Methoxychlor	20 U	20 U	21 U	20 UJ	19 UJ	21 UJ	19 UJ	20 UJ	21 UJ	18 UJ	18 UJ	21 UJ	17 UJ
alpha-Chlordane	2 U	2 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	2 U	2.1 U	1.8 U	1.8 U	2.1 U	1.7 U
beta-BHC	2 U	2 U	0.79 J	2 U	1.9 U	2.1 U	1.9 U	2 U	2.1 U	1.8 U	1.8 U	2.1 U	1.7 U
delta-BHC	2 U	2 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	2 U	2.1 U	1.8 U	1.8 U	2.1 U	1.7 U
gamma-BHC (Lindane)	2 U	2 U	2.1 U	2 UJ	1.9 UJ	2.1 UJ	1.9 UJ	2 UJ	2.1 UJ	1.8 UJ	1.8 UJ	2.1 UJ	1.7 UJ
gamma-Chlordane	2 U	2 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	2 U	2.1 U	1.8 U	1.8 U	2.1 U	1.7 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-10	W-SWMU-14											
Station ID	W10-SB10	W14-SB01	W14-SB02		W14-SB03	W14-SB04	W14-SB05	W14-SB06	W14-SB07	W14-SB08	W14-SB09	W14-SB10	W14-SB11
Sample ID	NDA145	NDA147	NDA149	NDA150FD1	NDA153	NDA155	NDA157	NDA159	NDA161	NDA164	NDA166	NDA168	NDA170
Sample Date	04/04/00	04/05/00	04/05/00	04/05/00	04/05/00	04/05/00	04/05/00	04/05/00	04/05/00	04/06/00	04/06/00	04/06/00	04/06/00
Chemical Name													
Pesticide/Polychlorinated Biphenyls (UG_KG)													
4,4'-DDD	3.7 U	3.5 U	3.6 U	3.4 U	3.5 U	3.8 U	0.68 J	3.4 U	3.5 U	4.1 UJ	4.1 UJ	3.9 UJ	4 UJ
4,4'-DDE	4.9	0.5 J	0.77 J	0.64 J	3.5 U	3.8 U	3 J	3.4 U	0.69 J	4.1 UJ	4.1 UJ	3.9 UJ	0.77 J
4,4'-DDT	4.9	3.5 UJ	3.6 U	3.4 U	3.5 UJ	3.8 U	3.4 U	3.4 U	3.5 U	4.1 UJ	4.1 UJ	3.9 UJ	4 UJ
Aldrin	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	2.1 UJ	2.1 UJ	2 UJ	2 UJ
Aroclor-1254	36 U	34 U	36 U	34 U	35 U	37 U	33 U	34 U	34 U	41 UJ	41 UJ	38 UJ	40 UJ
Aroclor-1260	36 U	34 U	36 U	34 U	35 U	37 U	33 U	34 U	34 U	41 UJ	41 UJ	38 UJ	40 UJ
Dieldrin	3.7 U	3.5 U	3.6 U	3.4 U	3.5 U	3.8 U	3.4 U	3.4 U	3.5 U	4.1 UJ	4.1 UJ	0.45 UJ	4 UJ
Endosulfan I	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	2.1 UJ	2.1 UJ	2 UJ	2 UJ
Endosulfan II	3.7 U	3.5 U	3.6 U	3.4 U	3.5 U	3.8 U	3.4 U	3.4 U	3.5 U	4.1 UJ	4.1 UJ	3.9 UJ	4 UJ
Endosulfan sulfate	3.7 U	3.5 U	3.6 U	3.4 U	3.5 U	3.8 U	3.4 U	3.4 U	3.5 U	4.1 UJ	4.1 UJ	3.9 UJ	4 UJ
Endrin	3.7 U	3.5 U	3.6 UJ	3.4 UJ	3.5 U	3.8 UJ	3.4 UJ	3.4 UJ	3.5 UJ	4.1 UJ	4.1 UJ	3.9 UJ	4 UJ
Endrin aldehyde	3.7 U	3.5 U	3.6 U	3.4 U	3.5 U	3.8 U	3.4 U	3.4 U	3.5 U	4.1 UJ	4.1 UJ	3.9 UJ	4 UJ
Heptachlor	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	2.1 UJ	2.1 UJ	2 UJ	2 UJ
Heptachlor epoxide	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	2.1 UJ	2.1 UJ	2 UJ	2 UJ
Methoxychlor	19 UJ	18 UJ	1.2 J	17 UJ	18 UJ	19 UJ	17 UJ	18 UJ	18 UJ	21 UJ	21 UJ	20 UJ	20 UJ
alpha-Chlordane	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	2.1 UJ	2.1 UJ	2 UJ	2 UJ
beta-BHC	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	2.1 UJ	2.1 UJ	2 UJ	2 UJ
delta-BHC	1.9 U	1.8 UJ	1.9 U	1.7 U	1.8 UJ	1.9 U	1.7 U	1.8 U	1.8 U	2.1 UJ	2.1 UJ	2 UJ	2 UJ
gamma-BHC (Lindane)	1.9 UJ	1.8 UJ	1.9 UJ	1.7 UJ	1.8 UJ	1.9 UJ	1.7 UJ	1.8 UJ	1.8 UJ	2.1 UJ	2.1 UJ	2 UJ	2 UJ
gamma-Chlordane	1.9 U	1.8 U	1.9 U	1.7 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	2.1 UJ	2.1 UJ	2 UJ	2 UJ

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-14			W-SWMU-15								
Station ID	W14-SB12	W14-SB13	W14-SB14	W15-SB01	W15-SB02	W15-SB03	W15-SB04	W15-SB05	W15-SB06		W15-SB07	W15-SB08
Sample ID	NDA172	NDA174	NDA176	NDA178	NDA179	NDA180	NDA181	NDA182	NDA183	NDA184FD1	NDA185	NDA186
Sample Date	04/06/00	04/06/00	04/06/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/12/00	04/12/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.6 UJ	3.5 UJ	9.3 UJ	3.40 U	3.5 U	3.40 U	3.70 U	3.90 U	3.80 U	3.70 U	3.90 UJ	3.70 UJ
4,4'-DDE	3.6 UJ	1 J	9.3 UJ	3.40 U	3.5 U	0.620 J	3.70 U	3.90 U	3.80 U	3.70 U	3.90 UJ	0.420 J
4,4'-DDT	3.6 UJ	3.5 UJ	9.3 UJ	3.40 U	3.5 U	3.40 U	3.70 U	3.90 U	3.80 U	3.70 U	3.90 UJ	3.70 UJ
Aldrin	1.8 UJ	1.8 UJ	4.8 UJ	1.70 U	1.80 U	1.70 U	1.90 U	2 U	1.90 U	1.90 U	2 UJ	1.90 UJ
Aroclor-1254	35 UJ	34 UJ	92 UJ	33 U	35 U	34 U	37 U	39 U	37 U	37 U	39 UJ	37 UJ
Aroclor-1260	35 UJ	34 UJ	92 UJ	33 U	35 U	21 J	37 U	39 U	37 U	37 U	39 UJ	37 UJ
Dieldrin	3.6 UJ	3.5 UJ	9.3 UJ	3.40 U	3.5 U	3.40 U	3.70 U	3.90 U	3.80 U	3.70 U	3.90 UJ	3.70 UJ
Endosulfan I	1.8 UJ	1.8 UJ	4.8 UJ	1.70 U	1.80 U	1.70 U	1.90 U	2 U	1.90 U	1.90 U	2 UJ	1.90 UJ
Endosulfan II	3.6 UJ	3.5 UJ	9.3 UJ	3.40 U	3.5 U	3.40 U	3.70 U	3.90 U	3.80 U	3.70 U	3.90 UJ	3.70 UJ
Endosulfan sulfate	3.6 UJ	3.5 UJ	9.3 UJ	3.40 U	3.5 U	3.40 U	3.70 U	3.90 U	3.80 U	3.70 U	3.90 UJ	3.70 UJ
Endrin	3.6 UJ	3.5 UJ	9.3 UJ	3.40 U	3.5 U	3.40 U	3.70 U	3.90 U	3.80 U	3.70 U	3.90 UJ	3.70 UJ
Endrin aldehyde	3.6 UJ	3.5 UJ	9.3 UJ	3.40 U	3.5 U	3.40 U	3.70 U	3.90 U	3.80 U	3.70 U	3.90 UJ	3.70 UJ
Heptachlor	1.8 UJ	1.8 UJ	4.8 UJ	1.70 U	1.80 U	1.70 U	1.90 U	2 U	1.90 U	1.90 U	2 UJ	1.90 UJ
Heptachlor epoxide	1.8 UJ	1.8 UJ	4.8 UJ	1.70 U	1.80 U	1.70 U	1.90 U	2 U	1.90 U	1.90 U	2 UJ	1.90 UJ
Methoxychlor	18 UJ	18 UJ	48 UJ	17 U	18 U	17 U	19 U	20 U	19 U	19 U	20 UJ	19 UJ
alpha-Chlordane	1.8 UJ	1.8 UJ	4.8 UJ	1.70 U	1.80 U	1.70 U	1.90 U	2 U	1.90 U	1.90 U	2 UJ	1.90 UJ
beta-BHC	1.8 UJ	1.8 UJ	4.8 UJ	1.70 U	1.80 U	1.70 U	1.90 U	2 U	1.90 U	1.90 U	2 UJ	1.90 UJ
delta-BHC	1.8 UJ	1.8 UJ	4.8 UJ	1.70 U	1.80 U	1.70 U	1.90 U	2 U	1.90 U	1.90 U	2 UJ	1.90 UJ
gamma-BHC (Lindane)	1.8 UJ	1.8 UJ	4.8 UJ	1.70 U	1.80 U	1.70 U	1.90 U	2 U	1.90 U	1.90 U	2 UJ	1.90 UJ
gamma-Chlordane	1.8 UJ	1.8 UJ	4.8 UJ	1.70 U	1.80 U	1.70 U	1.90 U	2 U	1.90 U	1.90 U	2 UJ	1.90 UJ

Notes:

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Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-15								
Station ID	W15-SB09	W15-SB10	W15-SB11	W15-SB12	W15-SB13		W15-SB14	W15-SB15	W15-SB16
Sample ID	NDA187	NDA188	NDA189	NDA190	NDA191	NDA192FD1	NDA193	NDA194	NDA195
Sample Date	04/12/00	04/12/00	04/12/00	04/12/00	04/12/00	04/12/00	04/12/00	04/12/00	04/12/00
Chemical Name									
Pesticide/Polychlorinated Biphenyls (UG_KG)									
4,4'-DDD	3.60 UJ	4.60 UJ	3.70 UJ	3.80 UJ	3.40 UJ	3.90 UJ	3.40 UJ	4.10 UJ	3.40 UJ
4,4'-DDE	3.60 UJ	4.60 UJ	3.70 UJ	3.80 UJ	3.40 UJ	0.440 J	1.10 J	4.10 UJ	3.40 UJ
4,4'-DDT	3.60 UJ	4.60 UJ	3.70 UJ	3.80 UJ	3.40 UJ	3.90 UJ	0.550 J	4.10 UJ	3.40 UJ
Aldrin	1.80 UJ	2.30 UJ	1.90 UJ	1.90 UJ	1.70 UJ	2 UJ	1.80 UJ	2.10 UJ	1.70 UJ
Aroclor-1254	35 UJ	45 UJ	37 UJ	37 UJ	34 UJ	38 UJ	34 UJ	40 UJ	34 UJ
Aroclor-1260	35 UJ	45 UJ	37 UJ	37 UJ	34 UJ	38 UJ	34 UJ	40 UJ	34 UJ
Dieldrin	3.60 UJ	4.60 UJ	3.70 UJ	3.80 UJ	3.40 UJ	3.90 UJ	0.450 J	4.10 UJ	3.40 UJ
Endosulfan I	1.80 UJ	2.30 UJ	1.90 UJ	1.90 UJ	1.70 UJ	2 UJ	1.80 UJ	2.10 UJ	1.70 UJ
Endosulfan II	3.60 UJ	4.60 UJ	3.70 UJ	3.80 UJ	3.40 UJ	3.90 UJ	3.40 UJ	4.10 UJ	3.40 UJ
Endosulfan sulfate	3.60 UJ	4.60 UJ	3.70 UJ	3.80 UJ	3.40 UJ	3.90 UJ	3.40 UJ	4.10 UJ	3.40 UJ
Endrin	3.60 UJ	4.60 UJ	3.70 UJ	3.80 UJ	3.40 UJ	3.90 UJ	3.40 UJ	4.10 UJ	3.40 UJ
Endrin aldehyde	3.60 UJ	4.60 UJ	3.70 UJ	3.80 UJ	3.40 UJ	3.90 UJ	3.40 UJ	4.10 UJ	3.40 UJ
Heptachlor	1.80 UJ	2.30 UJ	1.90 UJ	1.90 UJ	1.70 UJ	2 UJ	1.80 UJ	2.10 UJ	1.70 UJ
Heptachlor epoxide	1.80 UJ	2.30 UJ	1.90 UJ	1.90 UJ	1.70 UJ	2 UJ	1.80 UJ	2.10 UJ	1.70 UJ
Methoxychlor	18 UJ	23 UJ	19 UJ	19 UJ	17 UJ	20 UJ	18 UJ	21 UJ	17 UJ
alpha-Chlordane	1.80 UJ	2.30 UJ	1.90 UJ	1.90 UJ	1.70 UJ	2 UJ	1.80 UJ	2.10 UJ	1.70 UJ
beta-BHC	1.80 UJ	2.30 UJ	1.90 UJ	1.90 UJ	1.70 UJ	2 UJ	1.80 UJ	2.10 UJ	1.70 UJ
delta-BHC	1.80 UJ	2.30 UJ	1.90 UJ	1.90 UJ	1.70 UJ	2 UJ	1.80 UJ	2.10 UJ	1.70 UJ
gamma-BHC (Lindane)	1.80 UJ	2.30 UJ	1.90 UJ	1.90 UJ	1.70 UJ	2 UJ	1.80 UJ	2.10 UJ	1.70 UJ
gamma-Chlordane	1.80 UJ	2.30 UJ	1.90 UJ	1.90 UJ	1.70 UJ	2 UJ	1.80 UJ	2.10 UJ	1.70 UJ

Notes:
NA - Not analyzed
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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-4											
Station ID	SWMU4-MW05	SWMU4-MW06		SWMU4-MW07	SWMU4-MW08	W4-SB01	W4-SB02	W4-SB03		W4-SB04	W4-SB05	W4-SB06
Sample ID	NDB001	NDB003	NDB004FD1	NDB006	NDB008	NDA057	NDA059	NDA061	NDA062FD1	NDA065	NDA067	NDA069
Sample Date	06/06/00	06/06/00	06/06/00	06/06/00	06/06/00	04/18/00	04/18/00	04/18/00	04/18/00	04/18/00	04/18/00	04/18/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.60 U	3.5 U	3.5 U	3.5 U	3.30 U	4.10 UJ	3.60 UJ	3.5 UJ	3.5 UJ	4.20 UJ	3.60 UJ	3.40 UJ
4,4'-DDE	3.60 U	3.5 U	3.5 U	3.5 U	3.30 U	4.10 UJ	3.60 UJ	3.5 UJ	3.5 UJ	4.20 UJ	3.60 UJ	3.40 UJ
4,4'-DDT	3.60 U	3.5 U	3.5 U	3.5 U	3.30 U	4.10 UJ	3.60 UJ	3.5 UJ	3.5 UJ	4.20 UJ	3.60 UJ	3.40 UJ
Aldrin	1.80 U	1.80 U	1.80 U	1.80 U	1.70 U	2.10 UJ	1.80 UJ	1.80 UJ	1.80 UJ	2.10 UJ	1.80 UJ	1.70 UJ
Aroclor-1254	36 U	35 U	35 U	35 U	33 U	41 UJ	35 UJ	34 UJ	35 UJ	41 UJ	36 UJ	33 UJ
Aroclor-1260	36 U	35 U	35 U	35 U	33 U	41 UJ	35 UJ	34 UJ	35 UJ	41 UJ	36 UJ	33 UJ
Dieldrin	3.60 U	3.5 U	3.5 U	3.5 U	3.30 U	4.10 UJ	3.60 UJ	3.5 UJ	3.5 UJ	4.20 UJ	3.60 UJ	3.40 UJ
Endosulfan I	1.80 U	1.80 U	1.80 U	1.80 U	1.70 U	2.10 UJ	1.80 UJ	1.80 UJ	1.80 UJ	2.10 UJ	1.80 UJ	1.70 UJ
Endosulfan II	3.60 U	3.5 U	3.5 U	3.5 U	3.30 U	4.10 UJ	3.60 UJ	3.5 UJ	3.5 UJ	4.20 UJ	3.60 UJ	3.40 UJ
Endosulfan sulfate	3.60 U	3.5 U	3.5 U	3.5 U	3.30 U	4.10 UJ	3.60 UJ	3.5 UJ	3.5 UJ	4.20 UJ	3.60 UJ	3.40 UJ
Endrin	3.60 U	3.5 U	3.5 U	3.5 U	3.30 U	4.10 UJ	3.60 UJ	3.5 UJ	3.5 UJ	4.20 UJ	3.60 UJ	3.40 UJ
Endrin aldehyde	3.60 U	3.5 U	3.5 U	3.5 U	3.30 U	4.10 UJ	3.60 UJ	3.5 UJ	3.5 UJ	4.20 UJ	3.60 UJ	3.40 UJ
Heptachlor	1.80 U	1.80 U	1.80 U	1.80 U	1.70 U	2.10 UJ	1.80 UJ	1.80 UJ	1.80 UJ	2.10 UJ	1.80 UJ	1.70 UJ
Heptachlor epoxide	1.80 U	1.80 U	1.80 U	1.80 U	1.70 U	2.10 UJ	1.80 UJ	1.80 UJ	1.80 UJ	2.10 UJ	1.80 UJ	1.70 UJ
Methoxychlor	18 U	18 U	18 U	18 U	17 U	21 UJ	18 UJ	18 UJ	18 UJ	21 UJ	18 UJ	17 UJ
alpha-Chlordane	1.80 U	1.80 U	1.80 U	1.80 U	1.70 U	2.10 UJ	1.80 UJ	1.80 UJ	1.80 UJ	2.10 UJ	1.80 UJ	1.70 UJ
beta-BHC	1.80 U	1.80 U	1.80 U	1.80 U	1.70 U	2.10 UJ	1.80 UJ	1.80 UJ	1.80 UJ	2.10 UJ	1.80 UJ	1.70 UJ
delta-BHC	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	1.70 UJ	2.10 UJ	1.80 UJ	1.80 UJ	1.80 UJ	2.10 UJ	1.80 UJ	1.70 UJ
gamma-BHC (Lindane)	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	1.70 UJ	2.10 UJ	1.80 UJ	1.80 UJ	1.80 UJ	2.10 UJ	1.80 UJ	1.70 UJ
gamma-Chlordane	1.80 U	1.80 U	1.80 U	1.80 U	1.70 U	2.10 UJ	1.80 UJ	1.80 UJ	1.80 UJ	2.10 UJ	1.80 UJ	1.70 UJ

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-4										
Station ID	W4-SB07		W4-SB08	W4-SB09	W4-SB10	W4-SB11	W4-SB12	WW04-SO17	WW04-SO18	WW04-SO19	
Sample ID	NDA071	NDA072FD1	NDA074	NDA076	NDA078	NDA080	NDA082	WW04-SS17-01-07A	WW04-SS18-01-07A	WW04-SS19-01-07A	WW04-SS19P-01-07A
Sample Date	04/19/00	04/19/00	04/19/00	04/19/00	04/19/00	04/19/00	04/19/00	02/02/07	02/07/07	02/05/07	02/05/07
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	4 UJ	3.5 UJ	0.350 UJ	0.350 UJ	0.350 UJ	0.340 UJ	0.340 UJ	0.87 J	3.5 U	3.5 U	3.6 U
4,4'-DDE	4 UJ	3.5 UJ	0.350 UJ	0.350 UJ	0.350 UJ	0.340 UJ	0.340 UJ	3.4 U	0.35 U	0.89 U	0.94 J
4,4'-DDT	4 UJ	3.5 UJ	0.350 UJ	0.350 UJ	0.350 UJ	0.340 UJ	0.340 UJ	3.4 U	0.55 U	3.5 U	3.6 U
Aldrin	2 UJ	1.80 UJ	0.180 UJ	0.180 UJ	0.180 UJ	0.170 UJ	0.170 UJ	1.8 U	1.8 U	0.61 U	1.3 U
Aroclor-1254	39 UJ	35 UJ	35 UJ	35 UJ	35 UJ	34 UJ	33 UJ	34 U	35 U	35 U	36 U
Aroclor-1260	39 UJ	35 UJ	35 UJ	35 UJ	0.35 UJ	34 UJ	33 UJ	34 U	35 U	35 U	36 U
Dieldrin	4 UJ	3.5 UJ	0.350 UJ	0.350 UJ	0.35 UJ	0.340 UJ	0.340 UJ	0.069 U	3.5 U	1.3 U	1.1 U
Endosulfan I	2 UJ	1.80 UJ	0.180 UJ	0.180 UJ	0.8 UJ	0.170 UJ	0.170 UJ	1.8 U	1.8 U	1.3 U	3.5 J
Endosulfan II	4 UJ	3.5 UJ	0.350 UJ	0.350 UJ	0.350 UJ	0.340 UJ	0.340 UJ	0.25 U	3.5 U	0.33 U	0.29 U
Endosulfan sulfate	4 UJ	3.5 UJ	0.350 UJ	0.350 UJ	0.350 UJ	0.340 UJ	0.340 UJ	3.4 U	3.5 U	3.5 U	3.6 U
Endrin	4 UJ	3.5 UJ	0.350 UJ	0.350 UJ	0.350 UJ	0.340 UJ	0.340 UJ	3.4 U	3.5 U	0.25 U	3.6 U
Endrin aldehyde	4 UJ	3.5 UJ	0.350 UJ	0.350 UJ	0.350 UJ	0.340 UJ	0.340 UJ	3.4 U	0.34 J	3.5 U	3.6 U
Heptachlor	2 UJ	1.80 UJ	0.180 UJ	0.180 UJ	0.180 UJ	0.170 UJ	0.170 UJ	0.047 U	1.8 UJ	1.5 J	1.5 J
Heptachlor epoxide	2 UJ	1.80 UJ	0.180 UJ	0.180 UJ	0.180 UJ	0.170 UJ	0.170 UJ	1.8 U	1.8 U	1.3 U	1.7 J
Methoxychlor	20 UJ	18 UJ	1.80 UJ	1.80 UJ	1.80 UJ	1.70 UJ	1.70 UJ	18 U	0.81 U	18 U	0.7 J
alpha-Chlordane	2 UJ	1.80 UJ	0.180 UJ	0.180 UJ	0.180 UJ	0.170 UJ	0.170 UJ	1.8 U	1 J	3.7	4.6 J
beta-BHC	2 UJ	1.80 UJ	0.180 UJ	0.180 UJ	0.180 UJ	0.170 UJ	0.170 UJ	1.8 U	1.8 U	0.51 U	1.4 J
delta-BHC	2 UJ	1.80 UJ	0.180 UJ	0.180 UJ	0.180 UJ	0.170 UJ	0.170 UJ	1.8 U	1.8 U	0.97 U	1.2 U
gamma-BHC (Lindane)	2 UJ	1.80 UJ	0.180 UJ	0.180 UJ	0.180 UJ	0.170 UJ	0.170 UJ	1.8 U	1.8 U	0.44 U	0.66 J
gamma-Chlordane	2 UJ	1.80 UJ	0.180 UJ	0.180 UJ	0.180 UJ	0.170 UJ	0.170 UJ	0.11 U	0.24 U	1 U	2.3 R

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-4								
Station ID	WW04-SO20	WW04-SO21	WW04-SO22	WW04-SO23	WW04-SO24	WW04-SO25	WW04-SO26	WW04-SO27	
Sample ID	WW04-SS20-01-07A	WW04-SS21-01-07A	WW04-SS22-01-07A	WW04-SS23-02-07A	WW04-SS24-02-07A	WW04-SS25-02-07A	WW04-SS26-01-07A	WW04-SS27-01-07A	WW04-SS27P-01-07A
Sample Date	02/08/07	02/08/07	02/08/07	01/30/07	01/31/07	01/30/07	01/30/07	01/26/07	01/26/07
Chemical Name									
Pesticide/Polychlorinated Biphenyls (UG_KG)									
4,4'-DDD	3.5 U	3.5 U	3.4 U	0.33 J	4.6 U	3.6 U	3.5 U	3.7 U	3.7 U
4,4'-DDE	0.42 U	0.45 J	3.4 U	3.7 U	4.6 U	3.6 U	0.11 U	3.7 U	3.7 U
4,4'-DDT	3.5 U	3.5 U	3.4 U	3.7 U	4.6 U	3.6 U	3.5 U	3.7 U	3.7 U
Aldrin	1.8 U	0.2 J	1.8 U	1.9 U	2.3 U	1.9 U	0.87 J	1.9 U	1.9 U
Aroclor-1254	35 U	35 U	34 U	37 U	46 U	36 U	35 U	37 U	37 U
Aroclor-1260	35 U	35 U	34 U	37 U	46 U	36 U	35 U	37 U	37 U
Dieldrin	3.5 U	3.5 U	3.4 U	0.56 J	4.6 U	3.6 U	1.6 J	3.7 U	3.7 U
Endosulfan I	1.8 U	1.8 U	1.8 U	1.9 U	2.3 U	1.9 U	0.1 U	1.9 U	1.9 U
Endosulfan II	3.5 U	3.5 U	3.4 U	3.7 U	4.6 U	3.6 U	1.1 U	3.7 U	3.7 U
Endosulfan sulfate	3.5 U	0.22 J	3.4 U	3.7 U	4.6 U	3.6 U	3.5 U	3.7 U	3.7 U
Endrin	3.5 U	3.5 U	3.4 U	3.7 U	4.6 U	3.6 U	0.34 J	3.7 U	3.7 U
Endrin aldehyde	0.21 U	0.46 U	0.25 J	3.7 U	4.6 U	3.6 U	3.5 U	3.7 U	3.7 U
Heptachlor	1.8 U	1.8 U	1.8 U	0.1 U	2.3 UJ	1.9 UJ	0.61 U	1.9 UJ	1.9 UJ
Heptachlor epoxide	0.2 J	1.8 U	1.8 U	1.9 U	2.3 U	1.9 U	0.32 U	1.9 U	1.9 U
Methoxychlor	0.65 U	0.44 U	0.26 U	19 U	23 U	19 U	18 U	19 U	19 U
alpha-Chlordane	0.39 J	0.48 U	1.8 U	1.9 U	2.3 U	1.9 U	3	1.9 U	1.9 U
beta-BHC	1.8 U	1.8 U	1.8 U	1.9 U	2.3 U	1.9 U	1.8 U	1.9 U	1.9 U
delta-BHC	1.8 U	0.2 U	1.8 U	1.9 U	2.3 U	1.9 U	0.54 J	1.9 U	1.9 U
gamma-BHC (Lindane)	1.8 U	1.8 U	1.8 U	1.9 U	2.3 U	1.9 U	0.28 U	1.9 U	1.9 U
gamma-Chlordane	1.8 U	1.8 U	1.8 U	1.9 U	2.3 U	1.9 U	0.58 U	1.9 U	1.9 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-4								
Station ID	WW04-SO28	WW04-SO29	WW04-SO30	WW04-SO31	WW04-SO32	WW04-SO33	WW04-SO34	WW04-SO35	WW04-SO36
Sample ID	WW04-SS28-01-07A	WW04-SS29-01-07A	WW04-SS30-01-07A	WW04-SS31-01-07A	WW04-SS32-01-07A	WW04-SS33-01-07A	WW04-SS34-01-07A	WW04-SS35-01-07A	WW04-SS36-01-07A
Sample Date	01/31/07	01/23/07	01/25/07	01/31/07	01/24/07	02/01/07	01/25/07	02/01/07	02/13/07
Chemical Name									
Pesticide/Polychlorinated Biphenyls (UG_KG)									
4,4'-DDD	3.8 U	3.6 U	3.4 U	3.7 U	3.6 U	3.8 U	3.5 U	0.11 U	3.6 U
4,4'-DDE	3.8 U	3.6 U	3.4 U	3.7 U	0.75 U	0.091 U	3.5 U	0.24 U	3.6 U
4,4'-DDT	3.8 U	3.6 U	3.4 U	3.7 U	3.6 U	3.8 U	3.5 U	3.7 U	3.6 U
Aldrin	0.1 U	1.8 U	1.7 U	0.089 U	1.9 U	2 U	1.8 U	0.41 U	1.8 U
Aroclor-1254	38 U	36 U	34 U	37 U	36 U	38 U	35 U	37 U	36 U
Aroclor-1260	38 U	36 U	34 U	37 U	36 U	38 U	35 U	37 U	36 U
Dieldrin	0.099 U	3.6 U	3.4 U	3.7 U	3.6 U	3.8 U	3.5 U	0.89 U	3.6 U
Endosulfan I	0.43 U	1.8 U	1.7 U	1.9 U	1.9 U	2 U	1.8 U	0.29 U	1.8 U
Endosulfan II	3.8 U	3.6 U	3.4 U	3.7 U	3.6 U	1.2 U	3.5 U	0.42 U	0.18 U
Endosulfan sulfate	3.8 U	3.6 U	3.4 U	3.7 U	3.6 U	3.8 U	3.5 U	3.7 U	3.6 R
Endrin	0.18 U	3.6 U	3.4 U	3.7 U	3.6 U	3.8 U	3.5 U	0.26 U	3.6 U
Endrin aldehyde	3.8 U	0.32 J	0.3 U	3.7 U	0.21 U	3.8 U	0.21 J	0.12 U	0.34 U
Heptachlor	1.9 UJ	1.8 UJ	1.7 UJ	1.9 UJ	1.9 UJ	0.069 U	1.8 UJ	0.19 U	1.8 UJ
Heptachlor epoxide	1.9 U	1.8 U	1.7 U	1.9 U	1.9 U	2 U	1.8 U	0.079 U	1.8 U
Methoxychlor	0.49 J	18 U	17 U	19 U	19 U	20 U	0.32 U	0.43 U	18 U
alpha-Chlordane	1.9 U	1.8 U	1.7 U	1.9 U	1.9	2 U	1.8 U	1.8 U	0.26 U
beta-BHC	1.9 U	1.8 U	1.7 U	1.9 U	1.9 U	2 U	1.8 U	0.39 U	1.8 U
delta-BHC	1.9 U	1.8 U	1.7 U	1.9 U	1.9 U	2 U	0.19 U	0.62 U	1.8 U
gamma-BHC (Lindane)	1.9 U	1.8 U	1.7 U	0.063 U	1.9 U	2 U	1.8 U	1.9 U	1.8 U
gamma-Chlordane	1.9 U	1.8 U	1.7 U	1.9 U	0.26 U	2 U	1.8 U	0.96 U	1.8 U

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Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-4								
Station ID	WW04-SO37		WW04-SO38	WW04-SO39	WW04-SO40	WW04-SO41	WW04-SO42	WW04-SO44	WW04-SO45
Sample ID	WW04-SS37-01-07A	WW04-SS37P-01-07A	WW04-SS38-01-07A	WW04-SS39-01-07A	WW04-SS40-01-07A	WW04-SS41-01-07A	WW04-SS42-01-07A	WW04-SS44-01-07A	WW04-SS45-02-07A
Sample Date	02/13/07	02/13/07	02/13/07	02/12/07	02/09/07	02/09/07	02/12/07	02/02/07	02/15/07
Chemical Name									
Pesticide/Polychlorinated Biphenyls (UG_KG)									
4,4'-DDD	3.5 U	3.5 U	0.39 J	3.6 U	3.5 U	3.6 U	3.5 U	4 U	3.4 U
4,4'-DDE	3.5 U	3.5 U	3.7 U	3.6 U	3.5 U	3.6 U	3.5 U	4 U	3.4 U
4,4'-DDT	3.5 U	3.5 U	0.71 J	0.6 U	3.5 U	3.6 U	3.5 U	4 U	3.4 U
Aldrin	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	2.1 U	0.67 J
Aroclor-1254	35 U	35 U	37 U	36 U	35 U	36 U	35 U	40 U	34 U
Aroclor-1260	35 U	35 U	37 U	36 U	35 U	36 U	35 U	40 U	34 U
Dieldrin	3.5 U	3.5 U	3.7 U	3.6 U	3.5 U	3.6 U	3.5 U	0.12 U	3.4 U
Endosulfan I	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	2.1 U	1.8 U
Endosulfan II	3.5 U	3.5 U	3.7 U	3.6 U	3.5 U	3.6 U	3.5 U	4 U	3.4 U
Endosulfan sulfate	3.5 U	3.5 U	0.26 J	0.18 U	3.5 U	0.27 U	3.5 U	0.3 U	0.28 U
Endrin	3.5 U	3.5 U	3.7 U	3.6 U	0.22 J	3.6 U	3.5 U	4 U	0.31 U
Endrin aldehyde	3.5 U	0.2 U	3.7 U	0.18 U	0.25 U	0.26 U	1.5 J	4 U	1.8 U
Heptachlor	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ	1.8 U	1.9 U	1.8 UJ	0.066 U	1.8 UJ
Heptachlor epoxide	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.1 J	1.8 U
Methoxychlor	0.35 U	18 U	19 U	1.1 U	18 U	19 U	18 U	21 U	0.56 U
alpha-Chlordane	1.8 U	1.8 U	0.3 J	0.59 J	0.49 J	1.8 J	1.1 J	2.1 U	2.2 J
beta-BHC	1.8 U	1.8 U	1.9 U	0.39 U	1.8 U	1.9 U	1.8 U	2.1 U	1.8 U
delta-BHC	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	2.1 U	1.8 U
gamma-BHC (Lindane)	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	2.1 U	1.8 U
gamma-Chlordane	0.2 J	0.22 U	0.29 U	0.42 J	0.19 U	0.22 U	0.2 J	2.1 U	0.6 U

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SWMU 1 Work Plan

Site ID	W-SWMU-4								
Station ID	WW04-SO46	WW04-SO47	WW04-SO48	WW04-SO49	WW04-SO50	WW04-SO51	WW04-SO54	WW04-SO55	WW04-SO55
Sample ID	WW04-SS46-01-07A	WW04-SS47-01-07A	WW04-SS48-01-07A	WW04-SS49-01-07A	WW04-SS50-02-07A	WW04-SS51-02-07A	WW04-SS54-01-07A	WW04-SS55-01-07A	WW04-SS55P-01-07A
Sample Date	01/26/07	01/29/07	01/29/07	01/23/07	02/09/07	02/15/07	02/14/07	02/14/07	02/14/07
Chemical Name									
Pesticide/Polychlorinated Biphenyls (UG_KG)									
4,4'-DDD	3.7 U	3.7 U	3.7 U	3.5 U	4 U	3.5 U	3.9 U	0.2 U	0.51 U
4,4'-DDE	3.7 U	3.7 U	3.7 U	3.5 U	4 U	3.5 U	3.9 U	0.35 U	0.31 U
4,4'-DDT	3.7 U	3.7 U	3.7 U	3.5 U	4 U	3.5 U	3.9 U	0.19 U	0.25 U
Aldrin	1.9 U	1.9 U	1.9 U	1.8 U	0.22 U	1.8 U	2 U	1.8 U	1.8 U
Aroclor-1254	37 U	37 U	37 U	35 U	40 U	35 U	39 U	34 U	35 U
Aroclor-1260	37 U	37 U	37 U	35 U	40 U	35 U	39 U	34 U	35 U
Dieldrin	3.7 U	3.7 U	0.062 U	3.5 U	4 U	3.5 U	3.9 U	0.74 U	0.9 U
Endosulfan I	1.9 U	1.9 U	1.9 U	1.8 U	2 U	1.8 U	2 U	0.18 U	1.8 U
Endosulfan II	3.7 U	0.65 J	3.7 U	3.5 U	4 U	3.5 U	3.9 U	1.7 U	1.8 U
Endosulfan sulfate	3.7 U	0.66 U	3.7 U	3.5 U	4 U	3.5 U	3.9 U	0.8 J	0.67 J
Endrin	3.7 U	3.7 U	3.7 U	3.5 U	4 U	3.5 U	3.9 U	0.39 U	0.4 U
Endrin aldehyde	3.7 U	3.7 U	3.7 U	0.33 U	4 U	3.5 U	0.8 J	0.54 U	0.59 U
Heptachlor	1.9 UJ	1.9 UJ	1.9 UJ	1.8 UJ	2 U	1.8 UJ	2 UJ	1.8 UJ	1.8 UJ
Heptachlor epoxide	1.9 U	1.9 U	1.9 U	1.8 U	2 U	1.8 U	0.39 J	0.26 U	0.24 U
Methoxychlor	19 U	0.39 U	19 U	1.2 J	0.39 U	1.1 U	20 U	18 U	0.3 U
alpha-Chlordane	0.27 J	1.9 U	1.9 U	1.1 J	2 U	1.8 U	2 U	0.82 U	0.82 U
beta-BHC	1.9 U	1.9 U	1.9 U	1.8 U	2 U	1.8 U	2 U	0.82 U	0.67 U
delta-BHC	1.9 U	1.9 U	1.9 U	1.8 U	2 U	1.8 U	2 U	0.18 U	0.59 J
gamma-BHC (Lindane)	1.9 U	1.9 U	1.9 U	1.8 U	2 U	1.8 U	2 U	1.8 U	1.8 U
gamma-Chlordane	1.9 U	1.9 U	1.9 U	1.8 U	2 U	1.8 U	2 U	0.45 U	0.51 U

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-6										
Station ID	NDW06SS09		NDW06SS10	NDW06SS11	NDW06SS12	NDW06SS13	NDW06SS14	NDW06SS15	NDW06SS16	NDW06SS17	NDW06SS18
Sample ID	NDW06SS09-R01	NDW06SS09-R01	NDW06SS10-R01	NDW06SS11-R01	NDW06SS12-R01	NDW06SS13-R01	NDW06SS14-R01	NDW06SS15-R01	NDW06SS16-R01	NDW06SS17-R01	NDW06SS18-R01
Sample Date	08/28/03	08/28/03	08/28/03	08/28/03	08/28/03	08/28/03	08/28/03	08/28/03	08/28/03	08/28/03	08/28/03
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	4.3 U	4.4 U	4.4 U	4.3 UJ	4.8 U	28 J	5.8 U	2.5 J	5.8 U	5.6 U	5.7 U
4,4'-DDE	0.16 J	4.4 U	4.4 U	4.3 UJ	2.8 J	23 J	5.8 U	6 U	5.8 U	5.6 U	5.7 U
4,4'-DDT	4.3 U	4.4 U	4.4 U	4.3 UJ	4.8 U	9.2 J	5.8 U	6 U	5.8 U	5.6 U	5.7 U
Aldrin	2.2 U	2.3 U	2.3 U	2.2 UJ	2.4 U	2.2 U	3 U	3.1 U	3 U	2.9 U	2.9 U
Aroclor-1254	43 U	44 U	44 U	43 U	48 U	42 U	58 U	60 U	58 U	56 U	57 U
Aroclor-1260	43 U	44 U	44 U	43 U	48 U	42 U	58 U	60 U	58 U	56 U	57 U
Dieldrin	4.3 U	4.4 U	4.4 U	4.3 UJ	4.8 U	4.2 U	5.8 U	6 U	5.8 U	5.6 U	5.7 U
Endosulfan I	2.2 U	2.3 U	2.3 U	2.2 UJ	2.4 U	2.2 U	3 U	3.1 U	3 U	2.9 U	2.9 U
Endosulfan II	4.3 U	4.4 U	4.4 U	4.3 UJ	4.8 U	4.2 U	5.8 U	6 U	5.8 U	5.6 U	5.7 U
Endosulfan sulfate	4.3 U	4.4 U	4.4 U	4.3 UJ	4.8 U	4.2 U	5.8 U	6 U	5.8 U	5.6 U	5.7 U
Endrin	4.3 U	4.4 U	4.4 U	4.3 UJ	4.8 U	4.2 U	5.8 U	6 U	5.8 U	5.6 U	5.7 U
Endrin aldehyde	4.3 U	4.4 U	4.4 U	4.3 UJ	4.8 U	4.2 U	5.8 U	6 U	5.8 U	5.6 U	5.7 U
Heptachlor	2.2 U	2.3 U	2.3 U	2.2 UJ	2.4 U	2.2 U	3 U	3.1 U	3 U	2.9 U	2.9 U
Heptachlor epoxide	2.2 U	2.3 U	2.3 U	2.2 UJ	2.4 U	2.2 U	3 U	3.1 U	3 U	2.9 U	2.9 U
Methoxychlor	22 U	23 U	23 U	22 UJ	24 U	22 U	30 U	31 U	30 U	29 U	29 U
alpha-Chlordane	2.2 U	2.3 U	2.3 U	2.2 UJ	2.4 U	2.2 U	3 U	3.1 U	3 U	2.9 U	2.9 U
beta-BHC	2.2 U	2.3 U	2.3 U	2.2 UJ	2.4 U	2.2 U	3 U	3.1 U	3 U	2.9 U	2.9 U
delta-BHC	2.2 U	2.3 UJ	2.3 UJ	2.2 UJ	2.4 UJ	2.2 UJ	3 UJ	3.1 UJ	3 UJ	2.9 UJ	2.9 UJ
gamma-BHC (Lindane)	2.2 U	2.3 U	2.3 U	2.2 UJ	2.4 U	2.2 U	3 U	3.1 U	3 U	2.9 U	2.9 U
gamma-Chlordane	2.2 U	2.3 U	2.3 U	2.2 UJ	2.4 U	2.2 U	3 U	3.1 U	3 U	2.9 U	2.9 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-6											
Station ID	NDW06SS19	NDW06SS20	NDW06SS21	NDW06SS22	NDW06SS23	W6-SB01	W6-SB02		W6-SB03	W6-SB04	W6-SB05	W6-SB06
Sample ID	NDW06SS19-R01	NDW06SS20-R01	NDW06SS21-R01	NDW06SS22-R01	NDW06SS23-R01	NDA101	NDA103	NDA104FD1	NDA107	NDA109	NDA111	NDA113
Sample Date	08/28/03	08/28/03	08/28/03	08/28/03	08/28/03	04/24/00	04/24/00	04/24/00	04/24/00	04/24/00	04/24/00	04/20/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	56 U	48 U	44 U	4.3 U	4.2 J	11 J	4.5 UJ	4.70 UJ	4.20 UJ	0.620 J	2 J	4.10 UJ
4,4'-DDE	56 U	48 U	44 U	0.37 J	18 J	29 J	3.80 J	3 J	6.70 J	1.20 J	7.5 J	74 J
4,4'-DDT	56 U	48 U	44 U	4.3 U	44 U	7.20 J	4.5 UJ	4.70 UJ	3 J	4.30 UJ	4.40 UJ	17 J
Aldrin	29 U	25 U	22 U	2.2 U	23 U	2.30 UJ	2.30 UJ	2.40 UJ	2.10 UJ	2.20 UJ	2.20 UJ	2.10 UJ
Aroclor-1254	560 U	480 U	440 U	43 U	43 J	44 UJ	45 UJ	46 UJ	41 UJ	43 UJ	44 UJ	41 UJ
Aroclor-1260	560 U	480 U	440 U	43 U	440 U	44 UJ	45 UJ	46 UJ	41 UJ	43 UJ	44 UJ	41 UJ
Dieldrin	56 U	48 U	44 U	4.3 U	44 U	4.40 UJ	4.5 UJ	4.70 UJ	4.20 UJ	4.30 UJ	4.40 UJ	4.10 UJ
Endosulfan I	29 U	25 U	22 U	2.2 U	23 U	2.30 UJ	2.30 UJ	2.40 UJ	2.10 UJ	2.20 UJ	2.20 UJ	2.10 UJ
Endosulfan II	56 U	48 U	44 U	4.3 U	44 U	4.40 UJ	4.5 UJ	4.70 UJ	4.20 UJ	4.30 UJ	4.40 UJ	4.10 UJ
Endosulfan sulfate	56 U	48 U	44 U	4.3 U	44 U	4.40 UJ	4.5 UJ	4.70 UJ	4.20 UJ	4.30 UJ	4.40 UJ	4.10 UJ
Endrin	56 U	48 U	44 U	4.3 U	44 U	4.40 UJ	4.5 UJ	4.70 UJ	4.20 UJ	4.30 UJ	4.40 UJ	4.10 UJ
Endrin aldehyde	11 J	48 U	44 U	4.3 U	44 U	4.40 UJ	4.5 UJ	4.70 UJ	4.20 UJ	4.30 UJ	4.40 UJ	4.10 UJ
Heptachlor	29 U	25 U	22 U	2.2 U	23 U	2.30 UJ	2.30 UJ	2.40 UJ	2.10 UJ	2.20 UJ	2.20 UJ	2.10 UJ
Heptachlor epoxide	29 U	25 U	22 U	2.2 U	23 U	2.30 UJ	2.30 UJ	2.40 UJ	2.10 UJ	2.20 UJ	2.20 UJ	2.10 UJ
Methoxychlor	290 U	250 U	220 U	22 U	230 U	23 UJ	23 UJ	24 UJ	21 UJ	22 UJ	22 UJ	21 UJ
alpha-Chlordane	29 U	25 U	22 U	2.2 U	23 U	2.30 UJ	2.30 UJ	2.40 UJ	2.10 UJ	2.20 UJ	2.20 UJ	0.610 J
beta-BHC	29 U	25 U	22 U	2.2 U	23 U	2.30 UJ	2.30 UJ	2.40 UJ	2.10 UJ	2.20 UJ	2.20 UJ	2.10 UJ
delta-BHC	29 U	25 U	22 U	2.2 U	23 U	2.30 UJ	2.30 UJ	2.40 UJ	2.10 UJ	2.20 UJ	2.20 UJ	2.10 UJ
gamma-BHC (Lindane)	29 U	25 U	22 U	2.2 U	23 U	2.30 UJ	2.30 UJ	2.40 UJ	2.10 UJ	2.20 UJ	2.20 UJ	2.10 UJ
gamma-Chlordane	29 U	25 U	22 U	2.2 U	23 U	2.30 UJ	2.30 UJ	2.40 UJ	2.10 UJ	2.20 UJ	2.20 UJ	2.10 UJ

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-6		W-SWMU-7								
Station ID	W6-SB07	W6-SB08	NDW07SS07		NDW07SS08	NDW07SS09	NDW07SS10	NDW07SS11	NDW07SS12	NDW07SS13	NDW07SS14
Sample ID	NDA115	NDA117	NDW07FD02P-R01	NDW07SS07-R01	NDW07SS08-R01	NDW07SS09-R01	NDW07SS10-R01	NDW07SS11-R01	NDW07SS12-R01	NDW07SS13-R01	NDW07SS14-R01
Sample Date	04/20/00	04/20/00	08/26/03	08/26/03	08/27/03	08/26/03	08/27/03	08/27/03	08/27/03	08/27/03	08/26/03
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.80 UJ	13 J	3.8 U	3.7 U	3.9 U	3.9 U	4 U	4 U	4.3 U	4.2 U	3.8 U
4,4'-DDE	1.80 J	46 J	3.8 U	0.31 J	3.9 U	0.97 J	4 U	4 U	4.3 U	4.2 U	3.8 U
4,4'-DDT	3.80 UJ	7 J	0.64 J	0.43 J	3.9 U	3.9 U	4 U	4 U	4.3 U	4.2 U	3.8 U
Aldrin	1.90 UJ	2.10 UJ	1.9 U	1.9 U	2 U	2 U	2 U	2.1 U	2.2 U	2.2 U	1.9 U
Aroclor-1254	38 UJ	42 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	38 UJ	42 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	3.80 UJ	4.20 UJ	3.8 U	3.7 U	3.9 U	3.9 U	4 U	4 U	4.3 U	4.2 U	3.8 U
Endosulfan I	1.90 UJ	2.10 UJ	1.9 U	1.9 U	2 U	2 U	2 U	2.1 U	2.2 U	2.2 U	1.9 U
Endosulfan II	3.80 UJ	4.20 UJ	3.8 U	3.7 U	3.9 U	3.9 U	4 U	4 U	4.3 U	4.2 U	3.8 U
Endosulfan sulfate	3.80 UJ	4.20 UJ	3.8 U	3.7 U	3.9 U	3.9 U	4 U	4 U	4.3 U	4.2 U	3.8 U
Endrin	3.80 UJ	4.20 UJ	3.8 U	3.7 U	3.9 U	3.9 U	4 U	4 U	4.3 U	4.2 U	3.8 U
Endrin aldehyde	3.80 UJ	4.20 UJ	3.8 U	3.7 U	3.9 U	3.9 U	4 U	4 U	4.3 U	4.2 U	3.8 U
Heptachlor	1.90 UJ	2.10 UJ	1.9 U	1.9 U	2 U	2 U	2 U	2.1 U	2.2 U	2.2 U	1.9 U
Heptachlor epoxide	1.90 UJ	2.10 UJ	1.9 U	1.9 U	2 U	2 U	2 U	2.1 U	2.2 U	2.2 U	1.9 U
Methoxychlor	19 UJ	21 UJ	19 U	19 U	20 U	20 U	20 U	21 U	22 U	22 U	19 U
alpha-Chlordane	1.90 UJ	2.10 UJ	1.9 U	1.9 U	2 U	2 U	2 U	2.1 U	2.2 U	2.2 U	1.9 U
beta-BHC	1.90 UJ	2.10 UJ	1.9 U	1.9 U	2 U	2 U	2 U	2.1 U	2.2 U	2.2 U	1.9 U
delta-BHC	1.90 UJ	2.10 UJ	1.9 UJ	1.9 U	2 U	2 UJ	2 U	2.1 U	2.2 U	2.2 U	1.9 UJ
gamma-BHC (Lindane)	1.90 UJ	2.10 UJ	1.9 U	1.9 U	2 U	2 U	2 U	2.1 U	2.2 U	2.2 U	1.9 U
gamma-Chlordane	1.90 UJ	2.10 UJ	1.9 U	1.9 U	2 U	2 U	2 U	2.1 U	2.2 U	2.2 U	1.9 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Surface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-7										
Station ID	NDW07SS15	NDW07SS16	NDW07SS17		NDW07SS18	NDW07SS19	NDW07SS20	NDW07SS21	W7-SB01	W7-SB02	W7-SB03
Sample ID	NDW07SS15-R01	NDW07SS16-R01	NDW07SS17-R01	NDW07SS17-R01FD	NDW07SS18-R01	NDW07SS19-R01	NDW07SS20-R01	NDW07SS21-R01	NDA119	NDA120	NDA121
Sample Date	08/27/03	08/25/03	08/25/03	08/25/03	08/27/03	08/27/03	08/27/03	08/27/03	04/18/00	04/18/00	04/18/00
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.9 UJ	3.8 U	4.2 U	4.1 U	3.7 UJ	4 U	3.5 U	3.5 U	3.70 UJ	4.40 UJ	3.60 UJ
4,4'-DDE	3.9 UJ	3.8 U	4.2 U	4.1 U	3.7 UJ	4 U	3.5 U	3.5 U	3.70 UJ	4.40 UJ	3.60 UJ
4,4'-DDT	3.9 UJ	3.8 UJ	4.2 UJ	4.1 U	3.7 UJ	4 U	3.5 U	3.5 U	2 J	0.700 J	3.60 UJ
Aldrin	2 UJ	1.9 U	2.1 U	2.1 U	1.9 UJ	2 U	1.8 U	1.8 U	1.90 UJ	2.20 UJ	1.90 UJ
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	37 UJ	44 UJ	36 UJ
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	37 UJ	44 UJ	36 UJ
Dieldrin	3.9 UJ	3.8 U	4.2 U	4.1 U	3.7 UJ	4 U	3.5 U	3.5 U	3.70 UJ	4.40 UJ	3.60 UJ
Endosulfan I	2 UJ	1.9 U	2.1 U	2.1 U	1.9 UJ	2 U	1.8 U	1.8 U	1.90 UJ	2.20 UJ	1.90 UJ
Endosulfan II	3.9 UJ	3.8 U	4.2 U	4.1 U	3.7 UJ	4 U	3.5 U	3.5 U	3.70 UJ	4.40 UJ	3.60 UJ
Endosulfan sulfate	3.9 UJ	3.8 U	4.2 U	4.1 U	3.7 UJ	4 U	3.5 U	3.5 U	3.70 UJ	4.40 UJ	3.60 UJ
Endrin	3.9 UJ	3.8 U	4.2 U	4.1 U	3.7 UJ	4 U	3.5 U	3.5 U	3.70 UJ	4.40 UJ	3.60 UJ
Endrin aldehyde	3.9 UJ	3.8 U	4.2 U	4.1 U	3.7 UJ	4 U	3.5 U	3.5 U	3.70 UJ	4.40 UJ	3.60 UJ
Heptachlor	2 UJ	0.51 J	0.43 J	2.1 U	1.9 UJ	2 U	1.8 U	1.8 U	1.90 UJ	2.20 UJ	1.90 UJ
Heptachlor epoxide	2 UJ	1.9 U	2.1 U	2.1 U	1.9 UJ	2 U	1.8 U	1.8 U	1.90 UJ	2.20 UJ	1.90 UJ
Methoxychlor	20 UJ	19 UJ	21 UJ	21 U	19 UJ	20 U	18 U	18 U	19 UJ	22 UJ	19 UJ
alpha-Chlordane	2 UJ	1.9 U	2.1 U	2.1 U	1.9 UJ	2 U	1.8 U	1.8 U	1.90 UJ	2.20 UJ	1.90 UJ
beta-BHC	2 UJ	1.9 U	2.1 U	2.1 U	1.9 UJ	2 U	1.8 U	1.8 U	1.90 UJ	2.20 UJ	1.90 UJ
delta-BHC	2 UJ	1.9 U	2.1 U	2.1 UJ	1.9 UJ	2 U	1.8 U	1.8 U	1.90 UJ	2.20 UJ	1.90 UJ
gamma-BHC (Lindane)	2 UJ	1.9 U	2.1 U	2.1 U	1.9 UJ	2 U	1.8 U	1.8 U	1.90 UJ	2.20 UJ	1.90 UJ
gamma-Chlordane	2 UJ	1.9 U	2.1 U	2.1 U	1.9 UJ	2 U	1.8 U	1.8 U	1.90 UJ	2.20 UJ	1.90 UJ

Notes:

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Shading Indicates Detection

Appendix A-3

West Vieques Surface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-SWMU-7		
Station ID	W7-SB04	W7-SB05	W7-SB06
Sample ID	NDA122	NDA123	NDA124
Sample Date	04/18/00	04/18/00	04/18/00
Chemical Name			
Pesticide/Polychlorinated Biphenyls (UG_KG)			
4,4'-DDD	3.70 UJ	3.70 UJ	3.70 UJ
4,4'-DDE	9.90 J	2.30 J	0.400 J
4,4'-DDT	23 J	16 J	3.60 J
Aldrin	1.90 UJ	1.90 UJ	1.90 UJ
Aroclor-1254	37 UJ	37 UJ	37 UJ
Aroclor-1260	37 UJ	37 UJ	37 UJ
Dieldrin	3.70 UJ	3.70 UJ	3.70 UJ
Endosulfan I	1.90 UJ	1.90 UJ	1.90 UJ
Endosulfan II	3.70 UJ	3.70 UJ	3.70 UJ
Endosulfan sulfate	3.70 UJ	3.70 UJ	3.70 UJ
Endrin	3.70 UJ	3.70 UJ	3.70 UJ
Endrin aldehyde	3.70 UJ	3.70 UJ	3.70 UJ
Heptachlor	1.90 UJ	1.90 UJ	1.90 UJ
Heptachlor epoxide	1.90 UJ	1.90 UJ	1.90 UJ
Methoxychlor	19 UJ	19 UJ	19 UJ
alpha-Chlordane	1.90 UJ	1.90 UJ	1.90 UJ
beta-BHC	1.90 UJ	1.90 UJ	1.90 UJ
delta-BHC	1.90 UJ	1.90 UJ	1.90 UJ
gamma-BHC (Lindane)	1.90 UJ	1.90 UJ	1.90 UJ
gamma-Chlordane	1.90 UJ	1.90 UJ	1.90 UJ

Notes:

NA - Not analyzed

J - Reported value is estimated

JN - Analyte present at approximate quantity

R - Unreliable result

U - Analyte not detected

UJ - Analyte not detected; quantitation limit may be imprecise

Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	Range		W-AOC-B										
Station ID	Lowest	Highest	AB-SB05	AB-SB06	AB-SB07	AB-SB08	AB-SB09	AB-SB10	AB-SB11	AB-SB12	AB-SB13	AB-SB14	AB-SB15
Sample ID	Detected	Detected	NDE240	NDE242	NDE244	NDE246	NDE248	NDE251	NDE253	NDE255	NDE257	NDE259	NDE262
Sample Date	Concentration	Concentration	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01	04/13/01
Chemical Name													
Pesticide/Polychlorinated Biphenyls (UG_KG)													
4,4'-DDD	0.19 J	24	3.5 U	3.90 U	4 U	4.20 U	3.80 U	3.90 U	3.90 U	3.5 U	3.80 U	3.70 U	4.10 U
4,4'-DDE	0.1 J	764	3.5 U	3.90 U	4 U	4.20 U	3.80 U	3.90 U	3.90 U	3.5 U	3.80 U	3.70 U	4.10 U
4,4'-DDT	0.25 J	928	3.5 U	3.90 U	4 U	4.20 U	3.80 U	3.90 U	3.90 U	3.5 U	3.80 U	3.70 U	4.10 U
Aldrin	0.550 J	1.1 J	1.80 U	2 U	2.10 U	2.20 U	2 U	2 U	2 U	1.80 U	2 U	0.550 J	2.10 U
Aroclor-1254	15 J	230 J	35 U	39 U	40 U	42 U	38 U	39 U	39 U	35 U	38 U	37 U	41 U
Dieldrin	0.26 J	1.3 J	3.5 U	3.90 U	4 U	4.20 U	3.80 U	3.90 U	3.90 U	3.5 U	3.80 U	3.70 U	4.10 U
Endosulfan I	0.29 J	0.67 J	1.80 U	2 U	2.10 U	2.20 U	2 U	2 U	2 U	1.80 U	2 U	1.90 U	2.10 U
Endosulfan sulfate	0.26 J	0.29 J	3.5 U	3.90 U	4 U	4.20 U	3.80 U	3.90 U	3.90 U	3.5 U	3.80 U	3.70 U	4.10 U
Endrin	0.26 J	0.26 J	3.5 U	3.90 U	4 U	4.20 U	3.80 U	3.90 U	3.90 U	3.5 U	3.80 U	3.70 U	4.10 U
Endrin aldehyde	0.2 J	13	3.5 U	3.90 U	4 U	4.20 U	3.80 U	3.90 U	3.90 U	3.5 U	3.80 U	3.70 U	4.10 U
Endrin ketone	1.4 J	1.4 J	3.5 U	3.90 U	4 U	4.20 U	3.80 U	3.90 U	3.90 U	3.5 U	3.80 U	3.70 U	4.10 U
Heptachlor	0.2 J	0.66 J	1.80 U	2 U	2.10 U	2.20 U	2 U	2 U	2 U	1.80 U	2 U	1.90 U	2.10 U
Heptachlor epoxide	0.31 J	0.31 J	1.80 U	2 U	2.10 U	2.20 U	2 U	2 U	2 U	1.80 U	2 U	1.90 U	2.10 U
alpha-BHC	4.1 J	5.3 JN	1.80 U	2 U	2.10 U	2.20 U	2 U	2 U	2 U	1.80 U	2 U	1.90 U	2.10 U
alpha-Chlordane	0.22 J	3	1.80 U	2 U	2.10 U	2.20 U	2 U	2 U	2 U	1.80 U	2 U	1.90 U	2.10 U
beta-BHC	0.76 J	0.76 J	1.80 U	2 U	2.10 U	2.20 U	2 U	2 U	2 U	1.80 U	2 U	1.90 U	2.10 U
delta-BHC	0.22 J	0.22 J	1.80 U	2 U	2.10 U	2.20 U	2 U	2 U	2 U	1.80 U	2 U	1.90 U	2.10 U
gamma-Chlordane	0.20 J	8.3	1.80 U	2 U	2.10 U	2.20 U	2 U	2 U	2 U	1.80 U	2 U	1.90 U	2.10 U

Notes:

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JN - Analyte present at approximate quantity
R - Unreliable result
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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-B						W-AOC-C					
Station ID	AB-SB16	WWTPSB001	WWTPSB002	WWTPSB003	WWTPSB004		AC-SB16			AC-SB16		
Sample ID	NDE264	NDE189	NDE191	NDE193	NDE195FD1	NDE196	NDA213	NDA214FD1	NDA215	NDA216	NDA217	NDA218
Sample Date	04/13/01	12/04/00	12/04/00	12/04/00	12/04/00	12/04/00	04/07/00	04/07/00	04/07/00	04/07/00	04/07/00	04/07/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.60 U	3.70 UJ	3.80 UJ	3.70 UJ	3.60 UJ	3.60 UJ	3.8 UJ	3.7 UJ	3.8 UJ	3.6 UJ	3.8 UJ	3.7 UJ
4,4'-DDE	3.60 U	3.70 UJ	3.80 UJ	3.70 UJ	3.60 UJ	3.60 UJ	3.8 UJ	3.7 UJ	3.8 UJ	3.6 UJ	3.8 UJ	3.7 UJ
4,4'-DDT	3.60 U	3.70 UJ	3.80 UJ	3.70 UJ	3.60 UJ	3.60 UJ	3.8 UJ	3.7 UJ	3.8 UJ	3.6 UJ	3.8 UJ	3.7 UJ
Aldrin	1.90 U	1.90 UJ	2 UJ	1.90 UJ	1.90 UJ	1.90 UJ	2 UJ	1.9 UJ	2 UJ	1.8 UJ	1.9 UJ	1.9 UJ
Aroclor-1254	36 U	37 UJ	38 UJ	37 UJ	36 UJ	36 UJ	38 UJ	37 UJ	38 UJ	36 UJ	38 UJ	36 UJ
Dieldrin	3.60 U	3.70 UJ	3.80 UJ	3.70 UJ	3.6 UJ	3.60 UJ	3.8 UJ	3.7 UJ	3.8 UJ	3.6 UJ	3.8 UJ	3.7 UJ
Endosulfan I	1.90 U	1.90 UJ	2 UJ	1.90 UJ	3.6 UJ	1.90 UJ	2 UJ	1.9 UJ	2 UJ	1.8 UJ	1.9 UJ	1.9 UJ
Endosulfan sulfate	3.60 U	3.70 UJ	3.80 UJ	3.70 UJ	1.9 UJ	3.60 UJ	3.8 UJ	3.7 UJ	3.8 UJ	3.6 UJ	3.8 UJ	3.7 UJ
Endrin	3.60 U	3.70 UJ	3.80 UJ	3.70 UJ	3.60 UJ	3.60 UJ	3.8 UJ	3.7 UJ	3.8 UJ	3.6 UJ	3.8 UJ	3.7 UJ
Endrin aldehyde	3.60 U	3.70 UJ	3.80 UJ	3.70 UJ	3.60 UJ	3.60 UJ	3.8 UJ	3.7 UJ	3.8 UJ	3.6 UJ	3.8 UJ	3.7 UJ
Endrin ketone	3.60 U	3.70 UJ	3.80 UJ	3.70 UJ	3.60 UJ	3.60 UJ	3.8 UJ	3.7 UJ	3.8 UJ	3.6 UJ	3.8 UJ	3.7 UJ
Heptachlor	1.90 U	1.90 UJ	2 UJ	1.90 UJ	1.90 UJ	1.90 UJ	2 UJ	1.9 UJ	2 UJ	1.8 UJ	1.9 UJ	1.9 UJ
Heptachlor epoxide	1.90 U	1.90 UJ	2 UJ	1.90 UJ	1.90 UJ	1.90 UJ	2 UJ	1.9 UJ	2 UJ	1.8 UJ	1.9 UJ	1.9 UJ
alpha-BHC	1.90 U	1.90 UJ	2 UJ	1.90 UJ	1.90 UJ	1.90 UJ	2 UJ	1.9 UJ	2 UJ	1.8 UJ	1.9 UJ	1.9 UJ
alpha-Chlordane	1.90 U	1.90 UJ	2 UJ	1.90 UJ	1.90 UJ	1.90 UJ	2 UJ	1.9 UJ	2 UJ	1.8 UJ	1.9 UJ	1.9 UJ
beta-BHC	1.90 U	1.90 UJ	2 UJ	1.90 UJ	1.90 UJ	1.90 UJ	2 UJ	1.9 UJ	2 UJ	1.8 UJ	1.9 UJ	1.9 UJ
delta-BHC	1.90 U	1.90 UJ	2 UJ	1.90 UJ	1.90 UJ	1.90 UJ	2 UJ	1.9 UJ	2 UJ	1.8 UJ	1.9 UJ	1.9 UJ
gamma-Chlordane	1.90 U	1.90 UJ	2 UJ	1.90 UJ	1.90 UJ	1.90 UJ	2 UJ	1.9 UJ	2 UJ	1.8 UJ	1.9 UJ	1.9 UJ

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-C											
Station ID	AC-SB17			AC-SB17		AC-SB18						AC-SB19
Sample ID	NDA219	NDA220	NDA221	NDA222	NDA223	NDA224	NDA225	NDA226	NDA227FD1	NDA228	NDA229	NDA230
Sample Date	04/07/00	04/07/00	04/07/00	04/07/00	04/07/00	04/10/00	04/10/00	04/10/00	04/10/00	04/10/00	04/10/00	04/10/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.7 UJ	3.8 UJ	3.6 UJ	3.3 UJ	3.8 UJ	3.8 U	4.1 U	3.9 U	3.8 U	4 U	4.3 U	3.6 U
4,4'-DDE	3.7 UJ	3.8 UJ	3.6 UJ	3.3 UJ	3.8 UJ	3.8 U	4.1 U	3.9 U	3.8 U	4 U	4.3 U	3.6 U
4,4'-DDT	3.7 UJ	3.8 UJ	3.6 UJ	3.3 UJ	3.8 UJ	3.8 UJ	4.1 UJ	3.9 UJ	3.8 UJ	4 UJ	4.3 UJ	3.6 UJ
Aldrin	1.9 UJ	1.9 UJ	1.8 UJ	1.7 UJ	1.9 UJ	1.9 U	2.1 U	2 U	1.9 U	2 U	2.2 U	1.8 U
Aroclor-1254	37 UJ	38 UJ	35 UJ	33 UJ	38 UJ	38 U	41 U	39 U	38 U	40 U	43 U	36 U
Dieldrin	3.7 UJ	3.8 UJ	3.6 UJ	3.3 UJ	3.8 UJ	3.8 U	4.1 U	3.9 U	3.8 U	4 U	4.3 U	3.6 U
Endosulfan I	1.9 UJ	1.9 UJ	1.8 UJ	1.7 UJ	1.9 UJ	1.9 U	2.1 U	2 U	1.9 U	2 U	2.2 U	1.8 U
Endosulfan sulfate	3.7 UJ	3.8 UJ	3.6 UJ	3.3 UJ	3.8 UJ	3.8 U	4.1 U	3.9 U	3.8 U	4 U	4.3 U	3.6 U
Endrin	3.7 UJ	3.8 UJ	3.6 UJ	3.3 UJ	3.8 UJ	3.8 U	4.1 U	3.9 U	3.8 U	4 U	4.3 U	3.6 U
Endrin aldehyde	3.7 UJ	3.8 UJ	3.6 UJ	3.3 UJ	3.8 UJ	3.8 U	4.1 U	3.9 U	3.8 U	4 U	4.3 U	3.6 U
Endrin ketone	3.7 UJ	3.8 UJ	3.6 UJ	3.3 UJ	3.8 UJ	3.8 U	4.1 U	3.9 U	3.8 U	4 U	4.3 U	3.6 U
Heptachlor	1.9 UJ	1.9 UJ	1.8 UJ	1.7 UJ	1.9 UJ	1.9 U	2.1 U	2 U	1.9 U	2 U	2.2 U	1.8 U
Heptachlor epoxide	1.9 UJ	1.9 UJ	1.8 UJ	1.7 UJ	1.9 UJ	1.9 U	2.1 U	2 U	1.9 U	2 U	2.2 U	1.8 U
alpha-BHC	1.9 UJ	1.9 UJ	1.8 UJ	1.7 UJ	1.9 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.2 UJ	1.8 UJ
alpha-Chlordane	1.9 UJ	1.9 UJ	1.8 UJ	1.7 UJ	1.9 UJ	1.9 U	2.1 U	2 U	1.9 U	2 U	2.2 U	1.8 U
beta-BHC	1.9 UJ	1.9 UJ	1.8 UJ	1.7 UJ	1.9 UJ	1.9 U	2.1 U	2 U	1.9 U	2 U	2.2 U	1.8 U
delta-BHC	1.9 UJ	1.9 UJ	1.8 UJ	1.7 UJ	1.9 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.2 UJ	1.8 UJ
gamma-Chlordane	1.9 UJ	1.9 UJ	1.8 UJ	1.7 UJ	1.9 UJ	1.9 U	2.1 U	2 U	1.9 U	2 U	2.2 U	1.8 U

Notes:

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Shading Indicates Detection

Appendix A-3

West Vieques Subsurface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-C			
Station ID	AC-SB19			
Sample ID	NDA231	NDA232	NDA233	NDA234
Sample Date	04/10/00	04/10/00	04/10/00	04/10/00
Chemical Name				
Pesticide/Polychlorinated Biphenyls (UG_KG)				
4,4'-DDD	3.6 U	3.7 U	3.5 U	3.8 U
4,4'-DDE	3.6 U	3.7 U	3.5 U	3.8 U
4,4'-DDT	3.6 UJ	3.7 UJ	3.5 UJ	3.8 UJ
Aldrin	1.8 U	1.9 U	1.8 U	1.9 U
Aroclor-1254	35 U	36 U	35 U	38 U
Dieldrin	3.6 U	3.7 U	3.5 U	3.8 U
Endosulfan I	1.8 U	1.9 U	1.8 U	1.9 U
Endosulfan sulfate	3.6 U	3.7 U	3.5 U	3.8 U
Endrin	3.6 U	3.7 U	3.5 U	3.8 U
Endrin aldehyde	3.6 U	3.7 U	3.5 U	3.8 U
Endrin ketone	3.6 U	3.7 U	3.5 U	3.8 U
Heptachlor	1.8 U	1.9 U	1.8 U	1.9 U
Heptachlor epoxide	1.8 U	1.9 U	1.8 U	1.9 U
alpha-BHC	1.8 UJ	1.9 UJ	1.8 UJ	1.9 UJ
alpha-Chlordane	1.8 U	1.9 U	1.8 U	1.9 U
beta-BHC	1.8 U	1.9 U	1.8 U	1.9 U
delta-BHC	1.8 UJ	1.9 UJ	1.8 UJ	1.9 UJ
gamma-Chlordane	1.8 U	1.9 U	1.8 U	1.9 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-E										W-AOC-F
Station ID	NDAEMW01	WAE-SO13				WAE-SO14			WAE-SO15	WAE-SO16	AF-SB01
Sample ID	NDAEGW01-FP1	WAE-SB13-0406R	WAE-SB13P-0406R	WAE-SB13-3234	WAE-SB13-3436	WAE-SB14-0406	WAE-SB14-4244	WAE-SB14-4446	WAE-SB15-0406R	WAE-SB16-0406	NDA235
Sample Date	09/01/04	12/12/05	12/12/05	12/14/05	12/14/05	12/01/05	12/12/05	12/12/05	12/05/05	12/05/05	04/11/00
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	21,000 U	3.6 U	3.6 U	3.8 U	3.6 U	3.7 U	3.8 U	3.6 U	3.8 U	3.8 U	4.4 UJ
4,4'-DDE	21,000 U	3.6 U	1.5 J	3.8 U	3.6 U	3.7 U	3.8 U	7.8	3.8 U	3.8 U	4.4 UJ
4,4'-DDT	21,000 U	3.6 U	3.6 U	3.8 U	3.6 U	3.7 U	3.8 U	9.2	3.8 U	3.8 U	4.4 UJ
Aldrin	11,000 U	1.9 U	1.9 U	2 U	1.1 J	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.2 UJ
Aroclor-1254	210,000 U	36 U	36 U	38 U	36 U	15 J	38 U	36 U	38 U	38 U	43 UJ
Dieldrin	21,000 U	3.6 U	3.6 U	3.8 U	3.6 U	3.7 U	3.8 U	3.6 U	3.8 U	3.8 U	4.4 UJ
Endosulfan I	11,000 U	1.9 U	1.9 U	2 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.2 UJ
Endosulfan sulfate	21,000 U	3.6 U	3.6 U	3.8 U	3.6 U	3.7 U	3.8 U	3.6 U	3.8 U	3.8 U	4.4 UJ
Endrin	21,000 U	3.6 U	3.6 U	3.8 U	3.6 U	3.7 U	3.8 U	3.6 U	3.8 U	3.8 U	4.4 UJ
Endrin aldehyde	21,000 U	3.6 U	3.6 U	2.1 J	3.6 U	3.7 U	3.8 U	3.6 U	3.8 U	3.8 U	4.4 UJ
Endrin ketone	21,000 U	3.6 U	3.6 U	3.8 U	3.6 U	3.7 U	3.8 U	4 R	3.8 U	3.8 U	4.4 UJ
Heptachlor	11,000 U	1.9 U	1.9 U	2 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.2 UJ
Heptachlor epoxide	11,000 U	1.9 U	1.9 U	2 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.2 UJ
alpha-BHC	11,000 U	1.9 U	1.9 U	5.3 JN	4.1 J	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.2 UJ
alpha-Chlordane	11,000 U	1.9 U	1.9 U	2 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.2 UJ
beta-BHC	11,000 U	1.9 U	1.9 U	2 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.2 UJ
delta-BHC	11,000 U	1.9 U	1.9 U	2 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.2 UJ
gamma-Chlordane	11,000 U	1.9 U	5	2 U	1.8 U	1.9 U	1.9 U	8.3	1.9 U	2 U	2.2 UJ

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-F											
Station ID	AF-SB01					AF-SB02					AF-SB03	
Sample ID	NDA236	NDA237FD1	NDA238	NDA239	NDA240	NDA241	NDA242	NDA243	NDA244	NDA245	NDA246	NDA247FD1
Sample Date	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/12/00	04/12/00	04/12/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	4 UJ	3.7 UJ	4.2 UJ	3.9 UJ	3.7 UJ	3.8 UJ	4.1 UJ	3.8 UJ
4,4'-DDE	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	4 UJ	3.7 UJ	4.2 UJ	3.9 UJ	3.7 UJ	3.8 UJ	0.47 J	3.8 UJ
4,4'-DDT	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	4 UJ	3.7 UJ	4.2 UJ	3.9 UJ	3.7 UJ	3.8 UJ	4.1 UJ	3.8 UJ
Aldrin	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.1 UJ	2 UJ
Aroclor-1254	37 UJ	37 UJ	37 UJ	37 UJ	40 UJ	37 UJ	41 UJ	39 UJ	36 UJ	38 UJ	40 UJ	38 UJ
Dieldrin	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	4 UJ	3.7 UJ	4.2 UJ	3.9 UJ	3.7 UJ	3.8 UJ	4.1 UJ	3.8 UJ
Endosulfan I	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	4 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.1 UJ	2 UJ
Endosulfan sulfate	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	2 UJ	3.7 UJ	4.2 UJ	3.9 UJ	3.7 UJ	3.8 UJ	4.1 UJ	3.8 UJ
Endrin	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	4 UJ	3.7 UJ	4.2 UJ	3.9 UJ	3.7 UJ	3.8 UJ	4.1 UJ	3.8 UJ
Endrin aldehyde	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	4 UJ	3.7 UJ	4.2 UJ	3.9 UJ	3.7 UJ	3.8 UJ	4.1 UJ	3.8 UJ
Endrin ketone	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ	4 UJ	3.7 UJ	4.2 UJ	3.9 UJ	3.7 UJ	3.8 UJ	4.1 UJ	3.8 UJ
Heptachlor	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.1 UJ	2 UJ
Heptachlor epoxide	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.1 UJ	2 UJ
alpha-BHC	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.1 UJ	2 UJ
alpha-Chlordane	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.1 UJ	2 UJ
beta-BHC	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.1 UJ	2 UJ
delta-BHC	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.1 UJ	2 UJ
gamma-Chlordane	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.9 UJ	2.1 UJ	2 UJ	1.9 UJ	2 UJ	2.1 UJ	2 UJ

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-F						W-AOC-H						
Station ID	AF-SB03		AF-SB04				AOCHSB001	AOCHSB002	AOCHSB003	AOCHSB004	AOCHSB005	AOCHSB006	AOCHSB007
Sample ID	NDA248	NDA249	NDA252	NDA253	NDA254	NDA255	NDE006	NDE008	NDE010	NDE012	NDE014	NDE016	NDE018
Sample Date	04/12/00	04/12/00	04/12/00	04/12/00	04/12/00	04/12/00	12/05/00	12/05/00	12/05/00	12/05/00	12/05/00	12/06/00	12/06/00
Chemical Name													
Pesticide/Polychlorinated Biphenyls (UG_KG)													
4,4'-DDD	4 UJ	3.7 UJ	3.9 UJ	4.2 UJ	4.2 UJ	4.1 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 U	3.5 U
4,4'-DDE	4 UJ	3.7 UJ	3.9 UJ	4.2 UJ	4.2 UJ	4.1 UJ	764 J	124 J	3.9 J	1.6 J	8.7 J	2 J	4.5
4,4'-DDT	4 UJ	3.7 UJ	3.9 UJ	4.2 UJ	4.2 UJ	4.1 UJ	928 J	22 J	3.5 UJ	3.5 UJ	7.6 J	1.5 J	2.5 J
Aldrin	2.1 UJ	1.9 UJ	2 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 U	1.8 U
Aroclor-1254	40 UJ	37 UJ	39 UJ	33 UJ	41 UJ	41 UJ	39 UJ	35 UJ	35 UJ	35 UJ	35 UJ	35 U	35 U
Dieldrin	4 UJ	3.7 UJ	3.9 UJ	4.2 UJ	4.2 UJ	4.1 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 U	3.5 U
Endosulfan I	2.1 UJ	1.9 UJ	2 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 U	1.8 U
Endosulfan sulfate	4 UJ	3.7 UJ	3.9 UJ	4.2 UJ	4.2 UJ	4.1 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 U	3.5 U
Endrin	4 UJ	3.7 UJ	3.9 UJ	4.2 UJ	4.2 UJ	4.1 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 U	3.5 U
Endrin aldehyde	4 UJ	3.7 UJ	3.9 UJ	4.2 UJ	4.2 UJ	4.1 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 U	3.5 U
Endrin ketone	4 UJ	3.7 UJ	3.9 UJ	4.2 UJ	4.2 UJ	4.1 UJ	3.9 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 UJ	3.5 U	3.5 U
Heptachlor	2.1 UJ	1.9 UJ	2 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 U	1.8 U
Heptachlor epoxide	2.1 UJ	1.9 UJ	2 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 U	1.8 U
alpha-BHC	2.1 UJ	1.9 UJ	2 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 U	1.8 U
alpha-Chlordane	2.1 UJ	1.9 UJ	2 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 U	1.8 U
beta-BHC	2.1 UJ	1.9 UJ	2 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 U	1.8 U
delta-BHC	2.1 UJ	1.9 UJ	2 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 U	1.8 U
gamma-Chlordane	2.1 UJ	1.9 UJ	2 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 U	1.8 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-H												
Station ID	AOCHSB008	AOCHSB009			AOCHSB010	AOCHSB011	AOCHSB012	AOCHSB013	AOCHSB014	AOCHSB015		AOCHSB016	
Sample ID	NDE020	NDE022	NDE203	NDE204	NDE025	NDE027	NDE029	NDE031	NDE033	NDE035	NDE036FD1	NDE038	NDE039FD1
Sample Date	12/06/00	12/06/00	12/06/00	12/06/00	12/06/00	12/06/00	12/06/00	12/06/00	12/07/00	12/07/00	12/07/00	12/07/00	12/07/00
Chemical Name													
Pesticide/Polychlorinated Biphenyls (UG_KG)													
4,4'-DDD	3.7 U	3.6 U	3.9 U	3.9 U	3.8 U	4.9	13	2.5 J	3.7 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ
4,4'-DDE	3.7 U	3.6 U	3.9 U	3.9 U	1.5 J	419	24	1.7 J	3.7 UJ	3.8 UJ	3.7 UJ	3.8 J	3.7 UJ
4,4'-DDT	3.7 U	3.6 UJ	3.9 UJ	3.9 UJ	0.9 J	3.7 U	3.8 U	3.6 U	3.7 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ
Aldrin	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	1.8 U	1.9 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ
Aroclor-1254	37 U	36 U	39 U	39 U	38 U	37 U	38 U	36 U	37 UJ	38 UJ	37 UJ	37 UJ	37 UJ
Dieldrin	3.7 U	3.6 U	3.9 U	3.9 U	3.8 U	3.7 U	3.8 U	3.6 U	3.7 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ
Endosulfan I	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	1.8 U	1.9 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ
Endosulfan sulfate	3.7 U	3.6 U	3.9 U	3.9 U	3.8 U	3.7 U	3.8 U	3.6 U	3.7 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ
Endrin	3.7 U	3.6 U	3.9 U	3.9 U	3.8 U	3.7 U	3.8 U	3.6 U	3.7 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ
Endrin aldehyde	3.7 U	3.6 U	3.9 U	3.9 U	3.8 U	3.7 U	3.8 U	3.6 U	3.7 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ
Endrin ketone	3.7 U	3.6 U	3.9 U	3.9 U	3.8 U	3.7 U	3.8 U	3.6 U	3.7 UJ	3.8 UJ	3.7 UJ	3.7 UJ	3.7 UJ
Heptachlor	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	1.8 U	1.9 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ
Heptachlor epoxide	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	1.8 U	1.9 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ
alpha-BHC	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	1.8 U	1.9 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ
alpha-Chlordane	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	1.8 U	1.9 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ
beta-BHC	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	1.8 U	1.9 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ
delta-BHC	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	1.8 U	1.9 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ
gamma-Chlordane	1.9 U	1.9 U	2 U	2 U	2 U	1.9 U	2 U	1.8 U	1.9 UJ	2 UJ	1.9 UJ	1.9 UJ	1.9 UJ

Notes:

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Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-H										
Station ID	NDAHSB17	NDAHSB18	NDAHSB19	NDAHSB20		NDAHSB21	NDAHSB22	NDAHSB23	NDAHSB24	NDAHSB25	NDAHSB26
Sample ID	NDAHSB17-R01	NDAHSB18-R01	NDAHSB19-R01	NDAHFD05P-R01	NDAHSB20-R01	NDAHSB21-R01	NDAHSB22-R01	NDAHSB23-R01	NDAHSB24-R01	NDAHSB25-R01	NDAHSB26-R01
Sample Date	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03	08/26/03
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.5 UJ	3.9 UJ	3.4 UJ	3.4 U	3.5 UJ	3.4 UJ	3.4 UJ	3.4 UJ	3.4 UJ	3.6 U	3.6 U
4,4'-DDE	3.5 U	0.2 J	3.4 U	0.1 J	0.14 J	3.4 U	3.4 U	3.4 U	3.4 U	3.6 U	3.6 U
4,4'-DDT	3.5 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	3.4 U	3.4 U	3.4 U	3.6 U	3.6 U
Aldrin	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	3.5 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	3.4 U	3.4 U	3.4 U	3.6 U	3.6 U
Endosulfan I	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
Endosulfan sulfate	3.5 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	3.4 U	3.4 U	3.4 U	3.6 U	3.6 U
Endrin	3.5 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	3.4 U	3.4 U	3.4 U	3.6 U	3.6 U
Endrin aldehyde	3.5 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	3.4 U	3.4 U	3.4 U	3.6 U	3.6 U
Endrin ketone	3.5 U	3.9 U	3.4 U	3.4 U	3.5 U	3.4 U	3.4 U	3.4 U	3.4 U	3.6 U	3.6 U
Heptachlor	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
Heptachlor epoxide	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
alpha-BHC	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
alpha-Chlordane	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
beta-BHC	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
delta-BHC	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
gamma-Chlordane	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U

Notes:

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Shading Indicates Detection

Appendix A-3

West Vieques Subsurface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-H			W-AOC-I									
Station ID	NDAHSB27	NDAHSB28	NDAHSB29	AOCISB001	AOCISB002	AOCISB003	AOCISB004	AOCISB005	AOCISB006	AOCISB007	AOCISB008	AOCISB009	AOCISB010
Sample ID	NDAHSB27-R01	NDAHSB28-R01	NDAHSB29-R01	NDE044	NDE046	NDE048	NDE050	NDE052	NDE054	NDE056	NDE058	NDE060	NDE063
Sample Date	08/26/03	08/26/03	08/26/03	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00
Chemical Name													
Pesticide/Polychlorinated Biphenyls (UG_KG)													
4,4'-DDD	10 J	0.19 J	3.5 R	4 U	3.7 U	3.5 U	3.6 U	3.6 U	3.5 U	3.5 U	3.9 U	3.5 U	3.5 U
4,4'-DDE	2.7 J	0.61 J	3.2 J	4 U	3.7 U	3.5 U	3.6 U	3.6 U	3.5 U	3.5 U	3.9 U	3.5 U	3.5 U
4,4'-DDT	37 U	0.48 J	0.82 J	4 U	3.7 U	3.5 U	3.6 U	3.6 U	3.5 U	3.5 U	3.9 U	3.5 U	3.5 U
Aldrin	19 U	2 U	1.8 R	2.1 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U
Aroclor-1254	NA	NA	NA	40 U	37 U	35 U	36 U	36 U	35 U	35 U	39 U	35 U	35 U
Dieldrin	37 U	4 U	3.5 R	4 U	3.7 U	3.5 U	3.6 U	3.6 U	3.5 U	3.5 U	3.9 U	3.5 U	3.5 U
Endosulfan I	19 U	2 U	1.8 R	2.1 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U
Endosulfan sulfate	37 U	4 U	3.5 R	4 U	3.7 U	3.5 U	3.6 U	3.6 U	3.5 U	3.5 U	3.9 U	3.5 U	3.5 U
Endrin	37 U	4 U	3.5 R	4 U	3.7 U	3.5 U	3.6 U	3.6 U	3.5 U	3.5 U	3.9 U	3.5 U	3.5 U
Endrin aldehyde	37 U	4 U	3.5 R	4 U	3.7 U	3.5 U	3.6 U	3.6 U	3.5 U	3.5 U	3.9 U	3.5 U	3.5 U
Endrin ketone	37 U	4 U	3.5 R	4 U	3.7 U	3.5 U	3.6 U	3.6 U	3.5 U	3.5 U	3.9 U	3.5 U	3.5 U
Heptachlor	19 U	2 U	1.8 R	2.1 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U
Heptachlor epoxide	19 U	2 U	1.8 R	2.1 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U
alpha-BHC	19 U	2 U	1.8 R	2.1 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U
alpha-Chlordane	19 U	2 U	1.8 R	2.1 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U
beta-BHC	19 U	2 U	1.8 R	2.1 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U
delta-BHC	19 U	2 U	1.8 R	2.1 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U
gamma-Chlordane	19 U	2 U	1.8 R	2.1 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U

Notes:

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Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-I											
Station ID	AOCISB011	AOCISB012	AOCISB013	AOCISB014	AOCISB015	AOCISB016	AOCISB017	AOCISB018	AOCISB019	AOCISB020	AOCISB021	AOCISB022
Sample ID	NDE065	NDE067	NDE069	NDE071	NDE073	NDE076	NDE078	NDE080	NDE082	NDE085	NDE087	NDE089
Sample Date	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/01/00	12/01/00	12/01/00	12/01/00	12/01/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.5 U	3.5 U	3.5 U	3.5 U	3.6 U	3.5 U	3.5 U	4.2 UJ	3.5 UJ	3.6 UJ	3.5 UJ	4 UJ
4,4'-DDE	3.5 U	3.5 U	3.5 U	3.5 U	3.6 U	3.5 U	3.5 U	4.2 UJ	3.5 UJ	3.6 UJ	3.5 UJ	4 UJ
4,4'-DDT	3.5 U	3.5 UJ	3.5 UJ	3.5 UJ	3.6 UJ	3.5 U	3.5 U	4.2 UJ	3.5 UJ	3.6 UJ	3.5 UJ	4 UJ
Aldrin	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.2 UJ	1.8 UJ	1.9 UJ	1.8 UJ	2.1 UJ
Aroclor-1254	35 U	35 U	35 U	35 U	36 U	35 U	35 U	42 UJ	35 UJ	36 UJ	35 UJ	40 UJ
Dieldrin	3.5 U	3.5 U	3.5 U	3.5 U	3.6 U	3.5 U	3.5 U	4.2 UJ	3.5 UJ	3.6 UJ	3.5 UJ	4 UJ
Endosulfan I	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.2 UJ	1.8 UJ	1.9 UJ	1.8 UJ	2.1 UJ
Endosulfan sulfate	3.5 U	3.5 U	3.5 U	3.5 U	3.6 U	3.5 U	3.5 U	4.2 UJ	3.5 UJ	3.6 UJ	3.5 UJ	4 UJ
Endrin	3.5 U	3.5 U	3.5 U	3.5 U	3.6 U	3.5 U	3.5 U	4.2 UJ	3.5 UJ	3.6 UJ	3.5 UJ	4 UJ
Endrin aldehyde	3.5 U	3.5 U	3.5 U	3.5 U	3.6 U	3.5 U	3.5 U	4.2 UJ	3.5 UJ	3.6 UJ	3.5 UJ	4 UJ
Endrin ketone	3.5 U	3.5 U	3.5 U	3.5 U	3.6 U	3.5 U	3.5 U	4.2 UJ	3.5 UJ	3.6 UJ	3.5 UJ	4 UJ
Heptachlor	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.2 UJ	1.8 UJ	1.9 UJ	1.8 UJ	2.1 UJ
Heptachlor epoxide	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.2 UJ	1.8 UJ	1.9 UJ	1.8 UJ	2.1 UJ
alpha-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.2 UJ	1.8 UJ	1.9 UJ	1.8 UJ	2.1 UJ
alpha-Chlordane	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.2 UJ	1.8 UJ	1.9 UJ	1.8 UJ	2.1 UJ
beta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.2 UJ	1.8 UJ	1.9 UJ	1.8 UJ	2.1 UJ
delta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.2 UJ	1.8 UJ	1.9 UJ	1.8 UJ	2.1 UJ
gamma-Chlordane	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.2 UJ	1.8 UJ	1.9 UJ	1.8 UJ	2.1 UJ

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-I				W-AOC-J								
Station ID	AOCISB023	AOCISB024	AOCISB025	AOCISB026	AOCJSB001	AOCJSB002	AOCJSB003	AOCJSB004	AOCJSB005		NDAJSB06		NDAJSB07
Sample ID	NDE092	NDE094	NDE096	NDE098	NDE103	NDE105	NDE107	NDE109	NDE111FD1	NDE112	NDAJFD04P-R01	NDAJSB06-R01	NDAJSB07-R01
Sample Date	12/01/00	12/01/00	12/01/00	12/01/00	12/12/00	12/12/00	12/12/00	12/12/00	12/12/00	12/12/00	08/25/03	08/25/03	08/25/03
Chemical Name													
Pesticide/Polychlorinated Biphenyls (UG_KG)													
4,4'-DDD	3.6 U	3.6 U	3.3 U	3.5 U	4.3 U	3.8 U	3.7 U	3.8 U	3.3 U	3.3 U	4 U	4.1 U	3.7 U
4,4'-DDE	3.6 U	3.6 U	3.3 U	3.5 U	4.3 U	3.8 U	3.7 U	3.8 U	3.3 U	3.3 U	4 U	4.1 U	3.7 U
4,4'-DDT	3.6 U	3.6 U	3.3 UJ	3.5 U	4.3 U	3.8 U	3.7 U	3.8 U	3.3 U	3.3 U	4 U	4.1 U	3.7 U
Aldrin	1.9 U	1.8 U	1.7 U	1.8 U	2.2 U	2 U	1.9 U	1.9 U	1.7 U	1.7 U	2 U	2.1 U	1.9 U
Aroclor-1254	36 U	36 U	33 U	35 U	43 U	38 U	37 U	38 U	33 U	33 U	40 U	41 U	37 U
Dieldrin	3.6 U	3.6 U	3.3 U	3.5 U	4.3 U	3.8 U	3.7 U	3.8 U	3.3 U	3.3 U	4 U	4.1 U	3.7 U
Endosulfan I	1.9 U	1.8 U	1.7 U	1.8 U	2.2 U	2 U	1.9 U	1.9 U	1.7 U	1.7 U	2 U	2.1 U	1.9 U
Endosulfan sulfate	3.6 U	3.6 U	3.3 U	3.5 U	4.3 U	3.8 U	3.7 U	3.8 U	3.3 U	3.3 U	4 U	4.1 U	3.7 U
Endrin	3.6 U	3.6 U	3.3 U	3.5 U	4.3 U	3.8 U	3.7 U	3.8 U	3.3 U	3.3 U	4 U	4.1 U	3.7 U
Endrin aldehyde	3.6 U	3.6 U	3.3 U	3.5 U	4.3 U	3.8 U	3.7 U	3.8 U	3.3 U	3.3 U	4 U	4.1 U	3.7 U
Endrin ketone	3.6 U	3.6 U	3.3 U	3.5 U	4.3 U	3.8 U	3.7 U	3.8 U	3.3 U	3.3 U	4 U	4.1 U	3.7 U
Heptachlor	1.9 U	1.8 U	1.7 U	1.8 U	2.2 U	2 U	1.9 U	1.9 U	1.7 U	1.7 U	2 U	2.1 U	1.9 U
Heptachlor epoxide	1.9 U	1.8 U	1.7 U	1.8 U	2.2 U	2 U	1.9 U	1.9 U	1.7 U	1.7 U	2 U	2.1 U	1.9 U
alpha-BHC	1.9 U	1.8 U	1.7 U	1.8 U	2.2 UJ	2 UJ	1.9 UJ	1.9 UJ	1.7 UJ	1.7 UJ	2 U	2.1 U	1.9 U
alpha-Chlordane	1.9 U	1.8 U	1.7 U	1.8 U	2.2 U	2 U	1.9 U	1.9 U	1.7 U	1.7 U	2 U	2.1 U	1.9 U
beta-BHC	1.9 U	1.8 U	1.7 U	1.8 U	2.2 U	2 U	1.9 U	1.9 U	1.7 U	1.7 U	2 U	2.1 U	1.9 U
delta-BHC	1.9 U	1.8 U	1.7 U	1.8 U	2.2 U	2 U	1.9 U	1.9 U	1.7 U	1.7 U	2 U	2.1 U	1.9 U
gamma-Chlordane	1.9 U	1.8 U	1.7 U	1.8 U	2.2 U	2 U	1.9 U	1.9 U	1.7 U	1.7 U	2 U	2.1 U	1.9 U

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Appendix A-3

West Vieques Subsurface Soil Pesticide Detections

SWMU 1 Work Plan

Site ID	W-AOC-J			W-AOC-L			
Station ID	NDAJSB08	NDAJSB09	NDAJSB10	AOCLSB001	AOCLSB002	AOCLSB003	AOCLSB004
Sample ID	NDAJSB08-R01	NDAJSB09-R01	NDAJSB10-R01	NDE122	NDE124	NDE126	NDE129
Sample Date	08/25/03	08/25/03	08/25/03	11/29/00	11/29/00	11/29/00	11/29/00
Chemical Name							
Pesticide/Polychlorinated Biphenyls (UG_KG)							
4,4'-DDD	4.4 U	4.7 U	3.8 U	4.2 U	3.6 U	3.6 U	3.9 U
4,4'-DDE	4.4 U	4.7 U	3.8 U	4.2 U	3.6 U	3.6 U	3.9 U
4,4'-DDT	4.4 U	4.7 U	3.8 U	4.2 U	3.6 U	3.6 U	3.9 U
Aldrin	2.2 U	2.4 U	1.9 U	2.2 U	1.8 U	1.9 U	2 U
Aroclor-1254	44 U	47 U	38 U	42 U	36 U	36 U	39 U
Dieldrin	4.4 U	4.7 U	3.8 U	4.2 U	3.6 U	3.6 U	3.9 U
Endosulfan I	2.2 U	2.4 U	1.9 U	2.2 U	1.8 U	1.9 U	2 U
Endosulfan sulfate	4.4 U	4.7 U	3.8 U	4.2 U	3.6 U	3.6 U	3.9 U
Endrin	4.4 U	4.7 U	3.8 U	4.2 U	3.6 U	3.6 U	3.9 U
Endrin aldehyde	4.4 U	4.7 U	3.8 U	4.2 U	3.6 U	3.6 U	3.9 U
Endrin ketone	4.4 U	4.7 U	3.8 U	4.2 U	3.6 U	3.6 U	3.9 U
Heptachlor	2.2 U	2.4 U	1.9 U	2.2 U	1.8 U	1.9 U	2 U
Heptachlor epoxide	2.2 U	2.4 U	1.9 U	2.2 U	1.8 U	1.9 U	2 U
alpha-BHC	2.2 U	2.4 U	1.9 U	2.2 U	1.8 U	1.9 U	2 U
alpha-Chlordane	2.2 U	2.4 U	1.9 U	2.2 U	1.8 U	1.9 U	2 U
beta-BHC	2.2 U	2.4 U	1.9 U	2.2 U	1.8 U	1.9 U	2 U
delta-BHC	2.2 U	2.4 U	1.9 U	2.2 U	1.8 U	1.9 U	2 U
gamma-Chlordane	2.2 U	2.4 U	1.9 U	2.2 U	1.8 U	1.9 U	2 U

Notes:

NA - Not analyzed

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JN - Analyte present at approximate quantity

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-R											
Station ID	WAR-SO49	WAR-SO50		WAR-SO51	WAR-SO52	WAR-SO53	WAR-SO54	WAR-SO55	WAR-SO56	WAR-SO57	WAR-SO58	WAR-SO59
Sample ID	WAR-SB49-0406	WAR-SB50-0406	WAR-SB50P-0406	WAR-SB51-0406	WAR-SB52-0406	WAR-SB53-0406	WAR-SB54-0406	WAR-SB55-0406	WAR-SB56-0406	WAR-SB57-0406	WAR-SB58-0406	WAR-SB59-0406
Sample Date	12/15/05	12/15/05	12/15/05	12/15/05	12/15/05	12/15/05	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05	12/16/05
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.8 U	3.8 U	3.4 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.8 U	4.1 U	3.7 U	3.7 U
4,4'-DDE	1.1 J	3.8 U	1.3 J	3.2 J	1.7 J	1.7 J	4 U	3.8 U	3.8 U	0.98 J	3.7 U	3.7 U
4,4'-DDT	3.8 U	3.8 U	3.4 U	2.6 J	3.8 U	4 U	4 U	3.8 U	3.8 U	4.1 U	3.7 U	3.7 U
Aldrin	2 U	2 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	1.9 U
Aroclor-1254	38 U	38 U	34 U	37 U	38 U	40 U	40 U	38 U	38 U	41 U	37 U	37 U
Dieldrin	3.8 U	3.8 U	3.4 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.8 U	4.1 U	3.7 U	3.7 U
Endosulfan I	2 U	2 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	1.9 U
Endosulfan sulfate	3.8 U	3.8 U	3.4 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.8 U	4.1 U	3.7 U	3.7 U
Endrin	3.8 U	3.8 U	3.4 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.8 U	4.1 U	3.7 U	3.7 U
Endrin aldehyde	3.8 U	3.8 U	3.4 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.8 U	4.1 U	3.7 U	3.7 U
Endrin ketone	3.8 U	3.8 U	3.4 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.8 U	4.1 U	3.7 U	3.7 U
Heptachlor	2 U	2 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	1.9 U
Heptachlor epoxide	2 U	2 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	1.9 U
alpha-BHC	2 U	2 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	1.9 U
alpha-Chlordane	2 U	2 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	1.9 U
beta-BHC	2 U	2 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	1.9 U
delta-BHC	2 U	2 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	1.9 U
gamma-Chlordane	2 U	2 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2 U	1.9 U	2.1 U	1.9 U	1.9 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-AOC-R					W-SWMU-4							
Station ID	WAR-SO60		WAR-SO61	WAR-SO62	WAR-SO63	SWMU4-MW05	SWMU4-MW06	SWMU4-MW07	SWMU4-MW08	W4-SB01	W4-SB02	W4-SB03	
Sample ID	WAR-SB60-0406	WAR-SB60P-0406	WAR-SB61-0406	WAR-SB62-0406	WAR-SB63-0406	NDB002	NDB005	NDB007	NDB009	NDA058	NDA060	NDA063	NDA064FD1
Sample Date	12/15/05	12/15/05	12/15/05	12/15/05	12/15/05	06/06/00	06/06/00	06/06/00	06/06/00	04/18/00	04/18/00	04/18/00	04/18/00
Chemical Name													
Pesticide/Polychlorinated Biphenyls (UG_KG)													
4,4'-DDD	3.8 U	4 U	4 U	4.1 U	4.1 U	3.80 U	3.5 U	3.40 U	4 U	3.70 UJ	3.70 UJ	3.60 UJ	3.60 UJ
4,4'-DDE	3.8 U	4 U	4.5	0.94 J	1.9 J	3.80 U	3.5 U	3.40 U	4 U	3.70 UJ	3.70 UJ	3.60 UJ	3.60 UJ
4,4'-DDT	3.8 U	4 U	7.9	1.8 J	3.2 J	3.80 U	3.5 U	3.40 U	4 U	3.70 UJ	3.70 UJ	3.60 UJ	3.60 UJ
Aldrin	2 U	2 U	2.1 U	2.1 U	2.1 U	1.90 U	1.80 U	1.80 U	2 U	1.90 UJ	1.90 UJ	1.80 UJ	1.80 UJ
Aroclor-1254	38 U	40 U	40 U	41 U	41 U	38 U	35 U	34 U	40 U	37 UJ	36 UJ	35 UJ	35 UJ
Dieldrin	3.8 U	4 U	4 U	0.94 U	4.1 U	3.80 U	3.5 U	3.40 U	4 U	3.70 UJ	3.70 UJ	3.60 UJ	3.60 UJ
Endosulfan I	2 U	2 U	2.1 U	1.8 J	2.1 U	1.90 U	1.80 U	1.80 U	2 U	1.90 UJ	1.90 UJ	1.80 UJ	1.80 UJ
Endosulfan sulfate	3.8 U	4 U	4 U	2.1 U	4.1 U	3.80 U	3.5 U	3.40 U	4 U	3.70 UJ	3.70 UJ	3.60 UJ	3.60 UJ
Endrin	3.8 U	4 U	4 U	4.1 U	4.1 U	3.80 U	3.5 U	3.40 U	4 U	3.70 UJ	3.70 UJ	3.60 UJ	3.60 UJ
Endrin aldehyde	3.8 U	4 U	4 U	4.1 U	4.1 U	3.80 U	3.5 U	3.40 U	4 U	3.70 UJ	3.70 UJ	3.60 UJ	3.60 UJ
Endrin ketone	3.8 U	4 U	1.4 J	4.1 U	4.1 U	3.80 U	3.5 U	3.40 U	4 U	3.70 UJ	3.70 UJ	3.60 UJ	3.60 UJ
Heptachlor	2 U	2 U	2.1 U	2.1 U	2.1 U	1.90 U	1.80 U	1.80 U	2 U	1.90 UJ	1.90 UJ	1.80 UJ	1.80 UJ
Heptachlor epoxide	2 U	2 U	2.1 U	2.1 U	2.1 U	1.90 U	1.80 U	1.80 U	2 U	1.90 UJ	1.90 UJ	1.80 UJ	1.80 UJ
alpha-BHC	2 U	2 U	2.1 U	2.1 U	2.1 U	1.90 UJ	1.80 UJ	1.80 UJ	2 UJ	1.90 UJ	1.90 UJ	1.80 UJ	1.80 UJ
alpha-Chlordane	2 U	2 U	0.92 J	2.1 U	2.1 U	1.90 U	1.80 U	1.80 U	2 U	1.90 UJ	1.90 UJ	1.80 UJ	1.80 UJ
beta-BHC	2 U	2 U	2.1 U	2.1 U	2.1 U	1.90 U	1.80 U	1.80 U	2 U	1.90 UJ	1.90 UJ	1.80 UJ	1.80 UJ
delta-BHC	2 U	2 U	2.1 U	2.1 U	2.1 U	1.90 UJ	1.80 UJ	1.80 UJ	2 UJ	1.90 UJ	1.90 UJ	1.80 UJ	1.80 UJ
gamma-Chlordane	2 U	2 U	2.1 U	2.1 U	2.1 U	1.90 U	1.80 U	1.80 U	2 U	1.90 UJ	1.90 UJ	1.80 UJ	1.80 UJ

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-4											
Station ID	W4-SB04	W4-SB05	W4-SB06	W4-SB07	W4-SB08	W4-SB09	W4-SB10	W4-SB11	W4-SB12	WW04-SO17	WW04-SO18	WW04-SO19
Sample ID	NDA066	NDA068	NDA070	NDA073	NDA075	NDA077	NDA079	NDA081	NDA083	WW04-SB17-12-07A	WW04-SB18-13-07A	WW04-SB19-13-07A
Sample Date	04/18/00	04/18/00	04/19/00	04/19/00	04/19/00	04/19/00	04/19/00	04/19/00	04/19/00	02/06/07	02/09/07	02/06/07
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.5 UJ	3.60 UJ	3.5 UJ	3.5 UJ	0.350 UJ	0.400 UJ	0.380 UJ	0.350 UJ	0.340 UJ	3.5 U	3.4 U	0.068 U
4,4'-DDE	3.5 UJ	3.60 UJ	3.5 UJ	3.5 UJ	0.350 UJ	0.400 UJ	0.380 UJ	0.350 UJ	0.340 UJ	3.5 U	3.4 U	0.34 J
4,4'-DDT	3.5 UJ	3.60 UJ	3.5 UJ	3.5 UJ	0.350 UJ	0.400 UJ	0.380 UJ	0.350 UJ	0.340 UJ	3.5 U	3.4 U	3.5 U
Aldrin	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	0.180 UJ	0.200 UJ	0.190 UJ	0.180 UJ	0.170 UJ	1.8 U	1.8 U	0.8 U
Aroclor-1254	35 UJ	36 UJ	35 UJ	35 UJ	34 UJ	39 UJ	38 UJ	34 UJ	34 UJ	35 U	34 U	35 U
Dieldrin	3.5 UJ	3.60 UJ	3.5 UJ	3.5 UJ	0.350 UJ	0.400 UJ	0.380 UJ	0.350 UJ	0.340 UJ	3.5 U	3.4 U	1.3 J
Endosulfan I	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	0.180 UJ	0.200 UJ	0.190 UJ	0.180 UJ	0.170 UJ	0.062 U	1.8 U	1 U
Endosulfan sulfate	3.5 UJ	3.60 UJ	3.5 UJ	3.5 UJ	0.350 UJ	0.400 UJ	0.380 UJ	0.350 UJ	0.340 UJ	0.29 J	3.4 U	3.5 U
Endrin	3.5 UJ	3.60 UJ	3.5 UJ	3.5 UJ	0.350 UJ	0.400 UJ	0.380 UJ	0.350 UJ	0.340 UJ	3.5 U	0.18 U	3.5 U
Endrin aldehyde	3.5 UJ	3.60 UJ	3.5 UJ	3.5 UJ	0.350 UJ	0.400 UJ	0.380 UJ	0.350 UJ	0.340 UJ	0.2 U	3.4 U	3.5 U
Endrin ketone	3.5 UJ	3.60 UJ	3.5 UJ	3.5 UJ	0.350 UJ	0.400 UJ	0.380 UJ	0.350 UJ	0.340 UJ	3.5 U	3.4 U	0.32 U
Heptachlor	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	0.180 UJ	0.200 UJ	0.190 UJ	0.180 UJ	0.170 UJ	0.096 U	1.8 U	0.53 U
Heptachlor epoxide	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	0.180 UJ	0.200 UJ	0.190 UJ	0.180 UJ	0.170 UJ	1.8 U	1.8 U	0.59 U
alpha-BHC	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	0.180 UJ	0.200 UJ	0.190 UJ	0.180 UJ	0.170 UJ	1.8 U	1.8 U	1.8 U
alpha-Chlordane	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	0.180 UJ	0.200 UJ	0.190 UJ	0.180 UJ	0.170 UJ	1.8 U	1.6 J	3
beta-BHC	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	0.180 UJ	0.200 UJ	0.190 UJ	0.180 UJ	0.170 UJ	1.8 U	1.8 U	0.76 J
delta-BHC	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	0.180 UJ	0.200 UJ	0.190 UJ	0.180 UJ	0.170 UJ	0.096 U	0.22 J	0.43 U
gamma-Chlordane	1.80 UJ	1.80 UJ	1.80 UJ	1.80 UJ	0.180 UJ	0.200 UJ	0.190 UJ	0.180 UJ	0.170 UJ	0.088 U	0.25 U	5

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-4									
Station ID	WW04-SO20	WW04-SO21		WW04-SO25	WW04-SO26		WW04-SO27	WW04-SO28	WW04-SO29	WW04-SO30
Sample ID	WW04-SB20-12-07A	WW04-SB21-13-07A	WW04-SB21P-13-07A	WW04-SB25-46-07A	WW04-SB26-46-07A	WW04-SB26P-46-07A	WW04-SB27-46-07A	WW04-SB28-46-07A	WW04-SB29-46-07A	WW04-SB30-46-07A
Sample Date	02/08/07	02/08/07	02/08/07	01/30/07	01/30/07	01/30/07	01/26/07	01/31/07	01/23/07	01/25/07
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG_KG)										
4,4'-DDD	3.4 U	3.4 U	3.5 U	3.6 U	3.5 U	3.5 U	3.8 U	3.6 U	3.6 U	3.7 U
4,4'-DDE	3.4 U	0.5 U	0.24 U	3.6 U	3.5 U	3.5 U	3.8 U	3.6 U	3.6 U	3.7 U
4,4'-DDT	3.4 U	3.4 U	3.5 U	0.25 J	3.5 U	3.5 U	3.8 U	3.6 U	3.6 U	3.7 U
Aldrin	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U
Aroclor-1254	34 U	34 U	35 U	36 U	35 U	35 U	38 U	36 U	36 U	37 U
Dieldrin	3.4 U	3.4 U	3.5 U	0.26 J	3.5 U	3.5 U	3.8 U	3.6 U	3.6 U	3.7 U
Endosulfan I	1.8 U	1.7 U	1.8 U	1.8 U	0.38 J	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U
Endosulfan sulfate	3.4 U	3.4 U	3.5 U	3.6 U	3.5 U	3.5 U	3.8 U	3.6 U	3.6 U	3.7 U
Endrin	3.4 U	3.4 U	3.5 U	0.26 J	3.5 U	3.5 U	3.8 U	3.6 U	3.6 U	3.7 U
Endrin aldehyde	0.2 J	0.29 U	0.21 U	3.6 U	3.5 U	3.5 U	3.8 U	3.6 U	3.6 U	13
Endrin ketone	3.4 U	3.4 U	3.5 U	3.6 U	3.5 U	3.5 U	3.8 U	3.6 U	3.6 U	3.7 U
Heptachlor	1.8 U	0.2 J	1.8 U	0.22 U	0.17 U	0.13 U	1.9 UJ	0.16 U	1.8 UJ	1.9 UJ
Heptachlor epoxide	1.8 U	0.31 J	1.8 U	1.8 U	0.082 U	0.07 U	1.9 U	1.9 U	1.8 U	1.9 U
alpha-BHC	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U
alpha-Chlordane	1.8 U	1.1 J	0.27 J	1.8 U	0.47 J	0.49 J	1.9 U	1.9 U	1.8 U	1.9 U
beta-BHC	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U
delta-BHC	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U
gamma-Chlordane	1.8 U	1.7 U	1.8 U	1.8 U	1 J	0.77 J	1.9 U	1.9 U	0.2 J	1.9 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-4									
Station ID	WW04-SO31		WW04-SO32	WW04-SO33	WW04-SO34	WW04-SO35		WW04-SO36	WW04-SO37	WW04-SO38
Sample ID	WW04-SB31-46-07A	WW04-SB31-68-07A	WW04-SB32-46-07A	WW04-SB33-46-07A	WW04-SB34-46-07A	WW04-SB35-46-07A	WW04-SB35-68-07A	WW04-SB36-46-07A	WW04-SB37-46-07A	WW04-SB38-12-07A
Sample Date	01/31/07	01/31/07	01/24/07	02/01/07	01/25/07	02/01/07	02/02/07	02/13/07	02/13/07	02/13/07
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG_KG)										
4,4'-DDD	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.6 U	3.5 U
4,4'-DDE	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.6 U	0.42 J
4,4'-DDT	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	0.11 U	3.7 U	3.6 U	3.5 U
Aldrin	0.11 U	1.9 U	1.9 U	1.9 U	1.9 U	0.069 U	0.21 U	1.9 U	1.9 U	1.8 U
Aroclor-1254	37 U	37 U	36 U	37 U	37 U	37 U	37 U	37 U	36 U	35 U
Dieldrin	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	0.084 U	3.7 U	3.7 U	3.6 U	3.5 U
Endosulfan I	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	0.67 J	1.9 U	1.9 U	1.8 U
Endosulfan sulfate	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 R	3.6 U	0.26 J
Endrin	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.6 U	3.5 U
Endrin aldehyde	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.7 U	0.48 U	3.6 U	0.31 U
Endrin ketone	3.7 U	3.7 U	3.6 U	0.15 U	3.7 U	0.14 U	3.7 U	3.7 U	3.6 U	3.5 U
Heptachlor	0.079 U	0.13 U	1.9 UJ	0.075 U	1.9 UJ	0.09 U	0.29 U	1.9 UJ	1.9 UJ	1.8 UJ
Heptachlor epoxide	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	0.072 U	1.9 U	1.9 U	1.9 U	1.8 U
alpha-BHC	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.8 U
alpha-Chlordane	1.9 U	1.9 U	0.22 J	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.8 U
beta-BHC	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.8 U
delta-BHC	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.8 U
gamma-Chlordane	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	0.23 U	1.9 U	1.8 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-4									
Station ID	WW04-SO38	WW04-SO39			WW04-SO40	WW04-SO41	WW04-SO42	WW04-SO46	WW04-SO47	WW04-SO48
Sample ID	WW04-SB38P-12-07A	WW04-SB39-46-07A	WW04-SB39P-46-07A	WW04-SB39-67-07A	WW04-SB40-46-07A	WW04-SB41-46-07A	WW04-SB42-46-07A	WW04-SB46-46-07A	WW04-SB47-46-07A	WW04-SB48-46-07A
Sample Date	02/13/07	02/12/07	02/12/07	02/12/07	02/09/07	02/09/07	02/12/07	01/26/07	01/29/07	01/29/07
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG_KG)										
4,4'-DDD	24	3.6 U	3.7 U	3.7 U	3.5 U	3.7 U	3.5 U	3.5 U	3.8 U	3.8 U
4,4'-DDE	6.9 NJ	3.6 U	3.7 U	3.7 U	3.5 U	3.7 U	3.5 U	3.5 U	3.8 U	3.8 U
4,4'-DDT	4.5 R	3.6 U	3.7 U	3.7 U	3.5 U	3.7 U	3.5 U	3.5 U	3.8 U	3.8 U
Aldrin	0.42 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U
Aroclor-1254	230 J	36 U	37 U	37 U	35 U	37 U	35 U	35 U	38 U	38 U
Dieldrin	2.4 U	3.6 U	3.7 U	3.7 U	3.5 U	3.7 U	3.5 U	3.5 U	0.24 U	0.11 U
Endosulfan I	1.3 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U
Endosulfan sulfate	0.19 U	3.6 U	3.7 U	3.7 U	3.5 U	3.7 U	3.5 U	3.5 U	3.8 U	3.8 U
Endrin	1.1 U	3.6 U	3.7 U	3.7 U	3.5 U	3.7 U	3.5 U	3.5 U	3.8 U	3.8 U
Endrin aldehyde	2.5 J	0.21 U	0.81 U	0.25 U	0.48 U	0.19 U	3.5 U	3.5 U	3.8 U	3.8 U
Endrin ketone	0.18 U	3.6 U	3.7 U	3.7 U	3.5 U	3.7 U	3.5 U	3.5 U	3.8 U	3.8 U
Heptachlor	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ	1.8 U	1.9 U	1.8 UJ	1.8 UJ	1.9 UJ	1.9 UJ
Heptachlor epoxide	3.5 R	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U
alpha-BHC	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U
alpha-Chlordane	0.73 U	1.8 U	1.9 U	1.9 U	0.97 J	0.33 J	0.31 J	1.8 U	1.9 U	1.9 U
beta-BHC	1.8 R	1.8 U	0.25 U	0.21 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U
delta-BHC	1.8 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U
gamma-Chlordane	0.59 U	0.3 U	0.23 J	0.26 J	0.2 J	0.23 J	1.8 U	1.8 U	1.9 U	1.9 U

Notes:

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-4			W-SWMU-6								
Station ID	WW04-SO49	WW04-SO54	WW04-SO55	W6-SB01	W6-SB02	W6-SB02	W6-SB03	W6-SB04	W6-SB05	W6-SB06	W6-SB07	W6-SB08
Sample ID	WW04-SB49-46-07A	WW04-SB54-35-07A	WW04-SB55-24-07A	NDA102	NDA105	NDA106FD1	NDA108	NDA110	NDA112	NDA114	NDA116	NDA118
Sample Date	01/23/07	02/14/07	02/14/07	04/24/00	04/24/00	04/24/00	04/24/00	04/24/00	04/24/00	04/20/00	04/20/00	04/20/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.5 U	3.6 U	3.6 U	13 J	0.840 J	0.970 J	1 J	4.40 UJ	0.320 J	12 J	4.20 UJ	4.30 UJ
4,4'-DDE	3.5 U	3.6 U	0.35 U	30 J	11 J	5.30 J	5.80 J	0.880 J	2 J	316 J	4.20 UJ	4.30 UJ
4,4'-DDT	3.5 U	3.6 U	3.6 U	5.20 UJ	5.30 UJ	5.30 UJ	1.80 J	4.40 UJ	4.30 UJ	19 J	4.20 UJ	4.30 UJ
Aldrin	1.8 U	1.8 U	1.8 U	2.60 UJ	2.70 UJ	2.70 UJ	2.30 UJ	2.30 UJ	2.20 UJ	2.20 UJ	2.10 UJ	2.20 UJ
Aroclor-1254	35 U	36 U	36 U	51 UJ	52 UJ	52 UJ	44 UJ	44 UJ	43 UJ	43 UJ	41 UJ	42 UJ
Dieldrin	3.5 U	3.6 U	3.6 U	5.20 UJ	5.30 UJ	5.30 UJ	4.40 UJ	4.40 UJ	4.30 UJ	4.30 UJ	4.20 UJ	4.30 UJ
Endosulfan I	1.8 U	1.8 U	0.29 J	2.60 UJ	2.70 UJ	2.70 UJ	2.30 UJ	2.30 UJ	2.20 UJ	2.20 UJ	2.10 UJ	2.20 UJ
Endosulfan sulfate	3.5 U	3.6 U	3.6 U	5.20 UJ	5.30 UJ	5.30 UJ	4.40 UJ	4.40 UJ	4.30 UJ	4.30 UJ	4.20 UJ	4.30 UJ
Endrin	3.5 U	3.6 U	3.6 U	5.20 UJ	5.30 UJ	5.30 UJ	4.40 UJ	4.40 UJ	4.30 UJ	4.30 UJ	4.20 UJ	4.30 UJ
Endrin aldehyde	3.5 U	3.6 U	0.43 J	5.20 UJ	5.30 UJ	5.30 UJ	4.40 UJ	4.40 UJ	4.30 UJ	4.30 UJ	4.20 UJ	4.30 UJ
Endrin ketone	3.5 U	3.6 U	3.6 U	5.20 UJ	5.30 UJ	5.30 UJ	4.40 UJ	4.40 UJ	4.30 UJ	4.30 UJ	4.20 UJ	4.30 UJ
Heptachlor	1.8 UJ	1.8 UJ	1.8 UJ	2.60 UJ	2.70 UJ	2.70 UJ	2.30 UJ	2.30 UJ	2.20 UJ	2.20 UJ	2.10 UJ	2.20 UJ
Heptachlor epoxide	1.8 U	1.8 U	0.43 U	2.60 UJ	2.70 UJ	2.70 UJ	2.30 UJ	2.30 UJ	2.20 UJ	2.20 UJ	2.10 UJ	2.20 UJ
alpha-BHC	1.8 U	1.8 U	1.8 U	2.60 UJ	2.70 UJ	2.70 UJ	2.30 UJ	2.30 UJ	2.20 UJ	2.20 UJ	2.10 UJ	2.20 UJ
alpha-Chlordane	0.45 J	1.8 U	0.91 J	2.60 UJ	2.70 UJ	2.70 UJ	2.30 UJ	2.30 UJ	2.20 UJ	2.20 UJ	2.10 UJ	2.20 UJ
beta-BHC	1.8 U	1.8 U	1.8 U	2.60 UJ	2.70 UJ	2.70 UJ	2.30 UJ	2.30 UJ	2.20 UJ	2.20 UJ	2.10 UJ	2.20 UJ
delta-BHC	1.8 U	1.8 U	1.8 U	2.60 UJ	2.70 UJ	2.70 UJ	2.30 UJ	2.30 UJ	2.20 UJ	2.20 UJ	2.10 UJ	2.20 UJ
gamma-Chlordane	1.8 U	1.8 U	1.8 U	2.60 UJ	2.70 UJ	2.70 UJ	2.30 UJ	2.30 UJ	2.20 UJ	2.20 UJ	2.10 UJ	2.20 UJ

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Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-7											W-SMMU-10
Station ID	NDW07SB07	NDW07SB08	NDW07SB09	NDW07SB10	NDW07SB11	NDW07SB12	NDW07SB13	NDW07SB14	NDW07SB15	NDW07SB16	NDW07SB17	W10-SB01
Sample ID	NDW07SB07-R01	NDW07SB08-R01	NDW07SB09-R01	NDW07SB10-R01	NDW07SB11-R01	NDW07SB12-R01	NDW07SB13-R01	NDW07SB14-R01	NDW07SB15-R01	NDW07SB16-R01	NDW07SB17-R01	NDA126
Sample Date	08/26/03	08/27/03	08/26/03	08/27/03	08/27/03	08/27/03	08/27/03	08/26/03	08/27/03	08/25/03	08/25/03	04/04/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.8 U	4 U	3.7 U	3.7 UJ	4 U	3.8 U	3.7 U	3.7 U	3.5 U	3.8 U	4.1 UJ	3.6 U
4,4'-DDE	3.8 U	4 U	3.7 U	3.7 UJ	4 U	3.8 U	3.7 U	3.7 U	3.5 U	3.8 U	4.1 UJ	21
4,4'-DDT	3.8 U	4 U	3.7 U	3.7 UJ	4 U	3.8 U	3.7 U	3.7 U	3.5 U	3.8 UJ	4.1 UJ	11
Aldrin	1.9 U	2 U	1.9 U	1.9 UJ	2 U	2 U	1.9 U	1.9 U	1.8 U	1.9 U	2.1 R	1.9 U
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	36 U
Dieldrin	3.8 U	4 U	3.7 U	3.7 UJ	4 U	3.8 U	3.7 U	3.7 U	3.5 U	3.8 U	4.1 R	3.6 U
Endosulfan I	1.9 U	2 U	1.9 U	1.9 UJ	2 U	2 U	1.9 U	1.9 U	1.8 U	1.9 U	2.1 UJ	1.9 U
Endosulfan sulfate	3.8 U	4 U	3.7 U	3.7 UJ	4 U	3.8 U	3.7 U	3.7 U	3.5 U	3.8 U	4.1 UJ	3.6 U
Endrin	3.8 U	4 U	3.7 U	3.7 UJ	4 U	3.8 U	3.7 U	3.7 U	3.5 U	3.8 U	4.1 UJ	3.6 U
Endrin aldehyde	3.8 U	4 U	3.7 U	3.7 UJ	4 U	3.8 U	3.7 U	3.7 U	3.5 U	3.8 U	4.1 UJ	3.6 U
Endrin ketone	3.8 UJ	4 U	3.7 UJ	3.7 UJ	4 U	3.8 U	3.7 U	3.7 UJ	3.5 U	3.8 U	4.1 UJ	3.6 U
Heptachlor	1.9 U	2 U	0.22 J	1.9 UJ	2 U	2 U	1.9 U	0.66 J	1.8 U	1.9 U	0.54 J	1.9 U
Heptachlor epoxide	1.9 U	2 U	1.9 U	1.9 UJ	2 U	2 U	1.9 U	1.9 U	1.8 U	1.9 U	2.1 UJ	1.9 U
alpha-BHC	1.9 U	2 U	1.9 U	1.9 UJ	2 U	2 U	1.9 U	1.9 U	1.8 U	1.9 U	2.1 UJ	1.9 UJ
alpha-Chlordane	1.9 U	2 U	1.9 U	1.9 UJ	2 U	2 U	1.9 U	1.9 U	1.8 U	1.9 U	0.24 J	1.9 U
beta-BHC	1.9 U	2 U	1.9 U	1.9 UJ	2 U	2 U	1.9 U	1.9 U	1.8 U	1.9 U	2.1 UJ	1.9 U
delta-BHC	1.9 U	2 U	1.9 U	1.9 UJ	2 U	2 U	1.9 U	1.9 U	1.8 U	1.9 U	2.1 UJ	1.9 U
gamma-Chlordane	1.9 U	2 U	1.9 U	1.9 UJ	2 U	2 U	1.9 U	1.9 U	1.8 U	1.9 U	2.1 UJ	1.9 U

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Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SMMU-10										W-SWMU-14			
Station ID	W10-SB02		W10-SB03	W10-SB04	W10-SB05	W10-SB06	W10-SB07	W10-SB08	W10-SB09	W10-SB10	W14-SB01	W14-SB02		W14-SB03
Sample ID	NDA129	NDA130FD1	NDA132	NDA134	NDA136	NDA138	NDA140	NDA142	NDA144	NDA146	NDA148	NDA151	NDA152FD1	NDA154
Sample Date	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/04/00	04/05/00	04/05/00	04/05/00	04/05/00
Chemical Name														
Pesticide/Polychlorinated Biphenyls (UG_KG)														
4,4'-DDD	3.7 U	3.6 U	4.1 U	4.1 U	3.9 U	3.6 U	3.7 U	3.9 U	0.67 J	3.6 U	4.1 U	3.8 U	4.7 U	3.7 U
4,4'-DDE	3.7 U	3.6 U	4.1 U	4.1 U	3.9 U	1.2 J	3.7 U	0.8 J	15	1.3 J	4.1 U	3.8 U	4.7 U	3.7 U
4,4'-DDT	3.7 U	3.6 U	4.1 U	4.1 U	3.9 U	1 J	3.7 U	3.9 U	7.6 J	1 J	4.1 U	3.8 U	4.7 U	3.7 U
Aldrin	1.9 U	1.8 U	2.1 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	1.9 U	2.4 U	1.9 U
Aroclor-1254	37 U	36 U	41 U	40 U	39 U	36 U	36 U	38 U	36 U	35 U	40 U	37 U	47 U	37 U
Dieldrin	3.7 U	3.6 U	4.1 U	4.1 U	3.9 U	3.6 U	3.7 U	3.9 U	3.7 U	3.6 U	4.1 U	3.8 U	4.7 U	3.7 U
Endosulfan I	1.9 U	1.8 U	2.1 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	1.9 U	2.4 U	1.9 U
Endosulfan sulfate	3.7 U	3.6 U	4.1 U	4.1 U	3.9 U	3.6 U	3.7 U	3.9 U	3.7 U	3.6 U	4.1 U	3.8 U	4.7 U	3.7 U
Endrin	3.7 U	3.6 U	4.1 U	4.1 U	3.9 U	3.6 U	3.7 U	3.9 U	3.7 U	3.6 U	4.1 UJ	3.8 UJ	4.7 UJ	3.7 UJ
Endrin aldehyde	3.7 U	3.6 U	4.1 U	4.1 U	3.9 U	3.6 U	3.7 U	3.9 U	3.7 U	3.6 U	4.1 U	3.8 U	4.7 U	3.7 U
Endrin ketone	3.7 U	3.6 U	4.1 U	4.1 U	3.9 U	3.6 U	3.7 U	3.9 U	3.7 U	3.6 U	4.1 U	3.8 U	4.7 U	3.7 U
Heptachlor	1.9 U	1.8 U	2.1 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	1.9 U	2.4 U	1.9 U
Heptachlor epoxide	1.9 U	1.8 U	2.1 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	1.9 U	2.4 U	1.9 U
alpha-BHC	1.9 UJ	1.8 UJ	2.1 UJ	2.1 UJ	2 UJ	1.9 UJ	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	2.1 UJ	1.9 UJ	2.4 UJ	1.9 UJ
alpha-Chlordane	1.9 U	1.8 U	2.1 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	1.9 U	2.4 U	1.9 U
beta-BHC	1.9 U	1.8 U	2.1 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	1.9 U	2.4 U	1.9 U
delta-BHC	1.9 U	1.8 U	2.1 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	1.9 U	2.4 U	1.9 U
gamma-Chlordane	1.9 U	1.8 U	2.1 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	1.9 U	2.4 U	1.9 U

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Appendix A-3
West Vieques Subsurface Soil Pesticide Detections
SWMU 1 Work Plan

Site ID	W-SWMU-14											
Station ID	W14-SB04	W14-SB05	W14-SB06	W14-SB07		W14-SB08	W14-SB09	W14-SB10	W14-SB11	W14-SB12	W14-SB13	W14-SB14
Sample ID	NDA156	NDA158	NDA160	NDA162	NDA163FD1	NDA165	NDA167	NDA169	NDA171	NDA173	NDA175	NDA177
Sample Date	04/05/00	04/05/00	04/05/00	04/05/00	04/05/00	04/06/00	04/06/00	04/06/00	04/06/00	04/06/00	04/06/00	04/06/00
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	3.6 U	1.2 J	4 U	3.8 U	3.9 U	3.8 UJ	4.1 UJ	4 UJ	3.6 UJ	4.2 UJ	3.7 UJ	3.9 UJ
4,4'-DDE	3.6 U	3.6 U	4 U	3.8 U	3.9 U	3.8 UJ	4.1 UJ	4 UJ	3.6 UJ	4.2 UJ	3.7 UJ	3.9 UJ
4,4'-DDT	3.6 U	38	4 U	3.8 U	3.9 U	3.8 UJ	4.1 UJ	4 UJ	3.6 UJ	4.2 UJ	3.7 UJ	3.9 UJ
Aldrin	1.8 U	1.8 U	2 U	1.9 U	2 U	1.9 UJ	2.1 UJ	2 UJ	1.8 UJ	2.2 UJ	1.9 UJ	2 UJ
Aroclor-1254	35 U	36 U	40 U	38 U	39 U	37 UJ	40 UJ	39 UJ	36 UJ	42 UJ	37 UJ	38 UJ
Dieldrin	3.6 U	3.6 U	4 U	3.8 U	3.9 U	3.8 UJ	4.1 UJ	4 UJ	3.6 UJ	4.2 UJ	3.7 UJ	3.9 UJ
Endosulfan I	1.8 U	1.8 U	2 U	1.9 U	2 U	1.9 UJ	2.1 UJ	2 UJ	1.8 UJ	2.2 UJ	1.9 UJ	2 UJ
Endosulfan sulfate	3.6 U	3.6 U	4 U	3.8 U	3.9 U	3.8 UJ	4.1 UJ	4 UJ	3.6 UJ	4.2 UJ	3.7 UJ	3.9 UJ
Endrin	3.6 UJ	3.6 UJ	4 UJ	3.8 UJ	3.9 UJ	3.8 UJ	4.1 UJ	4 UJ	3.6 UJ	4.2 UJ	3.7 UJ	3.9 UJ
Endrin aldehyde	3.6 U	3.6 U	4 U	3.8 U	3.9 U	3.8 UJ	4.1 UJ	4 UJ	3.6 UJ	4.2 UJ	3.7 UJ	3.9 UJ
Endrin ketone	3.6 U	3.6 U	4 U	3.8 U	3.9 U	3.8 UJ	4.1 UJ	4 UJ	3.6 UJ	4.2 UJ	3.7 UJ	3.9 UJ
Heptachlor	1.8 U	1.8 U	2 U	1.9 U	2 U	1.9 UJ	2.1 UJ	2 UJ	1.8 UJ	2.2 UJ	1.9 UJ	2 UJ
Heptachlor epoxide	1.8 U	1.8 U	2 U	1.9 U	2 U	1.9 UJ	2.1 UJ	2 UJ	1.8 UJ	2.2 UJ	1.9 UJ	2 UJ
alpha-BHC	1.8 UJ	1.8 UJ	2 UJ	1.9 UJ	2 UJ	1.9 UJ	2.1 UJ	2 UJ	1.8 UJ	2.2 UJ	1.9 UJ	2 UJ
alpha-Chlordane	1.8 U	1.8 U	2 U	1.9 U	2 U	1.9 UJ	2.1 UJ	2 UJ	1.8 UJ	2.2 UJ	1.9 UJ	2 UJ
beta-BHC	1.8 U	1.8 U	2 U	1.9 U	2 U	1.9 UJ	2.1 UJ	2 UJ	1.8 UJ	2.2 UJ	1.9 UJ	2 UJ
delta-BHC	1.8 U	1.8 U	2 U	1.9 U	2 U	1.9 UJ	2.1 UJ	2 UJ	1.8 UJ	2.2 UJ	1.9 UJ	2 UJ
gamma-Chlordane	1.8 U	1.8 U	2 U	1.9 U	2 U	1.9 UJ	2.1 UJ	2 UJ	1.8 UJ	2.2 UJ	1.9 UJ	2 UJ

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Appendix B
LUC Site Inspection Checklist

Appendix B
LUC Site Inspection Checklist
Former Vieques Naval Training Range, Vieques, Peurto Rico

SWMU 1 (Annual Inspection)

DATE: _____ **WEATHER CONDITIONS:** _____ **INSPECTOR'S NAME:** _____

Item	Potential Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Vegetative Cover	Dead or distressed vegetation; insufficient coverage; areas of exposed soil					
Signs, Fencing, and Gates	Deterioration of signs, fence, or gates; Personnel unable to read sign due to obstruction; Observed signs of trespassing (noting the location)					
Erosion	Exposed debris. Visible runoff patterns such as channels or gullies.					
Other Observations						

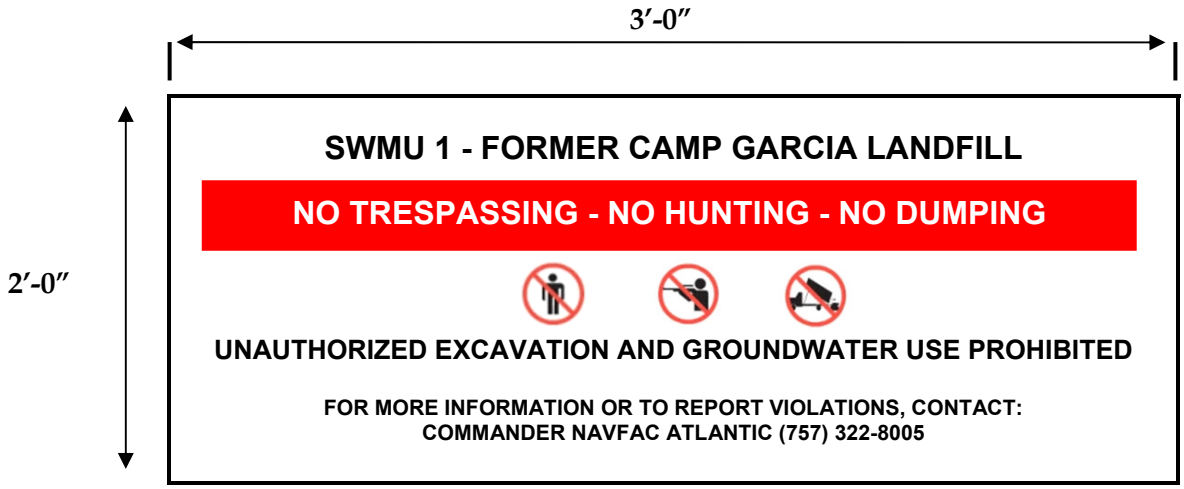
ADDITIONAL COMMENTS:

Appendix C
LUC Sign Design and Sign Language

SWMU 1 (Former Camp Garcia Landfill)

Former VNTR, Vieques, PR

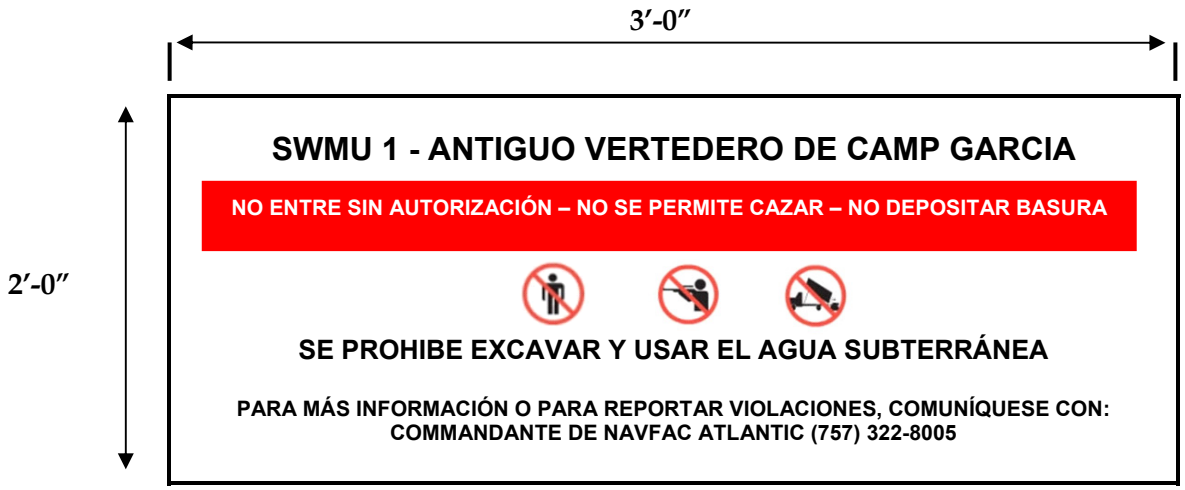
General Land Use Control Sign Schematic Drawing



SWMU 1 (Antiguo Vertedero de Camp Garcia)

Antiguo VNTR, Vieques, PR

Dibujo Esquemático del Letrero para el Control del Uso General de los Terrenos



Appendix D
SWMU 1 LTM SAP

Final

Solid Waste Management Unit 1 Groundwater Long-Term Monitoring Sampling and Analysis Plan

Former Vieques Naval Training Range Vieques, Puerto Rico

Contract Task Order 013

July 2012

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Atlantic Division

Under the

NAVFAC CLEAN 8012 Program
Contract N62470-11-D-8012

Prepared by

CH2MHILL

Tampa, Florida

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Executive Summary

This Sampling and Analysis Plan (SAP) is prepared to support Long-term Monitoring (LTM) of groundwater at Solid Waste Management Unit (SWMU) 1, located at the former Vieques Naval Training Range (VNTR), in the eastern portion of Vieques, Puerto Rico (**Figure D-1**). LTM of groundwater at SWMU 1 is a component of the presumptive remedy selected for the site and will be conducted to determine if a potential future release from the landfill results in groundwater contamination that may necessitate a groundwater remedy. This LTM SAP includes the details of the LTM of groundwater, including the types of results that may trigger groundwater remediation, modification of the LTM plan, and LTM exit conditions.

This SAP includes 37 worksheets that detail various aspects of the groundwater sampling process and serves as a guideline for the field activities and data assessment. This SAP was developed in general accordance with two guidance documents: 1) United States (U.S.) Environmental Protection Agency (EPA), *EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS* (USEPA, 2002) and 2) EPA, *Uniform Federal Policy for Quality Assurance Project Plans* (UFP-QAPPs) (Intergovernmental Data Quality Task Force, 2005).

This SAP was prepared under the U.S. Department of the Navy (Navy) Comprehensive Long-Term Environmental Action (CLEAN) Contract N62470-08-D-1000, Contract Task Order (CTO) 113, for submittal to the Naval Facilities Engineering Command (NAVFAC) Atlantic Division, EPA Region 2, the Commonwealth of Puerto Rico Environmental Quality Board (PREQB), and the U.S. Fish and Wildlife Service (USFWS). The Navy, EPA, PREQB, and USFWS work jointly as the Vieques Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Environmental Restoration Program (ERP) Technical Subcommittee.

The SWMU 1 LTM program will include groundwater sampling at various monitoring wells. For at least the initial post-Record of Decision (ROD) event, and the 2nd, 3rd and 4th year events, six monitoring wells will be sampled. Five monitoring wells (MW02, MW03, MW08, MW10, and MW11) are located immediately downgradient of the landfill boundary, and one monitoring well (MW13) is located upgradient of the landfill and is considered a background well (**Figure D-1**). Sampling will take place in general accordance with the Master Standard Operating Procedures, Protocols, and Plans (MSOPPPs) (denoted as the Master Plans in this SAP) for the ERP at Vieques (CH2M HILL, 2010a).

Unless otherwise determined (and approved by EPA and PREQB), based on evaluation of LTM data trends, groundwater sampling will occur every year for at least the first 5 years. Groundwater sampling will then be every 5 years thereafter if warranted, which will be conducted approximately 18 months before the due date of each Five-Year Review report so sample results can be evaluated (especially in the context of trends) and any recommendations regarding LTM protocol modifications (e.g., sampling frequency, sampling locations, analytical parameters, etc.) can be included in the Five-Year Review report. Modifications to the LTM program will be made via addenda to this SAP or other mechanisms that demonstrate formal concurrence by the Navy and regulatory agencies (i.e., if the modification is not significant enough to warrant addenda).

This SAP will help ensure that environmental data collected or compiled are scientifically sound, of known and documented quality, and suitable for their intended uses. The laboratory information cited in this SAP is for EMAX Laboratories, which will provide analytical services for this investigation. Should a different laboratory be selected for future monitoring events, an addendum will be submitted with revised, laboratory-specific worksheets.

The LTM data will be evaluated to monitor if a future release from the landfill occurs that results in groundwater contamination migrating beyond the boundary of SWMU 1 at concentrations above PALs. The six monitoring wells selected for LTM provide sufficient coverage to monitor the potential for chemicals to migrate beyond the extent of the landfill within groundwater. If LTM data indicate a groundwater remedy is warranted in the future, the ROD will be amended and a groundwater Remedial Action Objective(s) (RAO[s]) will be developed at that time.

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Acronyms and Abbreviations

µg/kg	microgram(s) per kilogram
µg/L	microgram(s) per liter
.pdf	portable document format
AHA	activity hazard analysis
amsl	above mean sea level
amu	atomic mass unit
AOC	Area of Concern
AQM	Activity Quality Manager
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
°C	degrees Celsius
CA	corrective action
CAS	Chemical Abstract Services
CCB	Continuing Calibration Blank
CCC	Calibration Check Compound
CCV	Continuing Calibration Verification
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-term Environmental Action—Navy
CLP	contract laboratory program
CN	cyanide
COC	contaminant of concern
COD	coefficient of determination
CSM	Conceptual Site Model
CTO	Contract Task Order
CVAA	cold vapor atomic absorption
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DL	Detection Limit
DO	dissolved oxygen
DoD	United States Department of Defense
DOI	Department of the Interior
DQE	data quality evaluation
DQI	data quality indicator
DQO	data quality objective
DV	data validator
EBS	Environmental Baseline Survey
ECA	Eastern Conservation Area
ECD	Electron Capture Detector
EICP	extracted ion current profile
EIS	Environmental Impact Statement
EM	Environmental Manager
EMA	Eastern Maneuver Area

EPA	United States Environmental Protection Agency
ERA	Ecological Risk Assessment
ERP	Environmental Restoration Program
ESI	Expanded Site Inspection
FMETAL	dissolved metal
FS	Feasibility Study
FTL	Field Team Leader
GC	gas chromatography
GIS	geographical information system
H&S	Health and Safety
HASP	Health and Safety Plan
HCl	hydrogen chloride
Hg	mercury
HHRA	Human Health Risk Assessment
HNO_3	nitric acid
ICAL	initial calibration
ICB	Initial Calibration Blank
ICP	inductively coupled plasma
ICS	Interference Check Solutions
ICV	second source calibration verification
ID	identification
IDW	investigation-derived waste
IS	Internal Standards
L	liter(s)
LCL	lower control limit
LCS	laboratory control sample
LIA	Live Impact Area
LIMS	Laboratory Information Management System
LOD	Limit of Detection
LOQ	Limit of Quantitation
LTM	Long-term Monitoring
MCL	maximum contaminant level
MEC	munitions and explosives of concern
METAL	metal
mg/L	milligram(s) per liter
ml	milliliter(s)
MPC	Measurement Performance Criteria
MRA	Munitions Response Area
MRP	Munitions Response Program
MS	matrix spike
MSA	method of standard additions
MSD	matrix spike duplicate
MSOPPP	Master Standard Operating Procedure, Protocol, and Plan
mV	millivolt(s)
N/A	not applicable
NaOH	sodium hydroxide
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy

NIRIS	Navy Installation Restoration Information System
NOAA	National Oceanic and Atmospheric Administration
NTU	Nephelometric Turbidity Units
ORP	oxidation-reduction potential
OU	operable unit
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbon
PAL	project action limit
PC	Project Chemist
PCB	polychlorinated biphenyl
PDM	Project Data Manager
PDS	post-digestion spike
PEST	pesticides
PM	Project Manager
POC	Point of Contact
PPE	personal protective equipment
ppt	part(s) per trillion
PREQB	Puerto Rico Environmental Quality Board
PRWQS	Puerto Rico Water Quality Standards
PT	Performance Testing
PTSP	Pre-Task Safety Plan
QA	quality assurance
QAMS	Quality Assurance Management Section
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	quality control
QL	quantitation limit
QSM	Quality Systems Manual
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RF	response factor
RFA	Resource Conservation and Recovery Act Facility Assessment
RFI	Resource Conservation and Recovery Act Facility Investigation
RI	Remedial Investigation
RL	reporting limit
ROD	Record of Decision
RPD	relative percent difference
RPM	Remedial Project Manager
rps	revolution(s) per second
RRT	relative retention times
RSD	relative standard deviation
RSL	Regional Screening Level
RT	retention time
SAP	Sampling and Analysis Plan
SI	Site Inspection
SIA	Surface Impact Area
SIM	Selected Ion Monitoring

SMP	Site Management Plan
SOP	Standard Operating Procedure
SPCC	System Performance Check Compound
SSC	Site Safety Coordinator
SSC-HW	Site Safety Coordinator Hazardous Waste
SSRG	Soil Screening and Remediation Goals
STAC	Safety Task Analysis Card
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
SWO	Safe Work Observation
TAL	target analyte list
TAT	turnaround time
TBD	to be determined
TCL	target compound list
TCMX	tetrachloro-*m*-xylene
TOC	total organic carbon
TRC	TRC Engineering Services, Inc.
U.S.	United States
UCL	upper confidence limit
UFP	Uniform Federal Policy
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance
VNTR	Vieques Naval Training Range
VOA	volatile organic analysis
VOC	volatile organic compound
WCHEM	wet chemistry
YSI	YSI Environmental, Inc.

SAP Worksheet #1—Title and Approval Page

Final

Solid Waste Management Unit 1
Long-Term Monitoring Sampling and Analysis Plan
Former Vieques Naval Training Range
Vieques, Puerto Rico
July 2012

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Naval Facilities Engineering Command
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Contract N62470-11-D-8012
Contract Task Order – 013

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Wilmarie Rivera
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Richard Henry
USFWS – Remedial Project Manager

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SAP Worksheet #2—SAP Identifying Information

Site Name/Number: Solid Waste Management Unit (SWMU) 1 at the former Vieques Naval Training Range (VNTR), Vieques, Puerto Rico
Operable Unit (OU):
Contractor Name: CH2M HILL
Contract Number: N62470-08-D-1000
Contract Title: Navy Comprehensive Long-term Environmental Action— Navy (CLEAN) Program 1000
Work Assignment Number (optional): Contract Task Order (CTO) 113

1. **Sampling and Analysis Plan (SAP) Requirements:** This SAP was prepared in general accordance with the requirements of the Uniform Federal Policy (UFP) for Quality Assurance Project Plans (QAPPs) (Intergovernmental Data Quality Task Force, 2005) and United States (U.S.) Environmental Protection Agency (EPA) for QAPPs, EPA Quality Assurance (QA)/G-5, Quality Assurance Management Section (QAMS) (USEPA, 2002).

2. **Regulatory program:** Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

3. **Type of SAP:** This SAP is a project-specific SAP for the Long-term Monitoring (LTM) of groundwater at SWMU 1.

4. **Dates of scoping sessions:**

Title	Date
Environmental Restoration Program (ERP)/Munitions Response Program (MRP) Subcommittee Meeting – Vieques Superfund Site	August 2011

5. **Dates and titles of any SAP documents written for previous site work that are relevant to the current investigation:**

Title	Date
Streamlined Remedial Investigation/Feasibility Study (RI/FS) Report	April 2011
Site Inspection/Expanded Site Inspection (SI/ESI)	August 2010
Master Standard Operating Procedures, Protocols, and Plans (MSOPPPs)	April 2010
Preliminary Assessment/Site Inspection (PA/SI) Report	June 2008

SAP Worksheet #2—SAP Identifying Information (continued)

6. Organizational partners (stakeholders) and connection with lead organization:

- EPA Region 2 – Federal regulatory stakeholder overseeing CERCLA Vieques ERP implemented by lead organization.
- Puerto Rico Environmental Quality Board (PREQB) – Commonwealth regulatory stakeholder overseeing CERCLA Vieques ERP implemented by lead organization.
- U.S. Fish and Wildlife Service (USFWS) – Land owner of land transferred from lead organization and on which SWMU 1 is located.
- National Oceanic and Atmospheric Administration (NOAA) – Marine habitat stakeholder and technical advisor to EPA.

7. Lead organization (see Worksheet #7 for detailed list of data users):

- U.S. Department of the Navy (Navy).

8. Applicable SAP elements: All required UFP-SAP elements are included in this UFP-SAP; therefore a crosswalk table is not necessary for this project.

SAP Worksheet #3—Distribution List

Name of SAP Recipients	Title/Project Role	Organization	Telephone Number (Optional)	E-mail Address or Mailing Address	D	DF	F
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Madeline Rivera (or current personnel)	Vieques ERP Site Manager /On-island coordination	Navy	757-286-6457 (cell)	llamasmad@gmail.com	A		A
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SAP Worksheet #3—Distribution List (continued)

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Felix Lopez Arroyo (or current personnel)	Environmental Contaminants Specialist/Technical input and draft document review/No project-specific role	USFWS	787-851-7297(x226)	felix_lopez@fws.gov	A		A
Angela Carpenter (or current personnel)	Specials Projects Branch	EPA	212-637-4435	Carpenter.angela@epa.gov	CL		CL
Julio Vasquez (or current personnel)	EPA RPM	EPA	212-637-4323	Vazquez.julio@epa.gov	A		A
Diane Wehner (or current personnel)	Regional Resource Coordinator/Technical input and draft document review/No project-specific role	NOAA	978-656-3583	diane.wehner@noaa.gov	A		A
Brett Doerr (or current personnel)	Contractor Environmental Manager (EM)/Program Quality Assurance Officer (QAO) - Navy contractor primary POC	CH2M HILL	757-671-6219	brett.doerr@ch2m.com	A	A	A
John Tomik (or current personnel)	Activity Manager	CH2M HILL	757-671-6259	john.tomik@ch2m.com	A		A
John Swenfurth (or current personnel)	Project Manager (PM)	CH2M HILL	813-281-7762	john.swenfurth@ch2m.com	A	A	A
To be determined (TBD)	Field Investigation Lead	CH2M HILL	TBD	TBD			A
Bill Hannah (or current personnel)	Senior Technical Consultant	CH2M HILL	757-671-6277	bill.hannah@ch2m.com	A		CD
Mike Zamboni (or current personnel)	Project Chemist (PC)	CH2M HILL	703-376-5301	Mike.zamboni@ch2m.com			CD
Bhavana Reddy (or current personnel)	NIRIS Data Specialist	Critigen	703-462-3784	bhavana.reddy@critigen.com			CD
Molly Nguyen	PM, POC at primary location.	EMAX Laboratories	301-618-8889	mnguyen@emaxlabs.com			HC
Laura Maschoff (or current personnel)	Data validator (DV)	DataQual Environmental Services	314-330-1327	dataqual@charter.net			CD
Roberta W. Britton (or current personnel)	Not Applicable (N/A)	Restoration Advisory Board (RAB)	978-463-9660	bdbritt7@gmail.com		CD	

SAP Worksheet #3—Distribution List (continued)

Name of SAP Recipients	Title/Project Role	Organization	Telephone Number (Optional)	E-mail Address or Mailing Address	D	DF	F
Michael P. Connelly Pagán (or current personnel)	N/A	RAB	787-741-4442	mpcbieke@yahoo.com		A	
Wanda Bermudez (or current personnel)	N/A	RAB	787-435-2841	wbromero@yahoo.com		CD	
Colleen McNamara (or current personnel)	N/A	RAB	787-380-2545	lacolina@hughes.com		A	
Stacie D. Notine (or current personnel)	N/A	RAB	N/A	N/A		HC	
Jorge Fernandez Porto (or current personnel)	N/A	RAB	787-726-2839	jfporto@onelinkpr.net		CD	
Hector Julian Camacho (or current personnel)	N/A	RAB	787-741-8261	vieques357@yahoo.com		HC	
Lionel Sanchez (or current personnel)	N/A	RAB	787-241-0063	sanchezcarambot@yahoo.com		HC	
Lirio Marquez D'Acunti (or current personnel)	N/A	RAB	787-726-2839	liriomarquez@gmail.com		n/a	

A = All DF = Draft Final CL = Cover Letter F = Final CD = Compact Disc HC = Hard Copy D = Draft

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SAP Worksheet #4—Project Personnel Sign-Off Sheet

Name	Organization-Title-Role	Telephone Number	Signature/email receipt	Date SAP Read	SAP Section Reviewed
John Tomik	CH2M HILL – AM	703-376-6259			
John Swenfurth	CH2M HILL – PM	813-281-7762			
Brett Doerr	CH2M HILL – EM/Activity Quality Manager (AQM)	757-671-6219			
Bill Hannah	CH2M HILL – Senior Technical Consultant	757-671-6277			
Anita Dodson	CH2M HILL – Program Chemist	757-671-6218			
Mike Zamboni	CH2M HILL – Project Chemist (PC)	703-376-5301			
TBD	CH2M HILL – Field Investigation Lead	TBD			
Mark Orman	CH2M HILL – Health and Safety (H&S) Officer	414-847-0597			
Bhavana Reddy	Critigen – Navy Installation Restoration Information System (NIRIS) Data Specialist	703-462-3784			
Molly Nguyen	EMAX Laboratories – PM	301-618-8889			
Laura Maschoff	DataQual Environmental Services - data validator (DV)	314-330-1327			

Signed versions of Worksheet #4 will be kept on file at CH2M HILL along with other project documents.

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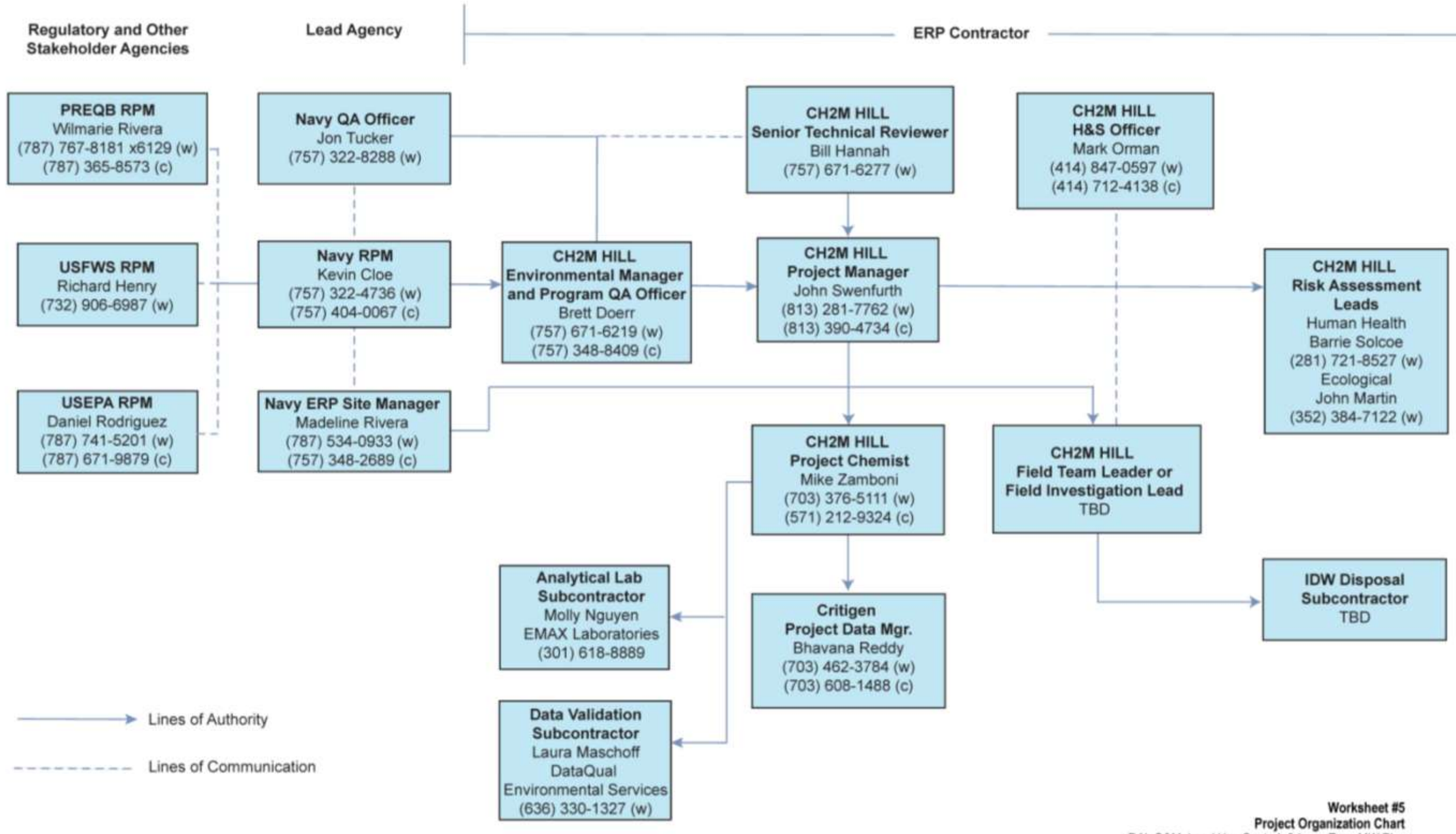
SAP Worksheet #5—Project Organizational Chart



Worksheet #5
Project Organization Chart
RAI, O&M, Land Use Control, & Long-Term MW Plan
SWMU 1
Former Vieques Naval Training Range,
Vieques, Puerto Rico

CH2MHILL

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SAP Worksheet #6—Communication Pathways

Communication Drivers	Responsible Affiliation	Name	Phone Number	Procedure
Communication to/from Navy (e.g., submission of SAP for review; receipt of regulatory comments, etc.)	Navy RPM	Kevin Cloe	757-322-4736	Primary POC for Navy (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other internal or external POCs. Stop work notices to regulators, notifying regulators of SAP changes or deviations, significant issues and necessary corrective actions by phone or e-mail within 2 weeks of notification of Navy RPM.
Communication to/from EPA (e.g., receipt of SAP for review; submission of EPA comments)	EPA RPM	Daniel Rodriguez	787-741-5201 787-671-9879 (cell)	Primary POC for EPA (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other internal or external POCs.
Communication to/from Navy	Navy - ERP Site Manager	Madeline Rivera	757-348-2689 (cell)	On-Island POC for Navy (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other internal or external POCs.
Communication to/from PREQB (e.g., receipt of SAP for review; submission of PREQB comments)	PREQB RPM	Wilmarie Rivera	787-767-8181 (x6129)	Primary POC for PREQB (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other internal or external POCs.
Communication to/from USFWS (e.g., receipt of SAP for review; submission of USFWS comments)	USFWS RPM	Richard Henry	732-906-6987	Primary POC for USFWS (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other internal or external POCs.
Navy QA/QC input	Navy QAO	Jon Tucker	757-322-8288	Provides review comments to Navy contractor on pre-draft SAP via e-mail through Kevin Cloe. Provides overall Navy guidance via direct communication with Navy contractor QAO, as warranted.
Communication to/from Navy contractor (e.g., submission of SAP for review; receipt of regulatory comments, updates on project progress, communication of stakeholder expectations, etc.)	CH2M HILL EM/AQM	Brett Doerr	757-671-6219	Primary POC for Navy contractor (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other contractor staff, as appropriate. Stop work notices to Navy RPM, notifying Navy RPM of SAP changes or deviations, significant issues or corrective actions.
Project administration and logistics	CH2M HILL PM	John Swenfurth	813-281-7762	Direct communication (via e-mail, telephone, hardcopy, or in-person, as warranted) to/from Navy contractor project staff to ensure appropriate project implementation.

SAP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number	Procedure
H&S expectations and procedures	CH2M HILL H&S Officer	Mark Orman	414-847-0597	Review of Health and Safety Plan (HASP). Direct communication (via e-mail, telephone, hardcopy, or in-person, will be notified within 24 hours of incident) to/from Navy contractor project staff to ensure implementation of appropriate H&S procedures.
Implementation of sampling activities; SAP changes in the field	CH2M HILL Field Investigation Lead	Stephen Brand or other qualified personnel	757-671-6211	Documentation of deviations from work plan made in field logbooks and rationale for deviations, made within 24 hours of deviation; assistance in material procurement and delivery; injection oversight and implementation; deviations made only with approval from contractor PM and/or EM. Notifying CH2MHILL EM/AQM of SAP changes or deviations, significant issues or corrective actions.
Daily Field Progress Reports	CH2M HILL Field Team Leader (FTL)	TBD	TBD	FTL will call to contractor PMs daily
Ensure staff H&S in the field	CH2M HILL Site Safety Coordinator (SSC)	TBD	TBD	Daily safety tailgates; daily observations; real-time discussions of observations and changes to be implemented with field staff.
QC on Laboratory Data	CH2M HILL Program Chemist	Anita Dodson	757-671-6218	Provides program-level chemistry support, program-level review of UFP-SAP, and senior review of analytical data
QC on Laboratory Data, release of analytical data for upload to database, Data tracking from collection through upload to database	CH2M HILL PC	Michael Zamboni	703-376-5301	See Worksheets 24, 25, and 28 for analytical corrective actions (CAs); Upon review of validated data to ensure adherence to project requirements, PC communicates via e-mail to PDM that data are ready for release (i.e., upload to database). Will track data from sample collection through upload to database, ensuring QAPP requirements are met by laboratory and field staff. Tracking involves receipt of electronic and hardcopy data from laboratory and DV. Communicates with CH2M HILL laboratory PM, and DV PM, as warranted, to ensure adherence to project analysis and validation requirements. Also coordinates data upload with contractor database manager.
Uploading project data and maintaining the database to ensure data are stored properly and can be retrieved by the PDM.	Critigen Database Manager	Bhavana Reddy	703-471-1441	Once contractor chemist ensures data are appropriate for upload to database, PDM submits data electronically to contractor database manager, who uploads data to NIRIS.

SAP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number	Procedure
Reporting Lab Data Quality Issues	Laboratory PM (EMAX Laboratories)	Molly Nguyen	310-618-8889	All QA/QC issues with project field samples will be reported by the lab to the PDM, PC, and Contractor QAO via e-mail within 2 business days.
Technical Support and Reporting	CH2M HILL Senior Technologist	Bill Hannah	757-671-6277	Data evaluation, analysis, and reporting
Technical Support	CH2M HILL Senior Human Health Risk Assessor	Barrie Selcoe	281- 246-4322	Data evaluation, analysis, and interpretation
Technical Support	CH2M HILL Senior Ecological Risk Assessor	John Martin	352-384-7122	Data evaluation, analysis, and interpretation
Validated data	DV PM (DataQual)	Laura Maschoff	314-330-1327	DV provides data validation reports (electronic and hardcopy) that provide the data qualifiers and associated explanations.

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SAP Worksheet #7—Personnel Responsibilities Table

Name	Title	Organizational Affiliation	Responsibilities
Kevin Cloe	Vieques RPM	Navy	ERP activities implemented under this SAP
Jon Tucker	QAO	Navy	Navy review of SAP and QA input
Madeline Rivera	Vieques ERP Site Manager	Navy	On-island Navy liaison; provides logistical support for implementation of ERP activities under this SAP
Brett Doerr	EM	CH2M HILL	Responsible for ERP at Vieques; primary Navy contractor POC; assists in data evaluation and interpretation; reviews report
John Swenfurth	PM	CH2M HILL	Project administration; coordinates staffing; monitors project performance; directs and oversees project staff
Bill Hannah	Senior Technologist	CH2M HILL	Technical support related to data collection and analysis
Barrie Selcoe	Senior Human Health Risk Assessor	CH2M HILL	As the Human Health technical lead, provides technical support related to human health considerations.
John Martin	Senior Ecological Risk Assessor	CH2M HILL	As the ecological technical lead, provides technical support related to ecological considerations.
Anita Dodson	Program Chemist	CH2M HILL	Provides program level review and support of the SAP.
Mike Zamboni	PC	CH2M HILL	Establishes laboratory scope of work; ensures selected laboratory can meet project-required analytical protocol; primary communications with laboratory and DV; performs data quality evaluation (DQE) to determine availability of analytical data. Manages sample tracking; coordinates assimilation of data from field collection through analysis, validation, and upload to environmental database; performs data queries for data evaluation and report writing
TBD	Field Investigation Lead	CH2M HILL	Supervises sampling and coordinates field activities; ensures onsite compliance with work plan
Mark Orman	H&S Officer	CH2M HILL	Responsible for overall Navy CLEAN program H&S performance; reviews project-specific HASP; interacts with SSC to ensure project-specific safety of field personnel
TBD	FTL	CH2M HILL	Responsible for maintaining daily communication with contractor PMs and Field Investigation Lead
TBD	SSC	CH2M HILL	Oversees and ensures safety of onsite personnel; responsible for use and completion of all field work related H&S paperwork
TBD	Field Team Member	CH2M HILL	Assist FTL/SSC with implementation of field tasks

SAP Worksheet #7—Personnel Responsibilities Table (continued)

Name	Title	Organizational Affiliation	Responsibilities
Bhavana Reddy	Database Manager	Critigen	Uploads validated data to environmental database
Molly Nguyen	Laboratory PM	EMAX Laboratories	Responsible for laboratory QA program and review of QC data
Laura Maschoff	PM and DV	DataQual	Responsible for validating analytical data in accordance with project-specific UFP-SAP
TBD	TBD	Investigation-derived Waste (IDW) Subcontractor	Responsible for transport and disposal of IDW deemed necessary for offsite disposal

Resumes are maintained by the individuals' organizations and are available upon request; upon execution of the project, staff may be removed (if unnecessary to project execution) and other staff may be added or substituted, as necessary and available.

SAP Worksheet #8—Special Personnel Training Requirements Table

Project Function	Specialized Training by Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
SWMU 1 LTM groundwater sampling	No special personnel training anticipated.					

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SAP Worksheet #9-1—Project Scoping Session Participants Sheet

Project Name: Long-term Monitoring Sampling, Solid Waste Management Unit 1, Former VNTR	
Projected Date(s) of Sampling: TBD	**Site Name:** Solid Waste Management Unit 1
PM: John Swenfurth	**Site Location:** Former VNTR, Vieques, Puerto Rico
Dates of Session: August 10-11, 2011, New York, NY **Scoping Session Purpose:** MRP/ERP Subcommittee Meeting for Vieques Superfund Site –SWMU 1 Groundwater LTM SAP Scoping Session.	

Name	Title/Role	Affiliation	Phone #	E-mail Address
Rich Henry	USFWS RPM	USFWS	732-906-6987	Richard_Henry@fws.gov
Felix Lopez	USFWS	USFWS	787-510-5208 (ext. 226)	Felix_lopez@fws.gov
Kevin Cloe	Naval Facilities Engineering Command (NAVFAC) RPM	Navy	757-322-4736	kevin.cloe@navy.mil
Daniel Hood	NAVFAC RPM	Navy	757-322-4630	daniel.r.hood@navy.mil
Stacin Martin	NAVFAC Technical Support	Navy	787-322-4780	Stacin.martin@navy.mil
Brett Doerr	Environmental Investigation Lead (CLEAN contractor to Navy)	CH2M HILL	757-671-6219	brett.doerr@ch2m.com
Tim Garretson	Munitions Response Lead (CLEAN contractor to Navy)	CH2M HILL	904-374-5633	Timothy.garretson@ch2m.com
John Tomik	Activity Manager (CLEAN contractor to Navy)	CH2M HILL	757-671-6259 6259 57 757)	john.tomik@ch2m.com
Dennis Ballam	CLEAN contractor to Navy	CH2M HILL	757- 671-6251	Dennis.ballam@ch2m.com
John Martin	CLEAN contractor to Navy	CH2M HILL	352-384-7122	john.martin@ch2m.com
Bill Hannah	CLEAN contractor to Navy	CH2M HILL	757-671-6277	bill.hannah@ch2m.com
Barrie Selcoe	HHRA Lead (CLEAN contractor to Navy)	CH2M HILL	281-721-8527	barrie.selcoe@ch2m.com
Angela Carpenter	EPA Special Projects Branch	EPA	212-637-4435	Carpenter.angela@epa.gov
Dianna Cutt	EPA Geologist	EPA	212-637-4311	Cutt.diana@epa.gov
Sergio Lopez	EPA	EPA		
Daniel Rodriguez	EPA RPM	EPA	787-741-5201	Rodriguez.daniel@epamail.gov
Michael Sivak	EPA Human Health Risk Assessor	EPA	212-637-4310	Sivak.michael@epa.gov
Mindy Pensak	EPA Ecological Risk Assessor	EPA	732-321-6705	Pensak.mindy@epa.gov
Julio Vazquez	EPA RPM	EPA	212-637-4323	Vazquez.julio@epa.gov
Diane Wehner	NOAA Ecological Risk Assessor	NOAA	732-872-3030	diane.wehner@noaa.gov
Wilmarie Rivera	PREQB RPM	PREQB	787-767-8181 x 6129	wilmarierivera@jca.gobierno.pr
Katarina Rutkowski	Technical support contractor to PREQB	TRC	860-298-6202	krutkowski@trcsolutions.com
Scott Heim	Technical support contractor to PREQB	TRC	978-656-3583	sheim@trcsolutions.com
Jim Pastorik	Technical support contractor to PREQB	UXOPro	703-548-5300	jim@uxopro.com
Forrest Cain	Geographical Information System (GIS) Support	Critigen	(720) 872-4434	forrest.cain@critigen.com

SAP Worksheet #9-1—Project Scoping Session Participants Sheet (continued)

Discussion Objective

Conduct scoping session for the groundwater LTM SAP and concur on objectives, monitoring locations, analytical protocol, data evaluation/decision-making process, and exit strategy.

Key Discussion Points

Brett Doerr/CH2M HILL walked the team through the Post-Record of Decision (ROD) long-term groundwater monitoring SAP seed file. The team discussed the number of wells to be monitored and the frequency of the sampling event. Dianna Cutt/EPA asked when the most recent data was collected. The Navy responded that there were two sampling events in 2004 and 2009. Angela Carpenter/EPA recommended that the sampling event not be scheduled immediately before the 5-year review, so the team has enough time to evaluate the data before inclusion in the 5-year review report. Katarina Rutkowski/TRC commented that placeholder information is needed within the 5-year review on how to address uncertainty in the future. Kevin Cloe/Navy asked if the 5-year review requires a sampling event to be conducted within the 5 years. Angela responded that it is not required, but the 5-year review needs to demonstrate that the remedy is working. Michael Sivak/EPA noted that the trigger date of 5-year reviews for Vieques begins with implementation of the SWMU 1 remedy, as this is the first site on Vieques with an active remedy.

The team had discussions on whether additional monitoring wells were needed, other than the five proposed in the seed file (MW02, MW03, MW10, MW11, MW13). Dianna Cutt/EPA asked if groundwater is discharging to the ephemeral stream, and it was noted that groundwater does not discharge to the ephemeral stream; the stream flows only during heavy rains. Danny Rodriguez/EPA concurred that the monitoring wells proposed are adequate. Katarina Rutkowski/TRC suggested that it may be beneficial to include an interior monitoring well (i.e., within the landfill boundaries) to determine if leachate is being generated that should be monitored or addressed before it migrates downgradient of the landfill boundaries. It was concurred that this suggestion would be taken into consideration during SAP preparation. The team had further discussions that existing monitoring wells at SWMU 1 will not be abandoned at this time. In response to Brett Doerr/CH2M HILL pointing out that a background exceedance may not necessarily be attributable to a release from the landfill (i.e., because there is only one background well, which represents a single point in the range of background concentrations), Danny Rodriguez/EPA added that additional background monitoring well(s) may be needed in the future if there are difficulties with interpretation of the data.

Consensus Decisions

The Navy will submit the SAP to the regulatory agencies for review. The Navy will evaluate if an interior monitoring well should be included for monitoring.

SAP Worksheet #10—Problem Definition

Introduction

This worksheet provides a summary of the site background and key elements of the Conceptual Site Model (CSM), followed by a narrative description of the problems to be addressed during the groundwater LTM program.

Site Background

The former VNTR consists of approximately 14,600 acres and is divided operationally into four Munitions Response Areas (MRAs) that from west to east comprise: the 11,000-acre Eastern Maneuver Area (EMA); the 2,500-acre Surface Impact Area (SIA); the 900-acre Live Impact Area (LIA); and the 200-acre Eastern Conservation Area (ECA) (**Figure D-1**). The former VNTR was transferred from the Navy to the Department of the Interior (DOI) in 2003 to be managed by USFWS as part of the National Wildlife Refuge System.

SWMU 1 is approximately 41 acres in size and located within the southern portion of the EMA (**Figure D-1**). SWMU 1 was an unlined landfill in operation from approximately 1954 to 1978, servicing an average population of 150 individuals that were stationed at nearby Camp García. Approximately 1,800 to 3,120 tons of municipal waste, such as waste paper, corrugated containers, cans and food packaging material, rags, wood, scrap metal, and yard waste, was disposed of at SWMU 1. In addition, several munitions related debris items, including spent ammunition, small arm cartridges, and practice items, were observed during recent investigation. Landfill debris material was initially covered with approximately 6 inches of soil to control blowing litter and later given a 2-foot thick soil cover consisting of compacted native soils. No hazardous materials were reported to have been placed in the disposal area.

SWMU 1 is currently managed as part of the Vieques National Wildlife Refuge and public access is prohibited. While all military activities have ceased at the former VNTR, the Navy retains responsibility for any environmental contaminant concerns attributable to past Navy activities that may exist.

Investigation History

Environmental investigations at SWMU 1 were initiated with an Environmental Impact Statement (EIS)(TAMS, 1979), conducted in 1979 to evaluate environmental impacts of the continued use of naval facilities on Vieques. Subsequent investigations, including a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)(PREQB, 1995); Environmental Baseline Survey (EBS)(NAVFAC Atlantic, 2003); Phase I RCRA Facility Investigation (RFI)(CH2M HILL, 2004); SI/ESI (CH2M HILL, 2010c); and a Streamlined RI/FS (CH2M HILL, 2011a) that incorporated a HHRA, an ERA, and an evaluation of presumptive remedies for the landfill, were conducted at the site.

Data collected as part of the Phase I RFI and the SI/ESI sufficiently characterized the site and was therefore used in the Streamlined RI/FS. The conclusion of the RI was that the landfill debris is primarily municipal-type debris generally overlain by a 2-foot-thick soil cover with a few localized areas that have landfill debris exposed at the ground surface, and that there were no unacceptable risks to human health or the environment posed by contaminant levels identified at the site. However, this conclusion relies upon maintaining the current land use and controlling access to the landfill debris and associated contamination.

The SWMU 1 ROD was finalized in September 2011 (CH2M HILL, 2011b), which identified Enhance Native Soil Cover, Institutional Controls, and LTM of groundwater as the selected presumptive remedy for the site. The Navy and EPA Region 2 jointly selected the remedy for SWMU 1, with the concurrence of PREQB. The remedy is intended to address potential exposure from direct contact with surface and subsurface landfill debris and associated contamination, minimize the potential for erosion of landfill debris, ensure that land use within the landfill boundaries is controlled, and monitor groundwater to determine if a future release from the landfill occurs that results in groundwater contamination that may necessitate a groundwater remedy.

SAP Worksheet #10—Problem Definition (continued)

Conceptual Site Model

Figure D-2 presents the generalized CSM of SWMU 1.

Physical Characteristics

The border of SWMU 1 is coincident with the extent of the landfill. SWMU 1 is approximately 41 acres in size and situated in a valley that gently slopes from the northwest to the southeast, with an approximate 55-foot elevation change. SWMU 1 is bounded by steep hills to the west and an ephemeral stream and steep hills to the east. The site is densely vegetated, dominated by thick thorn scrub. Surface water occurs within the ephemeral stream only during periods of heavy and prolonged rainfall.

Groundwater at SWMU 1 is within alluvial deposits (Qa), saprolite, and fractured volcanic bedrock (Kv) and ranges in elevation from 23 to 3 feet above mean sea level (amsl). A groundwater contour map is presented in **Figure D-3**. Groundwater flows generally to the south in the northern portion of the site and to the southeast in the southern portion of the site, generally mimicking the land topography, at a velocity that ranges from 17 to 158 feet per year (CH2M HILL, 2011a).

Potential Contaminant Sources and Transport Pathways to/within Groundwater

Contaminants from within the extent of the landfill may migrate downward through the vadose zone by leaching from infiltration. Once in the unsaturated zone, contaminants may sorb to soil or organic matter, become trapped in residual pore space, or continued to leach to the groundwater. Contaminant transport in groundwater is primarily by advection and dispersion. Once in groundwater, contaminants typically will not move as rapidly as groundwater because of retardation, or the adsorption of the contaminant to the solid media.

The number of years the landfill debris has been in place (between 30 and 55 years), the combined soil and groundwater analytical data, and Soil Screening and Remediation Goals (SSRG) model calculations show that the potential for leaching to groundwater is minimal and that no groundwater contaminant plume exists, as discussed in the *Final Streamlined Remedial Investigation/Feasibility Study Report Solid Waste Management Unit 1* (CH2M HILL, 2011a). Chemical constituents detected above leaching screening criteria in the surface soil and soil within the landfill debris were limited to benzo(a)pyrene and several pesticides, polychlorinated biphenyls (PCBs), and inorganics.

However, the only constituent not attributable to background detected above the leaching screening value in soil beneath the landfill debris was lead. However, lead was not observed above screening criteria in groundwater.

Groundwater data further support the insignificance of leaching. No organic constituents were detected in groundwater above PALs and the inorganics concentrations detected in groundwater were either below MCLs or attributed to background.

Although the above information suggests the potential for leaching to groundwater is minimal, modeling efforts conducted during the RI/FS estimate that the travel time from the landfill debris to groundwater for several organic constituents, including PCBs, pesticides, and benzo(a)pyrene, to be longer than the waste has been in place (i.e., between about 33 and 57 years), as these constituents are relatively immobile and tend to bind to soil. It is important to note that leaching models applied to sites on Vieques have been shown to be highly conservative in that the models tend to overestimate the leachability of chemicals in soil. Nonetheless, groundwater monitoring will be conducted to determine whether contaminants from the landfill leach to groundwater, resulting in contaminant migration above PALs offsite.

SAP Worksheet #10—Problem Definition (continued)

Future Land Use

The former VNTR occupies over 14,000 acres, most of which are undeveloped. On April 30, 2003, the land containing SWMU 1 was transferred to the DOI. The site is located on a designated wildlife refuge where the future land use will remain the same and is restricted from the public. Groundwater beneath the site is classified by the Commonwealth of Puerto Rico as SG, where groundwater may be intended for use as a source of drinking water supply, agricultural use, and/or flows into coastal, surface, and estuarine waters and wetlands. However, groundwater is not used as a potable water source at or in the vicinity of SWMU 1, is generally brackish and becomes saline in the southern portion of the site because of its close proximity to the sea (total dissolved solids concentrations range from 1,400 to 18,000 milligrams per liter [mg/L] as measured during the ESI), and there are no plans for future potable use of groundwater in this area.

Problem Statement

A Remedial Action Objective (RAO) for groundwater is not necessary because there is no groundwater contamination requiring remediation and no evidence that leaching is a concern. However, long-term groundwater monitoring will be conducted to determine if a future release from the landfill occurs that results in groundwater contamination that may necessitate a groundwater remedy (i.e., if contamination leached from the landfill is migrating offsite at concentrations above PALs). If LTM indicates a groundwater remedy is warranted in the future, the ROD will be amended and a groundwater RAO(s) will be developed at that time.

Based on the above information, the problem statement is: Determine if there is a release(s) from the landfill waste that leaches to groundwater and results in groundwater contamination migrating beyond the boundary of SWMU 1 at concentrations above PALs. Unless otherwise determined (and approved by EPA and PREQB), based on evaluation of LTM data trends, groundwater sampling will occur every 5 years (following the baseline event conducted shortly after the remedy is implemented), approximately 18 months before the due date of each Five-Year Review report so sample results can be evaluated (especially in the context of trends) and any recommendations regarding LTM protocol modifications (e.g., sampling frequency, sampling locations, analytical parameters, etc.) can be included in the Five-Year Review report. The results of groundwater LTM will be included as an appendix to each Five-Year Review report.

Modifications to the LTM program will be made via addenda to this SAP or other mechanisms that demonstrate formal concurrence by the Navy and regulatory agencies (i.e., if the modifications are not significant enough to warrant addenda). Details on the sampling approach, design, and rationale concerning sampling at SWMU 1 are detailed in Worksheet #17.

Environmental Questions to be Answered by the LTM SAP:

To address the problem statement, the following environmental questions will be answered via implementation of this SAP:

1. <u>Have contaminants that are attributable to the landfill and for which there are PALs migrated within groundwater at concentrations above the PALs beyond the downgradient boundary of the landfill?</u>

   Groundwater samples will be collected from six existing monitoring wells: five wells located downgradient (MW02, MW03, MW08, MW10, and MW11) and one well located upgradient (MW13) of the SWMU 1 landfill, and submitted for laboratory analysis. LTM monitoring well locations are presented in **Figure D-1**. Laboratory analysis will include constituents on the target compound list (TCL)/target analyte list (TAL) from EPA contract laboratory program (CLP) SOM01.2 and ILM05.4 for which there is a Federal maximum contaminant level (MCL) and/or Puerto Rico Water Quality Class SG standard. As constituents are added or removed from the Federal Safe Drinking Water Act list of primary drinking water standards or Puerto Rico groundwater quality standards, they will be added or removed from the suite of analyses for SWMU 1 groundwater.

   The downgradient wells selected for LTM provide sufficient coverage to monitor the potential for chemicals to migrate beyond the extent of the landfill within groundwater.

SAP Worksheet #10—Problem Definition (continued)

The upgradient well was chosen as a location that is representative of background groundwater conditions.

The groundwater analytical results will be evaluated against the PALs listed above and compared to constituent concentrations in the background monitoring well, the latter comparison being done to help determine if the constituent concentrations are likely attributable to landfill leachate or background. It is noted that a background exceedance may not necessarily be attributable to a release from the landfill (i.e., because there is only one background well, which represents a single point in the range of background concentrations) and that additional background well(s) may be necessary if there are difficulties with interpretation of the data relative to background.

2. <u>If contaminants attributed to the landfill have leached to groundwater, do the concentrations and spatial distribution, as well as other lines of evidence, indicate a groundwater remedy should be considered?</u>

   Information gathered as described under Environmental Question to be Answered #1 will be evaluated in a comprehensive manner (e.g., relative to likely or known background ranges; location(s) of exceedances; in the context of the CSM; with consideration of factors such as normal temporal variations, groundwater elevations, estimated groundwater velocities, etc.) to determine if a groundwater remedy should be considered.

3. <u>Do contaminant trend data suggest a revision to the monitoring protocol is warranted?</u>
   The results of the LTM will be used to determine if additional data are warranted to make site-specific determinations or if LTM wells or analytical suite can be reduced. Any recommendations regarding LTM protocol modifications (e.g., sampling frequency, sampling locations, analytical parameters, etc.) will be made in each 5-year ROD review report.

   If LTM data indicate an exceedance of background concentrations and PALs downgradient of the landfill, then LTM for those constituents exceeding the screening criteria (background and PALs) will be conducted annually until the next 5-year ROD review event to more closely monitor their trends, which will provide additional data for making determinations of the need for groundwater remedial action. The more frequent monitoring may include additional geochemistry parameters to assess whether groundwater conditions are conducive for natural attenuation processes. If LTM data suggest additional geochemistry parameters are warranted, an addendum to the SAP will be submitted that defines the rationale, analytical protocol, and data use for the additional geochemistry parameters.

SAP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements

1. For what and by whom will the data be used?

The Navy, EPA, PREQB, and USFWS will use the data collected during the LTM at SWMU 1 to assess if contamination is leaching from the landfill and migrating offsite at concentrations above PALs, potentially warranting a groundwater remedy.

2. What are the Project Action Limits (PALs)?

The PALs are the performance criteria necessary to meet the federal and state (commonwealth) applicable or relevant and appropriate requirements (ARARs). The PALs for groundwater are the chemical-specific ARARs, which comprise:

- Federal Safe Drinking Water Act (Title 40 of the Code of Federal Regulations [CFR], Part 141) primary MCLs.
- Drinking water quality standards, Puerto Rico Water Quality Standards (PRWQS) Regulation, as amended March 2010, Article 3.1.8.

Groundwater data will also be compared to background concentrations measured from the upgradient monitoring well MW13 (and any other background well installed) to distinguish constituents and constituent concentrations attributable to past Navy activities from those attributable to other sources, such as background. It is noted that a background exceedance may not necessarily be attributable to a release from the landfill (i.e., because there is only one background well, which represents a single point in the range of background concentrations). Therefore, if there are difficulties distinguishing concentrations attributable to background from releases from the landfill, additional background monitoring well(s) may be needed. If so, the additional background well(s) will be proposed in an addendum to this SAP or other mechanism that demonstrates formal concurrence by the Navy and regulatory agencies.

Required post-closure monitoring of hazardous landfills that are closed with waste in place is 30 years (40 CFR 264.117(a)(2)) after the completion of closure of the unit. Although the landfill has been inactive for more than 30 years, the timeframe for SWMU 1 groundwater LTM (post-remedy implementation) will be 30 years unless a release is identified necessitating a groundwater remedy.

3. What types of data are needed (matrix, target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques)?

Groundwater samples will be submitted to an offsite laboratory for analysis (EMAX Laboratories of Torrence, California). Worksheets #10, #15, and #18 define the matrices, analytical groups, and, where applicable, specific target analytes for the SWMU 1.

SAP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements (continued)

Chemicals of Concern warranting a groundwater remedy were not identified at SWMU 1 during RI activities. However, a broad suite of analyses is warranted because of the heterogeneous, and partially unknown, nature of the waste. For at least the baseline and first 5-year monitoring event, groundwater samples will be evaluated for constituents on the TCL/TAL from EPA CLP SOM01.2 and ILM05.4 for which there is an MCL and/or Puerto Rico Water Quality Class SG standard. As constituents are added or removed from the Federal Safe Drinking Water Act list of primary drinking water standards or Puerto Rico groundwater quality standards, they will be added or removed from the suite of analyses for SWMU 1 groundwater. Further, any constituent not observed over multiple events may be recommended for removal from the analytical protocol. Water-level measurements will be collected in all monitoring wells being sampled prior to samples being collected. A groundwater flow map will be produced and submitted with each report.

4. How "good" do the data need to be in order to support the environmental decision?

The data will be of the quantity and quality necessary to provide technically sound and defensible assessments of the groundwater conditions at SWMU 1 and make determinations of whether a groundwater remedy is warranted. Laboratory methods will meet CERCLA, EPA Region 2, and Navy guidance and the data will be validated by a third-party validator using national functional guidance, methodology, and laboratory Standard Operating Procedures (SOPs) as described in Worksheet #36.

The laboratory will follow the Measurement Performance Criteria (MPC) in Worksheet #12 for field QC samples and Worksheet #28 for laboratory QC samples. These MPC are consistent with the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) as applicable and laboratory in-house limits where the QSM does not apply.

As evidenced by Worksheet #15-2, 15-3, and 15-4, sometimes the laboratory cannot achieve a Limit of Detection (LOD) less than the PAL for a given constituent. When this occurs, it is useful to compare the Detection Limit (DL) to the PAL. When the DL is less than the PAL, then the laboratory will report the constituent (qualified as applicable) if detected at greater than the PAL. When the PAL is less than the DL, then nondetect results are treated as non-exceedances and the uncertainty surrounding such results is discussed in the DQE report section.

For SVOCs in groundwater, the PAL is less than the DL for 2,4-Dinitrotoluene; Hexachlorobenzene; and 3,3'-Dichlorobenzidine. In general, significantly lower-concentration methods are not available, and the laboratory is already utilizing three different concentration ranges (8270D, Selected Ion Monitoring [SIM], and Ultra Low PAH SIM) in order to achieve the Project Quantitation Limit (QL) Goals where they have that capability. 2,4-Dinitrotoluene is a precursor of trinitrotoluene and because explosives were not detected in soil within the landfill and below the landfill, this constituent is not likely to be a concern. Hexachlorobenzene is a fungicide formerly used as a seed treatment and is likely attributable to normal pesticide use and not a CERCLA-related release. 3,3'-Dichlorobenzidine was not detected in soil or groundwater at SWMU 1 and is likely not a concern.

SAP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements (continued)

For pesticides/PCBs (PEST/PCBs) in groundwater, the PAL is less than the DL for Heptachlor; Aldrin; Dieldrin; 4,4'- dichlorodiphenyldichloroethene (DDE); 4,4'- dichlorodiphenyldichloroethane (DDD); 4,4'-dichlorodiphenyltrichloroethane (DDT), Toxaphene; and the Aroclors. For the pesticides, lower-concentration methods are not available. For the aroclors, lower-concentration methods are not available without analyzing PCB homologues or PCB congeners. Such a specialty analytical approach is not appropriate when there are no specific contaminants of concern (refer to Section 3 "what types of data" immediately above). However, the DLs for the aroclors are below the MCL and will be reported as estimated. Therefore, the results will not adversely impact the data evaluation.

For metals (METALs) and dissolved metals (FMETALs) in groundwater, the PAL is less than the DL for only mercury. The laboratory-specific DL (0.0540 μg/L) is only marginally-greater than the PAL (0.05 μg/L) and thus there is acceptable uncertainty surrounding such a nondetect result. A lower-concentration method is not available without analyzing ultra-trace mercury or methyl mercury. As above, such a specialty analytical approach is not appropriate when mercury is not a specific contaminant of concern (COC).

5. How much data should be collected (number of samples for each analytical group, matrix, and concentration)?

For at least the baseline and first year 2, 3, and 4 monitoring events, groundwater samples, along with QA/QC samples will be collected at six monitoring well locations (MW02, MW03, MW08, MW10, MW11, and MW13) throughout the site (**Figure D-1**) and analyzed for VOCs, SVOCs, pesticides, PCBs, and inorganic constituents.

Based on the LTM analytical data evaluation, additional existing and/or new monitoring wells may be recommended. For example, if the LTM data suggest leaching may be occurring such that contaminant concentrations are or likely will migrate offsite, additional wells may be recommended to refine the area where the release from the landfill or offsite is suspected. Conversely, if the analytical data suggest a well is no longer needed to satisfy the LTM objectives, it will be recommended for removal, along with the rationale for its removal. Additional geochemistry parameters may be added to the LTM program if contaminants are detected at concentrations exceeding background and MCL or PRQWS in downgradient monitoring wells to assess whether groundwater conditions are conducive for natural attenuation processes. Geochemistry parameters may include the parameters listed in the following table:

SAP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements (continued)

Project Indicator Levels

Parameter	PIL	Justification
Methane	> 0.5 mg/L	Elevated methane levels are expected to be seen under highly reducing conditions as a byproduct of degradation by methanogenic bacteria and are a positive indicator that degradation of VOCs and some explosives can occur.
Ferrous Iron	> 1 mg/L	Elevated concentrations indicate the activity of iron-reducing bacteria and are a positive indication that reductive dechlorination of VOCs may be occurring.
Sulfate	< 20 mg/L	If sulfur compounds are present in the aquifer, higher concentrations of sulfate may compete with the reductive dechlorination pathway. Therefore, ideal conditions will maintain low sulfate levels.
Sulfide	> 1 mg/L	If sulfur compounds are present in the aquifer, higher concentrations of sulfide are more favorable to reductive dechlorination. Therefore, ideal conditions will maintain higher sulfide levels.
Total organic carbon (TOC)	> 20 mg/L	TOC is an indicator of the total amount of organic matter available to microbial communities to use as a carbon source in the degradation of VOCs. Increasing TOC concentrations are a positive indicator of natural attenuation potential.
Nitrate	Baseline value to later determine decreasing trend	Nitrate data will be collected in the event that a natural attenuation or enhanced biological remedy is later needed for the site. Enhanced biological treatment methods which reduce aquifer conditions are generally expected to result in decreasing concentrations of nitrate.
Nitrite	Baseline value to later determine increasing trend	Nitrite data will be collected in the event that a natural attenuation or enhanced biological remedy is later needed for the site. Enhanced biological treatment methods which reduce aquifer conditions are generally expected to result in increasing concentrations of nitrite.
Chloride	Baseline value to later determine increasing trend	Chloride data will be collected in the event that a natural attenuation or enhanced biological remedy is later needed for the site. Enhanced biological treatment methods which reduce aquifer conditions are generally expected to result in increasing concentrations of chloride, if chlorinated compounds are being degraded.
Alkalinity	> 50 mg/L	A measurement of the available buffering capacity against pH change, which can affect the rate of degradation of chemicals. Decreasing alkalinity may indicate that pH conditions are becoming less optimal for reductive dechlorination.

Field parameters (dissolved oxygen [DO], oxidation-reduction potential [ORP], pH, temperature, specific conductivity, and turbidity) will be collected during LTM.

SAP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements (continued)

The field parameters and geochemistry parameters do not have PALs because they do not have a "critical" level upon which decisions will be made; however, the relative values and the changes in the values over time will be used to help assess groundwater conditions. Temperature, turbidity, pH, and specific conductivity are only used as purging stabilization indicators.

Worksheet #18 contains the number of samples per matrix per analytical group for SWMU 1. Worksheet #15 contains the particular analytes, PALs, and QLs. Worksheet #17 provides the rationale for the particular sampling at each location.

6. Where, when, and how should the data be collected/generated?

The baseline event samples will be collected during one field mobilization, planned to occur shortly after implementation of the remedy (anticipated to be mid-to-late 2012). Sampling will then be annually thereafter up to the first Five-Year Review Report. Based on the results of the baseline and annual events, the frequency and requirements of sampling may be adjusted, as they may be after each subsequent monitoring event for the remainder of LTM. Data will be collected and generated in accordance with the procedures outlined in this LTM SAP. If warranted, sampling activities would be every 5 years and conducted approximately 18 months prior to the Five-Year Review process. See the SOPs for specific details pertaining to sampling methodology.

7. Who will collect and generate the data? How will the data be reported?

CH2M HILL field staff will collect and prepare the samples for shipment. Laboratory analysis will be performed by EMAX Laboratories of Torrence, California. The groundwater sampling results, conclusions, and recommendations will provide the basis for 5-Year reviews of the groundwater component of the ROD and will be documented in an appendix to the 5-Year ROD Review report.

8. How will the data be archived?

The data will be archived in accordance to procedures dictated in the Navy CLEAN program/contract. At the end of the project, archived data will be returned to the Navy.

9. List the PQOs in the form of if/then qualitative and quantitative statements

As stated previously, the primary objective of the groundwater LTM is to determine if there is a release(s) from the landfill waste that leaches to groundwater and results in groundwater contamination migrating beyond the boundary of SWMU 1 at concentrations above PALs. The associated PQO statements are:

If LTM data from a particular event indicate there is an exceedance(s) of a PAL(s) attributable to the landfill in groundwater downgradient of the landfill, then LTM for those exceedance constituents will be conducted annually until the next 5-year ROD review LTM event.

SAP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements (continued)

If the LTM trend data indicate there is (or will likely be) an exceedance(s) of a PAL(s) attributable to the landfill in groundwater downgradient of the landfill, then determine whether additional remedy for groundwater is warranted and, if so, evaluate potentially applicable alternatives. Because of the multitude of variables that would be considered in making this determination (e.g., location(s) and magnitude of exceedances, contaminant type(s), evidence of consistent trends versus fluctuations, etc.), it is not feasible to list all possible conditions that would necessitate remedy versus continued monitoring. However, evaluation of the LTM data, recommendations regarding the need for groundwater remedy, and the rationale upon which those recommendations are made will be included in the 5-year ROD review reports.

If the LTM data indicate a modification(s) to the monitoring protocol is warranted (i.e., additional or reduced data are warranted [e.g., additional or fewer geochemical parameters, additional or fewer constituents of interest, additional or fewer monitoring points, increased or decreased frequency, etc.]), the modification(s) will be added to the LTM via addenda to this SAP or other mechanism that constitutes formal concurrence among the agencies. Because of the multitude of variables that would be considered in making these determinations, it is not feasible to list all possible conditions that would warrant a modified monitoring protocol. However, evaluation of the LTM data, recommendations regarding modifying the monitoring protocol, and the rationale upon which those recommendations are made will be included in the 5-year ROD review reports.

If LTM data are collected for 30 years following remedy implementation and these data do not indicate a release from the landfill has occurred that warrants a groundwater remedy, groundwater LTM will be terminated in accordance with 40 CFR 264.117(a)(2).

SAP Worksheet #12-1—Field Quality Control Samples

(UFP-QAPP Manual Section 2.6.2)

Matrix: GW

Analytical Group: VOC

Analytical Method / SOP Reference: SW-846 8260B and 8260B_SIM

QC Sample	Analytical Group	Frequency	Data Quality Indicators (DQIs)	MPC
Field Duplicates	VOC	One per 10 field samples	Precision	%Relative percent difference (RPD) < 20%
Trip Blank	VOC	One per cooler containing VOCs (typically one per day)	Bias / Contamination	Same as method blank. Refer to Worksheet #28-1.
Equipment Rinseate Blank	VOC	One per day when equipment is decontaminated	Bias / Contamination	Same as method blank. Refer to Worksheet #28-1.
Temperature Blank	VOC	One per cooler	Representativeness	≤ 6 degrees Celsius (°C) but not frozen

Notes:
GW – groundwater
1. Matrix spike (MS)/matrix spike duplicate (MSD) is described on Worksheet 28.

SAP Worksheet #12-2—Field Quality Control Samples

(UFP-QAPP Manual Section 2.6.2)

Matrix: GW

Analytical Group: SVOC

Analytical Method / SOP Reference: SW-846 8270D; 8270D_SIM; and 'Ultra Low PAH SIM'

QC Sample	Analytical Group	Frequency	DQIs	MPC
Field Duplicates	SVOC	One per 10 field samples	Precision	%RPD < 20%
Equipment Rinseate Blank	SVOC	One per day when equipment is decontaminated	Bias / Contamination	Same as method blank. Refer to Worksheet #28-2.
Temperature Blank	SVOC	One per cooler	Representativeness	≤ 6°C but not frozen

Notes:
1. MS/MSD is described on Worksheet 28.

SAP Worksheet #12-3—Field Quality Control Samples

(UFP-QAPP Manual Section 2.6.2)

Matrix: GW

Analytical Group: PEST/PCB

Analytical Method / SOP Reference: SW-846 8081B and 8082A

QC Sample	Analytical Group	Frequency	DQIs	MPC
Field Duplicates	PEST/PCB	One per 10 field samples	Precision	%RPD < 20%
Equipment Rinseate Blank	PEST/PCB	One per day when equipment is decontaminated	Bias / Contamination	Same as method blank. Refer to Worksheet #28-3.
Temperature Blank	PEST/PCB	One per cooler	Representativeness	≤ 6°C but not frozen

Notes:
1. MS/MSD is described on Worksheet 28.

SAP Worksheet #12-4—Field Quality Control Samples

(UFP-QAPP Manual Section 2.6.2)

Matrix: GW

Analytical Group: METAL and FMETAL

Analytical Method / SOP Reference: SW-846 6020A; 7470B; and 9012B[2]

QC Sample	Analytical Group	Frequency	DQIs	MPC
Field Duplicates	METAL and FMETAL	One per 10 field samples	Precision	%RPD < 20%
Equipment Rinseate Blank	METAL and FMETAL	One per day when equipment is decontaminated	Bias / Contamination	Same as method blank. Refer to Worksheet #28-4.
Temperature Blank	METAL and FMETAL	One per cooler	Representativeness	≤ 6°C but not frozen

Notes:
1. MS/MSD is described on Worksheet 28.
2. Cyanide (CN) is not part of the FMETAL analysis group.

SAP Worksheet #13—Secondary Data Criteria and Limitations Table

The table below provides general information on how secondary data will be used in meeting the current project objectives and the limitations on their use in developing the SAP. Secondary data criteria and limitations tables are presented for each site where historical analytical data exist (applicable to the scope of work covered by this SAP), specifically to address the use and limitations of the historical analytical data.

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Soil	CH2M HILL. *Final Site Inspection / Expanded Site Inspection Report, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico.* August 2010c.	SWMU 1 landfill material.	Results of soil sampling may be used to support the determination of which landfill constituents have the potential to impact groundwater.	None

Note: See Worksheet 10 for discussion of historical documents pertaining to the site, the data from which will be used for historical perspective for the site and not for making decisions for the project; decisions regarding LTM will be primarily based on the data collected during the LTM.

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SAP Worksheet #14—Summary of Project Tasks for SWMU 1

In general, work will be performed by workers in Level D personal protective equipment (PPE), which includes hard hat, safety glasses, safety-toed boots, appropriate gloves, and hearing protection. Optional PPE includes the use of Tyvek® coveralls. Upgrades to higher levels of PPE are discussed in the *Vieques Environmental Master Health and Safety Plan* (CH2M HILL, 2010b). Sampling activities are expected to be performed during normal working hours, except under specific arrangement for after-hours or weekend activities.

The *Master Standard Operating Procedures, Protocols, and Plans* (CH2M HILL, 2010a) (Attachment A) address the protocols and SOPs to be used for the LTM. The proposed field activities for SWMU 1 are discussed below. The technical approach and sample design for the proposed field activities are discussed in Worksheet #17.

Pre-Mobilization Tasks

Mobilization for the field effort includes scheduling support staff, as well as 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.

Prior to mobilization, NAVFAC Atlantic, EPA, PREQB, and USFWS will be notified to allow for appropriate oversight and coordination. Additionally, CH2M HILL will procure the following subcontractors to support investigation activities:

- Analytical laboratory
- Data validation
- IDW disposal contractor

Field Investigation Tasks

Groundwater Sampling

CH2M HILL will collect groundwater samples from monitoring wells, as specified on Worksheet 17. To the extent practicable (based on quantity and depth of water present) sampling protocols will follow SOP B.7, referenced in Worksheet 21. When a fraction is collected for filtered metals, it will be field-filtered. Appropriate QA/QC samples will be collected as specified on Worksheet 20. Substantive deviations from the sampling protocols will be documented.

Sample Shipment

All collected samples will be delivered by FedEx to an offsite laboratory for analysis. All samples will be shipped in accordance with the Master SOP H-9, “Packaging and Shipping Procedures for Low-Concentration Samples.”

Documentation

Pertinent field observations will be recorded in a field notebook in accordance with applicable SOPs referenced on Worksheet #21.

SAP Worksheet #14—Summary of Project Tasks for SWMU 1 (continued)

Equipment Decontamination

All non-disposable sampling equipment will be decontaminated before sampling activities at each location in accordance with applicable SOPs referenced on Worksheet 21.

Investigation-Derived Waste Management

IDW purge water and decontamination rinse water will be placed in drums and sampled for waste characterization parameters (unless historical results are deemed sufficient by the waste disposal contractor) in accordance with applicable SOPs referenced on Worksheet 21.

Quality Control

In reference to the field tasks, all field work will be overseen by the FTL, or his/her delegate, who is responsible for the QC of the sampling task.

Post-Mobilization Tasks

Sample Analysis

The laboratory will analyze samples for various groups of parameters as shown on Worksheets #15 and #18. The laboratory will maintain, test, inspect, and calibrate analytical instruments (Worksheets #24 and #25).

Data Management

The Project PDM, Hillary Ott (or other qualified personnel), is responsible for data tracking and storage. In addition a third party DV will receive all analytical data from the laboratory and the data will be validated prior to its use by the Navy. All validated analytical data will be loaded into the NIRIS database.

Procedures for Recording and Correcting Data

Field data will be recorded in field logbooks.

Project Assessment/Audit: Worksheets #31 and #32.

Data Validation: Worksheets #35 and #36

Data Usability Assessment: Worksheet #37.

SAP Worksheet #15-1—Reference Limits and Evaluation Tables

(UFP-QAPP Manual Section 2.8.1)

Matrix: GW

Analytical Group: VOC

Analyte[1]	Chemical Abstract Services (CAS) No.[3]	Concentration Range	PRWQ Class SG (µg/L)	MCL-Groundwater[4] (µg /L)	Project QL Goal[2] (µg /L)	Laboratory Specific Limits (µg /L)			Laboratory Specific A/P Limits (%) for Laboratory Control Sample (LCS) and MS/MSD		
						Limit of Quantitations (LOQs)	LODs[6]	DLs	Lower Control Limit (LCL)	Upper Confidence Limit (UCL)	RPD
Vinyl chloride	75-01-4	8260B_SIM	0.25	2	0.125	0.050	0.022	0.0110	50	145	30
Bromomethane	74-83-9	8260B	47		23.5	1.0	0.33	0.164	30	145	30
1,1-Dichloroethene	75-35-4	8260B	7	7	3.5	1.0	0.20	0.100	70	130	30
Methylene chloride	75-09-2	8260B	46	5	2.5	2.0	1.0	0.500	55	140	30
trans-1,2-Dichloroethene	156-60-5	8260B	100	100	50	1.0	0.20	0.100	60	140	30
cis-1,2-Dichloroethene	156-59-2	8260B		70	35	1.0	0.20	0.100	70	125	30
Chloroform	67-66-3	8260B	57	80	28.5	1.0	0.20	0.100	65	135	30
1,1,1-Trichloroethane	71-55-6	8260B	200	200	100	1.0	0.20	0.100	65	130	30
Carbon tetrachloride	56-23-5	8260B	2.3	5	1.15	1.0	0.20	0.100	65	140	30
Benzene	71-43-2	8260B	5	5	2.5	1.0	0.20	0.100	80	120	30
1,2-Dichloroethane	107-06-2	8260B	3.8	5	1.9	1.0	0.20	0.100	70	130	30
Trichloroethene	79-01-6	8260B	5	5	2.5	1.0	0.20	0.100	70	125	30
1,2-Dichloropropane	78-87-5	8260B	5	5	2.5	1.0	0.20	0.100	75	125	30
cis-1,3-Dichloropropene	10061-01-5	8260B	3.4		1.7	1.0	0.20	0.100	70	130	30
Bromodichloromethane	75-27-4	8260B	5.5	80	2.75	1.0	0.20	0.100	75	120	30
Toluene	108-88-3	8260B	1000	1000	500	1.0	0.20	0.100	75	120	30
trans-1,3-Dichloropropene	10061-02-6	8260B	3.4		1.7	1.0	0.20	0.114	55	140	30
1,1,2-Trichloroethane	79-00-5	8260B	5	5	2.5	1.0	0.20	0.100	75	125	30
Tetrachloroethene	127-18-4	8260B	5	5	2.5	1.0	0.30	0.150	45	130	30
Dibromochloromethane	124-48-1	8260B	4	80	2	0.50	0.20	0.100	75	120	30
1,2-Dibromoethane	106-93-4	8260B_SIM		0.05	0.025	0.050	0.020	0.0100	80	120	30
Chlorobenzene	108-90-7	8260B	100	100	50	1.0	0.20	0.100	80	120	30
Ethylbenzene	100-41-4	8260B	530	700	265	0.50	0.20	0.100	75	125	30
o-Xylene	95-47-6	8260B		10000	5000	1.0	0.20	0.100	80	120	30
m- and p-Xylene	m&pXYLENE	8260B		10000	5000	2.0	0.43	0.212	75	130	30
Styrene	100-42-5	8260B		100	50	1.0	0.50	0.250	65	135	30
Bromoform	75-25-2	8260B	43	80	21.5	1.0	0.30	0.150	70	130	30

SAP Worksheet #15-1—Reference Limits and Evaluation Tables (continued)

Analyte[1]	CAS No.[3]	Concentration Range	PRWQ Class SG (µg/L)	MCL-Groundwater[4] (µg/L)	Project QL Goal[2] (µg/L)	Laboratory Specific Limits (µg /L)			Laboratory Specific A/P Limits (%) for LCS and MS/MSD		
1,1,2,2-Tetrachloroethane	79-34-5	8260B	1.7		0.85	1.0	0.22	0.110	65	130	30
1,3-Dichlorobenzene	541-73-1	8260B	320		160	1.0	0.22	0.107	75	125	30
1,4-Dichlorobenzene	106-46-7	8260B	63	75	31.5	1.0	0.20	0.100	75	125	30
1,2-Dichlorobenzene	95-50-1	8260B	420	600	210	1.0	0.20	0.100	70	120	30
1,2-Dibromo-3-chloropropane	96-12-8	8260B_SIM		0.2	0.1	0.050	0.022	0.0110	50	130	30
1,2,4-Trichlorobenzene	120-82-1	8260B	35	70	17.5	1.0	0.31	0.152	55	140	30
Hexachlorobutadiene[5]	87-68-3	8260B	4.4		2.2	1.0	0.442	0.221	50	140	30

Notes:

Screening levels are shaded if LOD > screening level.

1. Analyte list is TCL compounds (from SOM01) which have an ARAR.
2. The Project QL Goal is 1/2 the lesser of applicable screening levels.
3. Some CAS numbers are contractor-specific.
4. The MCL-Groundwater for "Total Xylene" is 10000 µg/L.
5. Hexachlorobutadiene is typically an SVOC but it is analyzed as a VOC in order to meet the Project QL Goal.
6. Project-specific LODs have been elevated to ≥ 2X DL when the verified LOD is < 2X DL.

SAP Worksheet #15-2—Reference Limits and Evaluation Tables

(UFP-QAPP Manual Section 2.8.1)

Matrix: GW

Analytical Group: SVOC

Analyte[1]	CAS No.	Concentration Range	PRWQ Class SG (µg/L)	MCL-Groundwater (µg/L)	Project QL Goal[2] (µg/L)	Laboratory Specific Limits (µg/L)			Laboratory Specific A/P Limits (%) for LCS and MS/MSD		
						LOQs	LODs[5]	DLs	LCL	UCL	RPD
Phenol[3]	108-95-2	8270D	21000		10500	10	5.0	2.50	0	115	30
bis(2-Chloroethyl)ether	111-44-4	8270D_SIM	0.3		0.15	1.0	0.10	0.0500	35	110	30
2-Chlorophenol	95-57-8	8270D	81		40.5	10	5.0	2.50	35	105	30
n-Nitroso-di-n-propylamine	621-64-7	8270D_SIM	0.05		0.05	1.0	0.10	0.0500	35	130	30
Hexachloroethane	67-72-1	8270D	14		7	10	5.0	2.50	30	100	30
Nitrobenzene	98-95-3	8270D	17		8.5	10	5.0	2.50	45	110	30
Isophorone	78-59-1	8270D	35		17.5	10	5.0	2.50	50	110	30
2,4-Dimethylphenol	105-67-9	8270D	380		190	10	5.2	2.60	30	110	30
2,4-Dichlorophenol	120-83-2	8270D	77		38.5	10	5.0	2.50	50	105	30
Hexachlorocyclopentadiene[4]	77-47-4	8270D	40	50	20	10	5.0	2.50	10	130	30
2,4,6-Trichlorophenol	88-06-2	8270D_SIM	14		7	1.0	0.10	0.0500	50	115	30
2-Chloronaphthalene	91-58-7	8270D	1000		500	10	5.0	2.50	50	105	30
Dimethyl phthalate	131-11-3	8270D	270000		135000	10	5.0	2.50	25	125	30
Acenaphthene	83-32-9	8270D	670		335	10	5.0	2.50	45	110	30
2,4-Dinitrophenol	51-28-5	8270D	69		34.5	20	5.0	2.50	15	140	30
2,4-Dinitrotoluene	121-14-2	8270D	1.1		1.1	10	5.0	2.50	50	120	30
Diethylphthalate	84-66-2	8270D	17000		8500	10	5.0	2.50	40	120	30
Fluorene	86-73-7	8270D	1100		550	10	5.0	2.50	50	110	30
4,6-Dinitro-2-methylphenol	534-52-1	8270D	13		6.5	20	5.0	2.50	40	130	30
n-Nitrosodiphenylamine	86-30-6	8270D	33		16.5	10	5.0	2.50	50	110	30
Hexachlorobenzene	118-74-1	8270D_SIM	0.0028	1	0.0028	1.0	0.10	0.0500	50	110	30
Atrazine[4]	1912-24-9	8270D		3	3	10	5.0	2.50	50	150	30
Pentachlorophenol	87-86-5	8270D_SIM	1	1	1	2.0	0.81	0.402	40	115	30
Anthracene	120-12-7	8270D	8300		4150	10	5.0	2.50	45	120	30
Di-n-butylphthalate	84-74-2	8270D	2000		1000	10	5.0	2.50	55	115	30
Fluoranthene	206-44-0	8270D	130		65	10	5.0	2.50	55	115	30

SAP Worksheet #15-2—Reference Limits and Evaluation Tables (continued)

Analyte[1]	CAS No.	Concentration Range	PRWQ Class SG (µg/L)	MCL-Groundwater (µg/L)	Project QL Goal[2] (µg/L)	Laboratory Specific Limits (µg/L)			Laboratory Specific A/P Limits (%) for LCS and MS/MSD		
						LOQs	LODs	DLs	LCL	UCL	RPD
Pyrene	129-00-0	8270D	830		415	10	5.0	2.50	50	130	30
Butylbenzylphthalate	85-68-7	8270D	1500		750	10	5.0	2.50	45	115	30
3,3'-Dichlorobenzidine	91-94-1	8270D	0.21		0.21	10	5.0	2.50	20	110	30
Benzo(a)anthracene	56-55-3	Ultra Low PAH SIM	0.038		0.019	0.020	0.010	0.00500	55	110	30
Chrysene	218-01-9	Ultra Low PAH SIM	0.038		0.019	0.020	0.010	0.00500	55	110	30
bis(2-Ethylhexyl)phthalate	117-81-7	8270D_SIM	12	6	3	3.0	1.2	0.565	40	125	30
Benzo(b)fluoranthene	205-99-2	Ultra Low PAH SIM	0.038		0.019	0.020	0.010	0.00500	45	120	30
Benzo(k)fluoranthene	207-08-9	Ultra Low PAH SIM	0.038		0.019	0.020	0.010	0.00500	45	125	30
Benzo(a)pyrene	50-32-8	Ultra Low PAH SIM	0.038	0.2	0.019	0.020	0.010	0.00500	55	110	30
Indeno(1,2,3-cd)pyrene	193-39-5	Ultra Low PAH SIM	0.038		0.019	0.020	0.010	0.00500	45	125	30
Dibenz(a,h)anthracene	53-70-3	Ultra Low PAH SIM	0.038		0.019	0.020	0.010	0.00500	40	125	30

Notes:

Screening levels are shaded if LOD > screening level. Refer to Worksheet #11 "how good do the data need to be. . .".

1. Analyte list is TCL compounds (from SOM01) which have an ARAR.
2. The Project QL Goal is 1/2 the lesser of applicable screening levels or is the lesser of applicable screening levels.
3. Phenol is a "poor performing analyte" as per DoD QSM v. 4.1 Table G-2. Historical phenol data for the site indicate more stringent measurement performance criteria are not warranted.
4. In-house accuracy limits are provided for Hexachlorocyclopentadiene and Atrazine (nominal).
5. Project-specific LODs have been elevated to ≥ 2X DL when the verified LOD is < 2X DL.

SAP Worksheet #15-3—Reference Limits and Evaluation Tables

(UFP-QAPP Manual Section 2.8.1)

Matrix: GW

Analytical Group: PEST/PCB

Analyte1	CAS No.	PRWQ Class SG[4] (µg/L)	MCL-Groundwater[3] (µg/L)	Project QL Goal[2] (µg/L)	Laboratory Specific Limits (µg/L)			Laboratory Specific A/P Limits (%) for LCS and MS/MSD		
					LOQs	LODs[6]	DLs	LCL	UCL	RPD
alpha-BHC	319-84-6	0.026		0.013	0.10	0.010	0.00500	60	130	30
beta-BHC	319-85-7	0.091		0.0455	0.10	0.014	0.00700	65	125	30
gamma-BHC (Lindane)	58-89-9	0.2	0.2	0.1	0.10	0.010	0.00500	25	135	30
Heptachlor	76-44-8	0.00079	0.4	0.00079	0.10	0.014	0.00700	40	130	30
Aldrin	309-00-2	0.00049		0.00049	0.10	0.010	0.00500	25	140	30
Heptachlor epoxide	1024-57-3	0.2	0.2	0.2	0.10	0.010	0.00500	60	130	30
Endosulfan I	959-98-8	62		62	0.10	0.016	0.00800	50	110	30
Dieldrin	60-57-1	0.00052		0.00052	0.10	0.010	0.00500	60	130	30
4,4'-DDE	72-55-9	0.0022		0.0022	0.10	0.010	0.00500	35	140	30
Endrin	72-20-8	0.059	2	0.059	0.10	0.016	0.00800	55	135	30
Endosulfan II	33213-65-9	62		62	0.10	0.010	0.00500	30	130	30
4,4'-DDD	72-54-8	0.0022		0.0022	0.10	0.010	0.00500	25	150	30
Endosulfan sulfate	1031-07-8	62		62	0.10	0.010	0.00500	55	135	30
4,4'-DDT	50-29-3	0.0022		0.0022	0.10	0.010	0.00500	45	140	30
Methoxychlor	72-43-5	40	40	40	1.0	0.10	0.0500	55	150	30
Endrin ketone	53494-70-5		2	2	0.10	0.010	0.00500	75	125	30
Endrin aldehyde	7421-93-4	0.29	2	0.29	0.10	0.010	0.00500	55	135	30

SAP Worksheet #15-3—Reference Limits and Evaluation Tables (continued)

Analyte[1]	CAS No.	PRWQ Class SG[4] (µg/L)	MCL-Groundwater[3] (µg/L)	Project QL Goal[2] (µg/L)	Laboratory Specific Limits (µg/L)			Laboratory Specific A/P Limits (%) for LCS and MS/MSD		
					LOQs	LODs[6]	DLs	LCL	UCL	RPD
alpha-Chlordane	5103-71-9	0.008	2	0.008	0.10	0.010	0.00500	65	125	30
gamma-Chlordane	5103-74-2	0.008	2	0.008	0.10	0.010	0.00500	60	125	30
Toxaphene[5]	8001-35-2	0.0028	3	0.0028	2.0	0.50	0.250	50	150	30
Aroclor-1016	12674-11-2	0.00064	0.5	0.00064	1.0	0.90	0.450	25	145	30
Aroclor-1221[5]	11104-28-2	0.00064	0.5	0.00064	1.0	0.58	0.290	50	150	30
Aroclor-1232[5]	11141-16-5	0.00064	0.5	0.00064	1.0	0.50	0.250	50	150	30
Aroclor-1242[5]	53469-21-9	0.00064	0.5	0.00064	1.0	0.50	0.250	50	150	30
Aroclor-1248[5]	12672-29-6	0.00064	0.5	0.00064	1.0	0.50	0.250	50	150	30
Aroclor-1254[5]	11097-69-1	0.00064	0.5	0.00064	1.0	0.50	0.250	50	150	30
Aroclor-1260	11096-82-5	0.00064	0.5	0.00064	1.0	0.62	0.310	30	145	30
Aroclor-1262[5]	37384-23-5	0.00064	0.5	0.00064	1.0	0.50	0.190	50	150	30
Aroclor-1268[5]	11100-14-4	0.00064	0.5	0.00064	1.0	0.50	0.250	50	150	30

Notes:

Screening levels are shaded if LOD > screening level. Refer to Worksheet #11 "how good do the data need to be. . ." .

1. Analyte list is TCL compounds (from SOM01) which have an ARAR.
2. The Project QL Goal is 1/2 the lesser of applicable screening levels or is the lesser of applicable screening levels.
3. The MCL for Chlordane is 2 µg/L. The MCL for PCBs is 0.5 µg/L
4. The PRWQ Class SG for PCBs is 0.00064 µg/L.
5. In-house (nominal) accuracy limits are provided for Toxaphene, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1262, and Aroclor-1268.
6. Project-specific LODs have been elevated to ≥ 2X DL when the verified LOD is < 2X DL.

SAP Worksheet #15-4—Reference Limits and Evaluation Tables

(UFP-QAPP Manual Section 2.8.1)

Matrix: GW

Analytical Group: METAL and FMETAL3

Analyte[1]	CAS No.	Concentration Range	PRWQ Class SG (µg/L)	MCL-Groundwater (µg/L)	Project QL Goal[2] (µg/L)	Laboratory Specific Limits (µg/L)			Laboratory Specific A/P Limits (%) for LCS and MS/MSD		
						LOQs	LODs[5]	DLs	LCL	UCL	RPD
Antimony	7440-36-0	6020A	5.6	6	2.8	1.0	0.50	0.250	80	120	20
Arsenic	7440-38-2	6020A	10	10	5	1.0	0.20	0.100	80	120	20
Barium	7440-39-3	6020A		2000	1000	1.0	0.50	0.250	80	120	20
Beryllium	7440-41-7	6020A		4	2	1.0	0.10	0.0500	80	120	20
Cadmium	7440-43-9	6020A	5	5	2.5	1.0	0.20	0.100	80	120	20
Chromium	7440-47-3	6020A	100	100	50	1.0	0.20	0.100	80	120	20
Copper	7440-50-8	6020A	1300	1300	650	1.0	0.50	0.250	80	120	20
Lead	7439-92-1	6020A	15	15	7.5	1.0	0.10	0.0500	80	120	20
Mercury	7439-97-6	7470B	0.05	2	0.05	0.50	0.11	0.0540	80	120	20
Nickel	7440-02-0	6020A	610		305	1.0	0.20	0.100	80	120	20
Selenium	7782-49-2	6020A	50	50	25	1.0	0.30	0.150	80	120	20
Thallium	7440-28-0	6020A	0.24	2	0.24	1.0	0.20	0.100	80	120	20
CN[3, 4]	57-12-5	9014	200	200	100	10	5.0	2.50	85	115	20

Notes:

Screening levels are shaded if LOD > screening level. Screening levels are shaded if LOD > screening level. Refer to Worksheet #11 "how good do the data need to be. . .".

1. Analyte list is TAL compounds (from ILM05) which have an ARAR.
2. The Project QL Goal is 1/2 the lesser of applicable screening levels or is the lesser of applicable screening levels.
3. CN is not part of the FMETAL analysis group.
4. In-house accuracy limits are provided for CN.
5. Project-specific LODs have been elevated to ≥ 2X DL when the verified LOD is < 2X DL.

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SAP Worksheet #16—Project Schedule / Timeline

The field investigation activities are anticipated to occur in late 2012 (following implementation of the remedial action) and conducted annually up to the first Five Year Review Report. If warranted, future sampling will be conducted approximately every 5 years thereafter (leaving time to evaluate the data for inclusion in each 5-Year ROD Review report), unless an alternate frequency is concurred upon by the Navy and regulatory agencies. The official schedule will be updated and distributed separately as part of the Site Management Plan (SMP).

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SAP Worksheet #17—Sampling Design and Rationale

Purpose

As previously discussed, the relatively low concentrations of chemicals detected in groundwater at SWMU 1 indicate leaching from the landfill has been insignificant as long as the landfill debris has been in place (about 33 to 57 years). Because there is no groundwater contamination requiring remediation and no evidence that leaching is a concern, no RAO for groundwater is necessary. Rather, the purpose of the groundwater LTM (as defined in this SAP) is to determine if a future release from the landfill occurs that results in groundwater contamination that may necessitate a groundwater remedy (i.e., if contamination leached from the landfill is migrating offsite at concentrations above PALs).

Sampling Rationale and Approach

LTM of the groundwater, and operations and maintenance will be performed, in addition to statutory 5-year reviews and reporting. Based on the average hydraulic conductivities (12.2 and 2.3 feet per day) observed within the saprolite and alluvial aquifer at other sites (such as SWMU 4 and AOC R in the western portion of Vieques), an effective porosity (0.30), and the average hydraulic gradients, the estimated groundwater flow velocity at SWMU 1 likely ranges from 17 to 158 feet per year (CH2M HILL, 2011a), with the lower estimated velocities in the downgradient direction at the site. Due to the relatively slow groundwater velocity, groundwater sampling at a frequency of once every 5 years (corresponding to the statuary 5-Year Review), likely will be sufficient to monitor for contaminant leaching to groundwater and migration offsite from beneath the landfill. Based on the results of the baseline and first 5-year events, the frequency and requirements of sampling may be adjusted, as they may be after each subsequent monitoring event for the remainder of LTM.

At least initially (i.e., baseline [first-post ROD event] and first 5-year events), the groundwater sampling program will include groundwater level measurements and sampling of the six previously installed monitoring wells (MW02, MW03, MW08, MW10, MW11 and MW13). The wells within and downgradient of the landfill provide appropriate coverage of the internal landfill conditions and, most importantly, the downgradient boundary conditions. Monitoring well MW13 has been designated as an upgradient sampling location, which will be used in background comparisons. The monitoring well locations for SWMU 1, including the background sampling location (MW13), are shown on **Figure D-1**. Based on the LTM analytical data evaluation, additional existing and/or new monitoring wells may be recommended. For example, if the LTM data suggest leaching may be occurring such that contaminant concentrations are or likely will migrate offsite, additional wells may be recommended to refine the area where the release from the landfill or offsite is suspected. Conversely, if the analytical data suggest a well is no longer needed to satisfy the LTM objectives, it will be recommended for removal, along with the rationale for its removal.

A broad suite of analyses is warranted because of the heterogeneous, and partially unknown, nature of the waste. For at least the baseline and first 5-year monitoring event, groundwater samples will be evaluated for constituents on the TCL/TAL from EPA CLP SOM01.2 and ILM05.4 for which there is an MCL and/or Puerto Rico Water Quality Class SG standard. As constituents are added or removed from the Federal Safe Drinking Water Act list of primary drinking water standards or Puerto Rico Groundwater Quality Standards, they will be added or removed from the suite of analyses for SWMU 1 groundwater. Further, any constituent not observed over multiple events may be recommended for removal from the analytical protocol.

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SAP Worksheet #18—Location-Specific Sampling Methods/SOP Requirements Table

(UFP-QAPP Manual Section 3.1.1)

Sampling Station / Sample ID	Matrix	Depth (feet bgs)	Screen Depth (feet amsl)	Analytical Group	Number of Samples	Sampling SOP Reference
CGW1MW02 / VEW01-MW02-MMYY	GW	24.06 to 34.06	-7.05 to -17.05	VOC, SVOC, PEST/PCB, METAL, FMETAL	1	See Worksheet #21
CGW1MW03 / VEW01-MW03-MMYY	GW	19.98 to 29.98	-6.77 to -16.05		1	
CGW1MW08 / VEW01-MW08-MMYY	GW	58.97 to 68.97	-29.15 to 39.15		1	
CGW1MW10 / VEW01-MW10-MMYY	GW	40.16 to 50.16	-27.99 to -37.99		1	
CGW1MW11 / VEW01-MW11-MMYY	GW	18.06 to 28.06	-6.11 to -16.11		1	
CGW1MW13 / VEW01-MW13-MMYY CGW1MW13 / VEW01-MW13-MMYY-MS CGW1MW13 / VEW01-MW13-MMYY-SD	GW	45.18 to 55.18	17.79 to 7.79		3 (MS/MSD)	
VE-SWMU-1-QC / VEW01-EB-MMDDYY	QC - EB	N/A	N/A		Reference Worksheet #20	
VE-SWMU-1-QC / VEW01-TB-MMDDYY	QC - TB	N/A	N/A	VOC		

Notes:
bgs – below ground surface
amsl – above mean sea level
ID – identification
1. Table representative of one round of sampling.
2. Field duplicate and MS/MSD locations may change.

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SAP Worksheet #19—Field Sampling Requirements Table

(UFP-QAPP Manual Section 3.1.1)

Matrix	Analytical Group	Analytical and Preparation Method / SOP Reference	Containers[1]	Sample Volume	Preservation Requirements	Maximum Holding Time
GW	VOC	LAB-01, LAB-02 / SW-846 5030, 8260B	Three of 40-milliliter (ml) volatile organic analysis (VOA) vials	40 ml	Hydrogen Chloride (HCl) to pH < 2; ≤ 6°C but not frozen	14 days
		LAB-01, LAB-03 / SW-846 5030, 8260B_SIM	Three of 40-ml VOA vials	40 ml	HCl to pH < 2; ≤ 6°C but not frozen	14 days
	SVOC	LAB-04, LAB-05 / SW-846 3520, SW-846 8270D	Two of 1 liter (L) Amber	1 L	≤ 6°C but not frozen	7 days / 40 days
		LAB-04, LAB-06 / SW-846 3520, SW-846 8270D_SIM	Two of 1 L Amber	1 L, 1 L	≤ 6°C but not frozen	7 days / 40 days
	PEST/PCB	LAB-04, LAB-07 / SW-846 3520, SW-846 8081B	Two of 1L Amber	1 L	≤ 6°C but not frozen	7 days / 40 days
		LAB-04, LAB-08 / SW-846 3520, 8082A	Two of 1 L Amber	1 L	≤ 6°C but not frozen	7 days / 40 days
	METAL, FMETAL (TAL and Hg)	LAB-09, LAB-10 / SW-846 3010, 6020A	One of 500 ml Poly	50 ml	Nitric Acid (HNO_3) to pH < 2; ≤ 6°C but not frozen	6 months
		LAB-11 / SW-846 7470A		50 ml		28 days
	METAL (CN-only)	LAB-12 / SW-846 9014	One of 125 ml Poly	6 ml	Sodium Hydroxide (NaOH) to pH > 12; ≤ 6°C but not frozen	14 days

Notes:

1. In general, triple (that required above) volume is provided for MS/MSD. However, due to the large number of ambers, only double (that required above; i.e. 4 ambers instead of two for each fraction) volume is required for ambers.

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SAP Worksheet #20—Field Quality Control Sample Summary Table

(UFP-QAPP Manual Section 3.1.1)

Matrix	Analytical Group	No. of Sampling Locations	No. of Field Duplicates	No. of MS/MSD Pairs	No. of Equipment Blanks[1]	No. of VOA Trip Blanks[1]	No. of Performance Testing (PT) Samples	Total No. of Samples to Lab[2]
GW	VOC	5	1	1	3	3		14
	SVOC	5	1	1	3			11
	PEST/PCB	5	1	1	3			11
	METAL	5	1	1	3			11
	FMETAL	5	1	1	3			11

Notes:

1. The number of blanks is based on a fundamental assumption of the number of days during which sampling occurs. It was assumed that two wells could be sampled per day. Refer to Worksheet #12 for the required frequencies.
2. Quantities represent a single round of sampling. Quantities represent a single round of sampling. Currently it is anticipated that sampling will occur baseline (shortly after the remedy is implemented), and every 5 years thereafter for a total of 30 years.

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SAP Worksheet #21—Project Sampling SOP References Table

Reference numbers refer to the SOP number in the Master Protocols.

Reference Number	Title, Revision Date and / or Number	Originating Organization of Sampling SOP	Equipment Type	Modified for Project Work? (Y/N)	Comments
SOP B-1	Groundwater Sampling Procedure Low Stress (Low Flow) Purging and Sampling	CH2M HILL	Adjustable pump, water quality meter, water level indicator, purge buckets, tubing and other disposables	N	
SOP C-1	Calibration and measurement with Field Instruments	CH2M HILL	Multi-parameter water quality monitoring instrument	N	
SOP E-1	Decontamination of Personnel and Equipment	CH2M HILL	Decon equipment and solutions	N	
SOP H-1	Preparing Field Log Books	CH2M HILL	Log book	N	
SOP H-2	Water Level Measurements	CH2M HILL	Water level meter	N	
SOP H-4	Chain-of-Custody	CH2M HILL	SOP, tape, custody seals, electronic chain-of-custody forms	N	
SOP H-5	Packaging and Shipping Procedures for Samples Not Considered Dangerous Goods	CH2M HILL	Packing materials, ice, shipping labels, etc	N	
SOP H-6	Equipment Blank	CH2M HILL	Sample containers	N	
Master Waste Management Plan	Master Waste Management Plan, U.S. Naval Ammunition Support Detachment, (NASD) and Former Vieques Naval Training Range (VNTR) Vieques Island, Puerto Rico	CH2M HILL	Drums, sample containers, tools, PPE, etc.	N	

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SAP Worksheet #22—Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing/Inspection Activity	Frequency	Acceptance Criteria	CA	Resp. Person	SOP Reference
YSI pH probe	Calibrate probe using YSI Auto-Calibration Standard Solution			Daily, before use	Std X-0.2<Reading<Std X+0.2	Clean probe with deionized water and calibrate again. Do not use this instrument if unable to calibrate properly.	FTL	SOP A-3
YSI Specific conductance Probe	Calibrate probe using YSI Calibration Standard Solution			Daily, before use	±3%	Clean probe with deionized water and calibrate again. Do not use this instrument if unable to calibrate properly.	FTL	SOP A-3
YSI Turbidity Meter	Calibrate probe using Hach-Calibration Standard			Daily, before use	0.1 to 10 Nephelometric Turbidity Units (NTU) standard - ±10%; 11 to 40 NTU standard - ±8%; 41 to 100 NTU standard - ±6.5%; >100 NTU standard - ±5%	Clean probe with deionized water and calibrate again. Do not use this instrument if unable to calibrate properly.	FTL	SOP A-3
YSI DO and Temperature Probes	Calibrate probe using YSI-Calibration Standard Solution		During calibration of other probes, check these readings against the day's atmospheric pressure and ambient temperature Check sensor for bubbles and membrane for wrinkles or tear	Daily, before use, at the end of the day (if practicable), and when unstable readings occur	±3 mg/L DO of what the tabulated DO is for the measured temperature	Clean probe with deionized water and calibrate again. Do not use this instrument if unable to calibrate properly. Follow manufacturer's instructions to remove bubble or replace torn membrane	FTL	SOP A-3
YSI multi-meter	Calibrate probe using multiple Calibration Standard Solutions	Check mechanical and electronic parts, verify system continuity, check battery, and clean probes. Calibration check.	Visual Inspection	Daily before use, at the end of the day (if practicable), and when unstable readings occur.	Stable readings after 3 minutes pH reads 4.0 +/- 3% conductivity reads 4.49 +/- 3%	Clean probe with deionized water and calibrate again. Do not use this instrument if unable to calibrate properly.	FTL	SOP A-3
ORP	Calibrate using ORP standard solution	Check batteries and have a replacement set on hand	Visual inspection	Daily, before use, at the end of the day (if practicable), and when unstable readings occur	±10 millivolts (mV) of the theoretical redox standard value at that temperature	Clean probe with deionized water and calibrate again. Do not use this instrument if unable to calibrate properly	FTL	SOP A-3

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SAP Worksheet #23—Analytical SOP References Table

(UFP-QAPP Manual Section 3.2.1)

Lab SOP Number	Title, Revision Date, and/or Number	Date Last Revisited if not Revised[1]	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM	Modified for Project Work?
LAB-01	EMAX-5030: Purge and Trap; 5/14/09; Rev. 2	8/2/2011	Definitive	GW / VOC	N/A	EMAX	None	N
LAB-02	EMAX-8260: Volatile Organics by gas chromatography (GC)/mass spectrometry (MS); 6/29/11; Rev. 8		Definitive	GW / VOC	GC-MS	EMAX	None	N
LAB-03	EMAX-8260SIM: Volatile Organics by GC/MS SIM; 11/17/10; Rev. 0		Definitive	GW / VOC	GC-MS	EMAX	None	N
LAB-04	EMAX-3520: Extraction, Continuous Liquid/Liquid; 2/28/11; Rev. 4		Definitive	GW / SVOC, PEST/PCB	N/A	EMAX	None	N
LAB-05	EMAX-8270: Semivolatile Organics by GC/MS; 5/15/10; Rev. 4	8/16/2011	Definitive	GW / SVOC	GC-MS	EMAX	None	N
LAB-06	EMAX-8270SIM: Semivolatile Organics by GC/MS SIM; 7/5/11; Rev. 2		Definitive	GW / SVOC	GC-MS	EMAX	None	N
LAB-07	EMAX-8081: Organochlorine Pesticides by GC; 8/10/10; Rev. 7	11/8/2010	Definitive	GW / PEST/PCB	GC-Electron Capture Detector (ECD)	EMAX	None	N
LAB-08	EMAX-8082: PCBs by GC; 8/10/10; Rev. 3	1/5/2011	Definitive	GW / PEST/PCB	GC-ECD	EMAX	None	N
LAB-09	EMAX-3010: Acid Digestion, Total Metals for Aqueous; 3/21/11; Rev. 5		Definitive	GW / METAL, FMETAL	N/A	EMAX	None	N
LAB-10	EMAX-6020: Trace Metals by inductively coupled plasma (ICP)-MS; 2/14/11; Rev. 6		Definitive	GW / METAL, FMETAL	ICP-MS	EMAX	None	N
LAB-11	EMAX-7470; Mercury in Liquid Waste; 10/26/10; Rev. 5		Definitive	GW / METAL, FMETAL	Cold vapor atomic absorption (CVAA)	EMAX	None	N
LAB-12	EMAX-9014; CN, Total; 7/13/11; Rev. 5		Definitive	GW / METAL	Spectrophotometer	EMAX	None	N
LAB-13	EMAX-SM01; Sample Management; 3/3/10; Rev. 5		N/A	N/A	N/A	EMAX	None	N
LAB-14	EMAX-SM02; Sample Receiving; 3/2/09; Rev. 5		N/A	N/A	N/A	EMAX	None	N
LAB-15	EMAX-SM03; Waste Disposal; 9/10/07; Rev. 4		N/A	N/A	N/A	EMAX	None	N

Notes:

1. Non-analytical SOPs do not require an annual review cycle.

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SAP Worksheet #24—Analytical Instrument Calibration Table

(UFP-QAPP Manual Section 3.2.2)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
GC-MS (VOC)	Tuning	Prior to initial calibration ICAL and at the beginning of each 12-hour period.	Refer to SW-846 8260B for specific ion criteria.	Retune instrument and verify. Rerun affected samples. Flagging criteria are not appropriate. Problem must be corrected. No samples may be accepted without a valid tune.	Analyst	LAB-02, LAB-03
	Minimum five-point ICAL for all analytes	ICAL prior to sample analysis.	1. Average response factor (RF) for System Performance Check Compounds (SPCCs): VOCs ≥ 0.30 for Chlorobenzene and 1,1,2,2-Tetrachloroethane; ≥ 0.1 for Chloromethane, Bromoform, and 1,1-Dichloroethane. 2. Relative standard deviation (RSD) for RFs for calibration check compounds (CCCs): VOCs ≤ 30% and one option below: Option 1: RSD for each analyte ≤ 15%; Option 2: Linear least-squares regression r ≥ 0.995; Option 3: Non-linear regression - coefficient of determination (COD) r^2 ≥ 0.99 (six points will be used for second order, seven points will be used for third order).	Correct problem then repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until ICAL has passed. Calibration may not be forced through the origin.		
	Second source calibration verification (ICV)	Once after each ICAL.	All project analytes within ±20% of true value.	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until calibration has been verified.		
	Retention time (RT) window position establishment for each analyte and surrogate	Once per ICAL	Position will be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial Continuing Calibration Verification (CCV) is used.	N/A		
	Evaluation of relative retention times (RRT)	With each sample.	RRT of each target analyte within ±0.06 RRT units.	Correct problem, then rerun ICAL. Flagging criteria are not appropriate. Refer to DoD QSM v. 4.1 Table F-4 for more information.		
	CCV	Daily before sample analysis and every 12 hours of analysis time.	1. Average RF for SPCCs: VOCs ≥ 0.30 for Chlorobenzene and 1,1,2,2-Tetrachloroethane; ≥ 0.1 for Chloromethane, Bromoform, and 1,1-Dichloroethane. 2. %Difference/Drift for all target compounds and surrogates: VOCs ≤ 20%D (Note: D = difference when using RFs or drift when using least squares regression or non-linear calibration).	Correct problem, then rerun calibration verification. If that fails, then repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since last acceptable CCV. Problem must be corrected. Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed.		

SAP Worksheet #24—Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
GC-MS (SVOC)	Tuning	Prior to ICAL and at the beginning of each 12-hour period.	Refer to SW-846 8270D for specific ion criteria.	Retune instrument and verify. Rerun affected samples. Flagging criteria are not appropriate. Problem must be corrected. No samples may be accepted without a valid tune.	Analyst	LAB-05, LAB-06
	Minimum five-point ICAL for all analytes	ICAL prior to sample analysis.	1. Average RF for SPCCs: SVOCs ≥ 0.050. 2. RSD for RFs for CCCs: SVOCs ≤ 30% and one option below: Option 1: RSD for each analyte ≤ 15%; Option 2: Linear least-squares regression r ≥ 0.995; Option 3: Non-linear regression - COD r^2 ≥ 0.99 (six points will be used for second order, seven points will be used for third order).	Correct problem then repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until ICAL has passed. Calibration may not be forced through the origin.		
	ICV	Once after each ICAL.	All project analytes within ±20% of true value.	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until calibration has been verified.		
	RT window position establishment for each analyte and surrogate	Once per ICAL	Position will be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	N/A		
	Evaluation of RRT	With each sample.	RRT of each target analyte within ±0.06 RRT units.	Correct problem, then rerun ICAL. Flagging criteria are not appropriate. Refer to DoD QSM v. 4.1 Table F-4 for more information.		
	CCV	Daily before sample analysis and every 12 hours of analysis time.	1. Average RF for SPCCs: SVOCs ≥ 0.050. 2. %Difference/Drift for all target compounds and surrogates: SVOCs ≤ 20%D (Note: D = difference when using RFs or drift when using least squares regression or non-linear calibration).	Correct problem, then rerun calibration verification. If that fails, then repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since last acceptable CCV. Problem must be corrected. Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed.		

SAP Worksheet #24–Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
GC-ECD (PEST/PCB)	RT window width calculated for each analyte and surrogate	At method setup and after major maintenance	RT width is ± 3 times standard deviation for each analyte RT from a 72-hour study.	N/A	Analyst	LAB-07, LAB-08
	Minimum five-point ICAL for all analytes	ICAL prior to sample analysis.	One of the options below: Option 1: RSD for each analyte ≤ 20%; Option 2: Linear least squares regression: r ≥ 0.995; Option 3: Non-linear regression: COD r^2 ≥ 0.99 (6 points will be used for second order, 7 points will be used for third order).	Correct problem then repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until ICAL has passed. Calibration may not be forced through the origin.		
	RT window position establishment for each analyte and surrogate	Once per ICAL and at the beginning of the analytical shift.	Position will be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	N/A		
	ICV	Immediately following ICAL.	All project analytes within established RT windows. GC methods: All project analytes within ± 20 % of expected value from the ICAL.	Correct problem, rerun ICV. If that fails, repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until calibration has been verified.		
	CCV	Prior to sample analysis, after every 10 field samples, and at the end of the analysis sequence.	All project analytes within established RT windows. GC methods: All project analytes within ± 20% of expected value from the ICAL.	Correct problem, then rerun calibration verification. If that fails, then repeat ICAL. Reanalyze all samples since the last successful calibration verification. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since the last acceptable calibration verification. Problem must be corrected. Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the sample cannot be reanalyzed.		

SAP Worksheet #24–Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
ICP-MS (METAL and FMETAL)	Tuning	Prior to ICAL	Mass calibration ≤ 0.1 atomic mass unit (amu) from the true value; Resolution ≤ 0.9 amu full width at 10% peak height; For stability, RSD ≤ 5% for at least four replicate analyses.	Retune instrument then reanalyze tuning solutions. Flagging criteria are not appropriate. No analysis will be performed without a valid MS tune.	Analyst	LAB-09, LAB-10
	ICAL for all analytes (minimum one high standard and a calibration blank)	Daily ICAL prior to sample analysis	If more than one calibration standard is used, r ≥ 0.995.	Correct problem, then repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until ICAL has passed.		
	ICV	Once after each ICAL, prior to beginning a sample run.	Value of second source for all analytes within ±10% of true value.	Verify second source standard. Rerun second source verification. If that fails, correct problem and repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until calibration has been verified.		
	CCV	After every 10 field samples and at the end of the analysis sequence.	All analytes within ±10% of true value.	Correct problem, rerun calibration verification. If that fails, then repeat ICAL. Reanalyze all samples since the last successful calibration verification. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since the last acceptable calibration verification. Problem must be corrected. Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed.		
	Low-level calibration check standard	Daily, after one-point ICAL.	Within ±20% of true value.	Correct problem, then reanalyze. Flagging criteria are not appropriate. No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the reporting limit (RL).		
	Linear dynamic range or high-level check standard	Every 6 months.	Within ±10% of true value.	N/A		
	Calibration Blank	Before beginning a sample run, after every 10 samples, and at the end of the analysis sequence.	No analytes detected > LOD.	Correct problem. Re-prep and reanalyze calibration blank. All samples following the last acceptable calibration blank must be reanalyzed. Apply B-flag to all results for specific analyte(s) in all samples associated with the blank.		

SAP Worksheet #24–Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
CVAA (METAL (Hg) and FMETAL (filtered Hg))	ICAL for all analytes (minimum five standards and a calibration blank)	Daily ICAL prior to sample analysis	If more than one calibration standard is used, r ≥ 0.995.	Correct problem, then repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until ICAL has passed.	Analyst	LAB-11
	ICV	Once after each ICAL, prior to beginning a sample run.	Value of second source for all analytes within ±10% of true value.	Verify second source standard. Rerun second source verification. If that fails, correct problem and repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until calibration has been verified.		
	CCV	After every 10 field samples and at the end of the analysis sequence.	Within ±20% of true value.	Correct problem, rerun calibration verification. If that fails, then repeat ICAL. Reanalyze all samples since the last successful calibration verification. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since the last acceptable calibration verification. Problem must be corrected. Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed.		
	Calibration Blank	Before beginning a sample run, after every 10 samples, and at the end of the analysis sequence.	No analytes detected > LOD.	Correct problem. Re-prep and reanalyze calibration blank. All samples following the last acceptable calibration blank must be reanalyzed. Apply B-flag to all results for specific analyte(s) in all samples associated with the blank.		
Spectrophotometer (METAL (CN))	ICAL (six standards and a calibration blank)	Daily ICAL prior to sample analysis	r ≥ 0.995.	Correct problem, then repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until ICAL has passed. All calibration standards must be distilled if samples are expected to contain sulfides.	Analyst	LAB-12
	Distilled standards (one high and one low)	Once per multipoint calibration	Within ±15% of true value.	Correct problem, then repeat distilled standards. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until distilled standards have passed.		
	ICV	Once after each ICAL, prior to beginning a sample run.	Within ±15% of true value.	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat ICAL. Flagging criteria are not appropriate. Problem must be corrected. No samples may be run until calibration has been verified.		

Notes:

DoD QSM v. 4.1 is the basis for specifications on this table.

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SAP Worksheet #25—Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

(UFP-QAPP Manual Section 3.2.3)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	CA	Responsible Person	SOP Reference
GC-MS, GC-ECD, ICP-MS, CVAA, Spectrophotometer	Parameter Setup	Physical Check	Examples: Check that the autosampler is functioning as expected. Check that temperature program is set at the most recently determined optimum condition. Check pressure, effluent, detector, flowrate is set as per SOP.	Initially, prior to each use.	Autosampler must move to the expected position when activated. Refer to instrument optimize temperature program setup.	Reset to SOP set-up if parameter checks reveal deviations. Notate all adjustments in Daily Maintenance Log. Examples: Reset autosampler, if problem persist perform autosampler troubleshooting prior to instrument use. Reset to optimized temperature setup. i.e. if temperature program is optimized at the following conditions: Initial Temp=40°C, hold for 1 min, Ramp= 6°C, Final Temp=200°C, Injection port=160°C, Interface=250°C, then the instrument setting must be on that condition when checked.	Analyst	LAB-02, LAB-03, LAB-05, LAB-06, LAB-07, LAB-08, LAB-10, LAB-11, LAB-12
Spectrophotometer	Daily Check	Physical Check	Examples: Check lamp stability, photometric noise, ensure sufficient instrument warmup (min. 15 minutes), verify proper wavelength.	Daily, prior to each use.	No physical defects and performance checks within limits.	Reset to SOP set-up if parameter checks reveal deviations. Notate all adjustments in Daily Maintenance Log.	Analyst	LAB-12
ICP-MS	Parameter Setup	Physical Check	Check that the autosampler is functioning as expected. Check pump rate. Check nebulizer gas flow. Check rinse bottle.	Initially, prior to each use.	Autosampler must move to the expected position when activated. Pump rate: 0.08-0.12 revolutions per second (rps). Nebulizer gas flow: 1.05-1.25 L per minute. Fill rinse bottle to mark.	Reset autosampler. If problem persists, perform autosampler troubleshooting prior to instrument use. Adjust pump rate if necessary. Otherwise, perform pump troubleshooting. Adjust gas flow if needed. Otherwise, perform instrument troubleshooting.	Analyst	LAB-10
GC-MS, ICP-MS	Tune Check	Instrument Performance	N/A	Prior to ICAL and at the beginning of each 12-hour period for GC-MS. Prior to ICAL for ICP-MS.	For VOCs and SVOCs, please refer to SW-846 8260C and 8270D, respectively. For METALs: Mass calibration ≤ 0.1 amu from the true value; Resolution ≤ 0.9 amu full width at 10% peak height; For stability, RSD ≤ 5% for at least four replicate analyses.	Retune and verify.	Analyst	LAB-02, LAB-03, LAB-05, LAB-06, LAB-10
GC-ECD	Endrin and DDT Breakdown Check	Instrument Performance	N/A	At the beginning of each 12-hour period, prior to analysis of samples	Degradation ≤ 20% for DDT. Benzidine and pentachlorophenol should be present at their normal responses and should not exceed a tailing factor of 2.	Correct problem and repeat breakdown check.	Analyst	LAB-07

SAP Worksheet #25–Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (continued)

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	CA	Responsible Person	SOP Reference
ICP-MS	Interference Check Sample	Instrument Performance	N/A	At the beginning of an analytical run and every 12 hours.	ICS-A: Absolute value of concentration for all non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes); ICS-AB: Within ±20% of true value.	Terminate analysis, locate and correct problem, reanalyze ICS, reanalyze all samples. If corrective action fails, apply Q-flag to all results for specific analyte(s) in all samples associated with the ICS.	Analyst	LAB-10
CVAA	Initial Calibration Blank (ICB)/Continuing Calibration Blank (CCB)	Instrument Performance	N/A	After every calibration verification, before samples, after every 10 samples, and at the end of the sequence.	No analytes detected ≥ LOD.	Determine possible source of contamination and apply appropriate measure to correct the problem. Reanalyze calibration blank and all associated samples.	Analyst	LAB-11
Spectrophotometer	ICB/CCB	Instrument Performance	N/A	After every calibration verification.	No analytes detected > RL	Determine possible source of contamination and apply appropriate measure to correct the problem. Reanalyze calibration blank and all associated samples.	Analyst	LAB-12

Notes:

Laboratory SOPs are the basis for specifications on this table.

SAP Worksheet #26—Sample Handling System

(UFP-QAPP Manual Appendix A)

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT	
Sample Collection (Personnel/Organization):	FTL (TBD)/CH2M HILL
Sample Packaging (Personnel/Organization):	Sample Processor or Field Team Member (TBD)/CH2M HILL
Coordination of Shipment (Personnel/Organization):	Sample Processor or Field Team Member (TBD)/CH2M HILL
Type of Shipment/Carrier:	Overnight/FedEx
SAMPLE RECEIPT AND ANALYSIS	
Sample Receipt (Personnel/Organization):	Sample Receipt Personnel/EMAX. Note that all samples will be shipped to EMAX.
Sample Custody and Storage (Personnel/Organization):	Sample Receipt Personnel/EMAX.
Sample Preparation (Personnel/Organization):	Extractions Personnel/EMAX
Sample Determinative Analysis (Personnel/Organization):	Analyst/EMAX
SAMPLE ARCHIVING	
Field Sample Storage (No. of days from sample collection):	90 Days
Sample Extract/Digestate Storage (No. of days from extraction/digestion):	Extracts may be disposed of 90 days after extraction.
Biological Sample Storage (No. of days from sample collection):	N/A
SAMPLE DISPOSAL	
Personnel/Organization:	Environmental H&S Officer/EMAX
Number of Days from Analysis:	Samples may be disposed of 90 days after report mail date.

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SAP Worksheet #27—Sample Custody Requirements

(UFP-QAPP Manual Section 3.3.3)

Sample Labeling:

Sample labels will include, at a minimum, client name, site, sample ID, date/time collected, analysis group or method, preservative, and sampler's initials. Labels will be taped to the jar to ensure that they do not separate.

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):

Samples will be collected by field team members under the supervision of the FTL. As samples are collected, they will be placed into containers and labeled, as outlined above. Samples will be cushioned with packaging material and placed into coolers containing enough ice to keep the samples below 4°C until they are received by the laboratory. The chain-of-custody will also be placed into the cooler. Coolers will be shipped to the laboratory via FedEx, with the airbill number indicated on the chain-of-custody (to relinquish custody). Upon delivery, the laboratory will log in each cooler and report the status of the samples.

Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal):

Please refer to LAB-13 (Sample Management), LAB-14 (Sample Receiving), and LAB-15 (Waste Disposal).

Sample Identification Procedures:

Upon opening the cooler, the receiving clerk signs the chain-of-custody and then takes the temperature using the temperature blank (if absent, then a sample container or infrared thermometer is used). The sample containers in the cooler are unpacked and checked against the client's chain-of-custody and any discrepancies or breakage is noted on the chain-of-custody. Next, if any water fractions require preservative, the clerk will check the pH values, with the exception of VOC vials, to see if they are within the acceptable pH range. The clerk will deliver the chain-of-custody (and any other paperwork; e.g. temperature or pH QA notice) to the PM for Laboratory Information Management Systems (LIMS) entry and client contact (if needed).

The field logbook will identify the sample ID with the location, depth, date/time collected, and the parameters requested. The laboratory will assign each field sample a laboratory sample ID based on information in the chain-of-custody. The laboratory will send sample log-in forms to the PDM to check sample IDs and parameters are correct.

Chain-of-Custody Procedures:

Chains of custody will include, at a minimum, laboratory contact information, client contact information, sample information, and relinquished by/received by information. Sample information will include sample ID, date/time collected, number and type of containers, preservative information, analysis method, and comments. The chain-of-custody will also have the sampler's name and signature. The chain-of-custody will link location of the sample from the field logbook to the laboratory receipt of the sample. The laboratory will use the sample information to populate the LIMS database for each sample.

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SAP Worksheet #28-1—Laboratory QC Samples Table

(UFP-QAPP Manual Section 3.4)

Matrix: GW

Analytical Group: VOC

Analytical Method / SOP Reference: LAB-01, LAB-02, LAB-03 / SW-846 5030, 8260B, 8260B_SIM

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Field Duplicates	Refer to Worksheet #12-1	Same as MPC	Assess homogeneity of groundwater during sample collection after purging. Qualify as per Worksheet #36.	PM/FTL, DV	Refer to Worksheet #12-1	Refer to Worksheet #12-1
Trip Blank	Refer to Worksheet #12-1	Same as MPC	Assess trip and sample container storage conditions. Qualify as per Worksheet #36.	PM/FTL, DV	Refer to Worksheet #12-1	Refer to Worksheet #12-1
Equipment Rinseate Blank	Refer to Worksheet #12-1	Same as MPC	Assess equipment decontamination procedures and ambient field conditions. Qualify as per Worksheet #36.	PM/FTL, DV	Refer to Worksheet #12-1	Refer to Worksheet #12-1
Temperature Blank	Refer to Worksheet #12-1	Same as MPC	Notify PC. Assess sample packaging and shipment procedures. Consider recollection if the exceedance may cause data rejection. Qualify as per Worksheet #36.	Laboratory PM, PM/FTL, DV	Refer to Worksheet #12-1	Refer to Worksheet #12-1
Internal Standards (IS) Verification	Every field sample, standard, and QC sample.	RT ±30 seconds from RT of the midpoint standard in the ICAL; extracted ion current profile (EICP) area within -50% to +100% of ICAL midpoint standard.	Inspect MS and GC for malfunctions. Reanalysis of samples analyzed while system was malfunctioning is mandatory. If CA fails in field samples, apply Q-flag to analytes associated with the non-compliant IS. Flagging criteria are not appropriate for failed standards. Sample results are not acceptable without a valid IS verification.	Analyst	Accuracy	RT ±30 seconds from RT of the midpoint standard in the ICAL; EICP area within -50% to +100% of ICAL midpoint standard.
Method Blank	One per preparatory batch.	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL (see Box D-1 of DoD QSM v. 4.1).	Correct problem, then see criteria in Box D-1 of DoD QSM v. 4.1. If required, reprep and reanalyze method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Contamination	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL (see Box D-1 of DoD QSM v. 4.1).
LCS containing all analytes to be reported, including surrogates	One per preparatory batch.	Refer to Worksheet #15-1. Limits are as per DoD QSM v. 4.1 Table G-4.	Correct problem then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Accuracy	Refer to Worksheet #15-1. Limits are as per DoD QSM v. 4.1 Table G-4.

SAP Worksheet #28-1–Laboratory QC Samples Table (continued)

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MS	One per preparatory batch per matrix	Same as for LCS	Examine the project-specific data quality objectives (DQOs). Contact the client as to additional measures to be taken. For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met.	Analyst	Accuracy	Same as for LCS
MSD or Laboratory Replicate	One per preparatory batch per matrix	Same as for LCS.	Same as MS.	Analyst	Accuracy / Precision	Same as for LCS.
Surrogate Spike	All field and QC samples	1,2-Dichloroethane-d_4: 70-120% 4-Bromofluorobenzene: 75-120% Dibromofluoromethane: 85-115% Toluene-d_8: 85-120% Limits are as per DoD QSM v. 4.1 Table G-3.	For QC and field samples, correct problem then reprep and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatoraphic interference with surrogate is present, reanalysis may not be necessary. Apply Q-flag to all associated analytes if acceptance criteria are not met.	Analyst	Accuracy	1,2-Dichloroethane-d_4: 70-120% 4-Bromofluorobenzene: 75-120% Dibromofluoromethane: 85-115% Toluene-d_8: 85-120% Limits are as per DoD QSM v. 4.1 Table G-3.
Results reported between DL and LOQ	N/A	Apply J-flag to all results between DL and LOQ.	N/A	Analyst	Accuracy	N/A

Notes:
DoD QSM v. 4.1 is the basis for specifications on this table.

SAP Worksheet #28-2—Laboratory QC Samples Table

(UFP-QAPP Manual Section 3.4)

Matrix: GW

Analytical Group: SVOC

Analytical Method / SOP Reference: LAB-04, LAB-05, LAB-06 / SW-846 3520, 8270D, 8270D_SIM

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Field Duplicates	Refer to Worksheet #12-2	Same as MPC	Assess precision and accuracy of the laboratory/field. Qualify as per Worksheet #36.	PM/FTL, DV	Refer to Worksheet #12-2	Refer to Worksheet #12-2
Equipment Rinseate Blank	Refer to Worksheet #12-2	Same as MPC	Assess equipment decontamination procedures and ambient field conditions. Qualify as per Worksheet #36.	PM/FTL, DV	Refer to Worksheet #12-2	Refer to Worksheet #12-2
Temperature Blank	Refer to Worksheet #12-2	Same as MPC	Notify PC. Assess sample packaging and shipment procedures. Consider recollection if the exceedance may cause data rejection. Qualify as per Worksheet #36.	Laboratory PM, PM/FTL, DV	Refer to Worksheet #12-2	Refer to Worksheet #12-2
Breakdown Check	At the beginning of each 12-hour period, prior to analysis of samples	Degradation ≤ 20% for DDT. Benzidine and pentachlorophenol should be present at their normal responses and should not exceed a tailing factor of 2.	Correct problem then repeat breakdown check. Flagging criteria are not appropriate. No samples will be run until degradation ≤ 20%.	Analyst	Accuracy	Degradation ≤ 20% for DDT. Benzidine and pentachlorophenol should be present at their normal responses and should not exceed a tailing factor of 2.
IS Verification	Every field sample, standard, and QC sample.	RT ±30 seconds from RT of the midpoint standard in the ICAL; EICP area within -50% to +100% of ICAL midpoint standard.	Inspect MS and GC for malfunctions. Reanalysis of samples analyzed while system was malfunctioning is mandatory. If CA fails in field samples, apply Q-flag to analytes associated with the non-compliant IS. Flagging criteria are not appropriate for failed standards. Sample results are not acceptable without a valid IS verification.	Analyst	Accuracy	RT ±30 seconds from RT of the midpoint standard in the ICAL; EICP area within -50% to +100% of ICAL midpoint standard.
Method Blank	One per preparatory batch.	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL (see Box D-1 of DoD QSM v. 4.1).	Correct problem, then see criteria in Box D-1 of DoD QSM v. 4.1 . If required, reprep and reanalyze method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Contamination	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL (see Box D-1 of DoD QSM v. 4.1).

SAP Worksheet #28-2–Laboratory QC Samples Table (continued)

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
LCS containing all analytes to be reported, including surrogates	One per preparatory batch.	Refer to Worksheet #15-2. Limits are as per DoD QSM v. 4.1 Table G-4. In-house accuracy limits are provided for Hexachlorocyclopentadiene and Atrazine (nominal).	Correct problem then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Accuracy	Refer to Worksheet #15-2. Limits are as per DoD QSM v. 4.1 Table G-4. In-house accuracy limits are provided for Hexachlorocyclopentadiene and Atrazine (nominal).
MS	One per preparatory batch per matrix	Same as for LCS	Examine the project-specific DQOs. Contact the client as to additional measures to be taken. For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met.	Analyst	Accuracy	Same as for LCS
MSD or Laboratory Replicate	One per preparatory batch per matrix	Same as for LCS.	Same as MS.	Analyst	Accuracy / Precision	Same as for LCS.
Surrogate Spike	All field and QC samples	2-Fluorobiphenyl: 50-110% Terphenyl-d_{14}: 50-135% 2,4,6-Tribromophenol: 40-125% 2-Fluorophenol: 20-110% Nitrobenzene-d_5: 40-110% Limits are as per DoD QSM v. 4.1 Table G-3.	For QC and field samples, correct problem then reprep and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatoraphic interference with surrogate is present, reanalysis may not be necessary. Apply Q-flag to all associated analytes if acceptance criteria are not met.	Analyst	Accuracy	2-Fluorobiphenyl: 50-110% Terphenyl-d_{14}: 50-135% 2,4,6-Tribromophenol: 40-125% 2-Fluorophenol: 20-110% Nitrobenzene-d_5: 40-110% Limits are as per DoD QSM v. 4.1 Table G-3.
Results reported between DL and LOQ	N/A	Apply J-flag to all results between DL and LOQ.	N/A	Analyst	Accuracy	N/A

Notes:
DoD QSM v. 4.1 is the basis for specifications on this table.

SAP Worksheet #28-3—Laboratory QC Samples Table

(UFP-QAPP Manual Section 3.4)

Matrix: GW

Analytical Group: PEST/PCB

Analytical Method / SOP Reference: LAB-04, LAB-07, LAB-08 / SW-846 3520, 8081B, 8082A

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
Field Duplicates	Refer to Worksheet #12-3	Same as MPC	Assess precision and accuracy of the laboratory/field. Qualify as per Worksheet #36.	PM/FTL, DV	Refer to Worksheet #12-3	Refer to Worksheet #12-3
Equipment Rinseate Blank	Refer to Worksheet #12-3	Same as MPC	Assess equipment decontamination procedures and ambient field conditions. Qualify as per Worksheet #36.	PM/FTL, DV	Refer to Worksheet #12-3	Refer to Worksheet #12-3
Temperature Blank	Refer to Worksheet #12-3	Same as MPC	Notify PC. Assess sample packaging and shipment procedures. Consider recollection if the exceedance may cause data rejection. Qualify as per Worksheet #36.	Laboratory PM, PM/FTL, DV	Refer to Worksheet #12-3	Refer to Worksheet #12-3
Breakdown check (method 8081 only)	At the beginning of each 12-hour period, prior to analysis of samples	Degradation ≤ 15% for both DDT and Endrin.	Correct problem then repeat breakdown check. Flagging criteria are not appropriate. No samples will be run until degradation ≤ 15% for both DDT and Endrin.	Analyst	Accuracy	Degradation ≤ 15% for both DDT and Endrin.
Method Blank	One per preparatory batch.	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results (see Box D-1 of DoD QSM v. 4.1).	Correct problem, then see criteria in Box D-1 of DoD QSM v. 4.1 . If required, reprep and reanalyze method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Contamination	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results (see Box D-1 of DoD QSM v. 4.1).
LCS	One per preparatory batch.	Refer to Worksheet #15-3. Limits are as per DoD QSM v. 4.1 Table G-14 and G-16. In-house accuracy limits (nominal) are provided for Toxaphene and for Aroclors other than Aroclor-1016 and Aroclor-1260.	Correct problem then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Accuracy	Refer to Worksheet #15-3. Limits are as per DoD QSM v. 4.1 Table G-14 and G-16. In-house accuracy limits (nominal) are provided for Toxaphene and for Aroclors other than Aroclor-1016 and Aroclor-1260.
MS	One per preparatory batch per matrix	Same as for LCS	Examine the project-specific DQOs. Contact the client as to additional measures to be taken. For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met.	Analyst	Accuracy	Same as for LCS

SAP Worksheet #28-3–Laboratory QC Samples Table (continued)

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
MSD or Laboratory Replicate	One per preparatory batch per matrix	Same as for LCS	Same as MS.	Analyst	Accuracy / Precision	Same as for LCS
Surrogate Spike	All field and QC samples	For PESTs: Decachlorobiphenyl: 30-135% Tetrachloro-m-xylene (TCMX): 25-140% For PCBs: Decachlorobiphenyl: 40-135%	For QC and field samples, correct problem then reprep and reanalyze all failed samples for failed surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatoraphic interference with surrogate is present, reanalysis may not be necessary. Apply Q-flag to all associated analytes if acceptance criteria are not met.	Analyst	Accuracy	For PESTs: Decachlorobiphenyl: 30-135% TCMX: 25-140% For PCBs: Decachlorobiphenyl: 40-135%
Confirmation of Positive Results (second column or second detector)	All positive results must be confirmed	Calibration and QC criteria same as for initial or primary column analysis. Results between primary and second column RPD ≤ 40%.	Apply J-flag if RPD > 40%. Discuss in the case narrative.	Analyst	Precision	Calibration and QC criteria same as for initial or primary column analysis. Results between primary and second column RPD ≤ 40%.
Results reported between DL and LOQ	N/A	Apply J-flag to all results between DL and LOQ.	N/A	Analyst	Accuracy	N/A

Notes:
DoD QSM v. 4.1 is the basis for specifications on this table.

SAP Worksheet #28-4—Laboratory QC Samples Table

(UFP-QAPP Manual Section 3.4)

Matrix: GW

Analytical Group: METAL, FMETAL[1]

Analytical Method / SOP Reference: LAB-09, LAB-10, LAB-11, LAB-12 / SW-846 3010, 6020A, 7470A, 9014

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
METALs and FMETALs[1] via SW-846 3010, 6020A, 7470A, 9014						
Field Duplicates	Refer to Worksheet #12-4	Same as MPC	Assess precision and accuracy of the laboratory/field. Qualify as per Worksheet #36.	PM/FTL, DV	Refer to Worksheet #12-4	Refer to Worksheet #12-4
Equipment Rinseate Blank	Refer to Worksheet #12-4	Same as MPC	Assess equipment decontamination procedures and ambient field conditions. Qualify as per Worksheet #36.	PM/FTL, DV	Refer to Worksheet #12-4	Refer to Worksheet #12-4
Temperature Blank	Refer to Worksheet #12-4	Same as MPC	Notify PC. Assess sample packaging and shipment procedures. Consider recollection if the exceedance may cause data rejection. Qualify as per Worksheet #36.	Laboratory PM, PM/FTL, DV	Refer to Worksheet #12-4	Refer to Worksheet #12-4
METALs and FMETALs via SW-846 3010, 6020A						
Method Blank	One per preparatory batch.	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL (see Box D-1 of DoD QSM v. 4.1).	Correct problem, then see criteria in Box D-1 of DoD QSM v. 4.1 . If required, reprep and reanalyze method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Contamination	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL (see Box D-1 of DoD QSM v. 4.1).
Interference Check Solutions (ICS-A and ICS-AB)	At the beginning of an analytical run and every 12 hours.	ICS-A: Absolute value of concentration for all non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes); ICS-AB: Within ±20% of true value.	Terminate analysis, locate and correct problem, reanalyze ICS, reanalyze all samples. If CA fails, apply Q-flag to all results for specific analyte(s) in all samples associated with the ICS.	Analyst	Accuracy	ICS-A: Absolute value of concentration for all non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes); ICS-AB: Within ±20% of true value.

SAP Worksheet #28-4–Laboratory QC Samples Table (continued)

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
LCS	One per preparatory batch.	Refer to Worksheet #15-4. Limits are as per DoD QSM v. 4.1 Table G-18.	Correct problem then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Accuracy	Refer to Worksheet #15-4. Limits are as per DoD QSM v. 4.1 Table G-18.
MS	One per preparatory batch per matrix	Same as for LCS	Examine the project-specific DQOs. If the MS falls outside of DoD criteria, additional QC tests (dilution test and post-digestion spike [PDS] addition) are required to evaluate matrix effects. For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met.	Analyst	Accuracy	Same as for LCS
MSD or Laboratory Replicate	One per preparatory batch per matrix	Same as for LCS	Same as MS.	Analyst	Accuracy / Precision	Same as for LCS
Dilution Test	One per preparatory batch.	Five-fold dilution must agree within ±10% of the original measurement.	Perform PDS addition. Flagging criteria are not appropriate. Only applicable for samples within concentration > 50X LOQ.	Analyst	Accuracy	Five-fold dilution must agree within ±10% of the original measurement.
Post digestion spike addition	When MS/MSD recoveries are unacceptable.	Recovery within 80-120%.	Run all associated samples in the preparatory batch by method of standard additions (MSA) or see flagging criteria. For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met. Spike addition should produce a concentration of 10-100X LOQ.	Analyst	Accuracy	Recovery within 80-120%.
MSA	When matrix interference is confirmed.	N/A	Document use of MSA in the case narrative.	Analyst	Accuracy	N/A
IS	Every sample.	IS intensity within 30-120% of intensity of the IS in the ICAL.	Reanalyze sample at 5-fold dilution with addition of appropriate amounts if IS. Flagging criteria are not appropriate.	Analyst	Accuracy	IS intensity within 30-120% of intensity of the IS in the ICAL.
Results reported between DL and LOQ	N/A	Apply J-flag to all results between DL and LOQ.	N/A	Analyst	Accuracy	N/A

SAP Worksheet #28-4–Laboratory QC Samples Table (continued)

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
METAL (Hg) and FMETAL (filtered Hg) via SW-846 7470A						
Method Blank	One per preparatory batch.	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL (see Box D-1 of DoD QSM v. 4.1).	Correct problem, then see criteria in Box D-1 of DoD QSM v. 4.1 . If required, reprep and reanalyze method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Contamination	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL (see Box D-1 of DoD QSM v. 4.1).
LCS containing all analytes to be reported	One per preparatory batch.	Refer to Worksheet #15-4. Limits are as per DoD QSM v. 4.1 Table G-18.	Correct problem then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Accuracy	Refer to Worksheet #15-4. Limits are as per DoD QSM v. 4.1 Table G-18.
MS	One per preparatory batch per matrix	Same as for LCS	Examine the project-specific DQOs. If the MS falls outside of DoD criteria, additional QC tests are required to evaluate matrix effects. For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met.	Analyst	Accuracy	Same as for LCS
MSD or Laboratory Replicate	One per preparatory batch per matrix	Same as for LCS	Same as MS.	Analyst	Accuracy / Precision	Same as for LCS
MSA	When matrix interference is confirmed.	N/A	Document use of MSA in the case narrative.	Analyst	Accuracy	N/A
Results reported between DL and LOQ	N/A	Apply J-flag to all results between DL and LOQ.	N/A	Analyst	Accuracy	N/A

SAP Worksheet #28-4–Laboratory QC Samples Table (continued)

QC Sample	Frequency & Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	MPC
METAL (CN) via SW-846 9014						
Method Blank	One per preparatory batch.	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL (see Box D-1 of DoD QSM v. 4.1).	Correct problem, then see criteria in Box D-1 of DoD QSM v. 4.1 . If required, reprep and reanalyze method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Contamination	No analytes detected > 1/2 RL and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL (see Box D-1 of DoD QSM v. 4.1).
LCS	One per preparatory batch.	Refer to Worksheet #15-4. Limits are as per LAB-12.	Correct problem then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch. Problem must be corrected. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst	Accuracy	Refer to Worksheet #15-4. Limits are as per LAB-12.
MS	One per preparatory batch per matrix	Same as for LCS	Examine the project-specific DQOs. If the MS falls outside of DoD criteria, the MSA will be used for the analysis. For the specific analyte in the parent sample, apply J-flag if acceptance criteria are not met. If MS results are outside the LCS limits, the data will be evaluated to determine the source of difference and to determine if there is a matrix effect or analytical error.	Analyst	Accuracy	Same as for LCS
MSD or Laboratory Replicate	One per preparatory batch per matrix	Same as for LCS	Same as MS.	Analyst	Accuracy / Precision	Same as for LCS
Results reported between DL and LOQ	N/A	Apply J-flag to all results between DL and LOQ.	N/A	Analyst	Accuracy	N/A

Notes:

DoD QSM v. 4.1 is the basis for specifications on this table.

1. CN is not part of the FMETAL analysis group.

SAP Worksheet #29—Project Documents and Records Table

Document	Where Maintained
Field Notes	Electronic portable document format (.pdf) copies in the project file. Hardcopy (bound Field Notebook) in the project file. Archived at project closeout*.
Chain-of-Custody Records	Electronic .pdf copies in the project file. Hardcopy in the project file. Archived at project closeout.
Air Bills	Hardcopy in the project file. Archived at project closeout.
Telephone Logs	Hardcopy in the project file. Archived at project closeout.
CA Forms	Electronic .pdf copies in the project file. Hardcopy in the project file. Archived at project closeout.
Pre-Task Safety Plan Forms or Safety Task Analysis Cards	Recorded in Field Notebook. Hardcopy in the project file. Archived at project closeout.
Safe Behavior Observation Forms	Recorded in Field Notebook. Hardcopy in the project file. Archived at project closeout.
Signed HASP and associated Activity Hazard Analysis (AHA) Forms	Recorded in Field Notebook. Hardcopy in the project file. Archived at project closeout.
Water quality field parameters collected during groundwater sampling	Recorded in Field Notebook. Stored in NIRIS.
Various field measurements	Recorded in Field Notebook.
All field equipment calibration information	Recorded in Field Notebook.
Pertinent telephone conversations	Recorded in Field Notebook.
Field equipment maintenance records	Inspected by FTL. Not maintained.
Sample Receipt, Custody, and Tracking Records	Electronic .pdf copies in the project file. Hardcopy in the full data package.
Equipment Calibration Logs	Hardcopy in the full data package[1]. Archived at project closeout.
Sample Prep Logs	Hardcopy in the full data package[1]. Archived at project closeout.
Run Logs	Hardcopy in the full data package[1]. Archived at project closeout.
Reported Field Sample Results	Electronic .pdf copies in the project file. Hardcopy in the full data package[1]. Archived at project closeout.
Reported Results for Standards, QC Checks, and QC Samples	Hardcopy in the full data package[1]. Archived at project closeout.

SAP Worksheet #29—Project Documents and Records Table (continued)

Document	Where Maintained
Instrument Printouts (raw data) for Field Samples, Standards, QC Checks, and QC Samples	Hardcopy in the full data package[1]. Archived at project closeout.
Sample Disposal Records	Maintained by the laboratory.
Extraction/Clean-up Records	Hardcopy in the full data package[1].
Raw Data	Hardcopy in the full data package[1]. Archived at project closeout.
Field Sampling Audit Checklists	Hardcopy in the project file. Archived at project closeout.
Fixed Laboratory Audit Checklists	If completed, hardcopy in the project file. Archived at project closeout.
Data Validation Reports	Electronic .pdf copies in the project file. Hardcopy stored with the data package. Archived at project closeout.
RI Report	Electronic .pdf copies in the project file. Hardcopy (bound notebook) in the project file and administrative record. Archived at project closeout.

* After completion of the project, project documents required to be maintained will be stored at the Federal Records Center (FRC) in Suitland, MD:

Washington National Records Center
4205 Suitland Road
Suitland, Maryland 20746-8001

1 CH2M HILL requires a “Level 4” package.

SAP Worksheet #30—Analytical Services Table

(UFP-QAPP Manual Section 3.5.2.3)

Matrix	Analytical Group	Sample Locations[1] / ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory / Organization	Backup Laboratory / Organization
GW	VOC	6	LAB-01, LAB-02, LAB-03	Standard 28 calendar-day turnaround time (TAT) from sample receipt to laboratory reporting. After reporting, standard 14 calendar-day TAT for data validation.	EMAX Laboratories, Inc. Attn: Sample Receiving 1835 W. 205th Street Torrance, CA 90501 POC: Molly Nguyen (310) 618-8889 x119	TBD
	SVOC	6	LAB-04, LAB-05, LAB-06			
	PEST/PCB	6	LAB-07, LAB-08			
	METAL	6	LAB-09, LAB-10, LAB-11, LAB-12			
	FMETAL	6	LAB-09, LAB-10, LAB-11			

Notes:

1. Quantities represent a single round of sampling.

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SAP Worksheet #31—Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (title and organizational affiliation)	Person(s) Responsible for Responding to Assessment Findings (title and organizational affiliation)	Person(s) Responsible for Identifying and Implementing CAs (title and organizational affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (title and organizational affiliation)
Field Performance Audit	One during sampling activities	Internal	CH2M HILL	Stephen Brand Field auditor CH2M HILL	Project Field Team CH2M HILL	John Swenfurth PM CH2M HILL	John Tomik AQM CH2M HILL
Pre-Task Safety Plan or Safety Task Analysis Card	One per day during field activities	Internal	CH2M HILL	Stephen Brand Field auditor CH2M HILL	Project Field Team CH2M HILL	Mark Orman H&S Officer CH2M HILL	Mark Orman H&S Officer CH2M HILL
Safe Behavior Observation Form	One per week during field activities	Internal	CH2M HILL	Stephen Brand Field auditor CH2M HILL	Project Field Team CH2M HILL	Mark Orman H&S Officer CH2M HILL	Mark Orman H&S Officer CH2M HILL

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SAP Worksheet #32—Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (name, title, organization)	Timeframe of Notification	Nature of CA Response Documentation	Individual(s) Receiving CA Response (name, title, organization)	Timeframe for Response
Field Performance Audit	Field Performance Audit Checklist	Field Team PM EM	Within one week of audit	Verbal and CA Form	FTL PM AQM EM	Within one week of receipt of CA Form
Safe Work Observation (SWO)	Safe Work Observation Form	FTL Field Team PM	Immediately (person involved or observed person). Following day (field team). Within 1 week if worthy of elevation (H&S Officer)	On SWO Form	FTL and individual being observed, and the PM and if elevated to the H&S Officer.	Corrected in the field immediately, and within 1 week if elevated.

SAP Worksheet #32-1 — Corrective Action Form

Person initiating CA _____ **Date** _____

Description of problem and when identified: _____

_____

_____

_____

_____

Cause of problem, if known or suspected: _____

_____

_____

_____

Sequence of CA: **(including date implemented, action planned and personnel/data affected)** _____

_____

_____

_____

_____

_____

_____

_____

CA implemented by: _____ **Date:** _____

CA initially approved by: _____ **Date:** _____

Follow-up date: _____

Final CA approved by: _____ **Date:** _____

Information copies to:

Anita Dodson, CH2M HILL Navy CLEAN Program Chemist

_____

_____

SAP Worksheet #32-2—Field Performance Audit Checklist

Project Responsibilities

Project No.: **Date:**

Project Location: **Signature:**

Team Members:

Yes No 1) Is the approved work plan being followed?
Comments

Yes No 2) Was a briefing held for project participants?
Comments

Yes No 3) Were additional instructions given to project participants?
Comments

Sample Collection:

Yes No 1) Is there a written list of sampling locations and descriptions?
Comments

Yes No 2) Are samples collected as stated in the Master SOPs?
Comments

Yes No 3) Are samples collected in the type of containers specified in the work plan?
Comments

Yes No 4) Are samples preserved as specified in the work plan?
Comments

Yes No 5) Are the number, frequency, and type of samples collected as specified in the work plan?
Comments

SAP Worksheet #32-2—Field Performance Audit Checklist (continued)

Yes No 6) Are QA checks performed as specified in the work plan?
Comments

Yes No 7) Are photographs taken and documented?
Comments

Document Control:

Yes No 1) Have any accountable documents been lost?
Comments

Yes No 2) Have any accountable documents been voided?
Comments

Yes No 3) Have any accountable documents been disposed of?
Comments

Yes No 4) Are the samples identified with sample tags?
Comments

Yes No 5) Are blank and duplicate samples properly identified?
Comments

Yes No 6) Are samples listed on a chain-of-custody record?
Comments

Yes No 7) Is chain-of-custody documented and maintained?
Comments

SAP Worksheet #32-3—Safe Behavior Observation Form

Safe Behavior Observation Form		
☐Federal or ☐Commercial Sector (check one)		☐Construction or ☐ Consulting (check one)
Project Number:	Client/Program:	
Project Name:	Observer:	Date:
Position/Title of worker observed:	Background Information/ comments:	
Task/Observation Observed:		

- ❖ Identify and reinforce safe work practices/behaviors
- ❖ Identify and improve on at-risk practices/acts
- ❖ Identify and improve on practices, conditions, controls, and compliance that eliminate or reduce hazards
- ❖ Proactive PM support facilitates eliminating/reducing hazards (do you have what you need?)
- ❖ Positive, corrective, cooperative, collaborative feedback/recommendations

Actions & Behaviors	Safe	At-Risk	Observations/Comments
Current & accurate Pre-Task Planning/Briefing (Project safety plan, Safety Task Analysis Card [STAC], AHA, Pre-Task Safety Plan [PTSP], tailgate briefing, etc., as needed)			**Positive Observations/Safe Work Practices:**
Properly trained/qualified/experienced			
Tools/equipment available and adequate			
Proper use of tools			**Questionable Activity/Unsafe Condition Observed:**
Barricades/work zone control			
Housekeeping			
Communication			
Work Approach/Habits			
Attitude			
Focus/attentiveness			**Observer's CAs/Comments:**
Pace			
Uncomfortable/unsafe position			
Inconvenient/unsafe location			
Position/Line of fire			
Apparel (hair, loose clothing, jewelry)			
Repetitive motion			**Observed Worker's CAs/Comments:**
Other…			

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SAP Worksheet #33—QA Management Reports Table

Type of Report	Frequency (daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (title and organizational affiliation)	Report Recipient(s) (title and organizational affiliations)
Field Audit Report	One during sampling activities	Submitted with report in which data are analyzed and presented	PM: John Swenfurth/CH2M HILL	Regional Health, Safety, Environment, and Quality Manager: Mark Orman/CH2M HILL Included in project files.
Data Validation Reports	Once, after analysis by laboratory, for all laboratory analytical data except wet chemistry (WCHEM) and MICRO analyses.	Submitted by the DV within 14 calendar-days of notification to begin)	PM: TBD	PC: Michael Zamboni/CH2M HILL Project PDM: Hillary Ott/CH2M HILL PM: John Swenfurth/CH2M HILL
Data Usability Assessments (DQE)	Once, as an appendix to the report in which data are analyzed and presented.	Along with the project report.	PC: Michael Zamboni/CH2M HILL	Vieques RPM: Daniel Rodriquez/EPA and Vieques RPM Wilmarie Rivera/PREQB

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SAP Worksheet #34-36—Data Verification and Validation (Steps I and IIa/IIb) Process Table

(UFP-QAPP Manual Section 5.2.1) (UFP-QAPP Manual Section 5.2.2) (Figure 37 UFP-QAPP Manual) (Table 9 UFP-QAPP Manual)

Data Review Input	Description	Responsible for Verification	Step I / IIa / IIb[1]	Internal / External[2]
Field Notebooks	Field notebooks will be reviewed internally and placed into the project file for archival at project closeout.	FTL/CH2M HILL (TBD)	Step I	Internal
Chains-of-Custody and Shipping Forms	Chain-of-custody forms and shipping documentation will be reviewed internally upon their completion and verified against the packed sample coolers they represent. The shipper's signature on the chain-of custody will be initialed by the reviewer, a copy of the chain-of-custody retained in the site file, and the original and remaining copies taped inside the cooler for shipment.	FTL/CH2M HILL (TBD) Hillary Ott/CH2M HILL (PDM)	Step I	Internal / External
Sample Condition Upon Receipt	Any discrepancies, missing, or broken containers will be communicated to the PDM in the form of laboratory logins.	Hillary Ott/CH2M HILL (PDM)	Step I	External
Documentation of Laboratory Method Deviations	Laboratory Method Deviations will be discussed and approved by the PC. Documentation will be incorporated into the case narrative which becomes part of the final hardcopy data package.	Michael Zamboni/CH2M HILL (PC)	Step I	External
Electronic Data Deliverables	Electronic Data Deliverables will be compared against hardcopy laboratory results (10% check, randomly-selected).	Hillary Ott/CH2M HILL (PDM)	Step I	External
Electronic Data Deliverables	Electronic Data Deliverables will be compared against data validation reports and marked-up Form 1s (100% check of all changes made during data validation).	Michael Zamboni/CH2M HILL (PC)	Step I	External
Case Narrative	Case narratives will be reviewed by the DV during the data validation process. This is verification that they were generated and applicable to the data packages.	Laura Maschoff/DataQual (DV)	Step I	External
Laboratory Data	All laboratory data packages will be verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.	Kenette Pimentel/EMAX (Laboratory QAO)	Step I	Internal

SAP Worksheet #34-36–Data Verification and Validation (Steps I and IIa/IIb) Process Table (continued)

Data Review Input	Description	Responsible for Verification	Step I / IIa / IIb[1]	Internal / External[2]
Laboratory Data	The data will be verified for completeness by a PDM.	Hillary Ott/CH2M HILL (PDM)	Step I	External
Audit Reports	Upon report completion, a copy of all audit reports will be placed in the site file. If CAs are required, a copy of the documented CA taken will be attached to the appropriate audit report in the QA site file. Periodically, and at the completion of site work, site file audit reports and CA forms will be reviewed internally to ensure that all appropriate CAs have been taken and that CA reports are attached. If CAs have not been taken, the site manager will be notified to ensure action is taken.	John Swenfurth/CH2M HILL (PM) Michael Zamboni/CH2M HILL (PC)	Step I	Internal
CA Reports	CA reports will be reviewed by the PC or PM and placed into the project file for archival at project closeout.	John Swenfurth/CH2M HILL (PM) Michael Zamboni/CH2M HILL (PC)	Step I	External
Laboratory Methods	Ensure the laboratory analyzed samples using the correct methods.	Michael Zamboni/CH2M HILL (PC)	Step IIa	External
TCL/TAL	Ensure the laboratory reported all analytes from each analysis group as per Worksheet 15.	Michael Zamboni/CH2M HILL (PC)	Step IIa	External
RLs	Ensure the laboratory met the project-designated QLs as per Worksheet 15. If QLs were not met, the reason will be determined and documented.	Michael Zamboni/CH2M HILL (PC)	Step IIb	External
Laboratory SOPs	Ensure that approved analytical laboratory SOPs were followed.	Laura Maschoff/DataQual (DV)	Step IIa	External
Sample Chronology	Holding times from collection to extraction or analysis and from extraction to analysis will be considered by the DV during the data validation process.	Laura Maschoff/DataQual (DV)	Step IIa / IIb	External

SAP Worksheet #34-36–Data Verification and Validation (Steps I and IIa/IIb) Process Table (continued)

Data Review Input	Description	Responsible for Verification	Step I / IIa / IIb[1]	Internal / External[2]
Raw Data	10 percent review of raw data, randomly-selected, to confirm laboratory calculations.	Laura Maschoff/DataQual (DV)	Step IIa	External
Onsite Screening	All non-analytical field data will be reviewed against QAPP requirements for completeness and accuracy based on the field calibration records.	FTL/CH2M HILL (TBD)	Step IIb	Internal
Documentation of Method QC Results	Establish that all required QC samples were run and met limits.	Laura Maschoff/DataQual (DV)	Step IIa	External
Documentation of Field QC Sample Results	Establish that all required QAPP QC samples were run and met limits.	Michael Zamboni/CH2M HILL (PC) Laura Maschoff/DataQual (DV)	Step IIb	External
Third-Party Data Validation	Validation qualifiers are hand-written or otherwise entered onto the laboratory Form 1s and then re-assembled into the data validation report. Validation qualifiers supersede laboratory qualifiers (for data subject to analytical data validation) and are presented on data tables when produced after validated data have been received. Nevertheless, all qualifiers are defined at the bottom of tables.	Laura Maschoff/DataQual (DV)	Step IIa and IIb	External
Third-Party Data Validation (VOC)[3]	SOP HW-24. "Validating Volatile Organic Compounds by SW-846 Method 8260B". Rev 2. August, 2009. Note that the DV will use the QC limits specified in this UFP-SAP.	Laura Maschoff/DataQual (DV)	Step IIa and IIb	External
Third-Party Data Validation (SVOC)[3]	SOP HW-22. "Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D". Rev 4. August, 2009. Note that the DV will use the QC limits specified in this UFP-SAP.	Laura Maschoff/DataQual (DV)	Step IIa and IIb	External
Third-Party Data Validation (PEST)[3]	SOP HW-44. "Validating Pesticide Compounds Organochlorine Pesticides by Gas Chromatography SW-846 Method 8081B". Rev 1. August, 2009. Note that the DV will use the QC limits specified in this UFP-SAP.	Laura Maschoff/DataQual (DV)	Step IIa and IIb	External
Third-Party Data Validation (PCB)[3]	SOP HW-45. "Validating PCB Compounds PCBs by Gas Chromatography SW-846 Method 8082A". Rev 1. August, 2009. Note that the DV will use the QC limits specified in this UFP-SAP.	Laura Maschoff/DataQual (DV)	Step IIa and IIb	External

SAP Worksheet #34-36–Data Verification and Validation (Steps I and IIa/IIb) Process Table (continued)

Data Review Input	Description	Responsible for Verification	Step I / IIa / IIb[1]	Internal / External[2]
Third-Party Data Validation (METAL)[3]	Analytical methods and laboratory SOPs, as presented in this UFP-SAP, will be used to evaluate compliance against QA/QC criteria. QA/QC criteria for field QC samples are presented in Worksheet 12, QLs and PALs are presented in Worksheet 15, QA/QC criteria for calibrations are presented in Worksheet 24, and QA/QC criteria for laboratory QC samples are presented in Worksheet 28. Data may be qualified if QA/QC exceedances have occurred. Data qualifiers will be those presented in "Evaluation of Metals Data for the CLP Program"; SOP HW-2 Rev.13, ILM05.3; September, 2006. Guidance and qualifiers from "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" (EPA 540-R-10-011, January, 2010) may also be applicable.	Laura Maschoff/DataQual (DV)	Step IIa and IIb	External

Notes:

1. IIa = compliance with methods, procedures, and contracts [see Table 10, page 117, UFP-QAPP manual, V.1, March 2005.]
   IIb = comparison with MPC in the SAP [see Table 11, page 118, UFP-QAPP manual, V.1, March 2005]
2. Internal/External is with respect to the data generator.
3. 100% of Definitive data will be third-party validated. Of the 100% validated, the third-party DV will also recalculate 10% of results from the raw data.

SAP Worksheet #37—Usability Assessment

Data usability evaluation comprises critical assessment of the data with respect to the project objective. Given that the primary objective of the LTM is to ensure leaching of contaminants to groundwater has not occurred and there are no unacceptable risks to human health, the comprehensive dataset will be reviewed to determine if it is adequate for making the project-specific determinations.

Some specific examples of data availability and usability protocol are:

- The third-party DV is the only party that may apply qualifiers to the data. Minor QC exceedances will result in "estimated" data, represented by J, NJ, and UJ qualifiers. Major QC exceedances will result in "rejected" data, represented by R-qualifiers. The effect on availability and usability of rejected results will be evaluated.
- The use of "estimated" data will be discussed in the report. "Estimated" data are generally considered usable for all purposes. For results reported between the DL and LOQ the laboratory will apply J-flags.
- While all non-rejected data are available for use to the project team, non-detect (and attributable to blank contamination) results may not be useful if the LOD is greater than the associated PAL. In these cases, the project team will determine whether or not the laboratory would likely have detected the contaminant if present at or above the PAL (i.e., evaluation of the PAL versus the DL).
- Ten percent of hardcopy analytical data will be checked against the electronic data to identify discrepancies. This check will be performed manually. The check will verify results and qualifiers. This process is intended to identify discrepancies between the hardcopy and electronic data. If any discrepancies are identified during the ten percent verification, the laboratory will be contacted, the discrepancies will be communicated, and the laboratory will resolve the discrepancies.
- If significant deviation is evident between parent samples and their field or laboratory duplicate, the cause will be investigated. The possibility of a switched sample will be examined. Field duplicates are expected to exhibit greater deviation than laboratory duplicates. Field duplicate and laboratory duplicate reproducibility is outlined in Worksheets 12 and 28.
- Significant biases may be evident based on LCS, MS/MSD, and spiked surrogate exceedances. The third-party DV will consider QC exceedances and biases when applying qualifiers to data. The project team will consider the direction of bias when determining the usability of qualified data compared to PALs. Low biases are expected to occur more frequently than high biases. In the case of rejected non-detect data, low biases represent the inability of the laboratory to detect contaminants that may or may not be present at the site. The project team will act conservatively and understand that it is not known whether or not these compounds are present below, at, or above the PAL. High biases indicate that a result may be lower than it is reported. When high-biased data are greater than a PAL, the project team will examine the proximity of the result to the PAL to determine whether additional data are needed or if the result should simply be considered a PAL exceedance.
- After completion of the data validation, the distribution of applied data validation qualifiers will be examined to determine if there are patterns that negatively affect the usability of data. This information will be compiled into a DQE, which will be presented as an appendix to the project report.
- Data usability is not decided upon by any one individual or entity. The project team, as a whole, will decide upon the usability of the data.

SAP Worksheet #37—Usability Assessment (continued)

- Deviations from the SAP sampling and analytical protocols will be reviewed to ascertain whether or not they are significant enough to negatively affect the usability of data.
- Precision is accessed via percent difference or relative percent difference. Percent difference is typically used when one value is considered theoretically correct and relative percent difference is typically used when both values are experimental. Percent difference is calculated by taking the absolute value of the difference divided by the theoretical value. This is also expressed as

$$((|X_1 - X_2|) / X_1) * 100$$

where X_1 is the theoretical value and X_2 is the experimental value. If it is necessary to imply the direction of a bias, such as for percent drift, the absolute value need not be considered. Relative percent difference is calculated by taking the absolute value of the difference divided by the mean. This is also expressed as

$$((|X_1 - X_2|) / ((X_1 + X_2)/2)) * 100$$

where X1 and X2 are both measured values. Percent difference and relative percent difference often have upper control limits for precision.

- Accuracy is accessed via percent recovery. This is calculated by taking the measured value divided by the theoretical value. This is also expressed as

$$(X_2 / X_1) * 100$$

where X1 is the theoretical value and X2 is the experimental value, both positive numbers because they are 'amounts' or concentrations. Percent recovery can be negative, such as for MS and MSD recovery, if X2 is calculated by subtracting a parent concentration from an experimental recovery. Percent recovery often has upper and lower control limits for accuracy.

- Completeness is calculated by taking the number of available results divided by the total number of results. This is also expressed as

$$(X_2 / X_1) * 100$$

where X2 is the number of distinct results deemed "available for use" (not rejected) and X1 is the total number of distinct results (not excluded). Completeness is calculated for the entire data set, for each matrix, and for each combination of matrix and analysis group. If patterns of rejection are evident in the data set, completeness may also be calculated for select combinations of matrix, analysis group, and analyte or other combinations as applicable for the data quality evaluation. Completeness has a lower control limit (completeness goal) and cannot exceed 100%.

Notes:

1. Completeness is defined as the percentage of measurements that are judged to be available compared to the total number of measurements made. The objective of the overall completeness goal for this project is set at 95% available data. This goal is inclusive of both field and laboratory analytical data.
2. Discussions of precision, accuracy, representativeness (qualitative), completeness, and comparability (qualitative) will be included in the data quality review to describe the impact of data quality on project data quality objectives and data usability. Sensitivity is assessed by comparing nondetect results, LODs, and DLs to the screening levels.

References

CH2MHILL, 2004. Phase 1 RCRA Facility Investigation Report, Former Atlantic Fleet Weapons Training Facility Vieques Island, Puerto Rico. June.

CH2M HILL. 2010a. *Final Master Standard Operating Procedures, Protocols, and Plans, Environmental Restoration Program Vieques, Puerto Rico.* April.

CH2M HILL. 2010b. *Vieques Environmental Master Health and Safety Plan.* February.

CH2M HILL. 2010c. *Final Site Inspection / Expanded Site Inspection Report, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico.* August.

CH2MHILL, 2011a. Streamlined Remedial Investigation/Feasibility Study Report, Solid Waste Management Unit 1(SWMU1) Former Vieques Naval Training Range, Vieques, Puerto Rico. April.

CH2M HILL. 2011b. *Record of Decision Solid Waste Management Unit (SWMU 1), Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico.* September.

Intergovernmental Data Quality Task Force. 2005. *EPA Uniform Federal Policy for Quality Assurance Project Plans* (UFP-QAPPs).

Puerto Rico Environmental Quality Board, 1995. Revised RCRA Facility Assessment Report, Atlantic Fleet Weapons Training Facility, Vieques, Puerto Rico. September.

Naval Facilities Engineering Command (NAVFAC) Atlantic Division. 2003. Environmental Baseline Survey, Vieques Naval Training Range, Vieques Island, Puerto Rico. April.

TAMS-Tippets-Abbett-McCarthy-Stratton and Ecology and Environment, 1979. Draft Environmental Impact Statement, Continued Use of the Atlantic Fleet Weapons Training Facility Inner Range (Vieques). December.

United States (U.S.) Environmental Protection Agency (EPA). 2002. Guidance for QAPPs, USEPA Quality Assurance (QA)/G-5, Quality Assurance Management Section (QAMS). October.

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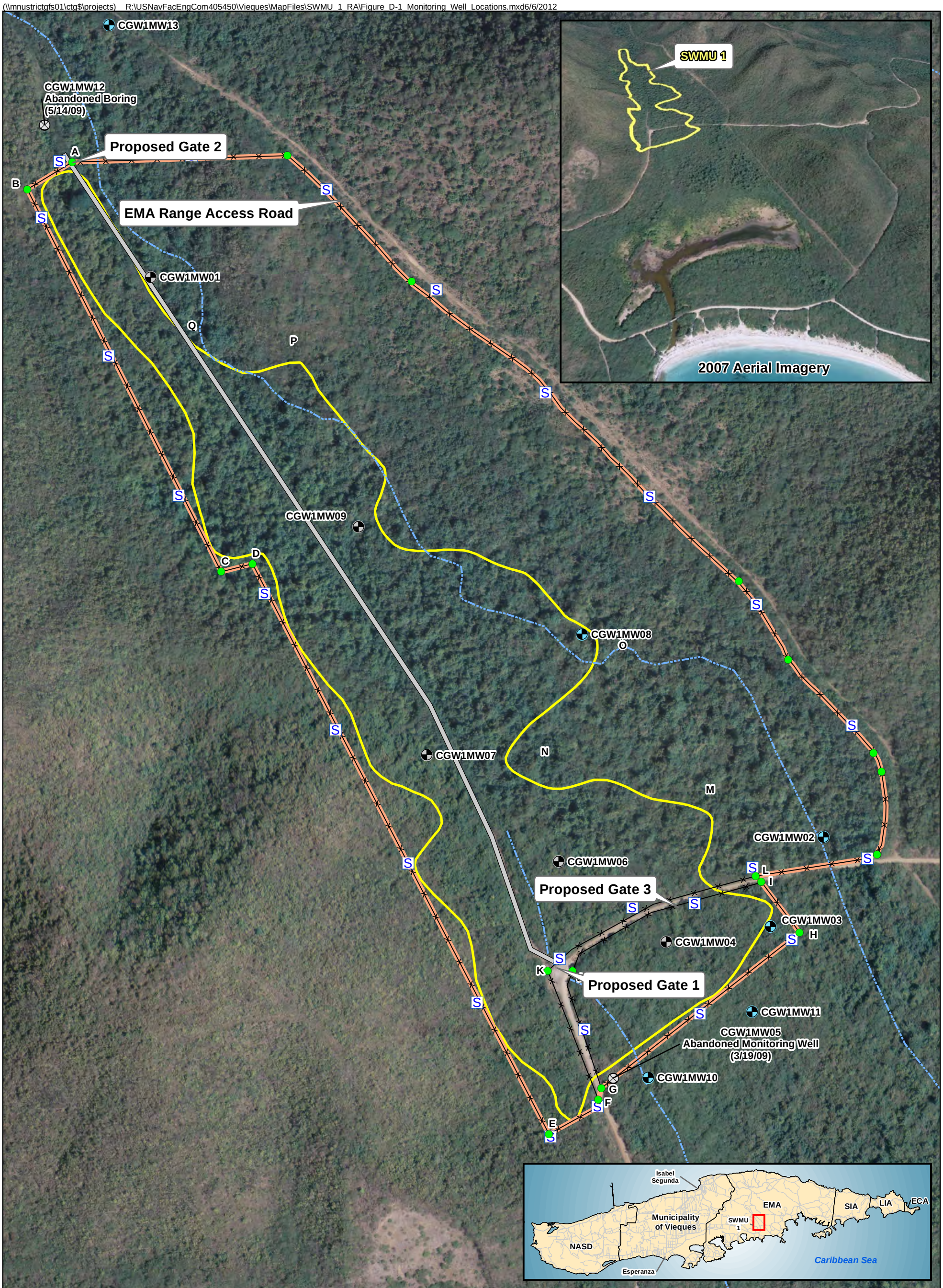
Figures

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\SWMU_1_RA\Figure_D-1_Monitoring_Well_Locations.mxd6/6/2012



Legend

- Proposed Fence Corners
- Proposed Sign Location
- Monitoring Well
- Long Term Monitoring Well
- Abandoned Boring or Monitoring Well
- Proposed 3-Wire Fence
- Ephemeral Stream
- Proposed LUC Boundary (To Be Surveyed by professional Surveyor)
- Existing 15-ft-Wide Access Road
- Approximate Extent of Landfill Debris

Notes:
1. Spacing for intermediate end post assembles shall be 400 ft maximum.
2. 6" x 6" x 8' wood posts to be treated with preservative.

N W E S

0 250 500 Feet

2007 Aerial Imagery

Figure D-1
Monitoring Well Locations
SWMU 1 Groundwater Long Term Monitoring SAP
Former Vieques Naval Training Range
Vieques, Puerto Rico

CH2MHILL

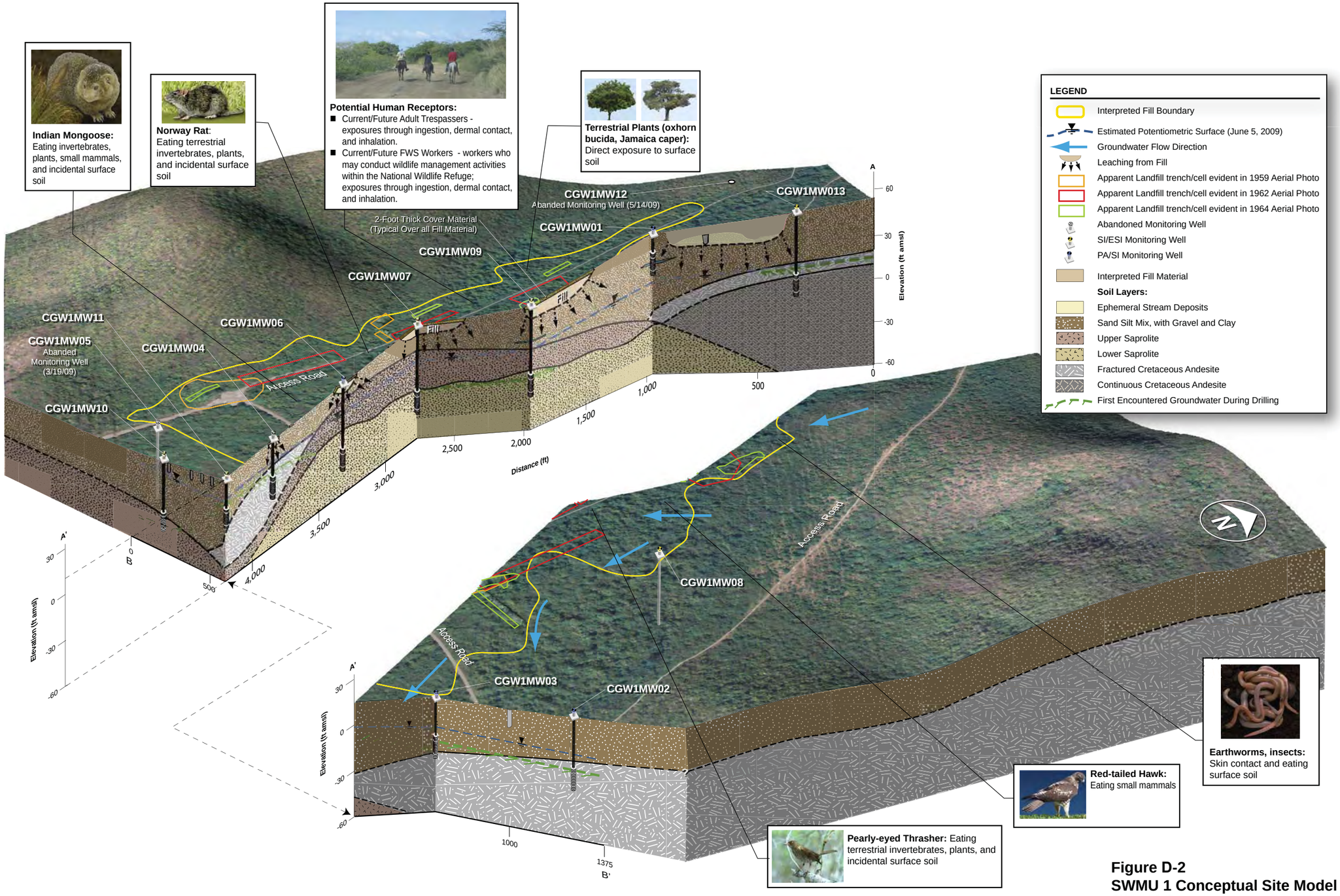


Figure D-2
SWMU 1 Conceptual Site Model
SWMU 1 Groundwater Long Term Monitoring SAP
Former Vieques Naval Training Range
Vieques, Puerto Rico

CH2MHILL

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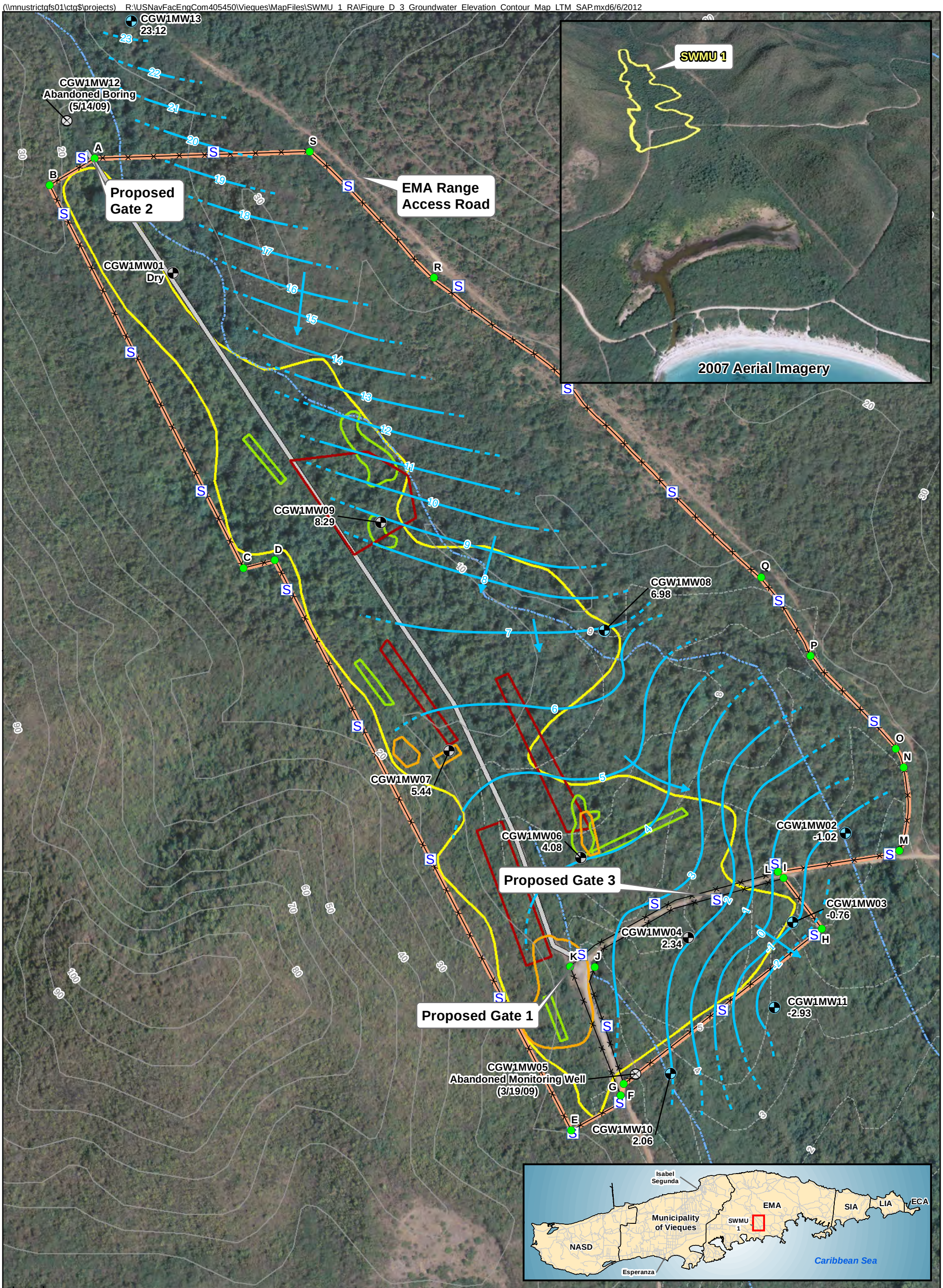

Legend

- Proposed Fence Corners
- Approximate Sign Location
- Monitoring Well
- Long Term Monitoring Well
- Abandoned Boring or Monitoring Well
- Estimated Groundwater Contours
- Estimated Groundwater Contours (Inferred)
- Estimated Direction of Groundwater Flow
- Proposed 3-Wire Fence
- Topographic Contour (1 Meter Interval)
- Topographic Contour (10 Meter Interval)
- Ephemeral Stream
- Apparent Landfill trench/cell evident in 1959 Aerial Photograph
- Apparent Landfill trench/cell evident in 1962 Aerial Photograph
- Apparent Landfill trench/cell evident in 1964 Aerial Photograph
- Proposed LUC Boundary (To Be Surveyed by professional Surveyor)
- Existing 15-ft-Wide Access Road
- Approximate Extent of Landfill Debris

Notes:
Groundwater Elevations in Ft MSL
Water Level Readings taken on 6/5/09.

N
W E
S

0 250 500
Feet

2007 Aerial Imagery

Figure D-3
Groundwater Elevation Contour Map
SWMU 1 Groundwater Long Term Monitoring SAP
Former Vieques Naval Training Range
Vieques, Puerto Rico

CH2MHILL

Attachment A
Laboratory DoD ELAP Accreditation Letter

LABORATORY ACCREDITATION BUREAU

Certificate of Accreditation

ISO/IEC 17025:2005 ***Certificate Number L2278***

EMAX Laboratories, Inc

1835 W 205th Street
Torrance, CA 90501

has met the requirements set forth in L-A-B's policies and procedures, all requirements of ISO/IEC 17025:2005 "General Requirements for the competence of Testing and Calibration Laboratories" and the U.S. Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP).*

The accredited lab has demonstrated technical competence to a defined "Scope of Accreditation" and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Accreditation Granted through: January 10, 2014

R. Douglas Leonard, Jr., Managing Director
Laboratory Accreditation Bureau
Presented the 10th of January 2011

*See the laboratory's Scope of Accreditation for details of the DoD ELAP requirements
Laboratory Accreditation Bureau is found to be in compliance with ISO/IEC 17011:2004 and recognized by ILAC (International Laboratory Accreditation Cooperation) and NACLA (National Cooperation for Laboratory Accreditation).

LABORATORY ACCREDITATION BUREAU

Certificate # L2278

Scope of Accreditation For EMAX Laboratories, Inc.

1835 W 205th Street
Torrance, CA 90501
Kenette Pimentel
310-618-8889

In recognition of a successful assessment to ISO/IEC 17025:2005 and the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in the DoD Quality Systems Manual for Environmental Laboratories (DoD QSM v4.1) based on the National Environmental Laboratory Accreditation Conference Chapter 5 Quality Systems Standard (NELAC Voted Revision June 5, 2003), accreditation is granted to **EMAX Laboratories, Inc.** to perform the following tests:

Accreditation granted through: **January 10, 2014**

Testing - Environmental

Non-Potable Water		
Technology	**Method**	**Analyte**
GC	AK101	GRO
GC	AK102	DRO
GC	AK103	RRO
GC	RSK175	Methane
GC	RSK175	Acetylene
GC	RSK175	Ethylene
GC	RSK175	Ethane
GC	RSK175	Propane
GC	RSK175	Carbon dioxide
Spectrometric	SM4500-NH3C	Ammonia
Spectrometric	SM4500-NH3F	Ammonia
Spectrometric	SM4500-NOrgC	TKN
Spectrometric	SM4500-PE	Phosphorus
Electrode	EPA 9040C	pH
Electrode	EPA 9045D	pH
Spectrometric	EPA 9065	Phenols
Pensky-Martens	EPA 1010	Ignitability
ICP	EPA 6010B / 6010C	Aluminum
ICP	EPA 6010B / 6010C	Antimony
ICP	EPA 6010B / 6010C	Arsenic
ICP	EPA 6010B / 6010C	Barium
ICP	EPA 6010B / 6010C	Beryllium
ICP	EPA 6010B / 6010C	Boron

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP	EPA 6010B / 6010C	Cadmium
ICP	EPA 6010B / 6010C	Calcium
ICP	EPA 6010B / 6010C	Chromium
ICP	EPA 6010B / 6010C	Cobalt
ICP	EPA 6010B / 6010C	Copper
ICP	EPA 6010B / 6010C	Iron
ICP	EPA 6010B / 6010C	Lead
ICP	EPA 6010B / 6010C	Magnesium
ICP	EPA 6010B / 6010C	Manganese
ICP	EPA 6010B / 6010C	Molybdenum
ICP	EPA 6010B / 6010C	Nickel
ICP	EPA 6010B / 6010C	Potassium
ICP	EPA 6010B / 6010C	Selenium
ICP	EPA 6010B / 6010C	Silver
ICP	EPA 6010B / 6010C	Sodium
ICP	EPA 6010B / 6010C	Strontium
ICP	EPA 6010B / 6010C	Thallium
ICP	EPA 6010B / 6010C	Tin
ICP	EPA 6010B / 6010C	Titanium
ICP	EPA 6010B / 6010C	Vanadium
ICP	EPA 6010B / 6010C	Zinc
ICP-MS	EPA 6020A	Aluminum
ICP-MS	EPA 6020A	Antimony
ICP-MS	EPA 6020A	Arsenic
ICP-MS	EPA 6020A	Barium
ICP-MS	EPA 6020A	Beryllium
ICP-MS	EPA 6020A	Boron
ICP-MS	EPA 6020A	Cadmium
ICP-MS	EPA 6020A	Calcium
ICP-MS	EPA 6020A	Chromium
ICP-MS	EPA 6020A	Cobalt
ICP-MS	EPA 6020A	Copper
ICP-MS	EPA 6020A	Iron
ICP-MS	EPA 6020A	Lead
ICP-MS	EPA 6020A	Magnesium
ICP-MS	EPA 6020A	Manganese
ICP-MS	EPA 6020A	Molybdenum
ICP-MS	EPA 6020A	Nickel
ICP-MS	EPA 6020A	Potassium
ICP-MS	EPA 6020A	Selenium
ICP-MS	EPA 6020A	Silver
ICP-MS	EPA 6020A	Sodium
ICP-MS	EPA 6020A	Strontium

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP-MS	EPA 6020A	Thallium
ICP-MS	EPA 6020A	Tin
ICP-MS	EPA 6020A	Titanium
ICP-MS	EPA 6020A	Uranium
ICP-MS	EPA 6020A	Vanadium
ICP-MS	EPA 6020A	Zinc
Spectrometric	EPA 7196A	Hex. Chromium
IC	EPA 7199	Hex. Chromium
Cold-Vapor	EPA 7470A / 7471A	Mercury
GC	EPA 8015B / 8015C	Gasoline
GC	EPA 8015B / 8015C	Diesel
GC	EPA 8015B / 8015C	Motor Oil
GC	EPA 8015B / 8015C	JP5
GC	EPA 8081A / 8081B	Aldrin
GC	EPA 8081A / 8081B	alpha-BHC
GC	EPA 8081A / 8081B	beta-BHC
GC	EPA 8081A / 8081B	delta-BHC
GC	EPA 8081A / 8081B	gamma-BHC (Lindane)
GC	EPA 8081A / 8081B	DDD (4,4)
GC	EPA 8081A / 8081B	DDE (4,4)
GC	EPA 8081A / 8081B	DDT (4,4)
GC	EPA 8081A / 8081B	Dieldrin
GC	EPA 8081A / 8081B	Endosulfan I
GC	EPA 8081A / 8081B	Endosulfan II
GC	EPA 8081A / 8081B	Endosulfan sulfate
GC	EPA 8081A / 8081B	Endrin
GC	EPA 8081A / 8081B	Endrin Aldehyde
GC	EPA 8081A / 8081B	Heptachlor
GC	EPA 8081A / 8081B	Heptachlor epoxide
GC	EPA 8081A / 8081B	Methoxychlor
GC	EPA 8081A / 8081B	alpha-Chlordane
GC	EPA 8081A / 8081B	gamma-Chlordane
GC	EPA 8081A / 8081B	Endrin Ketone
GC	EPA 8081A / 8081B	Toxaphene
GC	EPA 8081A / 8081B	Technical Chlordane
GC	EPA 8082 / 8082A	PCB1016
GC	EPA 8082 / 8082A	PCB1221
GC	EPA 8082 / 8082A	PCB1232
GC	EPA 8082 / 8082A	PCB1242
GC	EPA 8082 / 8082A	PCB1248
GC	EPA 8082 / 8082A	PCB1254
GC	EPA 8082 / 8082A	PCB1260
GC	EPA 8082 / 8082A	PCB1262

Non-Potable Water		
Technology	**Method**	**Analyte**
GC	EPA 8082 / 8082A	PCB1268
GC	EPA 8082 / 8082A	PCB 8
GC	EPA 8082 / 8082A	PCB 18
GC	EPA 8082 / 8082A	PCB 28
GC	EPA 8082 / 8082A	PCB 44
GC	EPA 8082 / 8082A	PCB 52
GC	EPA 8082 / 8082A	PCB 66
GC	EPA 8082 / 8082A	PCB 77
GC	EPA 8082 / 8082A	PCB 81
GC	EPA 8082 / 8082A	PCB 101
GC	EPA 8082 / 8082A	PCB 105
GC	EPA 8082 / 8082A	PCB 114
GC	EPA 8082 / 8082A	PCB 118
GC	EPA 8082 / 8082A	PCB 123
GC	EPA 8082 / 8082A	PCB 126
GC	EPA 8082 / 8082A	PCB 128
GC	EPA 8082 / 8082A	PCB 138
GC	EPA 8082 / 8082A	PCB 153
GC	EPA 8082 / 8082A	PCB 156
GC	EPA 8082 / 8082A	PCB 157
GC	EPA 8082 / 8082A	PCB 167
GC	EPA 8082 / 8082A	PCB 169
GC	EPA 8082 / 8082A	PCB 170
GC	EPA 8082 / 8082A	PCB 180
GC	EPA 8082 / 8082A	PCB 187
GC	EPA 8082 / 8082A	PCB 189
GC	EPA 8082 / 8082A	PCB 195
GC	EPA 8082 / 8082A	PCB 206
GC	EPA 8082 / 8082A	PCB 209
GC	EPA 8141A	Azinphos-methyl
GC	EPA 8141A	Bolstar
GC	EPA 8141A	Chlorpyrifos
GC	EPA 8141A	Coumaphos
GC	EPA 8141A	Demeton
GC	EPA 8141A	Diazinon
GC	EPA 8141A	Dichlorvos
GC	EPA 8141A	Disulfoton
GC	EPA 8141A	Ethoprop
GC	EPA 8141A	Fensulfothion
GC	EPA 8141A	Fenthion
GC	EPA 8141A	Merphos
GC	EPA 8141A	Mevinphos
GC	EPA 8141A	Naled

Non-Potable Water		
Technology	**Method**	**Analyte**
GC	EPA 8141A	Methyl Parathion
GC	EPA 8141A	Phorate
GC	EPA 8141A	Ronnel
GC	EPA 8141A	Stirophos
GC	EPA 8141A	Tokuthion
GC	EPA 8141A	Trichloronate
GC	EPA 8141A	Dimethoate
GC	EPA 8141A	EPN
GC	EPA 8141A	Famphur
GC	EPA 8141A	Malathion
GC	EPA 8141A	Ethyl Parathion
GC	EPA 8141A	O,O,O-Triethylphosphorothioate
GC	EPA 8141A	Sulfotepp
GC	EPA 8141A	Thionazin
GC	EPA 8141A	Tributyl Phosphate
GC-MS	EPA 8260B	Acetone
GC-MS	EPA 8260B	Acrolein
GC-MS	EPA 8260B	Acrylonitrile
GC-MS	EPA 8260B	Benzene
GC-MS	EPA 8260B	Bromobenzene
GC-MS	EPA 8260B	Bromochloromethane
GC-MS	EPA 8260B	Bromodichloromethane
GC-MS	EPA 8260B	Bromoform
GC-MS	EPA 8260B	Bromomethane
GC-MS	EPA 8260B	tert-Butyl alcohol
GC-MS	EPA 8260B	2-Butanone (MEK)
GC-MS	EPA 8260B	n-Butylbenzene
GC-MS	EPA 8260B	sec-Butylbenzene
GC-MS	EPA 8260B	tert-Butylbenzene
GC-MS	EPA 8260B	Carbon disulfide
GC-MS	EPA 8260B	Carbon tetrachloride
GC-MS	EPA 8260B	Chlorobenzene
GC-MS	EPA 8260B	2-Chloroethyl vinyl ether
GC-MS	EPA 8260B	Chloroethane
GC-MS	EPA 8260B	Chloroform
GC-MS	EPA 8260B	1-Chlorohexane
GC-MS	EPA 8260B	Chloromethane
GC-MS	EPA 8260B	2-Chlorotoluene
GC-MS	EPA 8260B	4-Chlorotoluene
GC-MS	EPA 8260B	Isopropyl ether (DIPE)
GC-MS	EPA 8260B	Dibromochloromethane
GC-MS	EPA 8260B	1,2-Dibromo-3-chloropropane
GC-MS	EPA 8260B	1,2-Dibromoethane

Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	Dibromomethane
GC-MS	EPA 8260B	1,1-Dichloroethane
GC-MS	EPA 8260B	1,2-Dichloroethane
GC-MS	EPA 8260B	1,2-Dichlorobenzene
GC-MS	EPA 8260B	1,3-Dichlorobenzene
GC-MS	EPA 8260B	trans-1,4-Dichloro-2-Butene
GC-MS	EPA 8260B	1,4-Dichlorobenzene
GC-MS	EPA 8260B	Dichlorodifluoromethane
GC-MS	EPA 8260B	1,1-Dichloroethene
GC-MS	EPA 8260B	cis-1,2-Dichloroethene
GC-MS	EPA 8260B	trans-1,2-Dichloroethene
GC-MS	EPA 8260B	Dichlorofluoromethane
GC-MS	EPA 8260B	1,1-Dichloropropene
GC-MS	EPA 8260B	1,2-Dichloropropane
GC-MS	EPA 8260B	1,3-Dichloropropane
GC-MS	EPA 8260B	2,2-Dichloropropane
GC-MS	EPA 8260B	cis-1,3-Dichloropropene
GC-MS	EPA 8260B	trans-1,3-Dichloropropene
GC-MS	EPA 8260B	tert-Butyl ethyl ether (ETBE)
GC-MS	EPA 8260B	Ethyl Methacrylate
GC-MS	EPA 8260B	Ethylbenzene
GC-MS	EPA 8260B	2-Hexanone (MBK)
GC-MS	EPA 8260B	Hexachlorobutadiene
GC-MS	EPA 8260B	Iodomethane
GC-MS	EPA 8260B	Isopropylbenzene
GC-MS	EPA 8260B	p-Isopropyltoluene
GC-MS	EPA 8260B	Methylene Chloride
GC-MS	EPA 8260B	4-Methyl-2-pentanone (MIBK)
GC-MS	EPA 8260B	tert-Butyl methyl ether
GC-MS	EPA 8260B	Naphthalene
GC-MS	EPA 8260B	n-Propylbenzene
GC-MS	EPA 8260B	Styrene
GC-MS	EPA 8260B	tert-Amyl methyl ether (TAME)
GC-MS	EPA 8260B	1,1,1,2-Tetrachloroethane
GC-MS	EPA 8260B	1,1,2,2-Tetrachloroethane
GC-MS	EPA 8260B	Tetrachloroethene
GC-MS	EPA 8260B	Toluene
GC-MS	EPA 8260B	1,1,1-Trichloroethane
GC-MS	EPA 8260B	1,1,2-Trichloroethane
GC-MS	EPA 8260B	1,2,3-Trichlorobenzene
GC-MS	EPA 8260B	1,2,4-Trichlorobenzene
GC-MS	EPA 8260B	Trichloroethene
GC-MS	EPA 8260B	Trichlorofluoromethane

Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	1,2,3-Trichloropropane
GC-MS	EPA 8260B	1,1,2-Trichloro1,2,2-trifluoroethane
GC-MS	EPA 8260B	1,2,4-Trimethylbenzene
GC-MS	EPA 8260B	1,3,5-Trimethylbenzene
GC-MS	EPA 8260B	Vinyl Acetate
GC-MS	EPA 8260B	Vinyl Chloride
GC-MS	EPA 8260B	m-Xylene & p-xylene
GC-MS	EPA 8260B	o-Xylene
GC-MS	EPA 8260B	2-Butanol
GC-MS	EPA 8260B	Cyclohexane
GC-MS	EPA 8260B SIM	Benzene
GC-MS	EPA 8260B SIM	Carbon tetrachloride
GC-MS	EPA 8260B SIM	Chloroform
GC-MS	EPA 8260B SIM	Chloromethane
GC-MS	EPA 8260B SIM	1,2-Dibromo-3-chloropropane
GC-MS	EPA 8260B SIM	1,2-Dibromoethane
GC-MS	EPA 8260B SIM	1,2-Dichloroethane
GC-MS	EPA 8260B SIM	1,1-Dichloroethene
GC-MS	EPA 8260B SIM	cis-1,2-Dichloroethene
GC-MS	EPA 8260B SIM	trans-1,2-Dichloroethene
GC-MS	EPA 8260B SIM	1,1,2,2-Tetrachloroethane
GC-MS	EPA 8260B SIM	Tetrachloroethene
GC-MS	EPA 8260B SIM	1,1,1-Trichloroethane
GC-MS	EPA 8260B SIM	1,1,2-Trichloroethane
GC-MS	EPA 8260B SIM	Trichloroethene
GC-MS	EPA 8260B SIM	1,2,3-Trichloropropane
GC-MS	EPA 8260B SIM	Vinyl Chloride
GC-MS	EPA 8270C / 8270D	Acenaphthene
GC-MS	EPA 8270C / 8270D	Acenaphthylene
GC-MS	EPA 8270C / 8270D	Aniline
GC-MS	EPA 8270C / 8270D	Anthracene
GC-MS	EPA 8270C / 8270D	Azobenzene
GC-MS	EPA 8270C / 8270D	Benzidine
GC-MS	EPA 8270C / 8270D	Benzo(a)anthracene
GC-MS	EPA 8270C / 8270D	benzo(a)pyrene
GC-MS	EPA 8270C / 8270D	Benzo(b)fluoranthene
GC-MS	EPA 8270C / 8270D	Benzo(e)pyrene
GC-MS	EPA 8270C / 8270D	Benzo(g,h,i)perylene
GC-MS	EPA 8270C / 8270D	Benzo(k)fluoranthene
GC-MS	EPA 8270C / 8270D	Benzoic Acid
GC-MS	EPA 8270C / 8270D	Benzyl Alcohol
GC-MS	EPA 8270C / 8270D	Biphenyl
GC-MS	EPA 8270C / 8270D	bis(2-chloroethoxy)methane

Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C / 8270D	bis(2-chloroethyl)ether
GC-MS	EPA 8270C / 8270D	bis(2-chloroisopropyl)ether
GC-MS	EPA 8270C / 8270D	bis(2-Ethylhexyl)adipate
GC-MS	EPA 8270C / 8270D	bis(2-Ethylhexyl)phthalate
GC-MS	EPA 8270C / 8270D	4-Bromophenyl-phenylether
GC-MS	EPA 8270C / 8270D	Butylbenzylphthalate
GC-MS	EPA 8270C / 8270D	Carbazole
GC-MS	EPA 8270C / 8270D	4-Chloro-3-methylphenol
GC-MS	EPA 8270C / 8270D	4-Chloroaniline
GC-MS	EPA 8270C / 8270D	2-Chloronaphthalene
GC-MS	EPA 8270C / 8270D	2-Chlorophenol
GC-MS	EPA 8270C / 8270D	4-Chlorophenyl-phenylether
GC-MS	EPA 8270C / 8270D	Chrysene
GC-MS	EPA 8270C / 8270D	Dibenzo(a,h)anthracene
GC-MS	EPA 8270C / 8270D	Dibenzofuran
GC-MS	EPA 8270C / 8270D	1,2-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	1,3-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	1,4-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	3,3'-Dichlorobenzidine
GC-MS	EPA 8270C / 8270D	2,4-Dichlorophenol
GC-MS	EPA 8270C / 8270D	Diethylphthalate
GC-MS	EPA 8270C / 8270D	2,6-Dimethylnaphthalene
GC-MS	EPA 8270C / 8270D	2,4-Dimethylphenol
GC-MS	EPA 8270C / 8270D	Dimethylphthalate
GC-MS	EPA 8270C / 8270D	Di-n-butylphthalate
GC-MS	EPA 8270C / 8270D	4,6-Dinitro-2-methylphenol
GC-MS	EPA 8270C / 8270D	2,4-Dinitrophenol
GC-MS	EPA 8270C / 8270D	2,4-Dinitrotoluene
GC-MS	EPA 8270C / 8270D	2-6-Dinitrotoluene
GC-MS	EPA 8270C / 8270D	Di-n-octylphthalate
GC-MS	EPA 8270C / 8270D	Fluoranthene
GC-MS	EPA 8270C / 8270D	Fluorene
GC-MS	EPA 8270C / 8270D	Hexachlorobenzene
GC-MS	EPA 8270C / 8270D	Hexachlorobutadiene
GC-MS	EPA 8270C / 8270D	Hexachlorocyclopentadiene
GC-MS	EPA 8270C / 8270D	Hexachloroethane
GC-MS	EPA 8270C / 8270D	Indeno(1,2,3-cd)pyrene
GC-MS	EPA 8270C / 8270D	Isophorone
GC-MS	EPA 8270C / 8270D	1-Methylnaphthalene
GC-MS	EPA 8270C / 8270D	2-Methylnaphthalene
GC-MS	EPA 8270C / 8270D	1-Methylphenanthrene
GC-MS	EPA 8270C / 8270D	2-Methylphenol
GC-MS	EPA 8270C / 8270D	4-Methylphenol

Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C / 8270D	Naphthalene
GC-MS	EPA 8270C / 8270D	2-Nitroaniline
GC-MS	EPA 8270C / 8270D	3-Nitroaniline
GC-MS	EPA 8270C / 8270D	4-Nitroaniline
GC-MS	EPA 8270C / 8270D	Nitrobenzene
GC-MS	EPA 8270C / 8270D	2-Nitrophenol
GC-MS	EPA 8270C / 8270D	4-Nitrophenol
GC-MS	EPA 8270C / 8270D	n-Nitrosodimethylamine
GC-MS	EPA 8270C / 8270D	n-Nitroso-di-n-propylamine
GC-MS	EPA 8270C / 8270D	n-Nitrosodiphenylamine
GC-MS	EPA 8270C / 8270D	Pentachlorophenol
GC-MS	EPA 8270C / 8270D	Perylene
GC-MS	EPA 8270C / 8270D	Phenanthrene
GC-MS	EPA 8270C / 8270D	Phenol
GC-MS	EPA 8270C / 8270D	Pyrene
GC-MS	EPA 8270C / 8270D	Pyridine
GC-MS	EPA 8270C / 8270D	2,3,4,6-Tetrachlorophenol
GC-MS	EPA 8270C / 8270D	1,2,4-Trichlorobenzene
GC-MS	EPA 8270C / 8270D	2,3,4-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,3,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,4,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,4,6-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,3,5-Trimethylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	Acenaphthene
GC-MS	EPA 8270C / 8270D SIM	Acenaphthylene
GC-MS	EPA 8270C / 8270D SIM	Anthracene
GC-MS	EPA 8270C / 8270D SIM	Azobenzene
GC-MS	EPA 8270C / 8270D SIM	Benzo(a)anthracene
GC-MS	EPA 8270C / 8270D SIM	benzo(a)pyrene
GC-MS	EPA 8270C / 8270D SIM	Benzo(b)fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Benzo(e)pyrene
GC-MS	EPA 8270C / 8270D SIM	Benzo(g,h,i)perylene
GC-MS	EPA 8270C / 8270D SIM	Benzo(k)fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Biphenyl
GC-MS	EPA 8270C / 8270D SIM	bis(2-chloroethyl)ether
GC-MS	EPA 8270C / 8270D SIM	bis(2-Ethylhexyl)phthalate
GC-MS	EPA 8270C / 8270D SIM	Carbazole
GC-MS	EPA 8270C / 8270D SIM	4-Chloro-3-methylphenol
GC-MS	EPA 8270C / 8270D SIM	2-Chlorophenol
GC-MS	EPA 8270C / 8270D SIM	Chrysene
GC-MS	EPA 8270C / 8270D SIM	Dibenzo(a,h)anthracene
GC-MS	EPA 8270C / 8270D SIM	2,4-Dichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,6-Dimethylnaphthalene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C / 8270D SIM	2,4-Dimethylphenol
GC-MS	EPA 8270C / 8270D SIM	Fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Fluorene
GC-MS	EPA 8270C / 8270D SIM	Hexachlorobenzene
GC-MS	EPA 8270C / 8270D SIM	Indeno(1,2,3-cd)pyrene
GC-MS	EPA 8270C / 8270D SIM	1-Methylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	2-Methylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	1-Methylphenanthrene
GC-MS	EPA 8270C / 8270D SIM	Naphthalene
GC-MS	EPA 8270C / 8270D SIM	n-Nitrosodimethylamine
GC-MS	EPA 8270C / 8270D SIM	n-Nitroso-di-n-propylamine
GC-MS	EPA 8270C / 8270D SIM	Pentachlorophenol
GC-MS	EPA 8270C / 8270D SIM	Perylene
GC-MS	EPA 8270C / 8270D SIM	Phenanthrene
GC-MS	EPA 8270C / 8270D SIM	Phenol
GC-MS	EPA 8270C / 8270D SIM	Pyrene
GC-MS	EPA 8270C / 8270D SIM	2,4,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,4,6-Trichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,3,5-Trimethylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	1,4-Dioxane
HPLC	EPA 8310	Acenaphthene
HPLC	EPA 8310	Acenaphthylene
HPLC	EPA 8310	Anthracene
HPLC	EPA 8310	Benzo(a)anthracene
HPLC	EPA 8310	Benzo(a)pyrene
HPLC	EPA 8310	Benzo(b)fluoranthene
HPLC	EPA 8310	Benzo(g,h,i)perylene
HPLC	EPA 8310	Benzo(k)fluoranthene
HPLC	EPA 8310	Chrysene
HPLC	EPA 8310	Dibenzo(a,h)anthracene
HPLC	EPA 8310	Fluoranthene
HPLC	EPA 8310	Fluorene
HPLC	EPA 8310	Indeno(1,2,3-cd)pyrene
HPLC	EPA 8310	1-Methylnaphthalene
HPLC	EPA 8310	2-Methylnaphthalene
HPLC	EPA 8310	Naphthalene
HPLC	EPA 8310	Phenanthrene
HPLC	EPA 8310	Pyrene
HPLC	EPA 8330A	HMX
HPLC	EPA 8330A	RDX
HPLC	EPA 8330A	1,3,5-TNB
HPLC	EPA 8330A	1,3-DNB
HPLC	EPA 8330A	Tetryl

Non-Potable Water		
Technology	**Method**	**Analyte**
HPLC	EPA 8330A	Nitrobenzene
HPLC	EPA 8330A	2,4,6-TNT
HPLC	EPA 8330A	4-AM-2,6-DNT
HPLC	EPA 8330A	2-AM-4,6-DNT
HPLC	EPA 8330A	2,6-DNT
HPLC	EPA 8330A	2,4-DNT
HPLC	EPA 8330A	2-Nitrotoluene
HPLC	EPA 8330A	4-Nitrotoluene
HPLC	EPA 8330A	3-Nitrotoluene
GC	EPA 8151A	Acifluorfen
GC	EPA 8151A	Bentazon
GC	EPA 8151A	Chloramben
GC	EPA 8151A	2,4-D
GC	EPA 8151A	2,4-DB
GC	EPA 8151A	Dacthal
GC	EPA 8151A	Dalapon
GC	EPA 8151A	Dicamba
GC	EPA 8151A	3,5 Dichlorobenzoic
GC	EPA 8151A	Dichlorprop
GC	EPA 8151A	Dinoseb
GC	EPA 8151A	MCPA
GC	EPA 8151A	MCPP
GC	EPA 8151A	4-Nitrophenol
GC	EPA 8151A	Pentachlorophenol
GC	EPA 8151A	Picloram
GC	EPA 8151A	Silvex
GC	EPA 8151A	2,4,5-T
Platinum Electrode	EPA 120.1	Specific Conductance
Titrimetric	EPA 130.2	Hardness
Electrode	EPA 150.1	pH
Gravimetric	EPA 160.1	TDS
Gravimetric	EPA 160.2	TSS
Gravimetric	EPA 160.3	Total Residue
Turbidimetric	EPA 180.1	Turbidity
ICP-MS	EPA 200.8	Aluminum
ICP-MS	EPA 200.8	Antimony
ICP-MS	EPA 200.8	Arsenic
ICP-MS	EPA 200.8	Barium
ICP-MS	EPA 200.8	Beryllium
ICP-MS	EPA 200.8	Boron
ICP-MS	EPA 200.8	Cadmium
ICP-MS	EPA 200.8	Calcium
ICP-MS	EPA 200.8	Chromium

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP-MS	EPA 200.8	Cobalt
ICP-MS	EPA 200.8	Copper
ICP-MS	EPA 200.8	Iron
ICP-MS	EPA 200.8	Lead
ICP-MS	EPA 200.8	Lithium
ICP-MS	EPA 200.8	Magnesium
ICP-MS	EPA 200.8	Manganese
ICP-MS	EPA 200.8	Molybdenum
ICP-MS	EPA 200.8	Nickel
ICP-MS	EPA 200.8	Potassium
ICP-MS	EPA 200.8	Selenium
ICP-MS	EPA 200.8	Silver
ICP-MS	EPA 200.8	Sodium
ICP-MS	EPA 200.8	Strontium
ICP-MS	EPA 200.8	Thallium
ICP-MS	EPA 200.8	Tin
ICP-MS	EPA 200.8	Titanium
ICP-MS	EPA 200.8	Uranium
ICP-MS	EPA 200.8	Vanadium
ICP-MS	EPA 200.8	Zinc
IC	EPA 218.6	Hexavalent Chromium
COLD VAPOR	EPA 245.1	Mercury
IC	EPA 300.0	Fluoride
IC	EPA 300.0	Chloride
IC	EPA 300.0	Nitrite
IC	EPA 300.0	Bromide
IC	EPA 300.0	Nitrate
IC	EPA 300.0	Phosphate
IC	EPA 300.0	Sulfate
IC	EPA 300.0	Bromate
IC	EPA 300M	Lactate
IC	EPA 300M	Acetate
IC	EPA 300M	Propionate
IC	EPA 300M	Butyrate
IC	EPA 300M	Pyruvate
IC	EPA 310.1	Alkalinity
IC	EPA 314.0	Perchlorate
Titrimetric	EPA 330.3	Total Residual Chlorine
Spectrometric	EPA 352.1	Nitrate-N
Spectrometric	EPA 353.3	Nitrate-N
Spectrometric	EPA 354.1	Nitrite-N
Spectrometric	EPA 365.2	Ortho-phosphate
Spectrometric	EPA 420.1	Phenols

Non-Potable Water		
Technology	**Method**	**Analyte**
Spectrometric	EPA 425.1	MBAS
Spectrometric	EPA 335.2	Cyanide
Spectrometric	EPA 350.2	Ammonia
Spectrometric	EPA 351.3	TKN
Spectrometric	EPA 365.2	Phosphorus
Spectrometric	EPA 370.1	Silica
Titrimetric	EPA 376.1	Sulfide
Spectrometric	EPA 376.2	Sulfide
Electrode	EPA 405.1	BOD
Spectrometric	EPA 410.4	COD
Combustion-IR	EPA 415.1	TOC
Turbidimetric	SM 2130B	Turbidity
Titrimetric	SM 2320B	Alkalinity
Titrimetric	SM 2340C	Hardness
Platinum Electrode	SM 2510B	Specific Conductance
Gravimetric	SM 2540C	TDS
Gravimetric	SM 2540D	TSS
Gravimetric	SM 2540B	Total Residue
Combustion-IR	SM5310	TOC
Spectrometric	SM3500-FeD	Ferrous iron
Titrimetric	SM4500-Cl B	Total Residual Chlorine
Spectrometric	SM4500-NO2B	Nitrite-N
Spectrometric	SM4500-NO3E	Nitrate-N
Spectrometric	SM4500PE	Ortho-phosphate
Spectrometric	SM4500-PE(PB5)	Phosphorus
Spectrometric	SM4500-S2D	Sulfide
Titrimetric	SM4500-S2F	Sulfide
Spectrometric	SM4500-SiO2C	Silica
Electrode	SM5210B	BOD
Spectrometric	SM5220B	COD
Combustion-IR	SM 5310B	TOC
Spectrometric	SM5540C	Surfactants (MBAS)
ICP/ICP-MS	SM2340B	Hardness
GC	EPA 608	Aldrin
GC	EPA 608	alpha-BHC
GC	EPA 608	beta-BHC
GC	EPA 608	delta-BHC
GC	EPA 608	gamma-BHC (Lindane)
GC	EPA 608	DDD (4,4)
GC	EPA 608	DDE (4,4)
GC	EPA 608	DDT (4,4)
GC	EPA 608	Dieldrin
GC	EPA 608	Endosulfan I

Non-Potable Water		
Technology	**Method**	**Analyte**
GC	EPA 608	Endosulfan II
GC	EPA 608	Endosulfan sulfate
GC	EPA 608	Endrin
GC	EPA 608	Endrin Aldehyde
GC	EPA 608	Heptachlor
GC	EPA 608	Heptachlor epoxide
GC	EPA 608	Methoxychlor
GC	EPA 608	alpha-Chlordane
GC	EPA 608	gamma-Chlordane
GC	EPA 608	Endrin Ketone
GC	EPA 608	Toxaphene
GC	EPA 608	Technical Chlordane
GC	EPA 608	PCB1016
GC	EPA 608	PCB1221
GC	EPA 608	PCB1232
GC	EPA 608	PCB1242
GC	EPA 608	PCB1248
GC	EPA 608	PCB1254
GC	EPA 608	PCB1260
GC	EPA 608	PCB1262
GC	EPA 608	PCB1268
GC-MS	EPA 624	Acrolein
GC-MS	EPA 624	Acrylonitrile
GC-MS	EPA 624	Benzene
GC-MS	EPA 624	Bromodichloromethane
GC-MS	EPA 624	Bromoform
GC-MS	EPA 624	Bromomethane
GC-MS	EPA 624	Carbon tetrachloride
GC-MS	EPA 624	Chlorobenzene
GC-MS	EPA 624	2-Chloroethyl vinyl ether
GC-MS	EPA 624	Chloroethane
GC-MS	EPA 624	Chloroform
GC-MS	EPA 624	Chloromethane
GC-MS	EPA 624	Dibromochloromethane
GC-MS	EPA 624	1,1-Dichloroethane
GC-MS	EPA 624	1,2-Dichloroethane
GC-MS	EPA 624	1,2-Dichlorobenzene
GC-MS	EPA 624	1,3-Dichlorobenzene
GC-MS	EPA 624	1,4-Dichlorobenzene
GC-MS	EPA 624	Dichlorodifluoromethane
GC-MS	EPA 624	1,1-Dichloroethene
GC-MS	EPA 624	cis-1,2-Dichloroethene
GC-MS	EPA 624	trans-1,2-Dichloroethene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 624	1,2-Dichloropropane
GC-MS	EPA 624	cis-1,3-Dichloropropene
GC-MS	EPA 624	trans-1,3-Dichloropropene
GC-MS	EPA 624	Ethylbenzene
GC-MS	EPA 624	Methylene Chloride
GC-MS	EPA 624	tert-Butyl methyl ether
GC-MS	EPA 624	Styrene
GC-MS	EPA 624	1,1,2,2-Tetrachloroethane
GC-MS	EPA 624	Tetrachloroethene
GC-MS	EPA 624	Toluene
GC-MS	EPA 624	1,1,1-Trichloroethane
GC-MS	EPA 624	1,1,2-Trichloroethane
GC-MS	EPA 624	1,2,4-Trichlorobenzene
GC-MS	EPA 624	Trichloroethene
GC-MS	EPA 624	Trichlorofluoromethane
GC-MS	EPA 624	1,1,2-Trichloro1,2,2-trifluoroethane
GC-MS	EPA 624	Vinyl Chloride
GC-MS	EPA 624	m-Xylene & p-xylene
GC-MS	EPA 624	o-Xylene
GC-MS	EPA 625	Acenaphthene
GC-MS	EPA 625	Acenaphthylene
GC-MS	EPA 625	Aniline
GC-MS	EPA 625	Anthracene
GC-MS	EPA 625	Azobenzene
GC-MS	EPA 625	Benzidine
GC-MS	EPA 625	Benzo(a)anthracene
GC-MS	EPA 625	benzo(a)pyrene
GC-MS	EPA 625	Benzo(b)fluoranthene
GC-MS	EPA 625	Benzo(e)pyrene
GC-MS	EPA 625	Benzo(g,h,i)perylene
GC-MS	EPA 625	Benzo(k)fluoranthene
GC-MS	EPA 625	Benzoic Acid
GC-MS	EPA 625	Benzyl Alcohol
GC-MS	EPA 625	Biphenyl
GC-MS	EPA 625	bis(2-chloroethoxy)methane
GC-MS	EPA 625	bis(2-chloroethyl)ether
GC-MS	EPA 625	bis(2-chloroisopropyl)ether
GC-MS	EPA 625	bis(2-Ethylhexyl)adipate
GC-MS	EPA 625	bis(2-Ethylhexyl)phthalate
GC-MS	EPA 625	4-Bromophenyl-phenylether
GC-MS	EPA 625	Butylbenzylphthalate
GC-MS	EPA 625	Carbazole
GC-MS	EPA 625	4-Chloro-3-methylphenol

Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 625	4-Chloroaniline
GC-MS	EPA 625	2-Chloronaphthalene
GC-MS	EPA 625	2-Chlorophenol
GC-MS	EPA 625	4-Chlorophenyl-phenylether
GC-MS	EPA 625	Chrysene
GC-MS	EPA 625	Dibenzo(a,h)anthracene
GC-MS	EPA 625	Dibenzofuran
GC-MS	EPA 625	1,2-Dichlorobenzene
GC-MS	EPA 625	1,3-Dichlorobenzene
GC-MS	EPA 625	1,4-Dichlorobenzene
GC-MS	EPA 625	3,3'-Dichlorobenzidine
GC-MS	EPA 625	2,4-Dichlorophenol
GC-MS	EPA 625	Diethylphthalate
GC-MS	EPA 625	2,6-Dimethylnaphthalene
GC-MS	EPA 625	2,4-Dimethylphenol
GC-MS	EPA 625	Dimethylphthalate
GC-MS	EPA 625	Di-n-butylphthalate
GC-MS	EPA 625	4,6-Dinitro-2-methylphenol
GC-MS	EPA 625	2,4-Dinitrophenol
GC-MS	EPA 625	2,4-Dinitrotoluene
GC-MS	EPA 625	2-6-Dinitrotoluene
GC-MS	EPA 625	Di-n-octylphthalate
GC-MS	EPA 625	1,2-Diphenylhydrazine
GC-MS	EPA 625	Fluoranthene
GC-MS	EPA 625	Fluorene
GC-MS	EPA 625	Hexachlorobenzene
GC-MS	EPA 625	Hexachlorobutadiene
GC-MS	EPA 625	Hexachlorocyclopentadiene
GC-MS	EPA 625	Hexachloroethane
GC-MS	EPA 625	Indeno(1,2,3-cd)pyrene
GC-MS	EPA 625	Isophorone
GC-MS	EPA 625	1-Methylnaphthalene
GC-MS	EPA 625	2-Methylnaphthalene
GC-MS	EPA 625	1-Methylphenanthrene
GC-MS	EPA 625	2-Methylphenol
GC-MS	EPA 625	4-Methylphenol
GC-MS	EPA 625	Naphthalene
GC-MS	EPA 625	2-Nitroaniline
GC-MS	EPA 625	3-Nitroaniline
GC-MS	EPA 625	4-Nitroaniline
GC-MS	EPA 625	Nitrobenzene
GC-MS	EPA 625	2-Nitrophenol
GC-MS	EPA 625	4-Nitrophenol

Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 625	n-Nitrosodimethylamine
GC-MS	EPA 625	n-Nitroso-di-n-propylamine
GC-MS	EPA 625	n-Nitrosodiphenylamine
GC-MS	EPA 625	Pentachlorophenol
GC-MS	EPA 625	Perylene
GC-MS	EPA 625	Phenanthrene
GC-MS	EPA 625	Phenol
GC-MS	EPA 625	Pyrene
GC-MS	EPA 625	Pyridine
GC-MS	EPA 625	2,3,4,6-Tetrachlorophenol
GC-MS	EPA 625	1,2,4-Trichlorobenzene
GC-MS	EPA 625	2,3,4-Trichlorophenol
GC-MS	EPA 625	2,3,5-Trichlorophenol
GC-MS	EPA 625	2,4,5-Trichlorophenol
GC-MS	EPA 625	2,4,6-Trichlorophenol
GC-MS	EPA 625	2,3,5-Trimethylnaphthalene
Gravimetric	EPA 1664A	Oil & Grease
GFAA	CA 939M	Organo Lead
HPLC-MS	EPA 6850	Perchlorate
Preparation	**Method**	**Type**
Purge & Trap	EPA 5030B	Volatiles Prep
Acid Digestion	EPA 3005A / EPA 3010A / EPA 200.8	Metals Prep
Continuous Liquid-Liquid	EPA 3520C	Organic Extraction
Separatory Funnel	EPA 3510B	Organic Extraction
Waste Dilution	EPA 3580A	Organic Extraction
TCLP	EPA 1311	Leaching
SPLP	EPA 1312	Leaching

Drinking Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 524.2	Acetone
GC-MS	EPA 524.2	Benzene
GC-MS	EPA 524.2	Bromobenzene
GC-MS	EPA 524.2	Bromochloromethane
GC-MS	EPA 524.2	Bromodichloromethane
GC-MS	EPA 524.2	Bromoform
GC-MS	EPA 524.2	Bromomethane
GC-MS	EPA 524.2	tert-Butyl alcohol
GC-MS	EPA 524.2	2-Butanone (MEK)
GC-MS	EPA 524.2	n-Butylbenzene

Drinking Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 524.2	sec-Butylbenzene
GC-MS	EPA 524.2	tert-Butylbenzene
GC-MS	EPA 524.2	Carbon disulfide
GC-MS	EPA 524.2	Carbon tetrachloride
GC-MS	EPA 524.2	Chlorobenzene
GC-MS	EPA 524.2	Chloroethane
GC-MS	EPA 524.2	Chloroform
GC-MS	EPA 524.2	Chloromethane
GC-MS	EPA 524.2	2-Chlorotoluene
GC-MS	EPA 524.2	4-Chlorotoluene
GC-MS	EPA 524.2	Dibromochloromethane
GC-MS	EPA 524.2	1,2-Dibromo-3-chloropropane
GC-MS	EPA 524.2	1,2-Dibromoethane
GC-MS	EPA 524.2	Dibromomethane
GC-MS	EPA 524.2	1,1-Dichloroethane
GC-MS	EPA 524.2	1,2-Dichloroethane
GC-MS	EPA 524.2	1,2-Dichlorobenzene
GC-MS	EPA 524.2	1,3-Dichlorobenzene
GC-MS	EPA 524.2	1,4-Dichlorobenzene
GC-MS	EPA 524.2	Dichlorodifluoromethane
GC-MS	EPA 524.2	1,1-Dichloroethene
GC-MS	EPA 524.2	cis-1,2-Dichloroethene
GC-MS	EPA 524.2	trans-1,2-Dichloroethene
GC-MS	EPA 524.2	1,1-Dichloropropene
GC-MS	EPA 524.2	1,2-Dichloropropane
GC-MS	EPA 524.2	1,3-Dichloropropane
GC-MS	EPA 524.2	2,2-Dichloropropane
GC-MS	EPA 524.2	cis-1,3-Dichloropropene
GC-MS	EPA 524.2	trans-1,3-Dichloropropene
GC-MS	EPA 524.2	tert-Butyl ethyl ether (ETBE)
GC-MS	EPA 524.2	Ethylbenzene
GC-MS	EPA 524.2	2-Hexanone (MBK)
GC-MS	EPA 524.2	Hexachlorobutadiene
GC-MS	EPA 524.2	Isopropyl ether (DIPE)
GC-MS	EPA 524.2	Isopropylbenzene
GC-MS	EPA 524.2	p-Isopropyltoluene
GC-MS	EPA 524.2	Methylene Chloride
GC-MS	EPA 524.2	4-Methyl-2-pentanone (MIBK)
GC-MS	EPA 524.2	tert-Butyl methyl ether
GC-MS	EPA 524.2	Naphthalene
GC-MS	EPA 524.2	n-Propylbenzene

Drinking Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 524.2	Styrene
GC-MS	EPA 524.2	tert-Amyl methyl ether (TAME)
GC-MS	EPA 524.2	1,1,1,2-Tetrachloroethane
GC-MS	EPA 524.2	1,1,2,2-Tetrachloroethane
GC-MS	EPA 524.2	Tetrachloroethene
GC-MS	EPA 524.2	Toluene
GC-MS	EPA 524.2	1,1,1-Trichloroethane
GC-MS	EPA 524.2	1,1,2-Trichloroethane
GC-MS	EPA 524.2	1,2,3-Trichlorobenzene
GC-MS	EPA 524.2	1,2,4-Trichlorobenzene
GC-MS	EPA 524.2	Trichloroethene
GC-MS	EPA 524.2	Trichlorofluoromethane
GC-MS	EPA 524.2	1,2,3-Trichloropropane
GC-MS	EPA 524.2	1,1,2-Trichloro1,2,2-trifluoroethane
GC-MS	EPA 524.2	1,2,4-Trimethylbenzene
GC-MS	EPA 524.2	1,3,5-Trimethylbenzene
GC-MS	EPA 524.2	Vinyl Chloride
GC-MS	EPA 524.2	m-Xylene & p-xylene
GC-MS	EPA 524.2	o-Xylene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC	AK101	GRO
GC	AK102	DRO
GC	AK103	RRO
GC	RSK175	Methane
GC	RSK175	Acetylene
GC	RSK175	Ethylene
GC	RSK175	Ethane
GC	RSK175	Propane
GC	RSK175	Carbon dioxide
Spectrometric	SM4500-NH3C	Ammonia
Spectrometric	SM4500-NH3F	Ammonia
Spectrometric	SM4500-NOrgC	TKN
Spectrometric	SM4500-PE(PB5)	Phosphorus
Electrode	EPA 9040C	pH
Electrode	EPA 9045D	pH
Spectrometric	EPA 9065	Phenols
Penskey-Martens	EPA 1010	Ignitability
ICP	EPA 6010B / 6010C	Aluminum

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP	EPA 6010B / 6010C	Antimony
ICP	EPA 6010B / 6010C	Arsenic
ICP	EPA 6010B / 6010C	Barium
ICP	EPA 6010B / 6010C	Beryllium
ICP	EPA 6010B / 6010C	Boron
ICP	EPA 6010B / 6010C	Cadmium
ICP	EPA 6010B / 6010C	Calcium
ICP	EPA 6010B / 6010C	Chromium
ICP	EPA 6010B / 6010C	Cobalt
ICP	EPA 6010B / 6010C	Copper
ICP	EPA 6010B / 6010C	Iron
ICP	EPA 6010B / 6010C	Lead
ICP	EPA 6010B / 6010C	Magnesium
ICP	EPA 6010B / 6010C	Manganese
ICP	EPA 6010B / 6010C	Molybdenum
ICP	EPA 6010B / 6010C	Nickel
ICP	EPA 6010B / 6010C	Potassium
ICP	EPA 6010B / 6010C	Selenium
ICP	EPA 6010B / 6010C	Silver
ICP	EPA 6010B / 6010C	Sodium
ICP	EPA 6010B / 6010C	Strontium
ICP	EPA 6010B / 6010C	Thallium
ICP	EPA 6010B / 6010C	Tin
ICP	EPA 6010B / 6010C	Titanium
ICP	EPA 6010B / 6010C	Vanadium
ICP	EPA 6010B / 6010C	Zinc
IPC-MS	EPA 6020A	Aluminum
IPC-MS	EPA 6020A	Antimony
IPC-MS	EPA 6020A	Arsenic
IPC-MS	EPA 6020A	Barium
IPC-MS	EPA 6020A	Beryllium
IPC-MS	EPA 6020A	Boron
IPC-MS	EPA 6020A	Cadmium
IPC-MS	EPA 6020A	Calcium
IPC-MS	EPA 6020A	Chromium
IPC-MS	EPA 6020A	Cobalt
IPC-MS	EPA 6020A	Copper
ICP-MS	EPA 6020A	Iron
ICP-MS	EPA 6020A	Lead
ICP-MS	EPA 6020A	Magnesium
ICP-MS	EPA 6020A	Manganese
ICP-MS	EPA 6020A	Molybdenum
ICP-MS	EPA 6020A	Nickel

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP-MS	EPA 6020A	Potassium
ICP-MS	EPA 6020A	Selenium
ICP-MS	EPA 6020A	Silver
ICP-MS	EPA 6020A	Sodium
ICP-MS	EPA 6020A	Strontium
ICP-MS	EPA 6020A	Thallium
ICP-MS	EPA 6020A	Tin
ICP-MS	EPA 6020A	Titanium
ICP-MS	EPA 6020A	Uranium
ICP-MS	EPA 6020A	Vanadium
ICP-MS	EPA 6020A	Zinc
Spectrometric	EPA 7196A	Hex. Chromium
IC	EPA 7199	Hex. Chromium
Cold-Vapor	EPA 7470A / 7471A	Mercury
GC	EPA 8015B / 8015C	Gasoline
GC	EPA 8015B / 8015C	Diesel
GC	EPA 8015B / 8015C	Motor Oil
GC	EPA 8015B / 8015C	JP5
GC	EPA 8081A / 8081B	Aldrin
GC	EPA 8081A / 8081B	alpha-BHC
GC	EPA 8081A / 8081B	beta-BHC
GC	EPA 8081A / 8081B	delta-BHC
GC	EPA 8081A / 8081B	gamma-BHC (Lindane)
GC	EPA 8081A / 8081B	DDD (4,4)
GC	EPA 8081A / 8081B	DDE (4,4)
GC	EPA 8081A / 8081B	DDT (4,4)
GC	EPA 8081A / 8081B	Dieldrin
GC	EPA 8081A / 8081B	Endosulfan I
GC	EPA 8081A / 8081B	Endosulfan II
GC	EPA 8081A / 8081B	Endosulfan sulfate
GC	EPA 8081A / 8081B	Endrin
GC	EPA 8081A / 8081B	Endrin Aldehyde
GC	EPA 8081A / 8081B	Heptachlor
GC	EPA 8081A / 8081B	Heptachlor epoxide
GC	EPA 8081A / 8081B	Methoxychlor
GC	EPA 8081A / 8081B	alpha-Chlordane
GC	EPA 8081A / 8081B	gamma-Chlordane
GC	EPA 8081A / 8081B	Endrin Ketone
GC	EPA 8081A / 8081B	Toxaphene
GC	EPA 8081A / 8081B	Technical Chlordane
GC	EPA 8082 / 8082A	PCB1016
GC	EPA 8082 / 8082A	PCB1221
GC	EPA 8082 / 8082A	PCB1232

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC	EPA 8082 / 8082A	PCB1242
GC	EPA 8082 / 8082A	PCB1248
GC	EPA 8082 / 8082A	PCB1254
GC	EPA 8082 / 8082A	PCB1260
GC	EPA 8082 / 8082A	PCB1262
GC	EPA 8082 / 8082A	PCB1268
GC	EPA 8082 / 8082A	PCB 8
GC	EPA 8082 / 8082A	PCB 18
GC	EPA 8082 / 8082A	PCB 28
GC	EPA 8082 / 8082A	PCB 44
GC	EPA 8082 / 8082A	PCB 52
GC	EPA 8082 / 8082A	PCB 66
GC	EPA 8082 / 8082A	PCB 77
GC	EPA 8082 / 8082A	PCB 81
GC	EPA 8082 / 8082A	PCB 101
GC	EPA 8082 / 8082A	PCB 105
GC	EPA 8082 / 8082A	PCB 114
GC	EPA 8082 / 8082A	PCB 118
GC	EPA 8082 / 8082A	PCB 123
GC	EPA 8082 / 8082A	PCB 126
GC	EPA 8082 / 8082A	PCB 128
GC	EPA 8082 / 8082A	PCB 138
GC	EPA 8082 / 8082A	PCB 153
GC	EPA 8082 / 8082A	PCB 156
GC	EPA 8082 / 8082A	PCB 157
GC	EPA 8082 / 8082A	PCB 167
GC	EPA 8082 / 8082A	PCB 169
GC	EPA 8082 / 8082A	PCB 170
GC	EPA 8082 / 8082A	PCB 180
GC	EPA 8082 / 8082A	PCB 187
GC	EPA 8082 / 8082A	PCB 189
GC	EPA 8082 / 8082A	PCB 195
GC	EPA 8082 / 8082A	PCB 206
GC	EPA 8082 / 8082A	PCB 209
GC	EPA 8141A	Azinphos-methyl
GC	EPA 8141A	Bolstar
GC	EPA 8141A	Chlorpyrifos
GC	EPA 8141A	Coumaphos
GC	EPA 8141A	Demeton
GC	EPA 8141A	Diazinon
GC	EPA 8141A	Dichlorvos
GC	EPA 8141A	Disulfoton
GC	EPA 8141A	Ethoprop

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC	EPA 8141A	Fensulfothion
GC	EPA 8141A	Fenthion
GC	EPA 8141A	Merphos
GC	EPA 8141A	Mevinphos
GC	EPA 8141A	Naled
GC	EPA 8141A	Methyl Parathion
GC	EPA 8141A	Phorate
GC	EPA 8141A	Ronnel
GC	EPA 8141A	Stirophos
GC	EPA 8141A	Tokuthion
GC	EPA 8141A	Trichloronate
GC	EPA 8141A	Dimethoate
GC	EPA 8141A	EPN
GC	EPA 8141A	Famphur
GC	EPA 8141A	Malathion
GC	EPA 8141A	Ethyl Parathion
GC	EPA 8141A	O,O,O-Triethylphosphorothioate
GC	EPA 8141A	Sulfotepp
GC	EPA 8141A	Thionazin
GC	EPA 8141A	Tributyl Phosphate
GC-MS	EPA 8260B	Acetone
GC-MS	EPA 8260B	Acrolein
GC-MS	EPA 8260B	Acrylonitrile
GC-MS	EPA 8260B	Benzene
GC-MS	EPA 8260B	Bromobenzene
GC-MS	EPA 8260B	Bromochloromethane
GC-MS	EPA 8260B	Bromodichloromethane
GC-MS	EPA 8260B	Bromoform
GC-MS	EPA 8260B	Bromomethane
GC-MS	EPA 8260B	tert-Butyl alcohol
GC-MS	EPA 8260B	2-Butanone (MEK)
GC-MS	EPA 8260B	n-Butylbenzene
GC-MS	EPA 8260B	sec-Butylbenzene
GC-MS	EPA 8260B	tert-Butylbenzene
GC-MS	EPA 8260B	Carbon disulfide
GC-MS	EPA 8260B	Carbon tetrachloride
GC-MS	EPA 8260B	Chlorobenzene
GC-MS	EPA 8260B	2-Chloroethyl vinyl ether
GC-MS	EPA 8260B	Chloroethane
GC-MS	EPA 8260B	Chloroform
GC-MS	EPA 8260B	1-Chlorohexane
GC-MS	EPA 8260B	Chloromethane
GC-MS	EPA 8260B	2-Chlorotoluene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	4-Chlorotoluene
GC-MS	EPA 8260B	Isopropyl ether (DIPE)
GC-MS	EPA 8260B	Dibromochloromethane
GC-MS	EPA 8260B	1,2-Dibromo-3-chloropropane
GC-MS	EPA 8260B	1,2-Dibromoethane
GC-MS	EPA 8260B	Dibromomethane
GC-MS	EPA 8260B	1,1-Dichloroethane
GC-MS	EPA 8260B	1,2-Dichloroethane
GC-MS	EPA 8260B	1,2-Dichlorobenzene
GC-MS	EPA 8260B	1,3-Dichlorobenzene
GC-MS	EPA 8260B	trans-1,4-Dichloro-2-Butene
GC-MS	EPA 8260B	1,4-Dichlorobenzene
GC-MS	EPA 8260B	Dichlorodifluoromethane
GC-MS	EPA 8260B	1,1-Dichloroethene
GC-MS	EPA 8260B	cis-1,2-Dichloroethene
GC-MS	EPA 8260B	trans-1,2-Dichloroethene
GC-MS	EPA 8260B	Dichlorofluoromethane
GC-MS	EPA 8260B	1,1-Dichloropropene
GC-MS	EPA 8260B	1,2-Dichloropropane
GC-MS	EPA 8260B	1,3-Dichloropropane
GC-MS	EPA 8260B	2,2-Dichloropropane
GC-MS	EPA 8260B	cis-1,3-Dichloropropene
GC-MS	EPA 8260B	trans-1,3-Dichloropropene
GC-MS	EPA 8260B	tert-Butyl ethyl ether (ETBE)
GC-MS	EPA 8260B	Ethyl Methacrylate
GC-MS	EPA 8260B	Ethylbenzene
GC-MS	EPA 8260B	2-Hexanone (MBK)
GC-MS	EPA 8260B	Hexachlorobutadiene
GC-MS	EPA 8260B	Iodomethane
GC-MS	EPA 8260B	Isopropylbenzene
GC-MS	EPA 8260B	p-Isopropyltoluene
GC-MS	EPA 8260B	Methylene Chloride
GC-MS	EPA 8260B	4-Methyl-2-pentanone (MIBK)
GC-MS	EPA 8260B	tert-Butyl methyl ether
GC-MS	EPA 8260B	Naphthalene
GC-MS	EPA 8260B	n-Propylbenzene
GC-MS	EPA 8260B	Styrene
GC-MS	EPA 8260B	tert-Amyl methyl ether (TAME)
GC-MS	EPA 8260B	1,1,1,2-Tetrachloroethane
GC-MS	EPA 8260B	1,1,2,2-Tetrachloroethane
GC-MS	EPA 8260B	Tetrachloroethene
GC-MS	EPA 8260B	Toluene
GC-MS	EPA 8260B	1,1,1-Trichloroethane

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B	1,1,2-Trichloroethane
GC-MS	EPA 8260B	1,2,3-Trichlorobenzene
GC-MS	EPA 8260B	1,2,4-Trichlorobenzene
GC-MS	EPA 8260B	Trichloroethene
GC-MS	EPA 8260B	Trichlorofluoromethane
GC-MS	EPA 8260B	1,2,3-Trichloropropane
GC-MS	EPA 8260B	1,1,2-Trichloro1,2,2-trifluoroethane
GC-MS	EPA 8260B	1,2,4-Trimethylbenzene
GC-MS	EPA 8260B	1,3,5-Trimethylbenzene
GC-MS	EPA 8260B	Vinyl Acetate
GC-MS	EPA 8260B	Vinyl Chloride
GC-MS	EPA 8260B	m-Xylene & p-xylene
GC-MS	EPA 8260B	o-Xylene
GC-MS	EPA 8260B	2-Butanol
GC-MS	EPA 8260B	Cyclohexane
GC-MS	EPA 8260B SIM	Benzene
GC-MS	EPA 8260B SIM	Carbon tetrachloride
GC-MS	EPA 8260B SIM	Chloroform
GC-MS	EPA 8260B SIM	Chloromethane
GC-MS	EPA 8260B SIM	1,2-Dibromo-3-chloropropane
GC-MS	EPA 8260B SIM	1,2-Dibromoethane
GC-MS	EPA 8260B SIM	1,2-Dichloroethane
GC-MS	EPA 8260B SIM	1,1-Dichloroethene
GC-MS	EPA 8260B SIM	cis-1,2-Dichloroethene
GC-MS	EPA 8260B SIM	trans-1,2-Dichloroethene
GC-MS	EPA 8260B SIM	1,1,2,2-Tetrachloroethane
GC-MS	EPA 8260B SIM	Tetrachloroethene
GC-MS	EPA 8260B SIM	1,1,1-Trichloroethane
GC-MS	EPA 8260B SIM	1,1,2-Trichloroethane
GC-MS	EPA 8260B SIM	Trichloroethene
GC-MS	EPA 8260B SIM	1,2,3-Trichloropropane
GC-MS	EPA 8260B SIM	Vinyl Chloride
GC-MS	EPA 8270C / 8270D	Acenaphthene
GC-MS	EPA 8270C / 8270D	Acenaphthylene
GC-MS	EPA 8270C / 8270D	Aniline
GC-MS	EPA 8270C / 8270D	Anthracene
GC-MS	EPA 8270C / 8270D	Azobenzene
GC-MS	EPA 8270C / 8270D	Benzidine
GC-MS	EPA 8270C / 8270D	Benzo(a)anthracene
GC-MS	EPA 8270C / 8270D	benzo(a)pyrene
GC-MS	EPA 8270C / 8270D	Benzo(b)fluoranthene
GC-MS	EPA 8270C / 8270D	Benzo(e)pyrene
GC-MS	EPA 8270C / 8270D	Benzo(g,h,i)perylene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C / 8270D	Benzo(k)fluoranthene
GC-MS	EPA 8270C / 8270D	Benzoic Acid
GC-MS	EPA 8270C / 8270D	Benzyl Alcohol
GC-MS	EPA 8270C / 8270D	Biphenyl
GC-MS	EPA 8270C / 8270D	bis(2-chloroethoxy)methane
GC-MS	EPA 8270C / 8270D	bis(2-chloroethyl)ether
GC-MS	EPA 8270C / 8270D	bis(2-chloroisopropyl)ether
GC-MS	EPA 8270C / 8270D	bis(2-Ethylhexyl)adipate
GC-MS	EPA 8270C / 8270D	bis(2-Ethylhexyl)phthalate
GC-MS	EPA 8270C / 8270D	4-Bromophenyl-phenylether
GC-MS	EPA 8270C / 8270D	Butylbenzylphthalate
GC-MS	EPA 8270C / 8270D	Carbazole
GC-MS	EPA 8270C / 8270D	4-Chloro-3-methylphenol
GC-MS	EPA 8270C / 8270D	4-Chloroaniline
GC-MS	EPA 8270C / 8270D	2-Chloronaphthalene
GC-MS	EPA 8270C / 8270D	2-Chlorophenol
GC-MS	EPA 8270C / 8270D	4-Chlorophenyl-phenylether
GC-MS	EPA 8270C / 8270D	Chrysene
GC-MS	EPA 8270C / 8270D	Dibenzo(a,h)anthracene
GC-MS	EPA 8270C / 8270D	Dibenzofuran
GC-MS	EPA 8270C / 8270D	1,2-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	1,3-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	1,4-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	3,3'-Dichlorobenzidine
GC-MS	EPA 8270C / 8270D	2,4-Dichlorophenol
GC-MS	EPA 8270C / 8270D	Diethylphthalate
GC-MS	EPA 8270C / 8270D	2,6-Dimethylnaphthalene
GC-MS	EPA 8270C / 8270D	2,4-Dimethylphenol
GC-MS	EPA 8270C / 8270D	Dimethylphthalate
GC-MS	EPA 8270C / 8270D	Di-n-butylphthalate
GC-MS	EPA 8270C / 8270D	4,6-Dinitro-2-methylphenol
GC-MS	EPA 8270C / 8270D	2,4-Dinitrophenol
GC-MS	EPA 8270C / 8270D	2,4-Dinitrotoluene
GC-MS	EPA 8270C / 8270D	2-6-Dinitrotoluene
GC-MS	EPA 8270C / 8270D	Di-n-octylphthalate
GC-MS	EPA 8270C / 8270D	Fluoranthene
GC-MS	EPA 8270C / 8270D	Fluorene
GC-MS	EPA 8270C / 8270D	Hexachlorobenzene
GC-MS	EPA 8270C / 8270D	Hexachlorobutadiene
GC-MS	EPA 8270C / 8270D	Hexachlorocyclopentadiene
GC-MS	EPA 8270C / 8270D	Hexachloroethane
GC-MS	EPA 8270C / 8270D	Indeno(1,2,3-cd)pyrene
GC-MS	EPA 8270C / 8270D	Isophorone

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C / 8270D	1-Methylnaphthalene
GC-MS	EPA 8270C / 8270D	2-Methylnaphthalene
GC-MS	EPA 8270C / 8270D	1-Methylphenanthrene
GC-MS	EPA 8270C / 8270D	2-Methylphenol
GC-MS	EPA 8270C / 8270D	4-Methylphenol
GC-MS	EPA 8270C / 8270D	Naphthalene
GC-MS	EPA 8270C / 8270D	2-Nitroaniline
GC-MS	EPA 8270C / 8270D	3-Nitroaniline
GC-MS	EPA 8270C / 8270D	4-Nitroaniline
GC-MS	EPA 8270C / 8270D	Nitrobenzene
GC-MS	EPA 8270C / 8270D	2-Nitrophenol
GC-MS	EPA 8270C / 8270D	4-Nitrophenol
GC-MS	EPA 8270C / 8270D	n-Nitrosodimethylamine
GC-MS	EPA 8270C / 8270D	n-Nitroso-di-n-propylamine
GC-MS	EPA 8270C / 8270D	n-Nitrosodiphenylamine
GC-MS	EPA 8270C / 8270D	Pentachlorophenol
GC-MS	EPA 8270C / 8270D	Perylene
GC-MS	EPA 8270C / 8270D	Phenanthrene
GC-MS	EPA 8270C / 8270D	Phenol
GC-MS	EPA 8270C / 8270D	Pyrene
GC-MS	EPA 8270C / 8270D	Pyridine
GC-MS	EPA 8270C / 8270D	2,3,4,6-Tetrachlorophenol
GC-MS	EPA 8270C / 8270D	1,2,4-Trichlorobenzene
GC-MS	EPA 8270C / 8270D	2,3,4-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,3,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,4,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,4,6-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,3,5-Trimethylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	Acenaphthene
GC-MS	EPA 8270C / 8270D SIM	Acenaphthylene
GC-MS	EPA 8270C / 8270D SIM	Anthracene
GC-MS	EPA 8270C / 8270D SIM	Azobenzene
GC-MS	EPA 8270C / 8270D SIM	Benzo(a)anthracene
GC-MS	EPA 8270C / 8270D SIM	benzo(a)pyrene
GC-MS	EPA 8270C / 8270D SIM	Benzo(b)fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Benzo(e)pyrene
GC-MS	EPA 8270C / 8270D SIM	Benzo(g,h,i)perylene
GC-MS	EPA 8270C / 8270D SIM	Benzo(k)fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Biphenyl
GC-MS	EPA 8270C / 8270D SIM	bis(2-chloroethyl)ether
GC-MS	EPA 8270C / 8270D SIM	bis(2-Ethylhexyl)phthalate
GC-MS	EPA 8270C / 8270D SIM	Carbazole
GC-MS	EPA 8270C / 8270D SIM	4-Chloro-3-methylphenol

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C / 8270D SIM	2-Chlorophenol
GC-MS	EPA 8270C / 8270D SIM	Chrysene
GC-MS	EPA 8270C / 8270D SIM	Dibenzo(a,h)anthracene
GC-MS	EPA 8270C / 8270D SIM	2,4-Dichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,6-Dimethylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	2,4-Dimethylphenol
GC-MS	EPA 8270C / 8270D SIM	Fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Fluorene
GC-MS	EPA 8270C / 8270D SIM	Hexachlorobenzene
GC-MS	EPA 8270C / 8270D SIM	Indeno(1,2,3-cd)pyrene
GC-MS	EPA 8270C / 8270D SIM	1-Methylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	2-Methylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	1-Methylphenanthrene
GC-MS	EPA 8270C / 8270D SIM	Naphthalene
GC-MS	EPA 8270C / 8270D SIM	n-Nitrosodimethylamine
GC-MS	EPA 8270C / 8270D SIM	n-Nitroso-di-n-propylamine
GC-MS	EPA 8270C / 8270D SIM	Pentachlorophenol
GC-MS	EPA 8270C / 8270D SIM	Perylene
GC-MS	EPA 8270C / 8270D SIM	Phenanthrene
GC-MS	EPA 8270C / 8270D SIM	Phenol
GC-MS	EPA 8270C / 8270D SIM	Pyrene
GC-MS	EPA 8270C / 8270D SIM	2,4,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,4,6-Trichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,3,5-Trimethylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	1,4-Dioxane
HPLC	EPA 8310	Acenaphthene
HPLC	EPA 8310	Acenaphthylene
HPLC	EPA 8310	Anthracene
HPLC	EPA 8310	Benzo(a)anthracene
HPLC	EPA 8310	Benzo(a)pyrene
HPLC	EPA 8310	Benzo(b)fluoranthene
HPLC	EPA 8310	Benzo(g,h,i)perylene
HPLC	EPA 8310	Benzo(k)fluoranthene
HPLC	EPA 8310	Chrysene
HPLC	EPA 8310	Dibenzo(a,h)anthracene
HPLC	EPA 8310	Fluoranthene
HPLC	EPA 8310	Fluorene
HPLC	EPA 8310	Indeno(1,2,3-cd)pyrene
HPLC	EPA 8310	1-Methylnaphthalene
HPLC	EPA 8310	2-Methylnaphthalene
HPLC	EPA 8310	Naphthalene
HPLC	EPA 8310	Phenanthrene
HPLC	EPA 8310	Pyrene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
HPLC	EPA 8330A	HMX
HPLC	EPA 8330A	RDX
HPLC	EPA 8330A	1,3,5-TNB
HPLC	EPA 8330A	1,3-DNB
HPLC	EPA 8330A	Tetryl
HPLC	EPA 8330A	Nitrobenzene
HPLC	EPA 8330A	2,4,6-TNT
HPLC	EPA 8330A	4-AM-2,6-DNT
HPLC	EPA 8330A	2-AM-4,6-DNT
HPLC	EPA 8330A	2,6-DNT
HPLC	EPA 8330A	2,4-DNT
HPLC	EPA 8330A	2-Nitrotoluene
HPLC	EPA 8330A	4-Nitrotoluene
HPLC	EPA 8330A	3-Nitrotoluene
GC	EPA 8151A	Acifluorfen
GC	EPA 8151A	Bentazon
GC	EPA 8151A	Chloramben
GC	EPA 8151A	2,4-D
GC	EPA 8151A	2,4-DB
GC	EPA 8151A	Dacthal
GC	EPA 8151A	Dalapon
GC	EPA 8151A	Dicamba
GC	EPA 8151A	3,5 Dichlorobenzoic
GC	EPA 8151A	Dichlorprop
GC	EPA 8151A	Dinoseb
GC	EPA 8151A	MCPA
GC	EPA 8151A	MCPP
GC	EPA 8151A	Pentachlorophenol
GC	EPA 8151A	Picloram
GC	EPA 8151A	Silvex
GC	EPA 8151A	2,4,5-T
GFAA	CA 939M	Organo Lead
Preparation	**Method**	**Type**
Purge &Trap	EPA 5030B / EPA 5035	Volatiles Prep
Acid Digestion	EPA 3010 / EPA 3050B	Metals Prep
Alkaline Digestion	EPA 3060A	Hexavalent Chrom
Soxhlet	EPA 3540C	Organic Extraction
Sonication	EPA 3520C / EPA 3550C	Organic Extraction
Waste Dilution	EPA 3580A	Organic Extraction
TCLP	EPA 1311	Leaching
SPLP	EPA 1312	Leaching
Floricil Clean-up	EPA 3520B	Extract Clean-Up
GPC Clean-up	EPA 3640A	Extract Clean-Up

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Sulfur Clean-up	EPA 3660B	Extract Clean-Up
Acid/Permanganate Clean-up	EPA 3665A	Extract Clean-Up

Air and Emissions		
Technology	**Method**	**Analyte**
GC-MS	TO-15	1,1,1-trichloroethane
GC-MS	TO-15	1,1,2,2-tetrachloroethane
GC-MS	TO-15	1,1,2-Trichloro1,2,2-trifluoroethane
GC-MS	TO-15	1,1,2-trichloroethane
GC-MS	TO-15	1,1-dichloroethane
GC-MS	TO-15	1,1-Dichloroethene
GC-MS	TO-15	1,2,4-trichlorobenzene
GC-MS	TO-15	1,2,4-trimethylbenzene
GC-MS	TO-15	1,2-dibromoethane
GC-MS	TO-15	1,2-dichlorobenzene
GC-MS	TO-15	1,2-dichloroethane
GC-MS	TO-15	1,2-dichloroethene
GC-MS	TO-15	1,2-dichloropropane
GC-MS	TO-15	1,3,5-trimethylbenzene
GC-MS	TO-15	1,3-Butadiene
GC-MS	TO-15	1,3-Butadiene, 1,1,2,3,4,Hexachloro
GC-MS	TO-15	1,3-dichlorobenzene
GC-MS	TO-15	1,4-dichlorobenzene
GC-MS	TO-15	1,4-Dioxane
GC-MS	TO-15	2,2,4-Trimethylpentane
GC-MS	TO-15	4-Ethyltoluene
GC-MS	TO-15	Acetone
GC-MS	TO-15	Acrylonitrile
GC-MS	TO-15	Allyl Chloride
GC-MS	TO-15	Benzene
GC-MS	TO-15	Benzyl Chloride
GC-MS	TO-15	Bromodichloromethane
GC-MS	TO-15	Bromoform
GC-MS	TO-15	Bromomethane
GC-MS	TO-15	Carbon Disulfide
GC-MS	TO-15	Carbon Tetrachloride
GC-MS	TO-15	Chlorobenzene
GC-MS	TO-15	Chloroethane
GC-MS	TO-15	Chloroethene
GC-MS	TO-15	Chloroform
GC-MS	TO-15	Chloromethane
GC-MS	TO-15	cis-1,3-Dichloropropene

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Air and Emissions		
Technology	**Method**	**Analyte**
GC-MS	TO-15	Cyclohexane
GC-MS	TO-15	Dibromochloromethane
GC-MS	TO-15	Dichlorodifluoromethane
GC-MS	TO-15	Dichlorotetrafluoroethane
GC-MS	TO-15	Ethyl Acetate
GC-MS	TO-15	Ethylbenzene
GC-MS	TO-15	Isopropyl Alcohol
GC-MS	TO-15	m+p-Xylene
GC-MS	TO-15	Methyl butyl Ketone
GC-MS	TO-15	Methyl Ethyl Ketone
GC-MS	TO-15	Methyl Isobutyl Ketone
GC-MS	TO-15	Methyl Tert-Butyl Ether
GC-MS	TO-15	Methylene Chloride
GC-MS	TO-15	n-Heptane
GC-MS	TO-15	n-Hexane
GC-MS	TO-15	o-Xylene
GC-MS	TO-15	Styrene
GC-MS	TO-15	Tetrachloroethylene
GC-MS	TO-15	Tetrahydrofuran
GC-MS	TO-15	Toluene
GC-MS	TO-15	Trans-1,2-Dichloroethene
GC-MS	TO-15	trans-1,3-Dichloropropene
GC-MS	TO-15	Trichloroethylene
GC-MS	TO-15	Trichloromonofluoromethan
GC-MS	TO-15	Vinyl Acetate
GC-MS	TO-15	Vinyl Bromide

Notes:

1) This laboratory offers commercial testing service.

Approved By: _____ Date: March 24, 2011

R. Douglas Leonard
Chief Technical Officer

Issued: 1/10/11 Revised: 1/18/11 Revised: 3/21/11 Revised: 3/24/11

Appendix E
Erosion Control Plan

Final

Erosion and Sediment Control Plan
Solid Waste Management Unit 1
(SWMU 1)

Former Vieques Naval Training Range, Vieques, Puerto Rico

Contract Task Order 013

July 2012

Prepared for

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Atlantic

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CH2MHILL

Tampa, Florida

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SECTION 1

Introduction

The objective of this Erosion and Sediment Control Plan (ESCP) is to describe the potential erosion and control measures for the Remedial Action (RA) activities at Solid Waste Management Unit (SWMU) 1.

This ESCP is included as an Appendix of the Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring (RA/LTM) Work Plan (CH2M HILL, 2012). The details of site background and RA can be found in the Streamlined Remedial Investigation and Feasibility Study report (RI/FS Report) (CH2M HILL, 2011a) and RA/LTM Work Plan (CH2M HILL, 2012).

1.1 Site Location and Description

SWMU 1, covering approximately 41 acres, is located at the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico. SWMU 1 is an unlined landfill in use from 1954 to 1978 for the disposal of municipal waste from Camp García. Approximately 1,800 to 3,120 tons of municipal waste were disposed in the landfill, but no hazardous materials reportedly were placed in the disposal area. During operation, materials were disposed in trenches, which were then covered with about 6 inches of soil to control blowing of litter. A final 2-foot (ft) thick soil cover, consisting of compacted native soils, was placed over the trenches. Based on an average waste thickness of 2 ft and reported total waste disposal of 3,120 tons (or 2,836 cubic yards, assuming 1.1 ton per cubic yard), the RI/FS Report estimated that the total waste disposal area would be approximately 0.9 acre, in isolated trenches across the 41 acres. So the actual area of waste is small compared to the entire SWMU 1 footprint, and approximately 98 percent of SWMU 1 footprint area would not have been used for historical waste disposal.

The RI/FS Report conservatively assumed that the exposed landfill debris areas would be less than 0.5 acre, with anticipated exposed debris less than 0.14 acre. SMWU 1 is currently densely vegetated with thick thorn scrub, as high as 10 to 30 feet tall. No federally protected plant species were observed at SWMU 1. The dense vegetation provides an effective phyto-cover, minimizing erosion during heavy storms, and providing a partial physical barrier that inhibits trespassing. Based on the site topography (relatively flat area within the landfill boundary, sloping from about 0.5 to 1.5 percent) and dense vegetation cover for infiltration control, erosion and ponding do not appear to be an issue at SMWU 1. In fact, observations of the landfill and surrounding area more than 30 years after operations ceased and collection of environmental media data adjacent to the landfill indicate erosion and debris/contaminant transport have been negligible. This is likely due to the fact that relatively small quantities of municipal-type waste were disposed of and that the dense vegetation is a very viable cover.

SECTION 2

Site Remedial Action Activities

Site Remedial Action (RA) activities will include a site reconnaissance, perimeter fence installation for establishing the Land Use Control (LUC) boundary, and installing a 2-foot soil cover in areas of exposed debris (if identified) (CH2M HILL, 2011b).

As documented in the Record of Decision (ROD), site-wide vegetation clearance is not preferred because the current dense vegetation provides various benefits, such as serving as an efficient phytocover, minimizing erosion and infiltration, and acting as a partial natural barrier for trespassing (CH2M HILL, 2011c). During the site reconnaissance, minor trimming using hand clearance tools will be conducted in order to gain access to visually inspect the 41 acres. This activity will not diminish the current vegetation cover to cause erosion concern. The Center Access Road is currently covered by grass and sparse shrubs; therefore, vegetation removal there by hand and potentially mechanical means (mower) would not enhance erosion, and the vegetation along this road will be allowed to re-establish following the covering activities. The only anticipated significant vegetation disturbance activities that could possibly enhance the erosion potential during the RA are:

- Vegetation clearance of perimeter fence line buffer approximately 11,000 feet long and 5 feet wide (1.3 acres)
- Vegetation clearance for installation of 2-foot soil cover for the exposed debris area, if identified (estimated to be less than 0.5 acre).

SECTION 3

Erosion and Sediment Control Best Management Practices

It is estimated that less than about 1.8 acres of vegetation/land will be disturbed that could result in enhanced erosion potential. Regardless of the actual area, this potential will be short-lived and properly controlled because: (1) the natural tendency of the dense vegetation to re-establish itself, (2) the replanting activities that will be done in the soil cover areas, and (3) the erosion and sediment control best management practices (BMPs) described herein that will be employed on an as-needed basis.

Attachment E-1 shows the potential erosion and sediment control BMP measures. The BMPs will be in general accordance with the *Puerto Rico Erosion Control and Sediment Control Handbook For Development Areas* (PREQB and USDA NRCS, 2005). The following provides a general description of potential BMP measures. The actual BMP measures to be implemented at SWMU 1 may be adjusted based on site reconnaissance findings and field conditions.

3.1 Minimizing Disturbed Area

The primary objective of the SWMU 1 RA is to prevent direct contact with surface and subsurface landfill debris and associated contamination that would potentially pose an unacceptable risk to exposed receptors. The RA activities are aimed at minimizing the disturbance of current dense vegetation cover for the dual purpose of controlling erosion and inhibiting trespassing. Wherever possible, existing vegetation will be retained. It minimizes erosion potential, protects water quality, and provides a natural barrier to discourage trespassing. If debris is not visible where the vegetation is dense, the intent of the remedy is being met.

3.2 Stabilizing Soils

As part of the soil cover activities, the exposed debris areas (if identified) will be stabilized, covered, and re-vegetated. A 24-inch native soil will be placed to cover the debris and provide a bedding layer for the surface vegetation. Mulching is a temporary soil stabilization or erosion control BMP practice where materials, such as, wood chips, straw or grass hay, or cut vegetation mulched on-site are placed on the soil surface. The vegetation selected will be native species selected with input from USFWS. During the period in which vegetation is becoming established, erosion control matting may be provided using techniques such as jute mesh, a synthetic stabilization mat, or other means determined to be suitable. However, past experience, including vegetation clearance during investigations, has shown natural vegetation re-growth occurs very rapidly in Vieques.

3.3 Straw or Hay Bale Barriers

Straw or hay bales work much like silt fence and may be used instead of silt fence (described below). They can be used to form a barrier or redirect water. They impede storm water flow. Unlike silt fence, straw or hay bales do not allow water to flow through freely; thus, they are used where detention, not just filtration, is necessary.

3.4 Silt Fence

The purpose of a silt fence is to protect streams or wetland areas, prevent erosion, and keep sediment onsite. A silt fence consists of posts with filter fabric stretched across the posts. The lower end of the fence fabric is vertically trenched and covered with backfill. This prevents water from passing by the fence without first being filtered. The fabric allows the water to pass through while retaining the sediment.

Silt fences (or hay bales) will be installed downgradient of the vegetation clearance area of SWMU 1, along the perimeter of the soil covering area, and critical locations adjacent to the intermittent ephemeral streams. This fencing will be put in place prior to the beginning of the construction activities. The fencing will be constructed in

general accordance with *Puerto Rico Erosion Control and Sediment Control Handbook For Development Areas* (PREQB and USDA NRCS, 2005). The controls will be inspected and maintained in accordance with procedures in Section 4.1 below.

Due to the relatively small land disturbance area, it is anticipated that the majority of sediment will be trapped by the dense vegetation and silt fence downgradient of the land disturbance areas. Accumulated sediment will be removed from the fence base if it reaches one-third of the height of the silt fence or if it is creating a noticeable strain on the fabric. At the completion of RA construction, temporary erosion control measures (slit fence and hay bales) shall be removed and a final inspection shall take place.

3.5 Revegetation

At the completion of RA activities, the perimeter fence line 5-foot vegetation buffer zone and center access roads will be allowed to naturally re-vegetate. Revegetation will be conducted in areas where native soil is added. USFWS input will be solicited for plants used to revegetate covered areas. As needed and practical, the cut vegetation during the site reconnaissance and fence installation activities will be mulched and dispersed over the cleared area to serve as temporal erosion control measure as well as soil nutrient.

SECTION 4

Inspections

4.1 Inspection During Construction

Inspections during the RA construction phase will be conducted by the Navy contractors and/or subcontractors on a weekly basis. Inspections will include all areas of the site disturbed by construction activity. The inspection schedule and procedures described below are relative to the land disturbance activities during the RA construction period.

4.1.1 Ephemeral Stream

During the construction period of land disturbance activities, intermittent ephemeral streams will be inspected weekly and after significant storms (approximately 0.5 inch/24-hour or greater) for the presence of eroded soil or debris from covered areas. Debris identified in the stream will be removed.

4.1.2 Soil Covering Area

Soil covering area will be inspected weekly and after significant storms (approximately 0.5 inch/24-hour or greater) for evidence of erosion. If erosion that threatens the cover is noticed, additional erosion controls will be implemented, including re-vegetation or adding additional vegetation, if warranted.

4.1.3 Silt Fencing

Silt fences will be inspected weekly and immediately after significant storms (approximately 0.5 inch/24-hour or greater) to ensure that they are intact, that there are no gaps where the fence meets the ground, and that there are no tears along the length of the fence. If gaps or tears are found, the fabric will be repaired or replaced immediately. Accumulated sediment will be removed from the fence base and put back to the soil covering area, as applicable. The silt fence will be removed from the project area after the completion of construction activities. EPA guidance documents indicate that the anticipated life span of a silt fence is 6 months; therefore, it will unlikely need to be replaced for this RA.

4.1.4 Straw or Hay Bale Barriers

All barriers will be inspected weekly and after significant storms (approximately 0.5 inch/24-hour or greater) for holes, tears, and snags. Straw or hay bales will be checked for proper arrangement and displacement. Accumulated sediment will be removed and put back to the soil covering area, as applicable. Repairs will be made immediately if the barrier has been damaged. The straw/hay bale barriers will be removed from the project area after the completion of construction activities.

4.2 Inspection Record

An ESCP inspection form is provided in **Attachment E-2**. A log of corrective actions will be maintained to describe repair, replacement, and maintenance of BMPs undertaken as a result of the inspections and maintenance procedures described in this plan.

SECTION 5

References

CH2M HILL, 2011a. *Streamlined Remedial Investigation/Feasibility Study Report, SWMU 1, Former Vieques Naval Training Range, Vieques, Puerto Rico.* April

CH2M HILL, 2011b. *Proposed Remedial Action Plan, SWMU 1, Atlanta Fleet Weapons Training Area, Former Vieques Naval Training Range, Vieques, Puerto Rico.* July

CH2M HILL, 2011c. *Record of Decision, SWMU 1, Former Vieques Naval Training Range, Vieques, Puerto Rico.* September.

CH2M HILL, 2012. *Draft Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan Proposed Remedial Action Plan, SWMU 1, Former Vieques Naval Training Range, Vieques, Puerto Rico.* April

Puerto Rico Environmental Quality Board and USDA-Natural Resources Conservation Service (PREQB and USDA NRCS, 2005). *Puerto Rico Erosion Control and Sediment Control Handbook For Development Areas*. March

Attachment E-1
Sediment and Erosion Control Measures Figure

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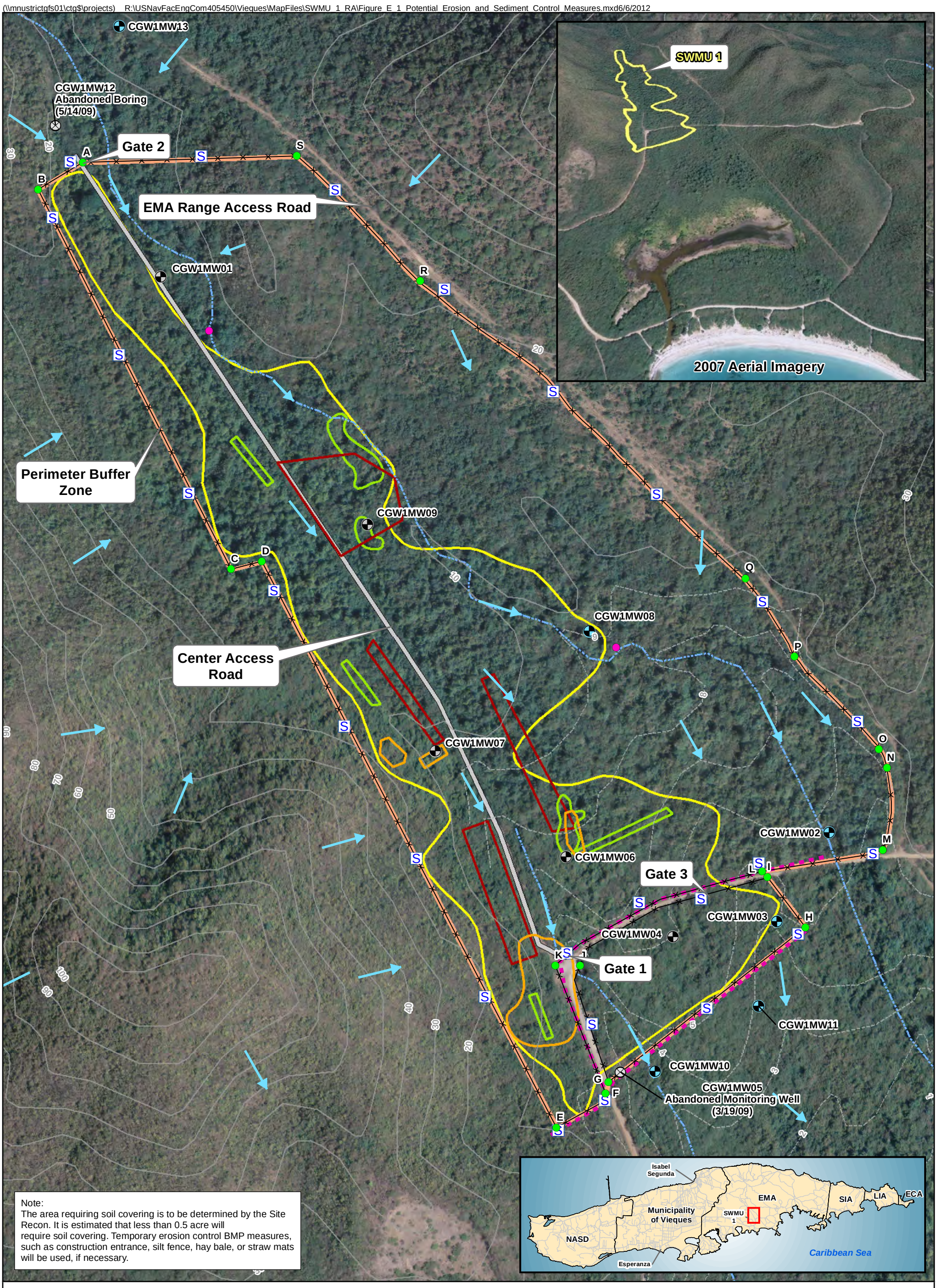

Note:
The area requiring soil covering is to be determined by the Site Recon. It is estimated that less than 0.5 acre will require soil covering. Temporary erosion control BMP measures, such as construction entrance, silt fence, hay bale, or straw mats will be used, if necessary.

Legend

- Fence Corners
- Haybale/Silt Fence (as necessary)
- Sign Location
- Monitoring Well
- Long Term Monitoring Well
- Abandoned Boring or Monitoring Well
- 3-Wire Fence
- Topographic Contour (1 Meter Interval)
- Topographic Contour (10 Meter Interval)
- Temporary Silt Fence
- Ephemeral Stream
- Stormwater Flow Direction
- Apparent Landfill trench/cell evident in 1959 Aerial Photograph
- Apparent Landfill trench/cell evident in 1962 Aerial Photograph
- Apparent Landfill trench/cell evident in 1964 Aerial Photograph
- 5-ft Wide Vegetation Clearance Buffer for Fence Installation
- Existing 15-ft-Wide Access Road
- Recon Area (approximate extent of landfill)

N W E S

0 125 250 Feet

2007 Aerial Imagery

Figure E-1
Potential Erosion and Sediment Control Measures
Former Vieques Naval Training Range
Vieques, Puerto Rico

CH2MHILL

Attachment E-2
ESCP Inspection Form

ESCP Inspection Form

SWMU 1, Former Vieques Naval Training Range
Vieques, Puerto Rico

Date: _____ Inspector: _____ Company: _____

Inspection Procedure	Yes/No	Comments	Date of Corrective Action	Corrective Action Taken
Is there evidence of exposed debris?				
Have any adverse impacts, such as erosion, accumulation of sediment, or litter occurred on adjacent roads, or streams?				
Are the erosion control measures in place and functioning as intended?				

Appendix F
Final Response to EPA, PREQB, and FWS Comments

Final Responses to

Technical Review of the Draft Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan, Solid Waste Management Unit 1 (SWMU 1), Former Vieques Naval Training Range, Vieques, Puerto Rico Dated December 2011

Presented below are review comments on the Draft Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan, Solid Waste Management Unit 1 (SWMU 1), Former Vieques Naval Training Range, Vieques, Puerto Rico, dated December 2011 (Draft RA/LTM Work Plan).

Navy General Note

For many of the comments below, it is important to keep in mind that the remedy selected for SWMU 1 is not like a conventional landfill post-closure cap design and thus does not warrant the same level of specifications. The regulatory agencies and public recognized in the Record of Decision that the existing landfill cover, which includes very dense vegetation, has provided an effective cover for the relatively small quantity (only about 3,120 tons) of generally municipal-type waste for over 30 years and that enhancing this cover by adding additional soil just in isolated areas where debris is observed at the ground surface is the most appropriate remedy.

Over the course of the investigations performed at SWMU 1, just over 10 acres of vegetation were cleared along transects that covered the entire areal extent of the landfill (see attached figure). Since the landfill is about 41 acres, this amounts to approximately 25 percent of the landfill vegetation that was cut to perform various investigation activities, including the areas where historical aerial photographs indicated the trenched waste disposal occurred. Over the course of investigations, only a trivial amount of debris was observed along these transects, and its presence may have been due to the ground-disturbing activities caused by vegetation removal and subsequent investigation activities, not necessarily by erosion. This information suggests only a small amount of debris likely exists on the ground surface across the landfill in very small, isolated areas, which will be managed through localized covering in a ecologically-friendly manner. The Navy feels that the existing work plan, with the enhancements made in accordance with the responses to comments below, provides the appropriate amount of detail and flexibility to address any debris encountered and meet the RAOs while maintaining the integrity of the existing landfill cover.

General Comments

1. The currently proposed soil cover and operations and maintenance (O&M) plan does not appear to meet the purpose and remedial action objectives (RAOs) presented in Sections 1.1 (Purpose) and 1.2 (Remedial Action Objectives). It is unclear how routine inspections of the site will prevent the potential for erosion of landfill debris and the two foot soil cover, as it does not appear that all locations that warrant repair will be addressed by the proposed reconnaissance approach. In addition, the final capped surface does not appear to be favorable to unimpeded surface water sheet flow. Revise the Draft RA/LTM Work Plan to propose a soil cover and operations and maintenance plan that will address these concerns and ensure that stakeholder approval is obtained throughout the development process.

Navy Response:

The Navy feels the proposed soil cover and operations and maintenance plan meets the RAOs, especially considering the low-environmental-footprint remedy that was selected for the site. Observations made of the site conditions during the investigations clearly demonstrated that erosion is not a significant concern at the site due to the very dense vegetation that covers the landfill. The landfill has been out of operation for over 30 years and reconnaissance activities during the investigation showed little to no evidence of erosion of the final cover placed on the landfill in 1978. It is specifically because of this dense vegetation that all of the agencies and public supported a remedy that emphasizes its preservation.

Vegetation re-growth on Vieques is unique, likely common throughout the tropics, but significantly different than temperate regions like the continental United States. Vieques sites cleared of vegetation for investigation often must be re-cleared within several months because they naturally re-vegetate before the investigation can be completed. For example, transects cut across the SWMU 1 landfill during the 2009 investigation, where no re-planting was done, are today indistinguishable from surrounding areas where no vegetation was cut, with thick thorn scrub and trees as high as 10 to 30 feet tall.

As discussed in the SWMU 1 RI/FS Report (CH2M HILL, 2011), the topography of the landfill is relatively flat. That, coupled with the dense vegetation, is likely the reason that after over 30 years, significant erosion has not been observed. In fact, the small amount of debris observed at the ground surface during the investigation may have been due to the transect cutting activities and not erosion.

Because only small, isolated areas are anticipated to require additional cover (0.5 acre or less as stated in the RI/FS Report), the surrounding vegetation will provide natural erosion controls, as it has done for over 30 years. As an added precaution, any covering activities performed during the remedial action implementation will employ additional erosion controls. To provide additional details on the erosion control measures, an Erosion and Sediment Control Plan (ESCP) has been included as Appendix E of the revised work plan. The ESCP highlights the Best Management Practices (BMPs) for erosion and sediment control, including inspection schedule and record keeping, that will be potentially employed during the remedial action , based on site-specific conditions and needs.

2. Section 2.3.1 (Cover Installation) states that, "If possible, the native soil cover material will be obtained in the general vicinity of the landfill, away from any SWMUs or AOCs [Areas of Concern] (e.g., the area shown around the landfill in Figure 2-3)." However, information to support the use of material in the general vicinity of the landfill as the native soil cover is not provided. For example, it is unclear why soil in the general vicinity of the landfill is deemed appropriate for use as the native soil cover (i.e., does it meet the soil gradation requirements for use), does not require analytical analysis to confirm it is uncontaminated and appropriate for use (the footprint of a borrow source should be defined and an appropriate sampling frequency based on volume used should be established). Further, it is unclear how removal of soil from the general vicinity of the landfill would not induce soil erosion in the general vicinity of the landfill. Revise the Draft RA/LTM Work Plan to support the use of material in the general vicinity of the landfill as the native soil cover.

Navy Response:

The first two bullets in Section 2.3.1 have been modified as follows:

The first bullet has been eliminated

The second bullet has been modified to read: “An attempt will be made to obtain the material from the location . . . “

In this way, if soil is obtained from anywhere where there is not historical data that show the soil is appropriate for use as cover (e.g., site closed out without land use restrictions), including in the general vicinity of the landfill, chemical analysis of the soil will be performed to demonstrate its suitability.

In addition, the following paragraph has been added to the end of Section 2.3.1:

"Once the soil cover source area is identified, necessary erosion control measures will be implemented there. As necessary, regarding and re-vegetation of the soil source area will be conducted."

3. Design specifications are not provided and/or referenced. For example:

   a. Section 2.3.1 (Cover Installation) indicates that the construction of the soil cover will include placement and compaction of the lower 16-inch fill material in 8-inch lifts with compaction sufficient to inhibit erosion and placement of the upper 8-inch native soil to support native vegetation growth; however, compaction specifications are not provided.

      Navy Response:

      It is important to note that because the SWMU 1 remedial action just enhances the existing soil cover on the landfill, as stated in the Record of Decision, the planned soil cover is not like a conventional landfill post-closure cap design, so compaction specifications are not necessary. As noted above, the existing conditions, including vegetation cover, provide sufficient coverage over the debris, except in small, isolated areas where debris may be exposed.

   b. As such, it is unclear if the fill and native soil material will be sufficiently compacted to inhibit erosion (ensure adequate compaction is achieved) and support native vegetation growth (ensure the surface soil which supports vegetative growth is not overcompacted).

      Navy Response:

      Please see response to EPA General Comment #3a.

   c. The source of the fill material, to be used in the lower 16-inch lift of the excavations, is not provided. As a result, it is unclear if the materials which will be used will be appropriate.

      Navy Response:

      Please see response to EPA General Comment #2. In addition, the source material will be obtained on island from areas where native vegetation like that to be planted at SWMU 1 do or could grow.

   d. The plant species which will be used to revegetate the cleared areas and control erosion are not specified. Thus, it is unclear if appropriate species will be utilized which will thrive in the tropical climate where the site is located. In addition, it is unclear if quarterly inspection of the areas is appropriate to ensure establishment of growth and prohibit erosion control. Further, it is unclear what measures will be taken should the inspections show vegetation has not become established and/or erosion is occurring.

      Navy Response:

      As stated in Section 2.3.1, the Navy will consult with USFWS to select the species to be used for re-vegetation. In addition, the 4th bullet in the second paragraph of Section 2.3.1 has been edited to read:

      "Planting of native vegetation to help re-vegetate the cleared areas and control erosion. Additional erosion control measures such as temporary cover (e.g., straw mats) will be implemented while the newly-planted vegetation becomes established, if warranted, based on physical characteristics such as the size of area covered, the topography, surrounding vegetation, etc."

      In addition, the first paragraph of Section 2.3.2 has been revised to read:

      "Immediately following RA implementation, O&M activities will comprise quarterly inspections of the disturbed areas for an estimated 1 year to ensure vegetation becomes established and

erosion is not occurring such that landfill debris is likely to become re-exposed. Quarterly inspections will continue beyond 1 year if necessary to achieve the stated objective. After the establishment of vegetation, the frequency of the site inspections for the long-term O&M activities will be reduced to annually. If inspections show that the erosion control measures are not sufficient, additional erosion control measures will be taken in accordance with the Erosion and Sediment Control Plan (ESCP). If inspections show that vegetation is not re-establishing, the Navy will consult with USFWS and conduct additional re-planting activities."

e. Section 2.3.2 (O&M Activities) does not provide the measures that will be utilized to maintain the active gravel road that passes through the southern portion of SWMU 1. In addition, the criterion that will be utilized to determine that measures are needed to maintain the active gravel road is not provided.

Navy Response:

During the long-term O&M period, annual inspection for erosion (potential exposed debris, road, and ephemeral streams) will be conducted. The requirement of long-term O&M inspection of active gravel road for erosion and inspection form has been included in the Erosion and Sediment Control Plan (ESCP), which has been included as Appendix E of the RA/LTM Work Plan.

f. Section 2.3.2 (O&M Activities) indicates that the perimeter vegetation buffer along the fence line will be periodically, but minimally, cleared to provide access for site O&M activities. However, periodically and minimally are not defined and do not constitute a specific frequency. As such, it is unclear how frequently the perimeter vegetation buffer will be inspected and cleared.

Navy Response:

The purpose of perimeter vegetation buffer clearance is to provide easy access for perimeter fence installation and boundary survey during the LUC implementation. In recent communications, USFWS has suggested that the best way to prevent access by potential trespassers but to allow wildlife relatively unimpeded movement is to use the natural dense vegetation, in addition to signs and 3-wire fence. Therefore, fence line will be allowed to fully re-vegetate. Subsequent inspection of the fence line will be done based on accessibility. If any particular portion of the fence cannot be accessed because the vegetation is too dense, then trespassers would also not be able to cross the boundary at that location, so the intent of the fence will still be met in those locations, even if the fence condition cannot be verified. In addition, to minimize the de-vegetation to install the fence, a 5-foot wide buffer instead of 10-foot wide buffer will be cleared.

The last bullet of Section 2.3.2 has been replaced with the following :

"Center Access Road and Perimeter Fence: Center access road will be periodically (annually), but minimally, cleared to provide access for site O&M activities. Perimeter vegetation buffer (along fence line) will be allowed to re-vegetate naturally to minimize potential trespassing, so periodic vegetation clearance is not required. Subsequent inspection of the fence line will be done based on accessibility. If any particular portion of the fence cannot be accessed because the vegetation is too dense, then trespassers would also not be able to cross the boundary at that location, so the intent of the fence will still be met in those locations, even if the fence condition cannot be verified. "

In addition, the phrase "10-foot vegetation buffer" has been replaced by "5-foot vegetation buffer" throughout the document.

g. Performance measures for the proposed soil cover are not provided. For example, the thickness measurements for the soil fill are not provided. Similarly, the method used to measure the thickness of the soil fill is not provided. In addition, the frequency for collection of thickness measurements is not provided.

Navy Response:

Page 2-4, Section 2.3.3, 2nd sentence of Paragraph 1 has been revised to read: "Performance measures for the proposed soil cover will include thickness measurements for the soil fill, at frequency of one measurement per 2,500 square feet of soil covering area, with photo documentation to help ensure that the soil cover meets RAO 1 and RAO 2."

h. Revise the Draft RA/LTM Work Plan to provide design specifications which at a minimum address the above items.

Navy Response:

Please see response to previous comments.

4. The Potential Contaminant Sources and Transport Pathways to/within Groundwater subsection of Sampling and Analysis Plan (SAP) Worksheet #10 (Problem Definition) of Appendix D (SWMU 1 LTM SAP) states that soil screening and remediation goals (SSRG) model calculations were utilized to show that the potential for leaching to groundwater is negligible and that no groundwater contaminant plume exists; however, this information is not referenced elsewhere in the Draft RA/LTM Work Plan [e.g., Section 4.0 (Groundwater Long-Term Monitoring)]. In addition, a reference to the document containing the SSRG model calculations is not provided. As such, it is unclear if the SSRG model calculations are appropriate to determine that the potential for leaching to groundwater is negligible and that no groundwater contaminant plume exists. Revise the Draft RA/LTM Work Plan to provide and/or reference the SSRG model calculations and ensure the SSRG model calculations are discussed in Section 4.0.

Navy Response:

SAP worksheet 10, Potential Contaminant Sources and Transport Pathways to/within Groundwater, 2nd paragraph, first sentence has been revised to "The number of years the landfill debris has been in place (between 30 and 55 years), the combined soil and groundwater analytical data, and Soil Screening and Remediation Goals (SSRG) model calculations show that the potential for leaching to groundwater is negligible and that no groundwater contaminant plume exists, as discussed in the *Final Streamlined Remedial Investigation/Feasibility Study Report Solid Waste Management Unit 1* (CH2M HILL, 2011a).

In Section 4 of the RA/LTM Work Plan, the following sentence has been added after the sentence "Groundwater data collected from beneath and downgradient of the landfill indicate no groundwater contamination is present requiring remediation and that leaching from the landfill to groundwater has been insignificant during the past 30 to 55 years that the landfill debris has been in place." in the first paragraph: "In addition, Soil Screening Remediation Goals (SSRG) model calculations show that the potential for leaching to groundwater is negligible and provides additional evidence that no groundwater contaminant plume exists, as discussed in the *Final Streamlined Remedial Investigation/Feasibility Study Report Solid Waste Management Unit 1* (CH2M HILL, 2011a)."

5. Discrepancies exist within the Draft RA/LTM Work Plan related to the selected remedy action (RA) for SWMU 1. Section 1 (Introduction) indicates that the selected RA for SWMU 1, as documented in the Record of Decision (ROD), is Enhanced Native Soil Cover and Institutional Controls (ICs); however, SAP Worksheet #10 (Problem Definition) of Appendix D (SWMU 1 LTM SAP) states that, "The SWMU 1 ROD was finalized in November 2011 (CH2M Hill, 2011b), which identified Enhanced Native Soil Cover, Institutional Controls, and LTM [long-term monitoring] of groundwater as the selected presumptive remedy for the site." As such, it is unclear if the RA is enhanced native soil cover and ICs or enhanced native soil cover, ICs, and LTM. Revise the Draft RA/LTM Work Plan to clarify the RA for SWMU 1, as specified in the ROD. Also, the SWMU 1 ROD was finalized in September 2011. Please correct.

Navy Response:

Section 1 Introduction 5th paragraph, the second sentence has been changed to: "…(CH2M HILL, 2011c), is Enhanced Native Soil Cover, Institutional Controls (ICs), and Long-Term Monitoring (LTM)."

SAP Worksheet 10, Investigation History, 3rd paragraph, the first sentence has been changed to: "The SWMU 1 ROD was finalized in September 2011…"

6. The data reporting, management and reduction procedures discussed in the SAP are insufficiently detailed. For example, the SAP does not list what is included in the raw data packages, or discuss the format of any electronic data deliverables. Also, it is unclear how validation qualifiers will be entered onto the reports, and why only a 10 percent check of the database as discussed in Worksheet #37, page 117, is sufficient. Further, the Quality Assurance Project Plan (QAPP) should indicate where the project files will be stored (i.e., provide address), who will manage them, and the minimum length of time the files will be kept. Revise the SAP to include the data management information discussed in Section 3.5.5 of the Uniform Federal Policy for Quality Assurance Project Plans Manual dated March 2005 (UFP QAPP Manual).

Navy Response:

The contents of the data package will be sufficient to allow for the verification and validation procedures required by Worksheet #34-36. The requirement for "Level IV" or "CLP-Like" data packages is in the laboratory SOW (part of the purchase order), which is not appropriate to include with the SAP. "Level IV" is specified in Worksheet #29. The format of the electronic data deliverable (i.e. "SNEDD") is contractor-specific and also specified in the laboratory SOW. The EDD requirement is sufficient for database loading, creating tables for the report, and loading data to NIRIS, the Navy's database.

"Validation qualifiers are hand-written or otherwise entered onto the laboratory Form 1s and then re-assembled into the data validation report. Validation qualifiers supersede laboratory qualifiers (for data subject to analytical data validation) and are presented on data tables when produced after validated data have been received. Nevertheless, all qualifiers are defined at the bottom of tables." A row has been added to Worksheets #34-36 (below 'Documentation of Field QC Sample Results'). The data review input is "Third-Party Data Validation." The description includes the three sentences at the beginning of this paragraph. The data validator is responsible for verification. It is Step IIa and IIb. It is external.

The 10% check described on Worksheet #37 refers to the 10% check between hardcopy and EDD. For clarity, the third sentence of the fourth bullet has been revised to: "The check will verify results and qualifiers." The 10% check is commonly used, not only for Vieques, but broadly within CERCLA and has been sufficient to identify systematic errors in reporting (for example, analyte discrepancies, missing qualifiers, nondetect results reported at the incorrect level, etc.). Note that, as part of the data-loading process, a 100% check is performed on all changes made during data validation (numerical changes, qualifiers added, etc.). A row has been added to Worksheets #34-36 (below 'Electronic Data Deliverables'). The data review input is "Electronic Data Deliverables." The description is: "Electronic Data Deliverables will be compared against data validation reports and marked-up Form 1s (100% check of all changes made during data validation)." The project chemist is responsible for verification. It is Step I. It is external.

The contractor manages the project files until the project is closed. The length of time for maintaining project files is both file- and contract-specific. Once the project is closed, the files are archived and/or returned to the Navy in accordance with contract terms. The asterisk footnote at the bottom of Worksheet #29 has been updated to these three sentences.

EPA Evaluation of Response:

The response does not provide the location where project documents will be stored (i.e., physical address). It is also unclear how long project reports will be archived or maintained once returned to

the Navy and if the project documents will be offered to EPA prior to disposal. Revise the Solid Waste Management Unit 1 Groundwater Long-Term Monitoring Sampling and Analysis Plan (SAP), included as Appendix D, to provide the location where project documents will be maintained, and to indicate that EPA will be offered the project documents prior to disposal.

Navy Follow Up Response:

After completion of the project, project documents required to be maintained will be stored at the Federal Records Center (FRC) in Suitland, MD:

Washington National Records Center
4205 Suitland Road
Suitland, Maryland 20746-8001

This statement and the physical address will be added to the bottom of Worksheet #29. EPA will be provided the required reports in accordance with the SAP; it is anticipated that the Navy will not dispose of project documents.

7. The project personnel information is inconsistently presented in the SAP.

   a. Several personnel listed in Worksheets #4, 5 and 7, including the contractor program chemist, project chemist, project data manager and data validator are not listed in Worksheet #3. Revise the SAP to include these personnel in Worksheet #3.

Navy Response:

The program chemist's role is to review all SAPs prior to distribution; therefore, she does not get a final copy. Project chemist Mike Zamboni has been added to SAP Worksheet 3, receiving a final CD. Worksheet 3 has been changed to show that Critigen Project Data Manager Bhavana Reddy gets a CD of the final, and Worksheet 7 has been revised to show her affiliation as Critigen. Data Validator Laura Maschoff has been added to Worksheet 3 to receive a final CD. Project Data Manager's role has been assumed by Project Chemist. Worksheets 4, 5, 6, and 7 have been changed to reflect that reorganization. In addition, wherever a particular person's name is used in a worksheet, the citations have been updated to include "or current personnel" to account for changes in personnel over the duration of the LTM.

EPA Evaluation of Response:

The response is partially adequate. The response indicates that the contractor program chemist reviews the SAP prior to distribution and does not receive a final version. However, it is unclear why the program chemist does not need the final version, as part of their role indicated in Worksheet #6 is to perform review of analytical data. Revise the SAP to include the contractor program chemist in Worksheet #3.

Navy Follow Up Response: The program chemist has been added to the SAP distribution list.

   b. Worksheet #7 identifies a Field Investigation Lead, but this person is not included in Worksheets #3, 4 or 5. Revise the SAP to include the Field Investigation Lead on worksheets #3, 4, and 5.

Navy Response:

The Field Investigation Lead is in Worksheet 3 as TBD, and has been added as such to Worksheet 4. Worksheet 5 has been revised to show the Field Team Leader or the Field Investigation Lead. Worksheet 7 has been revised to show the Field Investigation Lead as TBD.

c. Worksheet #5 lists a UXO subcontractor, but this is not included in Worksheets #3, 4 or 7. Revise the SAP to include the UXO subcontractor in Worksheets #3, 4, and 7.

Navy Response:

The UXO subcontractor has been removed from the SAP.

d. Worksheet #7 includes an Investigation-derived Waste (IDW) subcontractor, but this subcontractor is not listed in Worksheets #3, 4, or 5. Revise the SAP to include the IDW subcontractor in Worksheets #3, 4, and 5.

Navy Response:

The IDW subcontractor does not need to read or sign off on the SAP and is therefore not appropriate to include in Worksheets 3, 4, or 5.

EPA Evaluation of Response:

The response is partially adequate. However, all subcontractors should be included in the organizational chart to show reporting relationships and lines of communication as discussed in Section 2.4.1 of the Uniform Federal Policy for Quality Assurance Project Plans Manual dated March 2005 (UFP QAPP Manual). Revise the SAP to include the Investigation-derived Waste (IDW) subcontractor in Worksheet #5.

Navy Follow Up Response:

The IDW disposal subcontractor has been added to worksheet 5 as reporting to the CH2MHILL PM, with a line of communication between the FTL and the IDW subcontractor.

8. Throughout the SAP several standard operating procedures (SOPs) are referenced and listed, however, the corresponding SOPs are not provided. For example, Worksheet #14 references (SOP) B.7 and SOP H-9. SOPs are also listed in Worksheet #21 for project sampling and Worksheet #23 for analytical laboratory procedures. Revise the SAP to provide copies of all SOPs referenced.

Navy Response:

All SOPs are located in the *Final Master Standard Operating Procedures, Protocols, and Plans, Environmental Restoration Program, Vieques Puerto Rico* (April 2010). Reference to this document has been added to the SAP where the SOPs are cited.

EPA Evaluation of Response

The response is not adequate. The response indicates that all standard operating procedures (SOPs) are provided in the Master Standard Operating Procedures, Protocols, and Plans, dated April 2010 (Master SOPs), and that references have been added to the SAP where the SOPs are cited. However, several of the SOPs listed in Worksheet #21 were revised in May 2011. Additionally, several SOPs identified in Worksheet #21 are not included in the Master SOPs (e.g., A-7 through A-9). Revise the SAP to ensure that current versions of all SOPs are provided.

Navy Follow Up Response:

Worksheet 21 has several errors that have been corrected. The Vieques Master SOPs (Master Standard Operating Procedures, Protocols, and Plans, Environmental Restoration Program, Vieques, Puerto Rico, April 2010) is the most current SOPs document. Worksheet 21 has been revised to show the correct SOP reference numbers and titles.

Specific Comments

1. **Section 1, Introduction, page 1-1:** The text indicates that no hazardous materials were placed in the disposal area; however, information to support this conclusion is not provided and/or referenced. As a result, it is unclear if hazardous materials exist within the disposal area at SWMU 1 and will directly impact the RA. Revise the Draft RA/LTM Work Plan to provide and/or reference information to support the conclusion that hazardous materials do not exist within the disposal area at SWMU 1.

   Navy Response:

   The fourth paragraph of Section 1 has been revised to read: "A detailed description of site background, types of waste disposed, physical setting, previous investigations, conceptual site model (CSM), and site geology and hydrogeology can be found in the Streamlined Remedial Investigation and Feasibility Study report (RI/FS Report) (CH2M HILL, 2011a)..

2. **Section 2.1, Current Site Conditions, page 2-1:** The text indicates that several munitions- related items were observed at SWMU 1; however, the Site Reconnaissance subsection of Section 2.2.1 (Site Reconnaissance Approach) indicates that it is unlikely that munitions and explosives of concern (MECs) are present in SWMU 1. As such, it is unclear if munitions- related items will be encountered. Further, it is unclear where the munitions-related items were previously observed. Revise the Draft RA/LTM Work Plan to include the locations where munitions-related items were encountered. In addition, clarify why it is unlikely that MECs are present in SWMU 1 when munitions-related items were previously observed.

   Navy Response:

   The munitions related items found (spent ammunition, small arms cartridges and practice items) are not MEC; in fact, small arms cartridges are not even munitions debris, which is why the term munitions-related items was used. Disposing of live munitions in a landfill is and always has been prohibited. However, disposing of completely inert munitions related items, such as those discovered at SWMU 1, was not an uncommon practice and is not indicative of MEC being present at the site. The practice of disposing of inert munitions related items that retained the appearance of live munitions in landfills or as scrap metal was discontinued circa 2005, which explains why they could have been disposed of in waste that was buried at SWMU 1.

   Section 2.1, 2nd paragraph, the second sentence has been removed and starts a new paragraph following the one from which it was removed. The new paragraph reads: "Several munitions-related items (i.e., spent ammunition, small arms cartridges, and practice items) were also observed. The amount of small arms cartridges/spent ammunition items found was minimal and scattered, as would be expected in a military, municipal-type landfill. Disposing of live munitions in a landfill is and always has been prohibited. However, disposing of completely inert munitions-related items, such as those discovered at SWMU 1, was not an uncommon practice and is not indicative of MEC being present at the site."

3. **Section 2.2.1, Site Reconnaissance Approach, page 2-2:** The Vegetation Removal subsection states that, "Appropriate temporary erosion control measures (i.e., silt fence and hay bales) will be implemented before land-disturbing activities begin in areas where the potential for erosion is a concern." Similarly, Section 2.3.1 (Cover Installation) states that site preparation will include the installation of erosion control measures. However, the text does not indicate how areas where the potential for erosion is a concern will be determined or where erosion control measures will be installed in preparation of site activities. Revise the Draft RA/LTM Work Plan to specify the criteria used to determine that erosion is a potential concern. In addition, specify where erosion control measures will be installed in preparation of site activities.

Navy Response:

Please see the response to General Comment 1.

4. **Section 2.2.1, Site Reconnaissance Approach, page 2-2:** The Site Reconnaissance subsection states that, "The field teams will walk the entire landfill, where accessible with no or minimal hand vegetation clearance, to identify exposed waste areas." However, Section 2.2.1 also indicates that SWMU 1 is densely vegetated. As such, it appears that site reconnaissance will be extremely limited and the entire landfill will not be walked. Revise the Draft RA/LTM Work Plan to clarify how the entire landfill will be walked if only those areas with no vegetation or which require minimal hand vegetation removal will be assessed.

Navy Response:

The Navy feels the text is appropriate as is given the remedy selected is one that is intended to preserve vegetation and recognizes the dense vegetation has helped serve as adequate cover for over 30 years (except in places where debris may be exposed). If vegetation is too dense to see into or walk through, it is providing sufficient cover for the debris (if any) in that location. Removing the dense vegetation would be contrary to the objective of the remedy.

5. **Section 2.2.1, Site Reconnaissance Approach, page 2-2:** The Site Reconnaissance subsection indicates that the field team will delineate the boundary of the proposed debris areas and will record the coordinates on a geographic information system (GIS)-based map; however, it is unclear if the boundary will be sufficiently documented and delineated when it is highly likely that access difficulties and potential inadequate global positioning system (GPS) coverage will be encountered due to the dense vegetation at SWMU 1. Revise the Draft RA/LTM Work Plan to clarify how the boundary will be sufficiently documented and delineated if access difficulty and potential inadequate GPS coverage associated with the dense vegetation at SWMU 1 exists.

Navy Response:

The following sentence has been added following the third sentence of the second paragraph under Site Reconnaissance: “If a particular area does not have adequate GPS coverage, physical measurements will be made based an adjacent area where GPS coverage is adequate and the manually-gathered information will be entered into the GIS-based map.”

6. **Section 2.3.1, Cover Installation, page 2-3:** The second sentence in the first bullet is unclear. Please specify whether five samples from up to five different depths will be composited into one soil sample for analysis to represent the required one composite sample per 500 cubic yards for soil cover material.

Navy Response:

The first three sentences of the bullet have been edited to read: “If that is not possible, one composite and one discrete soil sample will be collected per 500 cubic yards from the identified cover material source area to determine its suitability. In this case, each composite soil sample will be collected from the cover material source area from up to five depths from ground surface to the anticipated depth of excavation. The five “subsamples” will be homogenized to create one composite sample per 500 cubic yards of cover material. The discrete soil sample(s) will be collected from mid-depth. The composite soil sample(s) will be analyzed for semivolatile organic compounds (SVOCs) by SW846 8270D, pesticides by SW846 8081B, and metals by SW846 6020A, 7470B, and 9012B (as applicable), and the discrete sample(s) for volatile organic compounds (VOCs) by SW846 8260B to determine if the material is suitable for use as cover.”

7. **Section 2.3.1, Cover Installation, page 2-3:** The analytical methods used to determine if material is suitable for use as native soil cover material is not provided. The third bullet of Section 2.3.1 indicates that composite soil sample(s) will be analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and metals yet does not specify the analytical methods that will be utilized. As such, it is unclear if the appropriate analytical methods will be utilized to analyze samples for VOCs, SVOCs, pesticides, and metals. Revise the Draft RA/LTM Work Plan to specify the analytical methods that will be used to evaluate the native soil cover material and determine whether it is suitable for use or not.

   Navy Response:

   Please see response to Comment 6.

8. **Section 2.3.1, Cover Installation, page 2-3:** Native vegetation will be planted to help re- vegetate the cleared areas (fifth bullet). Please provide a list of appropriate plantings or vegetation to be planted.

   Navy Response:

   Specific plant species to be used for re-vegetation will be determined in collaboration with USFWS staff. The following language has been added to the 4th bullet in the second paragraph of Section 2.3.1, which is in addition to the language added per comment response 3d:

   > "Appropriate native species, and sources of these plants, will be determined in collaboration with USFWS staff prior to implementation of the remedial action."

9. **Section 2.3.1, Cover Installation, page 2-3:** The text indicates that additional sections of haul road may be constructed to accommodate construction traffic; however, the criterion that will be utilized to determine that additional sections of haul road are necessary is not provided. In addition, details/specifications related to the construction of additional sections of haul road are not provided. As such, it is unclear if the construction of additional haul roads has been sufficiently designed to accommodate the potential for increased construction traffic. Revise the Draft RA/LTM Work Plan to provide the criterion that will be utilized to determine that additional sections of haul road are necessary. Also, revise the Draft RA/LTM Work Plan to provide details regarding the construction of additional haul roads.

   Navy Response:

   Based on the estimate that only a small area will require soil covering, an additional haul road will not be needed. A stabilized construction entrance/exit can be used to allow the construction traffic. The RA/LTM Work Plan has been revised to remove text regarding the use of an additional haul road. Figure 2-3 has been revised to remove "haul road."

10. **Section 2.3.2, O&M Activities, page 2-3:** This section should also include groundwater sampling as part of O&M activities.

    Navy Response:

    LTM is separate from landfill cover O&M and is included in Section 4.

11. **Section 3.2, Implementation and O&M Actions, page 3-1:** The second bullet of Section 3.2 indicates that 11,000 feet of three-wire fence will be installed; however, the type of wire to be used is not specified. As such, it is unclear if the wire is appropriate to last the lifespan of the project. Revise Section 3.2 to provide the type of wire to be used and clarify why it is appropriate for the lifespan of the project.

Navy Response:

The second bullet of Section 3.2 on Page 3-1 has been revised to read: ”Maintain the approximate 11,000-foot barbed wire fence (galvanized, three strands of No. 12-1/2 gauge or comparable), which will be installed after the completion of an approximate 5-foot vegetation buffer clearance during the site reconnaissance activities.”

12. **Section 3.2, Implementation and O&M Actions, page 3-2:** The last bullet of Section 3.2 indicates that the Navy shall notify the Environmental Protection Agency (EPA) and Puerto Rico Environmental Quality Board (PREQB) as soon as practicable of the discovery of activity at SWMU 1 inconsistent with the land use control (LUC) objectives; however, as soon as practicable is not appropriate. EPA and PREQB should be notified immediately (e.g., within 24 hours) of the discovery of activity at SWMU 1 inconsistent with the land use control LUC objectives. Revise Section 3.2 to clarify that EPA and PREQB will be notified immediately (e.g., within 24 hours) of the discovery of activity at SWMU 1 inconsistent with the land use control LUC objectives.

Navy Response:

Consistent with Navy documents such as this for other facilities under CERCLA, the bullet has been revised to: “The Navy shall notify EPA and PREQB as soon as practicable, presumptively within 10 days of the discovery of activity at SWMU 1 inconsistent with the LUC objectives stated above, and then promptly investigate and take appropriate corrective action. Such notice will also outline the steps to be taken to (1) investigate the cause and outcomes and/or potential outcomes of the activity inconsistent with the LUC objectives; (2) develop appropriate corrective action; and (3) evaluate the effectiveness of LUCs and assess lessons learned and prevent recurrence. For cases in which such inconsistent activity does not create an imminent and substantial threat to human health or the environment, investigation will normally commence within 60 days.”

13. **Section 4, Groundwater Long-Term Monitoring, pages 4-1 to 4-2**: Section 4 does not include and/or reference a figure. As such, the locations of the proposed groundwater wells to be sampled as part of the long-term groundwater monitoring plan are unclear. Revise Section 4 to reference a figure showing the locations of the proposed groundwater wells to be sampled as part of the long-term groundwater monitoring plan.

Navy Response:

Section 4.1, 3rd paragraph, first sentence has been changed to: “…six wells (five downgradient wells MW02, MW03, MW08, MW10, MW11 and one upgradient well MW13, as shown in Figure 4-1, will be sampled and analyzed…”

14. **Section 4, Groundwater Long-Term Monitoring, pages 4-1 to 4-2:** Long-term groundwater monitoring is proposed in one well at the northern boundary and four wells located at the southern boundary of the landfill. CGW1-MWO8 should also be included to monitor any groundwater flow along the downgradient eastern boundary of the landfill.

Navy Response:

MW-08 has been added to the LTM see response to comment 13, above.

SAP Executive Summary, 4th paragraph, 2nd and 3rd sentences have been revised to say “For at least the initial post-Record of Decision (ROD) event, and the 2nd, 3rd and 4th year events, six monitoring wells will be sampled. Five monitoring wells (MW02, MW03, MW08, MW10, and MW11) are located immediately downgradient of the landfill boundary and one monitoring well (MW13) is located upgradient of the landfill and is considered a background well (Figure 1).”

SAP worksheet 10, Environmental Questions to be Answered by the LTM SAP, question 1, first sentence after the question has been changed to: "Groundwater samples will be collected from six existing monitoring wells; five wells located downgradient (MW02, MW03, MW08, MW10, and MW11) and one well located upgradient (MW13) of the SWMU 1 Landfill, and submitted for laboratory analysis."

SAP Worksheet 11 Question 5, first response paragraph, first sentence has been changed to: "For at least the baseline and first year 2, 3, and 4 monitoring events, groundwater samples, along with QA/QC samples will be collected at six monitoring well locations (MW02, MW03, MW08, MW10, MW11, and MW13) throughout the site (**Figure 1**) and analyzed for VOCs, SVOCs, pesticides, PCBs and inorganic constituents."

SAP Worksheet 17, Sampling Rationale and Approach, 2nd paragraph, the first sentence has been changed to:

> At least initially (i.e., baseline [first post-ROD event] and first 5-year events), the groundwater sampling program will include groundwater level measurements and sampling of the six previously installed monitoring wells (MW02, MW03, MW08, MW10, MW11, and MW13)."

SAP Worksheet 18 added Sampling station/Sample ID CGW1MW08/VEW01-MW08-MMYY, matrix GW, Depth 68.97, Screen Depth -29.15 to-39.15 ft amsl, Analytical Group same, Number of Samples 1, Sampling SOP Reference same. Added note amsl-above mean sea level.

SAP Worksheet 20 Changed No. of Sampling locations to 6, added 1 to total No. of Samples to Lab.

15. **Section 4.1, Sampling Rationale and Approach, page 4-1:** The proposed approach involves sampling groundwater once every 5 years. Due to the activities at the site during the RA that may result in disturbing the landfill (site prep, transport of fill material, placement of the landfill cover, revegetation), EPA recommends sampling on a yearly basis for the first five years. The data will be reviewed during the Five-Year Review. Any proposed changes to the frequency of ground water monitoring will be considered at that time.

Navy Response:

Annual groundwater sampling will be done for the first five years and then re-assessed at five years.

16. **Section 5.1, Remedial Action Construction Completion Report, page 5-1:** Section 5.1 does not reference guidance on the preparation of a remedial action completion report (RACR). Revise Section 5.1 to reference the DoD and EPA Joint Guidance on Streamlined Site Closeout and NPL Deletion Process for DoD Facilities, August 2006 (RACR Guidance) and other applicable guidance documents which will be used to prepare the RACR.

Navy Response:

The following sentence has been inserted after the first sentence of Section 5.1: "The RACR will be prepared in accordance with the applicable guidance documents:

- *Joint Guidance on Streamlined Site Closeout and NPL Deletion Process for DoD Facilities, August 2006* (DOD and EPA, 2006));
- *Guidance to Documenting Milestones Through the Site Closeout Process, March 2006* (Navy, 2006);
- *Close Out Procedures for National Priorities List Sites, Office of Superfund Remediation and Technology Innovation 9320.2-22, US EPA, May, 2011* (EPA, 2011)". These guidance documents have been added to the Section 7 References Section.

17. Section 5.3, Five-Year Review Report, page 5-1:

a. Please be aware that EPA may update the Five-Year Review Guidance in the future. Each Five-Year Review report should be conducted using the most current EPA guidance.

Navy Response:

The last sentence of Section 5.3 has been revised to read:"The Five-Year Review report will generally follow the template included in the Appendix E of *Comprehensive Five-Year Review Guide (EPA 540-R-01-007)* (EPA, 2001 or most recent guidance, as applicable) unless an alternate format is concurred upon by the Navy and regulatory agencies."

b. Please note that the trigger for a statutory five-year review, which is the appropriate review for the SWMU 1 landfill, is the actual Remedial Action start, regardless of whether landfill debris is exposed or covered.

Navy Response:

The first paragraph of Section 5.3 has been revised to read: "The first Vieques statutory Five-Year Review period will be triggered by the start of the SWMU 1 RA, which is the mobilization date for site reconnaissance. Completion of the first Five-Year Review Report will be required 5 years from the mobilization date. After the completion of the first Five-Year Review, the trigger for subsequent reviews is the signature date of the previous Five-Year-Review report."

18. Table 6-1, SWMU 1 Remedial Action Schedule:

a. The schedule for the five-year review reports is incorrect. The trigger for completion of the first report is the RA start; according to the schedule in Table 6-1, the date of the RA construction start is 9/10/12, which would require the five-year review report to be completed by 9/10/17.

Navy Response:

Please see response to EPA comment 17b. Table 6-1 has been revised accordingly for all dates of scheduled five-year reviews and reports.

b. The schedule suggests that the five-year reviews will end at the sixth reporting period. Please note that the five-year review reports will continue as long as hazardous substances, pollutants, or contaminants remain on site above levels that allow for unrestricted exposure and unlimited use. Therefore, for the SWMU 1 landfill, five-year reviews will continue beyond the sixth reporting period and the thirtieth year.

Navy Response:

The schedule only shows the five-year-reviews for the 30 year post-closure period. At the end of 30-year post-closure period, the groundwater sampling program will be discontinued if no groundwater contamination warranting an RA is observed. However, the five-year-reviews will continue. In order to avoid confusion, the following footnotes have been added to Table 6-1: "Notes: 1. The tentative schedule is subject to change, pending the actual mobilization date. 2. The RA schedule only shows proposed RA and reporting activities for the first 30 years. Additional five-year reviews will continue beyond the sixth reporting period and the thirtieth year, as long as hazardous substances, pollutants, or contaminants remain on site above levels that allow for unrestricted exposure and unlimited use."

19. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet # 3 (Distribution List), page 15:** Replace Carl Soderberg with Jose Font, Acting Division Director. Also our San Juan Office moved to a new location. Please use the following address for correspondence:

    US EPA — Region 2
    Caribbean Environmental Protection Division
    City View Plaza II — Suite 7000
    #48 PR-165 km 1.2
    Guaynabo, PR 00968-8069

    Navy Response:

    The SAP has been revised as requested.

20. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet # 6 (Communication Pathways), pages 23-25:** The information contained in this worksheet is insufficiently detailed. For example, the worksheet does not discuss stop work notices if significant problems or issues are encountered. Additionally, there does not appear to be a procedure for notifying regulators of SAP changes or deviations. Further, this worksheet does not indicate that EPA will be notified of significant issues and/or corrective actions. Revise the SAP to address these issues.

    Navy Response:

    SAP Worksheet 6, communications drivers, under CH2MHILL EM/AQM row, added stop work notices to Navy RPM, notifying Navy RPM of SAP changes or deviations, significant issues or corrective actions.

    SAP Worksheet 6, communications drivers, under Navy RPM row, added stop work notices to regulators, notifying regulators of SAP changes or deviations, significant issues or corrective actions.

    SAP Worksheet 6, Communications Drivers, under CH2MHILL Field Investigation lead, added Notifying CH2MHILL EM/AQM of SAP changes or deviations, significant issues or corrective actions.

    EPA Evaluation of Response:

    The response is partially adequate. The response appears to indicate that the regulators will be notified by the Navy RPM if significant changes to the SAP, stop work orders, or corrective actions occur. However, the procedure for this notification is unclear (e.g., phone or email), and the timeframe and method(s) for this notification are not specified. Revise the SAP to clarify the notification procedure for notifications to regulators.

    Navy Follow Up Response:

    The above second response has been revised to:

    "SAP Worksheet 6, communications drivers, under Navy RPM row, added stop work notices to regulators, notifying regulators of SAP changes or deviations, significant issues and necessary corrective actions by phone or e-mail within 2 weeks of notification of Navy RPM."

21. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #10 (Problem Definition), page 33:** The Investigation History subsection references several historical investigations which were conducted at SWMU 1; however, documents associated with these historical investigations are not referenced. As such, it is unclear where information on these historical investigations can be found. Revise the Draft RA/LTM Work Plan to include references to documents associated with historical investigations.

    Navy Response:

    The following references have been incorporated into the text.

SAP Worksheet #10, Investigation History, first paragraph has been revised to “Environmental investigations at SWMU 1 were initiated with an Environmental Impact Statement (EIS) (TAMS, 1979), conducted in 1979 to evaluate environmental impacts of the continued use of naval facilities on Vieques. Subsequent investigations, including a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) (PREQB, 1995); Environmental Baseline Survey (EBS) (NAVFAC Atlantic, 2003); Phase 1 RCRA Facility Investigation (RFI) (CH2MHILL, 2004); SI/ESI (CH2MHILL, 2010c); and a Streamlined RI/FS (CH2MHILL, 2011a) that incorporated a HHRA, an ERA, and an evaluation of presumptive remedies for the landfill, were conducted at the site.”

The following references have been added to the Reference Section:

CH2MHILL, 2004. Phase 1 RCRA Facility Investigation Report, Former Atlantic Fleet Weapons Training Facility Vieques Island, Puerto Rico. June

Puerto Rico Environmental Quality Board, 1995. Revised RCRA Facility Assessment Report, Atlantic Fleet Weapons Training Facility, Vieques, Puerto Rico. September

Naval Facilities Engineering Command (NAVFAC) Atlantic Division. 2003. Environmental Baseline Survey, Vieques Naval Training Range, Vieques Island, Puerto Rico. April

CH2MHILL, 2010c. Site inspection/Expanded Site Inspection Report, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico. August.

CH2MHILL, 2011a. Streamlined Remedial Investigation/Feasibility Study Report, Solid Waste Management Unit 1(SWMU1) Former Vieques Naval Training Range, Vieques, Puerto Rico. April.

TAMS-Tippets-Abbett-McCarthy-Stratton and Ecology and Environment, 1979. Draft Environmental Impact Statement, Continued Use of the Atlantic Fleet Weapons Training Facility Inner Range (Vieques). December

22. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #10 (Problem Definition), page 37:** The Environmental Questions to be Answered by the LTM SAP subsection states that, "If LTM data indicate an exceedance of background concentrations and drinking water standards downgradient of the landfill, then LTM for those constituents exceeding the screening criteria (background and drinking water standards) will be conducted annually until the 5- year ROD review event to more closely monitor their trends, which will provide additional data for making determinations of the need for groundwater remedial action. The more frequent monitoring may include additional geochemistry parameters to assess whether groundwater conditions are conducive for natural attenuation processes." However, additional geochemistry parameters monitoring to assess whether groundwater conditions are conducive for natural attenuation processes is not discussed in Section 4.0 (Groundwater Long-Term Monitoring). Similarly, transition to a natural attenuation RA would require documentation of natural attenuation occurring at the site using the criteria presented in the Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water, EPA/600/R-98/128, dated September 1998 (Natural Attenuation Protocol) and a ROD amendment. Revise the Section 4.0 to include information on additional geochemistry parameter monitoring to assess whether groundwater conditions are conducive for natural attenuation processes. In addition, ensure that a potential transition to a natural attenuation

RA uses the criteria presented in the Natural Attenuation Protocol and includes a ROD amendment.

Navy Response:

If it is determined that additional geochemistry parameters will be added to help assess if groundwater conditions are conducive for natural attenuation processes, an addendum to this SAP will be provided for regulatory review. The following sentence has been added at the end of the paragraph referenced in the comment: “If LTM data suggest additional geochemistry parameters are warranted, an addendum to the

SAP will be submitted that defines the rationale, analytical protocol, and data use for the additional geochemistry parameters."

23. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet # 11 (Project Quality Objectives/Systematic Planning Process Statements), page 40:** Step 4 of the systematic planning process statements only indicates that uncertainty of data with project action limits (PALs) below the detection limit (DL) will be discussed. The data quality evaluation (DQE) or SAP should discuss the uncertainty of using any data below the limit of quantitation (LOQ). Revise this step to address this issue.

Navy Response:

This section (Worksheet #11 Step 4) goes into detail in order to describe the data use when the LOD and/or the DL is greater than the PAL. The requested information (uncertainty and use of results less than the LOQ) is addressed in the report and data quality evaluation described in Worksheet #37.

EPA Evaluation of Response:

The response does not address the comment. The response indicates that Worksheet #37 addresses the uncertainty of using results with project action limits (PALs) less than the limit of quantitation (LOQ). However, Worksheet #37 does not discuss results with a PAL less than the LOQ. Revise the SAP to describe how uncertainty between the DL and LOQ will be addressed.

Navy Follow Up Response:

As per Worksheet #28-1, #28-2, #28-3, and #28-4, for "Results reported between DL and LOQ," the laboratory will "apply J-flag to all results between DL and LOQ." This information has been added to Worksheet #37. As per Worksheet #37 (first bullet), such as "estimated" data, represented by J, NJ, and UJ qualifiers." Then, as per Worksheet #37 (second bullet), "the use of "estimated" data will be discussed in the report. "Estimated" data are generally considered usable for all purposes."

24. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #13 (Secondary Data Criteria and Limitations Table), page 49:** This table states that only one report (Site Inspection/Expanded Site Inspection SI/ESI, August 2010) will be used as secondary data. However, Worksheet #10 and Worksheet #2 identify several documents for previous site work that are relevant to the current investigation. Revise Worksheet #13 to include all secondary data that will be used for decision making in this project.

Navy Response:

There are several documents that were used to help prepare the SAP, but they will not be used in making decisions for the project. The decisions made regarding LTM will be primarily based on the data collected during LTM.

EPA Evaluation of Response:

The response addresses the comment. The response indicates that project decisions will be based on current data and not the secondary data from previous investigations, and it is noted that references to previous site investigations have been provided in the response to SC 21. Therefore, it is recommended that Worksheet #13 be revised to include a reference to this discussion in Worksheet #10.

Navy Follow Up Response:

Worksheet 13 has been revised with a note stating "See Worksheet 10 for discussion of historical documents pertaining to the site, the data from which will be used for historical perspective for the

site and not for making decisions for the project; decisions regarding LTM will be primarily based on the data collected during the LTM."

25. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #15-2 (Reference Limits and Evaluation Tables), page 55:** The proposed lower control limit (LCL) of zero percent] for phenol raises concerns on the sample accuracy for this analyte. It is recommended that more stringent criteria be applied (e.g., 10% or higher) for the LCL measurement performance criteria.

Navy Response:

As indicated by note 3 on Worksheet #15-2, phenol is a "poor-performing analyte" as per DoD QSM v. 4.1 Table G-2. The acceptable limits of 0-115% are from that document. There is no history to suggest a phenol issue at the site. There is a significant amount of other SVOC data which will be generated; therefore, it is not necessary to demonstrate absence of phenol at less than the screening level. Note that during data validation as described by Worksheet #36, phenol accuracy will be assessed and the data validator may use professional judgment to qualify due to MS/MSD or LCS exceedances. Given the amount of SVOC data which will be generated and historical data that suggest phenol is not of particular significance, qualification during data validation is sufficient corrective action.

EPA Evaluation of Response:

The response addresses the comment; however, this information should be reflected in the SAP. Revise the SAP to indicate that the acceptable limits for phenol were taken from the Department of Defense Quality Systems Manual and the historical data does not suggest phenol is a concern at the site.

Navy Follow Up Response:

Worksheets #28-2 indicates the "Limits are as per DoD QSM v 4.1 Table G-4"; Note 3 on Worksheet #15-2 has been updated to include the following: "Historical phenol data for the site indicate more stringent measurement performance criteria are not warranted."

26. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #19 (Field Sampling Requirements Table), page 67:** The table indicates that certain metals samples are preserved with sodium hydroxide (NaOH). However, only samples for cyanide analysis require NaOH preservation. Revise the table to state that preservation using NaOH is for cyanide, not metals.

Navy Response:

The requested information is already in the table. "METAL" is an analysis group which, for this project, refers to a TAL of metals, as specified by Worksheet #15-4, mercury, and cyanide. As per Worksheet #19, the NaOH-preserved container is used for analysis via LAB-12 / SW-846 9014. That lab SOP and analysis method are for cyanide. The remaining metals (including mercury) are HNO_3-preserved. For clarification, the "METAL, FMETAL" cell has been updated to "METAL, FMETAL (TAL and Hg)" and the "METAL" cell has been updated to "METAL (CN-only)."

27. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #20 (Field Quality Control Sample Summary Table), page 69:** The footnote on table indicates that quantities represent a single round of sampling. Revise the table to clarify or discuss the number of sampling rounds.

Navy Response:

Footnote 2 has been revised to: "Quantities represent a single round of sampling. Currently it is anticipated that sampling will occur baseline (shortly after the remedy is implemented), and every 5 years thereafter for a total of 30 years."

28. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #28 ((Laboratory QC Samples Tables), pages 89-98:** Laboratory specific surrogate limits have not been included for VOCs, SVOCs, and pesticides/polychlorinated biphenyls (PCBs). It appears that surrogate limits for these analytes are utilizing QSM limits; however, the laboratory specific surrogate limits should also be provided. Revise this Worksheet to provide laboratory specific surrogate limits for VOCs, SVOCs, and pesticides/PCBs.

Navy Response:

For strict DoD QSM compliance, the laboratory will adhere to the DoD QSM limits when they exist. Therefore, the laboratory-specific limits (for this project) are already provided.

EPA Evaluation of Response:

The response does not address the comment. The surrogate information should be provided by the laboratory to ensure that the laboratory can reasonably meet the acceptance criteria goals provided in the SAP. Revise this Worksheet to provide laboratory specific surrogate limits for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and pesticides/polychlorinated biphenyls (PCBs). It is also recommended that all laboratory quality control acceptance limits are provided.

Navy Follow Up Response:

The requested information is already in the UFP-SAP (i.e., Worksheet #28-1). For example, for aqueous VOCs, the laboratory will evaluate 1,2-Dichloroethane-d4 (surrogate) against acceptable limits of 70-120%. If there is an exceedance of these limits, the laboratory will proceed with the corrective action(s) specified by this table. Note that the laboratory may have established their own statistically-derived limits for this surrogate. However, those limits would only be acceptable if they are tighter than the DoD QSM limits. Therefore, from a practical standpoint, and for consistency, it is best to adhere to the DoD QSM limits. Otherwise, there is an undue burden on the UFP-SAP reviewer who would need to evaluate all limits to verify that they are tighter than the DoD QSM limits. There are hundreds (or more, if MS/MSD limits did not need to match LCS limits) of accuracy and precision limits within this UFP-SAP which would need to be verified. Furthermore, in the event that it may be necessary to change laboratories during the project, the entire process would need to be repeated for the new laboratory that would have its own statistically-derived limits but is also capable of adhering to the DoD QSM limits.

29. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #28 (Laboratory QC Samples Table), page 96:** This worksheet indicates that the post digestion spike (PDS) is needed if the dilution test fails or when analyte concentrations for all samples are less than fifty times the limit of detection. However, the PDS should be analyzed when the matrix spike (MS) does not meet the acceptance limits Further, the (PDS) QC acceptance limits are listed as 75-125 percent (%). However, the PDS criteria in the most recent methods (Method 6010C and 6020A) is 80-120%. Revise Worksheet #28 to indicate that the PDS will be analyzed.

Navy Response:

It is acceptable to set QA/QC procedures more-stringent than that specified in the DoD QSM, when warranted. In addition, laboratories do not typically take issue with this requirement because it is indeed specified in the analysis methods 6010C and 6020A. On Worksheet #28-4 for 6020A, the frequency for

post-digestion spike addition has been updated to "when MS/MSD recoveries are unacceptable" and the method limits (and MPC) have both been updated to "Recovery within 80-120%."

30. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #30 (Analytical Service Table), page 101:** Please indicate whether the Data Package Turnaround Time includes data validation. If not, this should be also indicated in this worksheet.

Navy Response:

On Worksheet #30, "Data Package" refers to the laboratory data package, not the data validation report. Therefore, the 28 calendar-day TAT does not include data validation. However, to reduce confusion, the data package turnaround time on Worksheet #30 has been updated to "Standard 28 calendar-day turnaround time (TAT) from sample receipt to laboratory reporting. After reporting, standard 14 calendar-day TAT for data validation."

31. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #34-36 (Data Verification and Validation (Steps I and IIa/IIb) Process Table), pages 113-115:** This worksheet indicates that 10% of the raw laboratory data will be recalculated by the data validator and a 10% check of Electronic Data Deliverables will be compared against hardcopy laboratory results. However, this table does not indicate how this data will be selected (e.g., randomly). Revise the table to indicate how data will be selected for recalculation and comparison to the hardcopy results

Navy Response:

Two different checks are described. The first, for "Electronic Data Deliverables," describes a verification of the results between the hardcopy and the EDD. The description was updated to "Electronic Data Deliverables will be compared against hardcopy laboratory results (10% check, randomly-selected)." The second, for "Raw Data," describes a check where the data validator reviews 10% of the results to verify that they were properly calculated from the raw data. The description was updated to "10 percent review of raw data, randomly-selected, to confirm laboratory calculations."

32. **Appendix D (SWMU 1 LTM SAP), SAP Worksheet #37 (Usability Assessment), pages 117-118:** The discussion of the Usability Assessment is insufficiently detailed. For example, this worksheet does not discuss how the data quality indicators (DQIs) (e.g., precision, accuracy, representativeness, comparability, and sensitivity) will be calculated and/or assessed. Further, Worksheet #37 does not indicate how field completeness will be measured. Revise Worksheet #37 to include a detailed discussion of the DQIs and include the calculation of each DQI.

Navy Response:

The following three bullets were appended to the bottom of Worksheet #37:

- Precision is accessed via percent difference or relative percent difference. Percent difference is typically used when one value is considered theoretically correct and relative percent difference is typically used when both values are experimental. Percent difference is calculated by taking the absolute value of the difference divided by the theoretical value. This is also expressed as

$$((|X_1 - X_2|) / X_1) * 100$$

where X_1 is the theoretical value and X_2 is the experimental value. If it is necessary to imply the direction of a bias, such as for percent drift, the absolute value need not be considered. Relative percent difference is calculated by taking the absolute value of the difference divided by the mean. This is also expressed as

$$((|X_1 - X_2|) / ((X_1 + X_2)/2)) * 100$$

where X1 and X2 are both measured values. Percent difference and relative percent difference often have upper control limits for precision.

- Accuracy is accessed via percent recovery. This is calculated by taking the measured value divided by the theoretical value. This is also expressed as

$$(X_2 / X_1) * 100$$

where X1 is the theoretical value and X2 is the experimental value, both positive numbers because they are 'amounts' or concentrations. Percent recovery can be negative, such as for MS and MSD recovery, if X2 is calculated by subtracting a parent concentration from an experimental recovery. Percent recovery often has upper and lower control limits for accuracy.

- Completeness is calculated by taking the number of available results divided by the total number of results. This is also expressed as

$$(X_2 / X_1) * 100$$

where X2 is the number of distinct results deemed "available for use" (not rejected) and X1 is the total number of distinct results (not excluded). Completeness is calculated for the entire data set, for each matrix, and for each combination of matrix and analysis group. If patterns of rejection are evident in the data set, completeness may also be calculated for select combinations of matrix, analysis group, and analyte or other combinations as applicable for the data quality evaluation. Completeness has a lower control limit (completeness goal) and cannot exceed 100%.

Note that "completeness" is measured in the same way for both field and laboratory data. Note 2 on Worksheet #37 was updated to read: "Discussions of precision, accuracy, representativeness (qualitative), completeness, and comparability (qualitative) will be included in the data quality review to describe the impact of data quality on project data quality objectives and data usability. Sensitivity is assessed by comparing nondetect results, LODs, and DLs to the screening levels."

EPA Evaluation of Response:

The response is partially adequate. The response states that field completeness will be measured in the same way as analytical completeness. However, field completeness should take into account potential sample breakage and the inability to collect samples at certain locations. Revise the SAP to indicate that field completeness will take into account the number of planned field samples.

Navy Follow Up Response:

"Field completeness" in this context refers to field results (such as pH, temperature, ORP, D.O., PID readings, etc.) not the number of samples.

33. Appendix D (SWMU LMT SAP), Figure B-3: Groundwater Elevation Contour Map: Groundwater elevations for each well need to be included on the figure.

Navy Response:

Figure B-3 legend has been revised to show that "Groundwater Elevations in Ft MSL" "Water Level Readings taken on 6/5/09." Groundwater elevations have been added in the figure below each well designation (MW-13=23.12, MW-01 Dry, MW-09=8.29, MW-08=6.98, MW-07=5.44, MW-06=4.08, MW-02=-1.02, MW-03=-0.76, MW-11=-2.93, MW-04=2.34, MW-10=2.06 Ft msl.)

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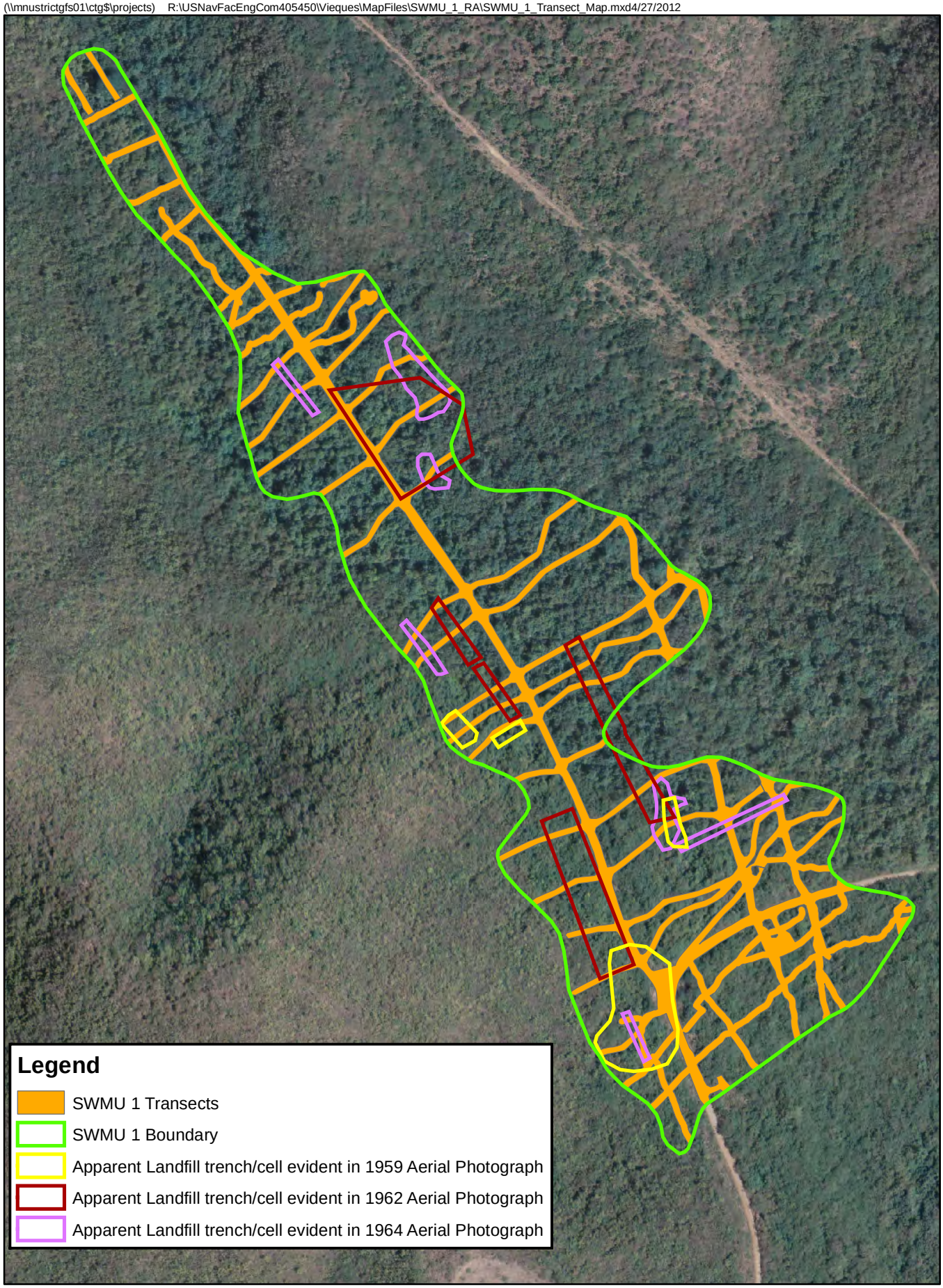

Final Responses

PREQB Technical Review of the Draft Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan, Solid Waste Management Unit 1 (SWMU 1), Former Vieques Naval Training Range, Vieques, Puerto Rico Dated December 2011

Page-Specific Comments

1. Page 2-2, Section 2.3.1:

   a. Please ensure that agency approval is obtained prior to obtaining soil from a contaminated site that has been closed out.

   Navy Response:

   All of the sites where soil may be obtained were closed out with no restrictions on use or exposure. However, the Navy will inform the agencies if one or more of these sites will be utilized as the source of cover material for SWMU 1.

   b. Planting of native vegetation is proposed for providing erosion control in areas where soil cover is required. The types and species of native plants are not identified within the report although the text states that USFWS input may be solicited. Depending upon the type of vegetation (planted seedlings/plugs or seeds) ultimately selected, it is recommended that temporary cover be provided until the vegetation becomes established. The use of temporary erosion control materials such as straw mats that are free of potentially invasive non-native plant seeds is encouraged.

   Navy Response:

   The 4th bullet text in the second paragraph of Section 2.3.1 has been edited to read: "Planting of native vegetation to help re-vegetate the cleared areas and control erosion. Additional erosion control measures such as temporary cover (e.g., straw mats) will be implemented while the newly-planted vegetation becomes established, if warranted, based on physical characteristics such as the size of area covered, the topography, surrounding vegetation, etc."

2. Page 2-3, Section 2.3.2:

   a. Please clarify what values or range of values will be used for each pesticide. Appendix A contains tables of sample data for pesticides, but does not indicate what the range of values is or the concentration that will be used as background for each detected pesticide.

   Navy Response:

   It is assumed the comment is referring to Section 2.3.1. The pesticide table in Appendix A has been modified to include the range of each pesticide contained in the table. Additionally, the last sentence of the third bullet in Section 2.3.1 has been modified to read "Appendix A contains tables listing the aforementioned background metals concentrations and range of pesticide concentrations that will be used to help assess whether the metals and pesticides detected in the composite sample(s) are attributable to background (metals) or representative of normal use (pesticides)."

b. Paragraphs 1 & 2: Please state how long the quarterly inspections will be performed before the frequency of the site inspections will be reduced to annually.

Navy Response:

The first paragraph of Section 2.3.2 has been revised to read: "Immediately following RA implementation, O&M activities will comprise quarterly inspections of the disturbed areas for an estimated 1 year to ensure vegetation becomes established and erosion is not occurring such that landfill debris is likely to become re-exposed. Quarterly inspections will continue beyond 1 year if necessary to achieve the stated objective. After the establishment of vegetation, the frequency of the site inspections for the long-term O&M activities will be reduced to annually. Erosion inspection and potential erosion control measures to be taken will follow the Erosion and Sediment Control Plan (ESCP). If inspections show that vegetation is not re-establishing, the Navy will consult with USFWS and conduct additional re-planting activities."

c. Cover Installation: Please revise text to state that representative grab samples will be collected for VOCs rather than composite samples.

Navy Response:

It is assumed the comment is referring to Section 2.3.1. The first three sentences of Section 2.3.1, 3rd bullet have been edited to read: "If that is not possible, one composite and one discrete soil sample will be collected per 500 cubic yards from the identified cover material source area to determine its suitability. In this case, each composite soil sample will be collected from the cover material source area from up to five depths from ground surface to the anticipated depth of excavation. The five "subsamples" will be homogenized to create one composite sample per 500 cubic yards of cover material. The discrete soil sample(s) will be collected from mid-depth. The composite soil sample(s) will be analyzed for semivolatile organic compounds (SVOCs) by SW846 8270D, pesticides by SW846 8081B, and metals by SW846 6020A, 7470B, and 9012B (as applicable), and the discrete sample(s) for volatile organic compounds (VOCs) by SW846 8260B to determine if the material is suitable for use as cover."

3. Page 2-4, Section 2.3.3, Paragraph 1: Please state the frequency of the proposed soil cover thickness measurements (how many measurements per acre). Also, please state that these measurements will be photo documented in a manner so as to record the thickness measurement.

Navy Response:

Page 2-4, Section 2.3.3, 2nd sentence of Paragraph 1 has been revised to read: "Performance measures for the proposed soil cover will include thickness measurements for the soil fill, at frequency of one measurement per 2,500 square feet of soil covering area, with photo documentation to help ensure that the soil cover meets RAO 1 and RAO 2."

4. Page 3-1, Section 3.1: Please review the last sentence for clarity.

Navy Response:

The last sentence of Section 3.1 has been revised to read: "The LUCs will ensure the RAO to control land use (including the use of groundwater) within the landfill boundaries is met."

5. Page 3-1, Section 3.2, bullet 3: Please provide the proposed deed notation language for agency review.

Navy Response:

As agreed upon during the May 2012 Vieques Technical Subcommittee meeting, the proposed deed notation language will not be included as Appendix F of the SWMU 1 Work Plan. Instead, the proposed deed notation language will be submitted to the agency for review after completion of the RA construction (fence installation and metes and bounds survey). The agency approved deed notation will then be filed appropriately.

Appendix B: LUC Site Inspection Checklist

1. Gates are proposed to be constructed. Please add an inspection and maintenance of these gates to the LUC Inspection Checklist. Also, please consider adding whether the inspector observed signs of trespassing, noting the location. If signs of trespassing are observed, additional controls may be warranted.

Navy Response:

The 2nd row in Appendix B – LUC Site Inspection Checklist has been revised as shown below:

Signs, Fencing, and Gates	Deterioration of signs, fence, or gates; Personnel unable to read sign due to obstruction; Observed signs of trespassing (noting the location)

2. Please consider adding a row in the form for "Other Observations" to prompt inspectors to view and record any issues which may impact the remedy effectiveness other than those specifically listed in the form. This should include any potential conditions that may be developing which could impact the remedy protectiveness in the future.

Navy Response:

The Appendix B – LUC Site Inspection Checklist has been revised by adding the additional row "Other Observations."

Appendix C: LUC Sign Design and Sign Language

1. Spanish Translation: Please consider using the word "violaciones" rather than "trasgresiones" as it is likely to be more understood by the Puerto Rican community.

Navy Response:

The above mentioned edit has been made.

Appendix D: LTM SAP

1. Worksheet 3:

   a. Please revise the table so that Elizabeth Denly receives hardcopies of all draft documents rather than cds.

   Navy Response:

   Worksheet 3 has been edited to show that Elizabeth Denly will receive hard copies, designated as "HC," of the Draft documents.

b. Please update this sheet, Worksheets 5, Worksheet 6 and Worksheet 9-1 to correct Wilmarie Rivera's extension to 6129.

Navy Response:

The above mentioned edit has been made, and additionally edited on Worksheet 3.

2. Worksheet 10:

a. Page 34: Please revise the text for consistency with the ROD, where the ROD language was changed to "potential for leaching to groundwater is minimal…(emphasis added)"

Navy Response:

The above mentioned edit has been made. The word "negligible" has been changed to "minimal."

b. Page 35: Please revise the third sentence for consistency with Puerto Rico's Water Quality Standard Regulation, which states that the usages and description for class SG are "Ground waters intended for use as source of drinking water supply and agricultural uses, including irrigation. Also, included under this class are those ground waters that flow into coastal, surface, and estuarine waters and wetlands as defined in this Regulation. (emphasis added)" There is no requirement for receiving water body or wetland to be of exceptional ecological value.

Navy Response:

The sentence has been revised as follows: "Groundwater beneath the site is classified by the Commonwealth of Puerto Rico as SG, where groundwater may be intended for use as a source of drinking water supply, agricultural use, and/or flows into coastal, surface, and estuarine waters and wetlands."

c. Page 36: It is unclear that the proposed LTM answers Question 1, rather the LTM answers the question as to whether contaminants are migrating downgradient of the landfill, as emphasized in paragraph 2 of this item and in the answer to Question 3. Please revise the question to be answered to meet the objectives of the monitoring program, which is to determine if contamination is migrating downgradient of the landfill.

Navy Response:

The Environmental Question 1 has been revised to "Have contaminants that are attributable to the landfill and for which there are PALs migrated within groundwater at concentrations above the PALs beyond the downgradient boundary of the landfill?"

3. Worksheet 11:

a. Page 41: The text states that lower-concentration methods are not appropriate for PCBs when there are no specific contaminants of concern. However, Worksheet #10 (pages 34 and 35) states that PCBs were detected above leaching screening criteria in soil within the landfill debris and that groundwater monitoring is needed to determine whether PCBs from the landfill leach to groundwater because of the potential travel time from landfill debris to groundwater. Therefore, based on Worksheet #10, it appears PCBs are a potential contaminant of concern for groundwater. Therefore, it is unclear why lower-concentration methods would not be utilized for PCBs, especially when these methods exist and are standard methodologies. Please clarify and revise text for consistency.

Navy Response:

The text in Worksheet #10 also states that PCBs are relatively immobile, tend to bind to soil, and notes that leaching models applied to sites on Vieques have shown to be highly conservative and that the models tend to overestimate the leachability of chemicals in soil. Long-term groundwater monitoring of PCBs will be conducted to determine if a future release from the landfill occurs to

groundwater and confirm that future groundwater conditions are consistent with the current post-closure groundwater conditions. Lower concentration methods are not available for aroclors and require analyzing PCB homologues or PCB congeners, which are not warranted at this time.

b. Page 43: Please consider using the term "PAL" throughout the document rather than "drinking water standard," as criteria other than drinking water standards are being used as performance criteria (i.e., background concentrations).

Navy Response:

The text has been edited to use the term PAL rather than drinking water standard.

c. Please ensure that water level measurements are recorded and groundwater flow direction provided in the reports.

Navy Response:

Worksheet 11, Question 3, page 40. The following sentence has been added to the end of the paragraph: "Water-level measurements will be collected in all monitoring wells being sampled prior to samples being collected. A groundwater flow map will be produced and submitted with each report."

4. Worksheet #12: Please add a table to cover the geochemistry parameters listed on Worksheet #11 that are analyzed by the laboratory.

Navy Response:

As noted by the text "Additional geochemistry parameters may be added. . ." and "Geochemistry parameters may include. . ." in Worksheet #11, these geochemistry parameters are not actually scheduled for analysis at this time (at the least, for the first 5 years). If they are added in the future, the LTM SAP will be modified accordingly with an addendum.

5. Worksheet #15:

a. Please add a table to cover the geochemistry parameters listed on Worksheet #11 that are analyzed by the laboratory.

Navy Response:

Please refer to the response to comment #3 for Appendix D, above.

b. Worksheet #15-1: VOCs: Please add cis-1,3-dichloropropene and trans-1,3-dichloropropene to the list of VOCs as these compounds are on the SOM01 list and have Puerto Rico Water Quality Standards, Class SG. According to Worksheet #11, this is the criterion for inclusion of a compound on the analyte list.

Navy Response:

The two missing SOM01 compounds have been added to Worksheet #15-1.

6. Worksheet #27, Sample Identification Procedures: Currently, the text states that if any water samples require preservative, the clerk will check the pH values. Please revise the text to clarify that the clerk will not check the pH values of VOC samples. The pH values of VOC samples should not be checked until after the analysis has been performed so as to not compromise the integrity of the sample.

Navy Response:

The statement on Worksheet #27 has been revised to read "Next, if any water fractions require preservative, the clerk will check the pH values, with the exception of VOCs vials, to see if they are within the acceptable pH range."

7. Worksheet #28:

   a. Please add a table to cover the geochemistry parameters listed on Worksheet #11 that are analyzed by the laboratory.

   Navy Response:

   Please refer to the response to comment #3 for Appendix D, above.

   b. For all worksheets, please remove the text for field duplicates that states these are collected to assess field homogenization procedures. There will be no field homogenization performed with the groundwater samples.

   Navy Response:

   The statement has been revised to state "Assess precision and accuracy of the laboratory/field. Qualify as per Worksheet #36." on each of Worksheets #28-1, #28-2, #28-3, and #28-4.

8. Worksheet #37, Page 117, Bullet #2: Data that are rejected are defined as not usable for project objectives. Please remove the text on rejected data or include a note that rejected data will not be used for the achievement of project objectives.

Navy Response:

The text regarding rejected data in the second bullet has been removed.

US Fish And Wildlife Service

Comments Regarding the Draft Remedial Action Implementation, Operations And Maintenance, Land Use Control, and Long-Term Monitoring Work Plan, Solid Waste Management Unit 1 (SWMU-1), Former Vieques Naval Training Range, Vieques, Puerto Rico, Dated December 2011

Presented below are the US Fish and Wildlife Service (FWS) thoughts and comments on the subject document.

1. Section 1, Introduction, page 1-1, paragraph 3 Please note that historic site documents indicate that a final 2-foot thick soil cover was placed over the waste disposal trenches. The text suggests that this was in fact what occurred throughout the operational history of the landfill. This is not necessarily the case as it has been confirmed in the Remedial Investigation (RI) report that areas of exposed debris are present. Please revise the text to indicate that the goal of a 2-foot cover was not universally applied across the landfill.

   Navy Response:

   As noted in Section 2.1, the presence of some debris at the ground surface of the landfill may be attributable to erosion or ground disturbance during investigative activities, not necessarily inadequate cover placement. For clarification, the following sentence has been added to the end of the third paragraph of Section 1: "During investigation, a small quantity of landfill debris was observed on the surface in few locations, from soil erosion, incomplete placement of the initial cover, or mechanized vegetation clearance to allow access during investigations."

2. Section 1, Introduction, page 1-1, paragraph 5 Please note that the FWS concurred with the selected remedy.

   Navy Response:

   The following sentence has been added following the first sentence of the fifth paragraph of Section 1: "USFWS also supported the selected remedy."

3. Section 2.1, Current Site Conditions, page 2-1, paragraph 3 Please confirm the location of the overgrown access road mentioned in the text. Is this the road labeled "Center Access Road" on Figures 2-1 through 2-3?

   Navy Response:

   The second sentence of the third paragraph of Section 2.1 has been revised to read: "One inactive 15-foot-wide access road crossing the SMWU 1 site from southwest to northwest (labeled Center Access Road in Figure 2-2) is currently overgrown with grass and sparse low shrubs."

   Please add that the other dirt/gravel road passes north through the southern portion of the site then turns east.

   Navy Response:

   The third sentence of the third paragraph of Section 2.1 has been revised to read: "Another active dirt/gravel road, approximately 25 feet wide, passes north through the southern portion of SWMU 1 and then turns east."

4. Section 2.2.1, Site Reconnaissance Approach, Vegetation Removal, page 2-2, paragraph 1 One objective of the site reconnaissance is to confirm that landfill debris is covered with a 2-foot layer of soil and that debris is not present on the ground surface. It is understood that it may not be possible to access some trenched areas due to the thick growth of vegetation and the FWS does not want to promote the unnecessary removal of vegetation, especially on steep slopes and in drainages. However, to fulfill the remedial action objectives (RAO), it may be necessary to use a slightly more intrusive approach in those heavily vegetated areas identified in historic aerial photographs as having received waste for disposal. The FWS would offer assistance regarding the approach used to selectively remove vegetation and examine these areas.

Navy Response:

Assistance from FWS will be solicited during vegetation removal and replanting as part of the remedial action. However, the RAO can be fulfilled without cutting down heavily vegetated areas.

5. Section 2.2.1, Site Reconnaissance Approach, Vegetation Removal, page 2-2, paragraph 2 It should be made clear that vegetation removal for site reconnaissance and vegetation removal along the Site Access Road fence line buffer are different tasks and accordingly use different methods. The FWS agrees with the use of mechanical means to remove vegetation from the existing access road however, we request that cut vegetation be chipped and spread along the sides of the road. Brush piles and side casting of vegetation should be avoided. The proposed western fence line will be going through densely forested areas, hill tops and gullies. Other than along roads and in areas where the public requires a visual cue, the FWS does not see the need for a complete perimeter fence line as the vegetation and rugged terrain already forms a barrier to site access. The FWS suggests that fence not intrude more than 100-yards into the vegetation from the road. The removal of vegetation for the fence line buffer should be done by hand and at the minimum width necessary to install the barbwire fence. As above, the FWS requests that cut vegetation be chipped and spread across the cleared area. Chipping and spreading the vegetation will fulfill the objective of a temporary erosion control measure.

Navy Response:

The first two paragraphs of the Vegetation Removal portion of Section 2.2.1 distinguish the two types of vegetation removal methods and where they will be used. The following sentence has been added after the first sentence of the second paragraph: "Where mechanical vegetation clearance is performed, the cut vegetation will be chipped and spread, to the extent practicable, to avoid creating brush piles."

The perimeter fence surrounding the landfill is a requirement per the Record of Decision. However, a less intrusive vegetation clearance and maintenance protocol will be employed along the fence line than was stated in the Draft Work Plan. In recent communications, USFWS has suggested that the best way to prevent access by potential trespassers but to allow wildlife relatively unimpeded movement is to use the natural dense vegetation, in addition to signs and 3-wire fence. Therefore, the fence line will be allowed to fully re-vegetate. Subsequent inspection of the fence line will be done based on accessibility. If any particular portion of the fence cannot be accessed because the vegetation is too dense, then trespassers would also not be able to cross the boundary at that location, so the intent of the fence will still be met in those locations, even if the fence condition cannot be verified. In addition, to minimize the de-vegetation to install the fence, a 5-foot wide buffer instead of 10-foot wide buffer will be cleared.

Based on the above, the last bullet of Section 2.3.2 has been replaced with the following:

> "Center Access Road and Perimeter Fence: Center access road will be periodically (annually), but minimally, cleared to provide access for site O&M activities. Perimeter vegetation buffer (along fence line) will be allowed to re-vegetate naturally to minimize potential trespassing, so periodic vegetation clearance is not required. Subsequent inspection of the fence line will be done based on accessibility. If any particular portion of the fence cannot be accessed because the vegetation is too dense, then

trespassers would also not be able to cross the boundary at that location, so the intent of the fence will still be met in those locations, even if the fence condition cannot be verified."

In addition, the phrase "10-foot vegetation buffer" has been replaced by "5-foot vegetation buffer" throughout the document.

6. Section 2.2.1, Site Reconnaissance Approach, Site Reconnaissance, page 2-2, paragraph 2 The examination of trenched areas for exposed debris should be conducted deliberately and carefully as it is likely that only remnants of material will be present.

   It is not clear how the depth of soil cover will be determined. This is a critical component of the reconnaissance and will likely require some type of intrusive activity along with munitions avoidance support. Further, it is unclear what the path forward will be if areas with less than the 6-inches of soil cover are observed. Based on RAO 1, it is assumed that the depth of cover will be brought up to the prescribed 2-foot thickness, but the Work Plan does not address this. Similarly, the Work Plan does not discuss the issue of the 2-foot cover. Existing documents (those cited in Section 7) indicate that debris was disposed of in trenches which were then covered with a 6-inch layer of soil to control blowing litter, and then with a final 2-foot layer of compacted soil. Given that exposed debris is present, the potential exists that some areas received no cover, or substantially less that the prescribed 2-foot of cover. To ensure the integrity of the remedy and to fulfill the objectives of RAO 1 and RAO 2, the FWS suggests that the reconnaissance includes intrusive activities (e.g., examination of the soil profile using a tube auger) aimed at confirming the thickness of cover soil in areas know to be trenched.

   Navy Response:

   The depth of soil cover will be determined in areas where debris is visible on the ground surface where the vegetation is somewhat less dense and access requires little or no clearance. Starting from where the debris is observed and fanning out in all directions, the soil will be probed using an auger, shovel, or other means to expose the near surface soil profile and determine the depth of cover. Soil cover will then be added to areas determined to have less than 2 feet of soil over debris. Areas where the vegetation density prevents access without substantial clearance will not be intrusively evaluated. In these areas, the density of vegetative cover likely reflects a substantial and intact soil cover and is consistent with the basis of the overall remedy; that is, the establishment of vegetation that will prevent erosion, stabilize the integrity of the soil cover, and discourage trespassing.

7. Section 2.3.1, Cover Installation, page 2-2, paragraph 1 Due to natural resource concerns, it may not be possible to mine an area of the Vieques National Wildlife Refuge (NWR) for cover soil. Based on soil maps and existing knowledge of Vieques, there are few areas on the NWR that can be mined for the volume of soil that may be required without impacting relative large areas that are currently undisturbed. Moreover, many of the currently disturbed areas on the NWR that would be candidates for soil mining do not have the quality of soil required (e.g., there may be crushed rock or gravel on the ground surface rather than soil). As the final remedy depends on the establishment of a vegetative cover, the soil put in place needs to be of a sufficient quality to support native plant species and may have to be mined from off refuge areas or from the main island.

   Navy Response:

   Over the course of the investigations performed at SWMU 1, just over 10 acres of vegetation were cleared along transects that covered the entire areal extent of the landfill. Since the landfill is about 41 acres, this amounts to approximately 25 percent of the landfill vegetation that was cut to perform various investigation activities, including the areas where historical aerial photographs indicated the trenched waste disposal occurred. Over the course of investigations, only a trivial amount of debris was observed along these transects, and its presence may have been due to the ground-disturbing activities caused by

vegetation removal and subsequent investigation activities, not necessarily by erosion. This information suggests only a small amount of debris likely exist on the ground surface across the landfill in very small, isolated areas. Based on this information, only a very small amount of cover soil will likely be necessary, which can be obtained on-island. For example, FWS has a significant quantity of soil stockpiled from construction of the refuge visitor's center that may be suitable for use as cover.

8. Section 2.3.1, Cover Installation, page 2-3, paragraph 2 The FWS would like to offer our expertise and input into the seed mixture, plant selection, and overall design of the revegetation effort. The plant species selected should be based on native species lists and their value to wildlife, as well as factors related to the integrity of the landfill cover. The revegetation plan will require a component to prevent/minimize the establishment of invasive species or other undesirable species that may be introduced from adjacent areas or transported to the site as seeds or propagules in the cover soil.

Navy Response:

FWS will be consulted on the selection of species for re-vegetation as stated in the last paragraph of Section 2.3.1.

9. Section 2.3.2, O&M Activities, page 2-3, paragraph 1 The prevention and management of invasive species should be part of the Operations and Maintenance (O&M) plan.

Navy Response:

It is anticipated that only a very small fraction of the SWMU 1 landfill will require additional cover and re-vegetation. The vast majority of the existing vegetation cover (native and invasive) on the landfill will remain. Therefore, while native species will be used for re-vegetation, in consultation with FWS, it is not practical to maintain these small, isolated areas from the influence of the surrounding vegetation. Ultimately, the goal is re-establishment of any vegetation on the areas where additional soil cover is added that provides an effective cover and discourages erosion.

10. Section 2.3.2, O&M Activities, page 2-3, paragraph 2 The frequency of routine inspections should be specified.

Navy Response:

The first sentence of paragraph 2 states the frequency as annual (at a minimum).

For the long term (following the completion of the clean-up), the Vieques NWR staff will likely be the first to become aware of events (hurricanes, fires, etc.) that may threaten the integrity of the remedy. The plan should acknowledge this and add that any of the participating parties can trigger an unscheduled inspection.

Navy Response:

The following sentence has been added to the end of paragraph 2: "Given their permanent presence on the refuge, USFWS personnel may be the first to become aware of these types of events and can help the Navy determine if an additional inspection is warranted."

11. Section 2.3.2, O&M Activities, page 2-4, paragraph 2 The third bullet indicates that the vegetation buffer along the perimeter fence will be minimally cleared to provide access for site O&M activities whereas the last paragraph of Section 2.3.1 (page 2-3) indicates that the 10-foot vegetation buffer zone will be allowed to naturally revegatate. Please clarify. The FWS suggests that the minimum width be cleared for fence installation and that selective planting along the fence line be conducted to result in a permanent path width

of approximately 3-feet. This would allow inspections and/or maintenance to be performed on foot, horseback or using all-terrain vehicles.

Navy Response:

Please see the response to Comment 5 above.

12. Section 2.3, Land Use Control Plan, page 3-1, paragraph 1 The key to a successful implementation of the Land Use Control (LUC) plan is communication with the Vieques NWR regarding the entity performing inspections and O&M, the nature of these activities, and timing of these activities. Similarly, the Vieques NWR will communicate activities and plans regarding land use at the site.

Navy Response:

The following bullet has been added after the fourth bullet in Section 3.2:

- "The Navy will communicate its schedule for conducting inspections and O&M. Similarly, USFWS refuge personnel will communicate any planned activities within the SWMU 1 boundary to ensure they are consistent with the remedial action, LUCs, and ICs."

13. Section 2.3, Implementation and O&M Actions, page 3-2, bullet s 4 and 5 Please add the Department of the Interior (DOI) to the agencies notified regarding modifications to the remedy (bullet 4) and the discovery of activities inconsistent with LUCs.

Navy Response:

DOI has been added to the list of agencies in the sixth and eight bullets (accounting for the addition of a fifth bullet in accordance with the response to Comment 12 above).

14. Appendix B, LUC Site Inspection Checklist Erosion is probably the biggest threat to the integrity of the remedy at SWMU-1. In addition to Exposed Debris on the checklist, a notation under the Potential Problems column regarding erosion should be added. For example, "Visible runoff patterns such as channels or gullies" can be added which may be a precursor to the "Exposed Debris" notation. Similarly, in this same column in the vegetative cover row, a notation such as "Areas of exposed soil" can be added.

Navy Response:

The suggested language has been added to the checklist.

15. Appendix C, LUC Sign Design and Sign Language The FWS suggests that the words "Prohibido depositar basura" be used. Also it is suggested that the word "violación" be used in place of "trangresion" in the bottom line.

Navy Response:

To maintain the style of the other prohibitions, "No Botar Baura" has been replaced with "No Depositar Basura." In addition, "trangresión" has been replaced with "violaciones" as requested. In addition an accent mark was added to the word Comuníquese.

16. Appendix D, SWMU 1 LTM SAP, Executive Summary, paragraph 4 This paragraph states that five wells will be sampled for "at least the first post-ROD and the first Five-Year sampling events…" suggesting that there may be a change in this design. Please indicate if this potential exists and what would trigger a change in this plan.

It is suggested that some language from Worksheet #11, Statement 5 be added to this section to clarify the statement.

Navy Response:

Note a sixth well has been added per response to EPA Specific Comment 14 and the fourth paragraph of the Executive Summary revised accordingly. In addition, the following has been added after the second sentence of the fourth paragraph of the Executive Summary: "Based on the LTM analytical data evaluation, additional existing and/or new monitoring wells may be recommended. For example, if the LTM data suggest leaching may be occurring such that contaminant concentrations are or likely will migrate offsite, additional wells may be recommended to refine the area where the release from the landfill or offsite is suspected. Conversely, if the analytical data suggest a well is no longer needed to satisfy the LTM objectives, it will be recommended for removal, along with the rationale for its removal."

17. Appendix D, SWMU 1 LTM SAP, Executive Summary, paragraph 5 Please add DOI to the list of approving agencies.

Navy Response:

LTM is conducted to meet the requirements of the Record of Decision. Therefore, DOI approval is not required to make LTM modifications. However, as part of the Vieques Environmental Restoration Technical Subcommittee, USFWS will have input on the data evaluation process that may lead to LTM modifications.

18. Appendix D, SWMU 1 LTM SAP, Executive Summary, paragraph 7 This paragraph indicates that six well were selected for monitoring whereas previous paragraphs indicate that 5 will be sampled. Please clarify.

Navy Response:

Six wells will be monitored as noted above.

19. Appendix D, SWMU 1 LTM SAP, SAP Worksheet #3, Distribution List The use of the term "no project specific role" seems to be applied in a somewhat random fashion and needs to be defined or its application clarified.

Navy Response:

There are stakeholder agency and contractor personnel that may be kept apprised of the LTM activities, but have no specific role in executing the project. The phrase is used for personnel that fall into that general category.

20. Appendix D, SWMU 1 LTM SAP, SAP Worksheet #5, Project Organizational Chart Please add the US Fish and Wildlife Service to this chart.

Navy Response:

FWS has been added to the organizational chart.