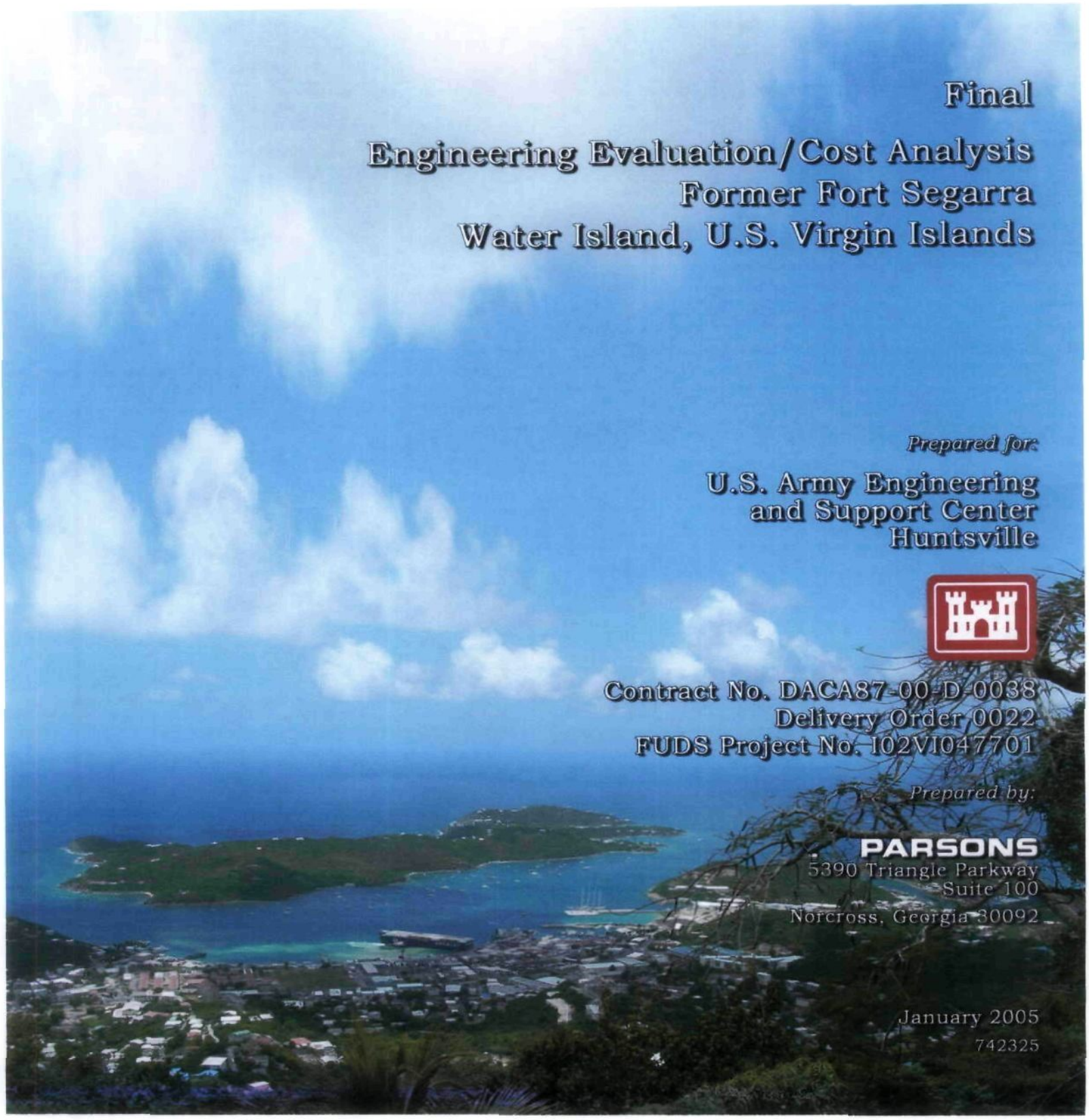


Final

Engineering Evaluation/Cost Analysis
Former Fort Segarra
Water Island, U.S. Virgin Islands

Prepared for:

U.S. Army Engineering and Support Center Huntsville

Contract No. DACA87-00-D-0038
Delivery Order 0022
FUDS Project No. I02VI047701

Prepared by:

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5390 Triangle Parkway
Suite 100
Norcross, Georgia 30092

January 2005
742325

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January 2005

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LIST OF ACRONYMS

3X	XXX – Denotes Surface Decontaminated Item
ABP	Agent Breakdown Product
ACM	Asbestos-Containing Material
AE	Architects/Engineers
AEL	Airborne Exposure Limit
AOIs	Areas of Interest
AR	Army Regulation
ARAR	Applicable or Relevant and Appropriate Requirement
ARB	Anomaly Review Board
ASR	Archives Search Report
BWM	Biological Warfare Materiel
CADD	Computer Aided Drafting and Design
CAP	Contractor-acquired Property
CD	Compact Disk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESAJ	U.S. Army Corps of Engineers, Jacksonville District
CFR	Code of Federal Regulations
CG	Phosgene – Choking Agent - Industrial Chemical
CK	Cyanogen Chloride – Blood Agent – Industrial Chemical
CSM	Conceptual Site Model
CWM	Chemical Warfare Materiel
DAAMS	Depot Area Air Monitoring System
DA PAM	Department of the Army Pamphlet
DERP	Defense Environmental Restoration Program
DID	Data Item Description
DO	Delivery Order
DoD	U.S. Department of Defense
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation

LIST OF ACRONYMS

DQO	Data Quality Objective
DVR	Data Validation Report
EA	Environmental Assessment
ECBC	Edgewood Chemical Biological Center
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
EZ	Exclusion Zone
FDE	Findings of Fact and Determination of Eligibility
FONSI	Finding of No Significant Impacts
FUDS	Formerly Used Defense Site
GA	Tabun – Nerve Agent
GFP	Government Furnished Property
GIF	Graphics Interchange Format
GIS	Geographic Information System
GPS	Global Positioning System
H	Mustard – Blister Agent
HD	Distilled Mustard – Blister Agent
HE	High Explosive
HQ	Sesquimustard – Blister Agent
HTW	Hazardous Toxic Waste
IA	Institutional Analysis
IC	Institutional Controls
ID	Identification
IDW	Investigative Derived Waste
MEC	Munitions and Explosives of Concern
MINICAMS	Miniature Chemical Agent Monitoring System
MTA	Management Technology Associates, Inc.

LIST OF ACRONYMS

NAD83	North American Datum, 1983
NCP	National Contingency Plan
NDAI	No DoD Action Indicated
NEPA	National Environmental Policy Act
NGS	National Geodetic Survey
NTP	Notice to Proceed
OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Administration
PC	Personal Computers
PHSO	Project Health and Safety Officer
PM	Project Manager
QA	Quality Assurance
QC	Quality Control
QCI	Quality Conformance Inspection
QCS	Quality Control Specialist
QIA	Qualitative Impact Analysis
RAC	Risk Assessment Code
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Materiel
ROE	Right-of-Entry
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
SM	Site Manager
SOP	Standard Operating Procedure
SOW	Scope of Work
SRE	Site Risk Evaluation
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan

LIST OF ACRONYMS

SUXOS	Senior UXO Supervisor
TBC	To Be Considered
TBD	To Be Determined
TCLP	Toxicity Characteristic Leachate Procedure
TCRA	Time-Critical Removal Action
TDG	Thiodiglycol
TEC	Topographic Engineering Center, USACE
TEU	U.S. Army Technical Escort Unit
TIFF	Tagged Image File Format
TPP	Technical Project Planning
TSSDS	Tri-Services Spatial Data Standards
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USVI	U.S. Virgin Islands
UXO	Unexploded Ordnance
VITEMA	Virgin Islands Territorial Environmental Management Agency
WAN	Wide-Area Network
WICA	Water Island Civic Association
WP	Work Plan

GLOSSARY

3X (XXX)

An agent symbol with three "Xs" (XXX) indicates that a known or suspected contaminated item has been surface decontaminated by locally approved procedures, bagged or contained in an agent-tight barrier, of sufficient volume to permit sample air to be withdrawn without being diluted with incoming air, and/or appropriate tests/monitoring have verified that concentrations above 0.0001 mg/m^3 for agent GB, 0.00001 mg/m^3 for agent VX, 0.003 mg/m^3 for H or L, or 0.00003 mg/m^3 for agent GD (Unmasked worker AEL values for other covered chemicals) do not exist. Monitoring is not required for completely decontaminated and disassembled parts that are shaped simply (no crevices, threads, or the like) and are made of essentially impervious materials (such as simple lab glassware, and steel gears).

Action Memorandum

The action memorandum is used to approve a time-critical removal action and to conclude the Engineering Evaluation/Cost Analysis. It provides a concise, written record of the decision to select an appropriate response action. As the primary decision document, it substantiates the need for a response action, identifies the proposed action, and explains the rationale for the response action selected.

Anomaly

An anomaly is a deviation from uniformity in physical properties; a perturbation from a normal, uniform, or predictable geophysical field. Specifically, an anomaly is a deviation of interest for the project. This irregularity should deviate from the expected subsurface ferrous and non-ferrous material at a site (i.e., pipes, power lines, etc.).

Archives Search Report (ASR)

A report of past MEC activities conducted on an installation based on readily available information. The principal purpose of the archives search is to assemble historical records and available field data, assess potential ordnance presence, and recommend follow-up actions at a DERP-FUDS. There are four general steps in an Archives Search: records search phase, site safety and health plan, site survey, and archives search report including risk assessment.

Chemical Agent

Chemical warfare agents, such as V- and G-series nerve agents, H-series blister agents, and Lewisite, that have been used in military applications. Chemical agents are not gases, although "poison gas" is a term used to refer to them. Chemical agents produce various physiological effects on the human body. They will produce a harmful physiological or psychological reaction when applied to the body externally, when inhaled, or when taken internally.

Chemical Agent Contaminated Media

GLOSSARY (CONTINUED)

Chemical agent contaminated media are any materials that are contaminated with chemical agent or agent breakdown products. This can include residual soil contamination and 3X items determined to contain residual chemical agent or agent breakdown products.

Chemical Warfare Materiel (CWM)

An item configured as a munition containing a chemical that is intended to kill, seriously injure, or incapacitate a person through its physiological effects. The term includes V- and G-series nerve agent, H-series blister agent, and Lewisite in other-than-munition configurations. Due to their hazards, prevalence, and military-unique application, chemical agent identification sets (CAIS) are also considered CWM. CWM does not include: riot control agents; chemical herbicides; smoke and flame producing items; or soil, water, debris, or other media contaminated with chemical agent.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)

CERCLA authorizes federal action to respond to the release or threatened release of hazardous substances into the environment or a release or threat of release of a pollutant or contaminant into the environment that may present an imminent or substantial danger to public health or welfare.

Conventional Ordnance and Explosives

Ordnance and explosives (see definition) other than CWM, BWM and nuclear ordnance. (ER 1110-1-8153)

Defense Environmental Restoration Program (DERP)

Established in 1984, DERP promotes and coordinates efforts for the evaluation and cleanup of contamination at Department of Defense installations. (10 U.S.C. 2701)

Depot Area Air Monitoring System (DAAMS)

A portable air-sampling unit, designed to draw a controlled volume of air through a glass tube filled with a collection material. After a specified length of time and flow rate, the tube is removed and sent to a chemical laboratory for analysis (approximately 1 hour process time) to determine the presence, type, and quantity of agent collected in the samples. This technique will sample down to the AEL and provides low-level detection capability for GA, GB, HD, and VX.

Electromagnetic Method

A method of geophysical exploration in which the magnetic or electrical fields associated with subsurface currents are measured. The two primary techniques applied during MEC and CWM investigations are the time-domain electromagnetic (TDEM) method and the frequency-domain electromagnetic (FDEM) method. Both methods use

GLOSSARY (CONTINUED)

manmade sources. In the case of TDEM, a pulsed source that is composed of many frequencies is used to generate a source field while the local ground response to that field is monitored using a receiver antenna. In the case of FDEM, the source is a constant frequency and the receiver is tuned to measure the ground response to that frequency.

Exclusion Zone (EZ)

A safety zone established around a work area. Only authorized project personnel are allowed within the exclusion zone. Examples of exclusion zones are safety zones around MEC intrusive activities and safety zones where UXO is intentionally detonated. (DDESB-KO, 27 January 1990)

Explosive Ordnance Disposal (EOD)

The detection, identification, field evaluation, rendering safe, recovery and final disposal of unexploded ordnance or munitions.

Explosives Safety Submission (ESS)

The document that serves as the specifications for conducting work activities at the project. The ESS details the scope of the project, the planned work activities, and potential hazards (including the maximum credible event) and the methods for their control.

Formerly Used Defense Sites (FUDS)

Properties previously owned, leased, or otherwise possessed by the U.S. and under the jurisdiction of the Secretary of Defense; or manufacturing facilities for which real property accountability rested with DOD but were operated by contractors (Government owned - contractor operated) and which were later legally disposed of. FUDS is a subprogram of the DERP. Restoration of military land was extended to formerly used sites in 1983 under Public Law 98-212 (DOD Appropriations Act of FY84).

Geophysical Techniques

Methods used to explore subsurface conditions using quantitative physical properties. Typical properties measured include seismic wave travel time and waveform changes, electrical potential differences, magnetic and gravitational field strength, temperature, etc. For MEC and CWM investigations, electromagnetic and magnetic methods are most frequently used.

Headspace

Headspacing is done using a closed, sealed container, where items suspected of being CWM related are placed for testing. The items are placed in the container and the container is either heated from an outside source or allowed to heat by solar conduction. The vapors inside the box are monitored through a sampling port for indications of chemical agent.

GLOSSARY (CONTINUED)

Intrusive Activity

An action involving or resulting in the penetration of the ground surface at an area known or suspected to contain MEC. Intrusive activities can be of an investigative or removal action nature.

Miniature Chemical Agent Monitoring System (MINICAMS)

An automatic air monitoring system that collects compounds on a solid sorbent trap, thermally desorbs them into a capillary gas chromatography column for separation, and detects the compounds with a Flame Photometric Detector (FPD) or Halogen Specific Detector (XSD). It is a lightweight; portable, low-level detector designed to respond in less than fifteen minutes with alarm capability.

National Oil and Hazardous Substance Pollution Contingency Plan (NCP)

Revised in 1990, the NCP provides the regulatory framework for responses under CERCLA. The NCP designates the Department of Defense as the removal response authority for ordnance and explosives hazards.

Non-Stockpile Chemical Warfare Materiel

CWM (see definition) that is not included in the chemical stockpile. Non-stockpile CWM is divided into five categories: buried CWM, recovered chemical weapons (items recovered during range clearing operations, from chemical burial sites, and from research and development testing), former chemical weapon production facilities, binary chemical weapons, and miscellaneous CWM (unfilled munitions and devices and equipment specially designed for use directly in connection with employment of chemical weapons). (HQDA Interim Guidance for Biological Warfare Materiel (BWM) and Non-stockpile Chemical Warfare Materiel (CWM) Response Activities)

Ordnance and Explosives (OE)

Ammunition, ammunition components, chemical or biological warfare materiel or explosives that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, buried, or fired. Such ammunition, ammunition components, and explosives are no longer under accountable record control of any DOD organization or activity. (HQDA Policy Memorandum "Explosives Safety Policy for Real Property Containing Conventional OE")

Photo-ionization Detector (PID)

A portable instrument used to detect, measure, and provide a direct reading of the concentration of a variety of trace gases based on the principle of photo-ionization. The process involves the absorption of ultraviolet light by a gas molecule leading to ionization.

GLOSSARY (CONTINUED)

Recovered Chemical Warfare Materiel (RCWM)

Non-stockpile CWM that was previously discarded, buried, or fired, and discovered unexpectedly or during planned environmental restoration operations. Chemical warfare agent in soil and debris is not considered RCWM.

Response Action

Action taken instead of or in addition to the removal of MEC to prevent or minimize the release of MEC so that it does not cause substantial danger to present or future public health, welfare or the environment. (ER 1110-1-8153)

Site Safety and Health Plan (SSHP)

Document that establishes the personnel protection standards and mandatory safety practices and procedures for work being performed. These policies and procedures are necessary to protect workers and the public from the potential hazards posed by work at the site.

Stakeholder

Federal, state, and local officials, community organizations, property owners, and others having a personal interest or involvement, or having a monetary or commercial involvement in the real property, which is to undergo an MEC response action.

Unexploded Ordnance (UXO)

Military munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material and remain unexploded either by malfunction, design, or any other cause. (40 CFR 266.201).

EXECUTIVE SUMMARY

ES1 Parsons, under contract with the U.S. Army Engineering and Support Center, Huntsville, conducted an Engineering Evaluation and Cost Analysis at the former Fort Segarra on Water Island in the U.S. Virgin Islands. The U.S. Army Corps of Engineers, Jacksonville District was the District Project Manager for this project. This Engineering Evaluation and Cost Analysis was conducted under the Defense Environmental Restoration Program for Formerly Used Defense Sites. Water Island was used by the Department of Defense from 1948 to 1950 to test chemical warfare materiel.

ES2 The purpose of the Engineering Evaluation and Cost Analysis was to characterize the nature and extent of chemical warfare materiel and chemical agent contaminated media, assess the risk posed by any chemical warfare materiel and chemical agent contaminated media, study risk management alternatives and identify the appropriate response alternative and future recurring reviews for Areas of Interest at the former Fort Segarra. In addition, sampling and analysis of soil was conducted to collect data on hazardous and toxic waste constituents at the Areas of Interest. The field investigation for the Engineering Evaluation and Cost Analysis began on April 28, 2003 and was concluded on June 17, 2003.

ES3 Test Area 4 consists of a 4.9-acre parcel of land located in the southern portion of Water Island directly south of Flamingo Bay. Debris has been deposited on the site, typically consisting of abandoned vehicles, household garbage and construction rubble. None of the debris identified within Test Area 4 is related to Department of Defense activity. Test Area 4 was reportedly used for four tests conducted from 1948 through 1950, which involved chemical agents (USACE, 2002).

ES4 Test Area 5 is located east of Test Area 4, south of Flamingo Bay on Water Island and consists of a 3.3-acre parcel that was the repository for a large amount of rubble associated with the demolition of the Water Island Hotel. Test Area 5 had been used by the residents of Water Island as a solid waste transfer station for several years prior to this investigation. Test Area 5 was reportedly used for a single test during December 1948, which involved chemical agent (USACE, 2002).

ES5 Test Area 8 is located north of Flamingo Bay, adjacent to the Water Island Fire Department, and consists of 3.5 acres. It was the approximate location of the hotel constructed on Water Island during the early 1960's. Currently, only an asphalt pad remains on the site. According to existing records, Phases V and VI of the distilled mustard-filled, M70 bomb static-firing test were conducted in a wooded area with offshore winds within this test area. According to the Archives Search Report, a toxic storage yard was located in the vicinity of Test Area 8. T-3 bombs filled with mustard

and distilled mustard and M70, M78 and M79 bombs filled with aged cyanogen chloride that were involved in surveillance tests were stored outdoors in this area; all other chemical munitions and chemical agent containers were stored inside buildings. Agent transfer operations to support the tests were also reportedly conducted in Test Area 8.

ES6 The Flamingo Bay Landfill Area is located adjacent to Test Area 4, south of Flamingo Bay and consists of an approximately 5.4-acre tract of land that was historically used as a landfill. Large amounts of various types of non-Department of Defense related debris is located on the surface and subsurface within the Flamingo Bay Landfill Area. Flamingo Bay Landfill Area was identified for investigation due to the fact that the adjacent deepwater dock was used to deliver equipment and munitions during the Tropical Test Program and at least two suspect chemical bombs (identified as M70 and M78 bombs) were uncovered in this area in 1966 (U.S. Army Chemical Materiel Destruction Agency, 1993). The two suspect chemical bombs were located during a dredging operation and were disposed of by personnel from Roosevelt Roads Naval Base with "no noticeable release of agent." There are two Department of Defense associated items on the surface at the Flamingo Bay Landfill Area, a chemical warfare agent storage cylinder known as a one-ton container, and a concrete-filled M78 chemical bomb. Both items are classified as 3X scrap, meaning that they may once have contained chemical warfare agent but air monitoring did not detect any agent. As such, the 3X scrap items may present a low level hazard.

ES7 To achieve the objectives of the Engineering Evaluation and Cost Analysis, each site required sufficient characterization concerning the presence of chemical warfare materiel and chemical agent contaminated media. The characterization goals included conducting intrusive investigations, collection of soil samples, interpretation of the data, and documentation of the findings. The characterization data were used to determine if chemical warfare materiel-contaminated areas exist at each site and to identify appropriate response alternatives. Specific sampling procedures, analytical methods, and quality control procedures are contained in the site-specific Sampling and Analysis Plan for former Fort Segarra (Parsons, 2002a).

ES8 No chemical warfare materiel was identified during this Engineering Evaluation and Cost Analysis investigation at any of the Areas of Interest investigated at the former Fort Segarra; however, chemical agent contaminated media was discovered in the form of the 3X scrap at the Flamingo Bay Landfill Area.

ES9 Currently, the Areas of Interest are owned by the Department of the Interior. All of the Areas of Interest are undeveloped. Test Area 4, Test Area 5, and the Flamingo Bay Landfill Area are currently used for the storage of various types of debris and garbage.

ES10 Site wide institutional controls, consisting of signs at both of the boat docks that provide access to the island, are recommended for implementation at the former Fort Segarra. In addition to the signs, it is recommended that a printed information brochure be prepared to inform residents and visitors at Water Island of the potential chemical

warfare materiel hazards associated with all of the Areas of Interest investigated. The removal of all known 3X scrap from Flamingo Bay Landfill Area is also recommended.

ES11 Recurring reviews are required by CERCLA to ensure that remedial actions remain protective of human health, safety, and the environment. The recurring review process will be used to evaluate the effectiveness of the recommended response alternatives over time. Recurring reviews including document review, site visit, and documentation of findings is expected to cost approximately $17,100 every five years.

ES12 The total cost for the implementation of the recommended site-wide Institutional Controls is approximately $17,200 for initial set up and installation, with a cost of approximately $9,500 every two years. The cost to remove the 3X scrap identified within the Flamingo Bay Landfill Area is approximately $35,900.

SECTION 1
INTRODUCTION

1.1 REGULATORY FRAMEWORK / PROJECT AUTHORIZATION

1.1.1 Project Authorization

Parsons received Contract No. DACA87-95-D-0038, Delivery Order No. 22, from the U.S. Army Engineering and Support Center, Huntsville (USAESCH) to conduct an Engineering Evaluation and Cost Analysis (EE/CA) at the former Fort Segarra on Water Island in the U.S. Virgin Islands. The U.S. Army Corps of Engineers, Jacksonville District (CESAJ) was the District Project Manager for this project. This EE/CA was conducted under the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS). The FUDS project number for the former Fort Segarra is I02VI097701. Water Island was used by the Department of Defense (DoD) from 1948 to 1950 to test chemical warfare materiel (CWM).

1.1.2 Regulatory Overview

The actions performed under this contract are consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil & Hazardous Substance Pollution Contingency Plan (NCP). In accordance with the NCP, on-site actions did not require Federal, State, or local permits. The EE/CA adhered to the DERP for FUDS and relevant U.S. Army regulations and guidance for CWM projects.

1.2 PURPOSE AND SCOPE

1.2.1 Project Purpose

1.2.1.1 The purpose of this EE/CA was to characterize the nature and extent of CWM and chemical agent contaminated media, assess the risk posed by any CWM or chemical agent contaminated media, study risk management alternatives and identify the appropriate response alternative and future recurring reviews for areas of interest (AOIs) at the former Fort Segarra. In addition, sampling and analysis of soil was conducted to characterize hazardous and toxic waste (HTW) constituents at the AOIs.

1.2.1.2 Specifically, the work conducted within each AOI included investigating Test Area 4, Test Area 5, Test Area 8 and the Flamingo Bay Landfill Area for the presence of CWM or chemical agent contaminated media and to collect and analyze soil samples from these AOIs for HTW constituents.

1.2.1.3 The USAESCH evaluated the applicability of the "Interim Guidance for Biological Warfare Materiel (BWM) and Non-Stockpile Chemical Warfare Materiel (CWM) Response Activities" (referred to as "Interim Guidance") (DA, 1997). The Interim Guidance states that if it is determined that the probability of encountering CWM is "seldom" or "unlikely," the Installation (or District) Commander or designated representative may assume the risk of conducting site activities as a non-CWM site. USAESCH determined that the probability of encountering CWM was "unlikely" for the sites under investigation at former Fort Segarra.

1.2.2 Scope and Objectives

1.2.2.1 The EE/CA focused on selected sites at the former Fort Segarra that were historically used for CWM testing. The objectives of this EE/CA are as follows:

1. Evaluate the historical use and testing of CWM at Test Area 4, Test Area 5, Test Area 8 and Flamingo Bay Landfill Area;
2. Evaluate the potential presence of CWM, chemical agent contaminated media, and related ordnance that may have resulted from past DoD activity;
3. Identify, evaluate, and recommend appropriate response alternatives for each site; and
4. Provide cost estimates for the recommended response alternatives.

1.2.2.2 During the EE/CA field investigation, site characterization efforts involved intrusive excavation, sampling, and data collection. These activities were conducted to determine or classify those portions of the site that are contaminated or potentially contaminated with CWM or chemical agent contaminated media; to estimate the type and amount of CWM or chemical agent contaminated media; and to quantify the concentrations of HTW constituents, if any, in soil at the selected AOIs.

1.2.2.3 The major work components included the following:

- Reviewed previous reports, documents, and historical records, including the Archives Search Report (ASR), and other data that was available;
- Visually inspected the sites and collected additional relevant data;
- Prepared a Work Plan and Sampling and Analysis Plan (SAP) for the field investigation;
- Re-acquired previously identified geophysical anomalies;
- Located additional sampling locations based on aerial photographic evaluations and historical site uses;
- Performed intrusive investigations of geophysical anomalies and other suspect locations based on results of the re-acquisition effort and historical site information;
- Collected soil samples at selected locations for chemical agent and HTW analysis;

- Prepared a qualitative assessment of risk from CWM and chemical agent contaminated media;
- Validated HTW analytical data;
- Provided technical support to the government for meetings and public relations activities;
- Evaluated site investigation results, assessed institutional controls and other response alternatives, and prepared this EE/CA Report as documentation of all work activities; and
- Provided project management.

1.3 TECHNICAL PROJECT PLANNING (TPP) TEAM

The organization of a TPP team was not part of the scope for this project. However, all members of the Project Team, detailed in Section 3, provided input into the field investigation and report preparation. All field activities and documentation have been reviewed and approved by USAESCH and CESAJ.

1.4 SUMMARY OF PUBLIC PARTICIPATION

Prior to the field investigation, public meetings were held on St. Thomas Island and on Water Island to provide information relevant to the EE/CA investigation to local residents and the local regulatory community. Several articles were published in local media pertaining to the investigation conducted as part of this EE/CA.

1.5 OTHER ENVIRONMENTAL CONTAMINATION ENCOUNTERED

1.5.1 Suspected Asbestos-Containing Material (ACM)

During the field investigation, a limited amount of material suspected to be transite, an asbestos containing material (ACM), was identified in Test Area 4 and Test Area 5 based on visual inspection. Transite is nonfriable; however, several of the sampling locations were not investigated due to the presence of suspected ACM on the surface.

1.5.2 Investigative Derived Waste (IDW)

Less than five gallons of soil contaminated with diesel fuel and hydraulic fluid was generated during the intrusive investigation. This material was generated during fueling and heavy equipment maintenance operations. The investigative derived waste (IDW) was turned over to a waste disposal company for disposal. A letter of disposal is included in Appendix C.

SECTION 2
SITE DESCRIPTION

2.1 SITE LOCATION

2.1.1 The former Fort Segarra is located on Water Island, fourth largest of the U.S. Virgin Islands, approximately 1,800 feet from St. Thomas Island and south of the capital city, Charlotte Amalie (Figure 2.1).

2.1.2 Water Island is approximately 500 acres in size, measuring 1.75 miles long and 0.5 miles wide (Figure 2.2). Water Island has steep, rocky slopes and a highly indented coast with a maximum elevation of 290 feet. Access is primarily by boat via two docks: one small dock located on the west side of the island and the deep-water dock on the south side of Flamingo Bay. There is also a helicopter pad on the northern side of Flamingo Bay. In 2000, Water Island had a population of 161 residents, living in 80 households (U.S. Census Bureau, 2002). Currently, there are no commercial facilities on the island.

2.2 PHYSICAL DESCRIPTION

2.2.1 Terrain and Vegetation

A primary ridgeline 200 to 290 feet above sea level runs down the center of the island in a north-south direction. The southern and southeastern coastlines are characterized by steep cliffs. The remainder of the coastline includes sand and sand/gravel beaches, a number of small bays and peninsulas, and four salt ponds with associated mangrove systems (Ebasco, 1991).

2.2.2 Geology and Soil Conditions

Water Island is volcanic in origin. It has shallow soils of the Cramer gravelly clay loam variety, dense semiarid vegetation, and a rather steeply sloping terrain. Volcanic rock outcrops and cliffs are found along most of the south coast of the island. Limestone outcrops and soils are found primarily in Limestone Bay (DOI, 1996).

2.2.3 Climate

Water Island lies within the subtropical dry forest life zone where mean annual rainfall ranges from approximately 23.6 to 43.3 inches with the rainy season occurring from May to November. The climate is tempered by easterly tradewinds, relatively low humidity and little seasonal temperature variation (DOI, 1996). The island is periodically exposed to damaging hurricanes that generally occur from June through September.

2.2.4 Hydrology

2.2.4.1 Very little information is available regarding groundwater on Water Island. The depth to groundwater ranges from ground level at the saltwater ponds to more than 10 feet below ground surface for most of the island. Groundwater generally occurs in both the residual soils and in the fractured bedrock. Groundwater is not used by island residents; rather they collect water from rainfall using catchment basins and cisterns. When necessary (e.g., during droughts), water is brought in by trucks on a barge from St. Thomas Island (DOI, 1996).

2.2.4.2 The only surface water on Water Island exists in salt ponds at various locations around the island, generally on the southeastern side. These ponds are at sea level and probably are replenished through a combination of seawater intrusion and shallow groundwater flow. No data are available on the quality of the water in these ponds. Water Island got its name from fresh water ponds where sailing ships could replenish their water supply. Fresh water ponds apparently were once found in association with saltwater ponds (DOI, 1996).

2.2.5 Site Description

Three CWM test areas and one additional AOI were identified and investigated during the field investigation for this EE/CA (Figure 2.2). These areas are described in the following subsections.

2.2.5.1 Test Area 4

Test Area 4 consists of a 4.9-acre parcel of land located in the southern portion of Water Island (Figure 2.2). Prior to the field investigation, it was determined that a large number of abandoned automobiles had been deposited on this site. In addition to the automobiles, various other types of debris, typically consisting of common trash and not related to DoD activity, were deposited on the site as well. Test Area 4 was reportedly used for four CWM tests (USACE, 2002). Descriptions of the various tests are provided in Section 4.

2.2.5.2 Test Area 5

Test Area 5 is located east of Test Area 4, south of Flamingo Bay (Figure 2.2). Test Area 5 consists of a 3.3-acre parcel that was the repository for a large amount of demolition debris, which was generated by the destruction of a 1960's-era hotel built on Water Island. Test Area 5 had been used by the residents of Water Island as a solid waste transfer area for several years prior to this investigation. As a result, there are large amounts of trash and debris located at Test Area 5. Included in this debris are a stack of used car batteries, containerized waste oil, and other household trash. Road access consists of a semicircular unimproved road that traverses the site, providing two points of access to the site. Training Area 5 was reportedly used for a single CWM test (USACE, 2002).

2.2.5.3 Test Area 8

Test Area 8 is located north of Flamingo Bay, adjacent to the Water Island Fire Department (Figure 2.2). Test Area 8 consists of 3.5 acres. It was the approximate location of the hotel constructed on Water Island during the early 1960's. The hotel was demolished because of severe hurricane damage and is no longer present at the site. Currently, only an asphalt pad remains on the site. Vegetation on the site is composed of low scrub brush and grasses. Access to Test Area 8 consists of several roads that enter the site, originating from the surrounding primary roads that bound the site on all sides. Test Area 8 was reportedly used for one test (USACE, 2002).

2.2.5.4 Flamingo Bay Landfill Area

The Flamingo Bay Landfill Area is located adjacent to Test Area 4, south of Flamingo Bay (Figure 2.2). The Flamingo Bay Landfill Area occupies approximately 5.4 acres of land that was historically used as a landfill by the residents of Water Island. Large amounts of various types of debris, unrelated to past DoD activity, are located on the surface and subsurface within the Flamingo Bay Landfill. An empty, vented, one-ton storage container was located within the boundaries of the Flamingo Bay Landfill Area in addition to a M78 500-lb concrete-filled bomb casing located at the water line. These items are considered 3X scrap and presently remain on site. The Flamingo Bay Landfill Area was identified for investigation due to the historical discovery of suspect chemical bombs within the bounds of the landfill during a dredging operation in 1966.

2.3 SITE HISTORY

2.3.1 The U.S. government acquired Water Island in 1944 for the DoD to establish a coastal defense installation. Fort Segarra was subsequently built at the southern tip of the island and consisted of World War II-era gun emplacements, barracks, watchtowers, underground bunkers and other military facilities. In addition, docks, roads, and water, sewage and power systems were constructed. The facility was named in honor of U.S. Army Lieutenant Colonel Raphael Angel Segarra. At the end of World War II, construction on Fort Segarra halted and it was declared excess in 1946.

2.3.2 From May 1948 to September 1950, the U.S. Army Chemical Corps used Water Island for testing and storage of chemical munitions as part of the Tropical Test Program. Test areas were designated on the western end of St. Thomas Island and in several areas on Water Island. The purpose of the tests was to evaluate the performance of CWM in a tropical environment. The Tropical Test Program ended in 1950 and the operations were moved to Dugway Proving Grounds in Utah.

2.3.3 Historical records indicate that 57 CWM tests were planned for the Tropical Test Program in the U.S. Virgin Islands. However, only nine of these tests were actually conducted (Table 2.1). As shown in Table 2.1, two of the nine tests were conducted on St. Thomas Island and seven were conducted on Water Island (U.S. Army Chemical Materiel Destruction Agency, 1993).

2.3.4 The disposition of chemical munitions at the end of the Tropical Test Program was detailed in a 1950 Army memorandum. Items were either dumped at sea at the Naval Ammunition Dumping Ground in the Caribbean Sea south of Vieques Island, or shipped to the Army Chemical Center, Maryland; the Midwest Chemical Depot, Arkansas; or the Dugway Proving Ground, Utah. According to the ASR, the only items not accounted for are four 500-pound M78 bombs that were taken out of the test inventory because the cyanogen chloride (CK) filler had solidified. Scrap from statically tested bombs may have been disposed of on-site (USACE, 2002).

2.3.5 Following the end of the Tropical Test Program in 1950, the Army granted a permit to DOI for use of the island. In 1952, Water Island was transferred to the DOI. DOI subsequently leased the island to a private party (master lessee) for two 20-year terms for development as a resort area. This included the construction of a resort hotel on Rainbow Point, north of Flamingo Bay, beginning in the 1960s. The original master lessee, Water Island Incorporated, sold their rights in the lease to the Water Isle Hotel and Beach Club. The hotel is variably referred to in historical documents as the Water Isle Hotel and the Sea Cliff Resort Hotel. This lease expired in 1992. In December 1996, title was transferred to the U.S. Virgin Islands government for certain parcels of Water Island that included the catchment basin site and the hotel complex site and associated buildings.

2.3.6 Over the term of the lease, the master lessee granted numerous subleases. Many of the sublessees have constructed homes on their parcels. Many of the barracks, administration and support buildings constructed as part of Fort Segarra have been converted to private homes. Some of these parcels have been transferred to the sublessees.

2.3.7 Hurricane Hugo in 1989 and Hurricane Marilyn in 1995 caused extensive damage to many of the structures on Water Island. Due to this hurricane damage, the hotel and associated structures were demolished. Debris generated because of the hurricane damage was largely deposited in the southern portion of the island near Test Area 5. This includes a large amount of concrete rubble generated during the demolition of the hotel in 1998.

Table 2.1
CWM Tests Conducted during the Tropical Test Program in the U.S. Virgin Islands (Ebasco, 1991)

Test Area	Test Number	Description
Test Area 1	N/A	- Test Area 1 was identified in the plans for the static M70 bomb test. - Records indicate that no CWM testing was conducted in this area.
Test Area 2	N/A	- Records indicate that no CWM testing was conducted in this area.
Test Area 3	N/A	- Records indicate that no CWM testing was conducted in this area.
Test Area 4	136 166 176 179*	- Static test of M70 bomb, distilled mustard (HD)-filled (Phase 1 and 2 of Test 136). - Static test in the open of a single E-23 smoke pot, tabun (GA)-filled. - Static test in the open of a single E-23 smoke pot, HD-filled. - Test of a single E-23 smoke pot, sesquimustard (HQ)-filled, functioned statically in open on land.
Test Area 5	136	- Static test of M70 bomb, HD-filled (Phase 3 and 4 of Test 136).
Test Area 6	136 168*	- Static test of M70 bomb, HD-filled (Phase 7 and 8 of Test 136). - Test of a single E-23 smoke pot, GA-filled, functioned statically on water with onshore wind.
Test Area 7	N/A	- Records indicate that no CWM testing was conducted in this area.
Test Area 8	136	- Static test of M70 bomb, HD-filled (Phase 5 and 6 of Test 136).
Toxic Storage Yard	89 135	- Surveillance** of T-3 bombs filled with mustard and distilled mustard (H/HD) in storage. - Surveillance** of unstabilized cyanogen chloride (CK) in M70, M78, and M79 bombs.
West End, St. Thomas Island	102	- Location of entrances to gas-proof shelters in relation to winds tested using phosgene (CG) from 1-ton containers.
St. Thomas Island	132	- Surveillance** of particulate bombs (4-lb, E-1) in storage.

* - Actual Test Location Unknown, suspected to be in the test area indicated
** - Surveillance consisted of monitoring chemical filled bombs to determine affects of a tropical environment on agent filler

2.4 CURRENT LAND USE

Water Island, although owned by the U.S. Government, is under the administrative jurisdiction of the Virgin Islands government for fire and police protection, zoning regulations, building permits, and land use planning. The Sprat Bay portion of the island, on the northeastern end, is zoned for low-density residential use. The remainder of the island is zoned for waterfront, pleasure use. In fact, however, since the destruction of the hotels on the island, the primary land use is residential.

2.5 PREVIOUS INVESTIGATIONS

Previous investigations have been limited to record searches, interviews, surface assessments and generally non-intrusive activities. A summary of these investigations is provided below.

2.5.1 1966 Ordnance Discovery at Flamingo Bay Landfill Area

2.5.1.1 In 1966, a Naval Ordnance Disposal Detachment at Roosevelt Roads, Puerto Rico, responded to an unearthing of metal objects that appeared to be bombs. The Navy report noted "several" bombs had been unearthed during a dredging operation at the Flamingo Bay Landfill Area, that they believed them to be Army M70 and M78 chemical bombs, that all but one had been vented, and that they blew the unvented bomb without noticeable release of any chemical (USACE, 2002).

2.5.1.2 Eyewitnesses described two bombs as 18 to 24 inches in diameter, both the same size, except that one had fins making it 8 to 12 inches longer. The bomb with fins was about five feet long. The eyewitness accounts did not say that the Navy had blown the items in place, but that they had taken the bombs with them and advised that no more excavation be performed at the site.

2.5.2 1991 Archives Search Report and Site Visit

In 1991, the USAESCH contracted Ebasco Services, Inc., to conduct an archives search and site visit of the former Fort Segarra. This report and site visit resulted in the installation of a chain link fence around the perimeter of the Flamingo Bay Landfill. The 1991 ASR outlined the site history, site description, real estate ownership information, results of a visual site inspection and interviews, and evaluation of potential ordnance contamination based on site information and archives search (Ebasco, 1991). The sites addressed by the ASR included all of those being addressed by this EE/CA.

2.5.3 1993 Former Fort Segarra Scoping Study

The U.S. Army Chemical Materiel Destruction Agency conducted a scoping study on the former Fort Segarra and submitted the document on December 10, 1993 (U.S. Army Chemical Materiel Destruction Agency, 1993). This study summarized the background information, recorded disposition of CWM, and potential strategies for remediating potentially buried CWM. The report also identified regulatory and technical issues associated with efforts to clean up potentially buried CWM at the former Fort Segarra.

2.5.4 1994 MTA Site Characterization

2.5.4.1 In March 1993, Management Technology Associates, Inc. (MTA) was awarded a contract to perform non-intrusive site characterization and debris removal operations at former Fort Segarra. All field operations were completed by June 9, 1994.

2.5.4.2 MTA conducted a surface investigation of Test Areas 4, 5, 6, 8, Tamarind Bay, and the Flamingo Bay Landfill Area. Tamarind Bay is a separate area not directly related to CWM training and is located south of Test Area 1. Tamarind Bay was deemed suspect after stressed vegetation was observed in the area during an archeological investigation. Test Areas 2, 3, and 7 were not investigated because interviewees indicated that no CWM testing was conducted at the northern end of Water Island. The MTA investigation of all sites included surface inspection, magnetometer sweeps, and select surface soil sampling (MTA, 1994).

2.5.4.3 The results of the investigation concluded no suspect anomalies or surface debris at Tamarind Bay, Test Area 6, Test Area 8, the portion of Test Area 4 north of the road, and the portions of the Flamingo Bay Landfill Area outside the fence. The remainder of Test Area 4, Test Area 5, and the fenced Flamingo Bay Landfill Area were further characterized by completing 100% magnetometer surveys, selecting areas or anomalies for investigation, and collecting surface soil samples. Chemical warfare agent or agent breakdown products (ABP) were not detected during field screening or laboratory analysis of any of the surface soil samples collected at former Fort Segarra.

2.5.4.4 MTA submitted recommendations for intrusive investigation for consideration by the Anomaly Review Board (ARB) in September 1994. MTA recommended specific anomalies and representative "hot" areas in Test Area 5 for intrusive investigation, as well as 10% of the 20-foot by 20-foot grid squares dividing the southern portion of Test Area 4 and the fenced portion of the Flamingo Bay Landfill Area. MTA also recommended sampling of the circular depression in Test Area 4 and the suspected trench area in the Flamingo Bay Landfill Area. The ARB approved MTA's recommendations in January 1995.

2.5.5 1995 Environmental Assessment

In 1995, the U.S. Department of the Interior (DOI), Bureau of Reclamation, conducted an environmental assessment (EA) of Water Island for the Office of Territorial and International Affairs to fulfill a requirement for the Water Island title transfer to one or more entities. The final version included a finding of no significant impacts (FONSI), and concluded that an environmental impact statement was not required to implement the title transfer of Water Island from the DOI to former sub-lessees and the Virgin Islands Government (DOI, 1996).

2.5.6 July 2000 Site Visit

In July 2000, Parsons conducted a site visit to Water Island to assess sites presented in the ASR. The visit focused on the Flamingo Bay Landfill Area, Test Area 4, and Test Area 5. Observations made during the site visit included:

- Test Area 4 is covered with junk cars and trucks.
- Test Area 5 is currently the site for solid waste staging on Water Island including dumpsters, household trash, and recycling containers.

2.5.7 2001 Historical Photo Analysis

In September 2001, the U.S. Army Corps of Engineers, Engineering Research and Development Center, Topographic Engineering Center (TEC), published a report on the historical photo analysis of Water Island (TEC, 2001). While the report covered all of Water Island, it focused on Test Area 4, Test Area 5, and the Flamingo Bay Landfill Area.

2.5.8 June 2001 Revised Archives Search Report

The U.S. Army Corps of Engineers, Saint Louis District, completed revising the ASR for former Fort Segarra in June 2001. The revised ASR updated the 1991 ASR by Ebasco to include information made available in the last decade (USACE, 2002).

2.6 PREVIOUS RISK ASSESSMENT FOR FORT SEGARRA

2.6.1 The Risk Assessment Procedure for Ordnance and Explosives (OE) Sites was completed in July 1991 by the Jacksonville District of the U.S. Army Corps of Engineers. This procedure resulted in a risk assessment code (RAC) assigned to Water Island. The purpose of assigning a RAC is to allow prioritizing of risks and their associated corrective actions. The RAC scores can be summarized as follows:

- RAC 1 - Imminent Hazard
- RAC 2 - High Priority Hazard
- RAC 3 - Moderate Hazard
- RAC 4 - Minor Hazard
- RAC 5 - Negligible Hazard

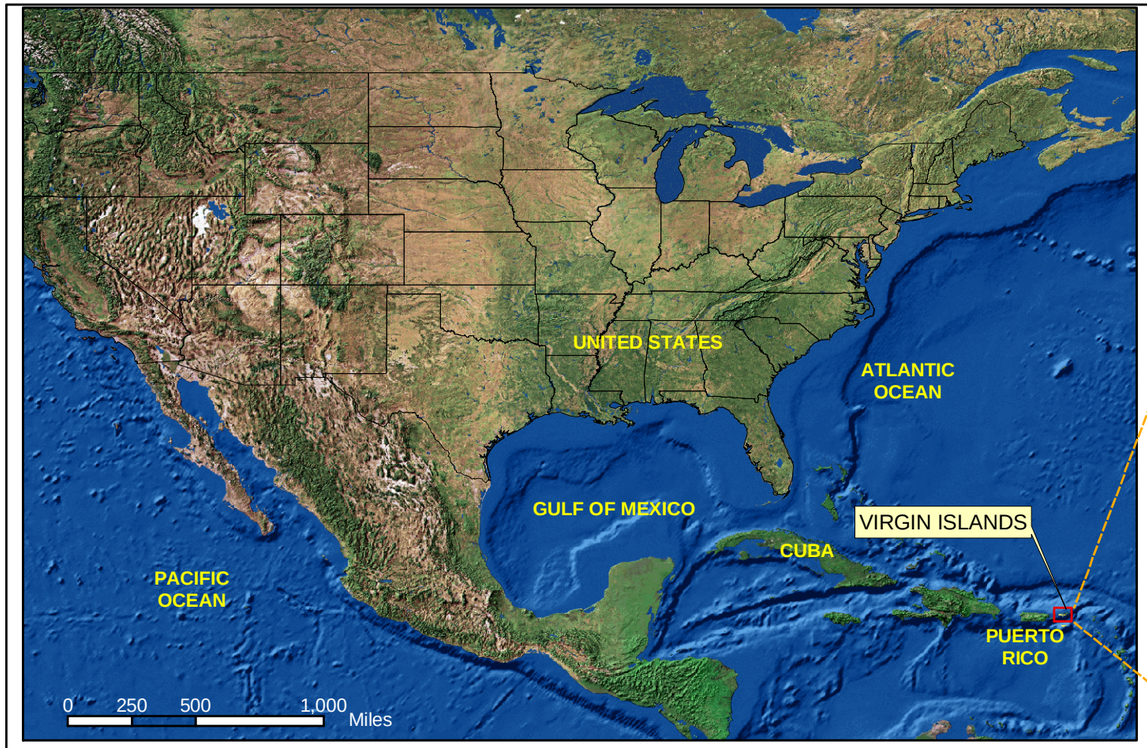
2.6.2 The RAC is derived from scores in two categories, hazard severity and hazard probability. Hazard severity categories include the type and size of ordnance at the site. Hazard probability categories include location of ordnance, distance to inhabited locations, numbers and types of buildings in the area, and accessibility to the site.

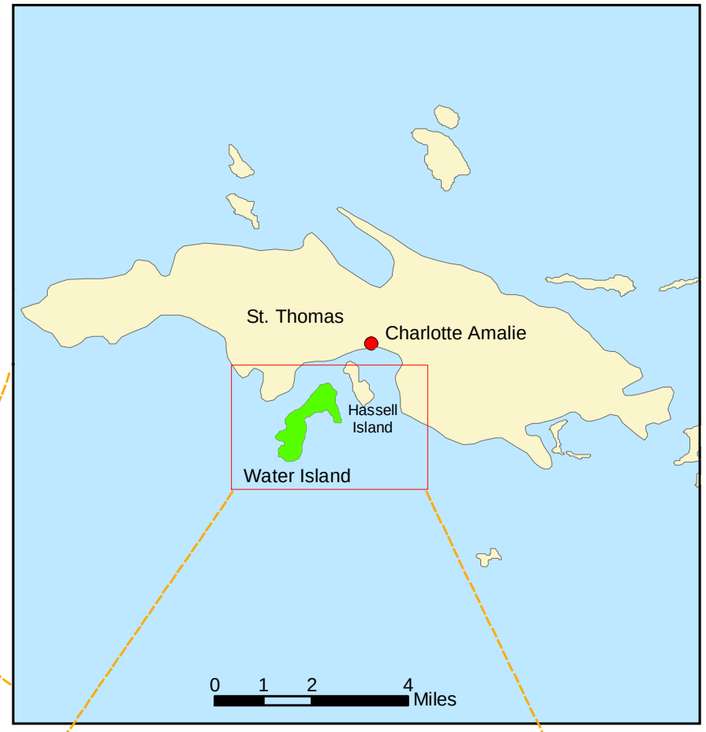
2.6.3 The risk assessment conducted as part of the ASR in July 1991 assigned a RAC 1 to Water Island. The imminent hazard severity was determined based on historical records/documents, personnel interviews, a site visit, and a report and eyewitness account of a 1966 incident in which some number of bombs were unearthed on the south shore of Flamingo Bay.

Figure 2.1

Location of Former Fort Segarra

Water Island, U.S. Virgin Islands





N

Image Source: ESRI World Shaded Relief Map, Published 2002, and USGS Topographic Map.

Legend

Test Area Boundaries (MTA, 1994)

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER
DESIGNED BY: BT	Location of Former Fort Segarra Water Island, U.S. Virgin Islands
DRAWN BY: BT	
CHECKED BY: JM	SCALE: As Shown — PROJECT NUMBER: 742325
SUBMITTED BY: TR	DATE: January 2005 — PAGE NUMBER: 2 - 9
	FILE: x:\gis\739122\gis\maps\final\figure2_1_loc.mxd

Figure 2.2

Areas of Interest

Former Fort Segarra
Water Island, U.S. Virgin Islands

Legend

Boundary of Area of Interest

Image Source: USGS Topographic Map.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

1,000 500 0 1,000 Feet

N

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	Areas of Interest		
DRAWN BY: BT			
CHECKED BY: JM	SCALE: As Shown	PROJECT NUMBER: 732325	
SUBMITTED BY: TR	DATE: December 2003	PAGE NUMBER: 2 - 10	
	FILE: x:\gis\739122\gis\maps\draft_eeca\figure2_2_AOI.mxd		

SECTION 3
PROJECT OBJECTIVES

3.1 PROJECT TEAM

Several organizations had significant responsibilities during the field investigation and development of the EE/CA report. This project team was primarily composed of the following organizations:

- U.S. Army Corps of Engineers (USACE), Jacksonville District (CESAJ);
- U.S. Army Engineering and Support Center, Huntsville (USAESCH);
- U.S. Department of the Interior (DOI);
- U.S. Army Edgewood Chemical Biological Center (ECBC); and
- Parsons (and subcontractors).

3.1.1 U.S. Army Engineer District, Jacksonville, Florida (CESAJ)

CESAJ was the District Project Manager for this project. The goal of CESAJ's involvement in this EE/CA was to satisfy the terms of DERP/FUDS. This included the review of project plans and documents, coordination with State and local regulatory agencies on issues pertaining to implementation of this study, and protection of ecological and cultural resources. CESAJ is also responsible for conducting the public affairs program and maintaining the administrative record.

3.1.2 U.S. Army Engineering and Support Center, Huntsville (USAESCH)

USAESCH was the implementing agency for execution of this project. USAESCH provided technical expertise for the EE/CA investigation. USAESCH goals included procurement of an EE/CA contractor through the services contract, direction of the EE/CA contractor, field safety oversight, and coordination of document reviews and approvals.

3.1.3 U. S. Department of the Interior (DOI)

DOI currently owns portions of Water Island, including former Test Area 4, Test Area 5, Test Area 8, and the Flamingo Bay Landfill Area. In addition to allowing use of the firehouse on Water Island for project material storage, DOI coordinated access to the AOCs.

3.1.4 Edgewood Chemical Biological Center (ECBC)

During all intrusive operations, ECBC conducted air monitoring for chemical warfare agents in the exclusion zone. ECBC provided both onsite and offsite analysis for chemical warfare agents and degradation products on soil samples collected from the AOIs. All samples that left the site were screened by ECBC to ensure that any chemical warfare agents detected were below airborne exposure limits (AELs) before leaving the site.

3.1.5 Parsons

As the prime contractor, Parsons was responsible for executing all aspects of the EE/CA investigation outlined in the Scope of Work. Parsons conducted the EE/CA investigation in accordance with the applicable Data Item Descriptions (DIDs).

3.1.6 Subcontractors

3.6.1.1 Parsons procured the services of USA Environmental to provide the investigation team with qualified unexploded ordnance (UXO) technicians to conduct all downrange activity in conjunction with Parsons personnel. Additionally, USA Environmental provided the senior UXO supervisor (SUXOS) for the EE/CA field investigation.

3.6.1.2 Severn Trent Laboratories was contracted to perform HTW and explosives analysis on soil samples collected during this EE/CA field investigation.

3.1.7 Federal and Territorial Agencies

The U.S. Environmental Protection Agency (USEPA) Region II and the Virgin Island Territorial Environmental Management Agency (VITEMA) are the Federal and Territorial agencies involved in the former Fort Segarra project. The roles of these agencies include review of project plans and documents.

3.2 REGULATORY / OTHER STAKEHOLDER CONCERNS

No regulatory concerns or other stakeholder concerns have been identified that would influence the selection of a response action at any of the AOIs addressed by this EE/CA. All response actions will be conducted in accordance with applicable or relevant and appropriate requirements (ARARs).

3.3 CONSTRAINTS

3.3.1 Logistics

Logistics is the major constraint on the performance of potential response actions. Due to the fact that Water Island is accessible only by boat or helicopter, the transportation of project materials and personnel would be difficult. All materials used during a response action would have to be transported to Water Island via barge or the public ferry. A high degree of logistical planning would be necessary to ensure that there

will be no lost work time due to lack of equipment or equipment malfunction during the implementation of the selected response action.

3.3.2 Exclusion Zone

Due to the proximity of the AOIs to public areas and roads, the exclusion zone required to conduct intrusive operations would have to be continually monitored to ensure that individuals do not inadvertently enter the exclusion zone while intrusive investigation is under way. During any recommended intrusive investigation, activity of unauthorized persons entering the exclusion zone will have to be closely monitored. Several roads may fall within exclusion zones and would have to be monitored by a road guard who would suspend intrusive activities while cars drove within the exclusion zone. This may require additional personnel.

3.3.3 Shipment of Foreign Soils

3.3.3.1 Several factors must be considered if soil samples are to be collected and analyzed by an off-site laboratory. Laboratories in the continental U.S. must be permitted by the U.S. Department of Agriculture (USDA) to receive imported soil, which includes soil samples collected from the USVI. USDA requirements for the shipping of soil in sealed containers must be followed to assure the timely delivery of samples to the recipient laboratory. USDA also has the right to inspect all shipments, which may lead to delays in delivery and could compromise the integrity of the sample chain of custody. Potential delays due to shipping and inspection problems may be alleviated by securing the cooperation of the local USDA office on St. Thomas Island and having the packages inspected and sealed by USDA prior to sending off-island.

3.3.3.2 Shipments from the USVI are treated as international shipments. In addition to USDA inspections, shipments are subject to holding and searching by the U.S. Customs Service. This may lead to delays in delivery and could compromise the integrity of the sample chain of custody. In addition, not all common carriers will accept international shipments of soil, and most carriers will not guarantee overnight deliveries from the USVI to the continental U.S. Therefore, samples must contain sufficient volumes of ice to allow for two-day deliveries, and extra sample volumes should be collected and held onsite in the event a shipment is significantly delayed, lost, or destroyed.

3.4 IDENTIFICATION OF RESPONSE ACTION ALTERNATIVES

3.4.1 Introduction

3.4.1.1 The response action alternatives identified below have been selected based on a review of historical data, the results of field investigations, and available CWM detection and disposal technology. Although no evidence of CWM contamination was identified during the EE/CA investigation at the former Fort Segarra, the CWM removal response alternative was considered applicable for removing chemical agent contaminated media in the form of 3X scrap. Three alternatives were developed for potential CWM response actions within sites at former Fort Segarra:

- No DoD Action Indicated (NDAI);
- Institutional Controls (IC); and
- Removal Action

3.4.1.2 Section 121(c) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and Section 300.430 (f) (4) (ii) of the NCP, requires that periodic (no less often than every five years) reviews be conducted for sites where hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure following completion of all removal or response actions.

3.4.1.3 The three response action alternatives listed above were considered for the former Fort Segarra and were also evaluated independently for each of the AOIs investigated in this EE/CA. This approach ensures that a tailored response action alternative suitable for each AOI is developed based on the anticipated future land use and results of the CWM investigation.

3.4.2 Alternative 1: No DoD Action Indicated

Alternative 1 is for the government to take no action in regards to locating, removing, and disposing of potential CWM present within a specific AOI at the former Fort Segarra. In addition, no public awareness or education training would be initiated. If the potential exposure and hazards associated with the site are compatible with current and future development in the area, as well as the CWM response action objectives, then NDAI may be warranted. It is important to note that the government will respond to any future CWM discovery on former Fort Segarra property regardless of whether the affected parcel was designated for NDAI. The NDAI alternative is a potential candidate alternative for each of the CWM sites within former Fort Segarra.

3.4.3 Alternative 2: Institutional Controls

3.4.3.1.1 Implementation of an Institutional Controls response alternative would provide a means for the DoD and their representatives to coordinate with current and future landowners on education, notification, and land use restrictions of potentially affected properties. Successful implementation of Institutional Controls may be contingent on the cooperation and active participation of the existing powers and authorities of other government agencies. The Institutional Controls response alternative relies on access control strategies to reduce or eliminate potential risk.

3.4.3.1.2 Risks related to potential CWM may be managed through land use restrictions, access control, public awareness programs, or a combination of strategies. It is important to understand that the risk associated with CWM contamination is associated with three primary elements and if one of these elements is not present then there is no risk of exposure. These three elements are: source, receptor, and source-receptor interaction. If there is no CWM within the site, then there is no possibility of a CWM-related exposure. An exposure requires all three events or circumstances to be present.

No exposure will occur if any one element is missing. Each element provides the basis for a separate implementation strategy.

3.4.4 Alternative 3: Removal Action

Removal actions generally have limited objectives and typically are short-term actions to mitigate the threats posed by a release or threatened release of hazardous substances including chemical agent. Removal actions typically include such measures as

- Installing fences, warning signs, or animals to prevent access to the release;
- Installing drainage controls to prevent erosion and exposure of hazardous substances;
- Capping contaminated soils or sludges to reduce migration of hazardous substances;
- Excavation, consolidation or removal of highly contaminated soils to reduce the spread or contact with these hazards;
- Removal of munitions and explosives of concern (MEC), drums, tanks, and other containers that contain or may contain hazardous substances to reduce the likelihood of spillage, leakages or exposure to humans and the environment; or
- Any other similar short-term actions.

3.5 PROJECT OBJECTIVE

The objective of this EE/CA is to recommend and justify the appropriate OE/CWM response alternative for each of the four sites investigated at the former Fort Segarra. This objective was accomplished by characterizing CWM or chemical agent contaminated media, analyzing risk management alternatives, and recommending feasible risk reduction alternatives. An additional objective was to provide HTW analytical data to the DOI for incorporation into a DOI Site Inspection (SI) Report. Each task of this project was included in the Scope of Work, which is provided as Appendix A to this document.

3.6 IDENTIFICATION OF DATA QUALITY OBJECTIVES

3.6.1 Introduction

The Data Quality Objectives (DQOs) for evaluating CWM risk at former Fort Segarra were based on sampling distribution, investigation methodology, and types of CWM historically present. Some of the DQOs are, by necessity, qualitative and were based on professional judgment; whereas, others are quantitative and were based on actual data. It should be noted that some DQOs are related to efficiencies but do not

necessarily impact the risk evaluation. The DQOs serve as standards against which project objectives are measured.

3.6.2 Site-Wide DQOs

3.6.2.1 **Representative Coverage** – The intent of the intrusive effort was to thoroughly evaluate the potential presence of CWM or chemical agent contaminated media. Since the historical CWM activities at former Fort Segarra are known to have been limited to specific areas, the investigation focused on the most likely locations of CWM or chemical agent contaminated media based on the historical data.

3.6.2.2 **Detection of CWM** – The process for identifying CWM included visual examination of buried metallic scrap, air monitoring for chemical warfare agent, and collection of soil samples that were analyzed for chemical agents (and associated degradation products) that have been documented as being used at former Fort Segarra. The results of the CWM air monitoring and analysis at the former Fort Segarra are presented in Appendix B to this document

3.6.2.3 **Detection of HTW** – The presence of HTW was evaluated based on the analytical results of soil samples taken from shallow soil borings and from test pits and trenches. The suite of analyses was determined by the DOI for these sites. Background samples were taken at each site to help evaluate the analytical results. The specific analyses, procedures, and quality control for the HTW sampling are included in the Site Specific SAP for former Fort Segarra (Parsons, 2003a). The results of the HTW analysis at former Fort Segarra are presented in Appendix C to this document.

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SECTION 4
SITE CHARACTERIZATION

4.1 HISTORICAL RECORDS ANALYSIS

4.1.1 Test Area 4

4.1.1.1 Test Area 4 was used during three of the tests conducted on Water Island including:

- Phases 1 and 2 of the static test of distilled mustard (HD) filled M70 chemical bombs (Test Number 136);
- Phases 1 through 5 of the static test of HD-filled E23 smoke pots (Test Number 176); and
- Static test of nerve agent, tabun (GA), filled E23 smoke pots (Test Number 166).

Test Area 4 may have also been the site used for testing of sesquimustard (HQ) filled E23 smoke pots (Test Number 179). At the end of the Tropical Test Program on Water Island, Test Area 4 was also reportedly used for the destruction of excess burster charges used for the M70 tests, and was reportedly the site of a demonstration on Army Day in 1949 in which non-agent 4.2-inch mortars (assumed smoke-filled) were fired as a public demonstration.

4.1.1.2 Static test of M70 bomb, HD-filled (Test Number 136). This test was performed in eight phases between November 23, 1948, and February 23, 1949. Phases 1 and 2 were to be conducted in an open area with offshore winds (Test Area 4). Phases 3 and 4 were conducted in a wooded area with offshore winds (Test Area 5). Phases 5 and 6 were conducted in a wooded area with onshore winds (Test Area 8), and Phases 7 and 8 were conducted in an open area with onshore winds (Test Area 6). The purpose of the test was to establish meteorological and terrain factors on Water Island so results could be used as a basis for comparison with tests conducted at other sites. Test Area 4 was used as an "open area with offshore winds." In all phases, a single M70 bomb filled with 55 to 57 pounds of HD dyed with Dupont red or yellow oil was placed vertically and fired statically. In Phase 1, conducted on November 23, 1948, the bomb was placed tail down. In Phase 2, conducted on December 2, 1948, the bomb was placed nose down. The M70 bomb is a 115-pound chemical bomb, 51.5 inches long and 8 inches in diameter, with an 11-inch fin span. The M70 bombs were designed to be dropped from aircraft and were normally detonated by a nose fuze and central burster.

4.1.1.3 Static test of E23 smoke pot, HD-filled. This test was performed at Test Area 4 in four phases on July 27, August 2, August 5, and August 10, 1949. The purpose of this test was to determine the dosage field, rate of dosage achievement, total dosage, decomposition loss, and overall efficiency for a single E23 smoke pot filled with HD and fired statically in an open area. A fifth phase was conducted at Test Area 4 on August 15, 1949, to determine the effectiveness of multiple burning. The smoke pots contained 18.6 pounds of HD dyed with Dupont red oil. The same area was used for all phases. Phases 1 through 4 were each conducted using a single E23 smoke pot, fired statically. Phase 5 was conducted using nine smoke pots, fired simultaneously. The smoke pots burned for between 7 and 12.5 minutes, sometimes erratically. The test report states that "on several occasions a considerable portion of the chemical warfare agent was left in the pot and it was not uncommon for the smoke pot to swell noticeably from heat of burning". Overall efficiency ranged from 2.7% to 60%." The E23 smoke pots are 5-gallon steel containers, 13 inches high and 12 1/16 inches in diameter. Photographs of the smoke pot tests indicate that they were conducted on the peninsula that was previously part of Test Area 4 (U.S. Army Chemical Materiel Destruction Agency, 1993).

4.1.1.4 Static test of E23 smoke pot, GA-filled. A final report for this test was not available for review and may not have been completed. The test included four phases and was conducted between September 1, 1949, and November 9, 1949. Reportedly, the test was conducted in an open area of Test Area 4 and involved the electrical firing of a GA-filled smoke pot (U.S. Army Chemical Materiel Destruction Agency, 1993).

4.1.1.5 Static test of E23 smoke pot, HQ-filled. Phase 1 and 2 of this test were performed on February 15 and 17, 1950. This test is described in a progress report for the month of March 1950 as "ongoing." Records do not indicate the location of the test but it is likely that it was performed in Test Area 4 consistent with the other smoke pot tests. Additional smoke pots containing HQ may have been prepared for additional phases of this test (U.S. Army Chemical Materiel Destruction Agency, 1993).

4.1.1.6 Testing activities are interpreted to have been all performed in the northern portion of Test Area 4. Photographs included in the 1993 Scoping Study appear to illustrate that the tests were conducted on the peninsula formerly in the northern part of Test Area 4. Disposition of the smoke pots is not accounted for in disposition records prepared at the end of the Tropical Test Program.

4.1.1.7 Historical maps and aerial photos indicate that the northern portion of Test Area 4 originally included a peninsula east of the currently remaining portion. Photographs of testing conducted in Test Area 4 indicate that the testing was conducted on this peninsula. Part of this peninsula was dredged in the early to mid 1960s to open up a pond that previously existed on the eastern side of the peninsula and then construct a marina with access to Flamingo Bay. Based on comparison of a 1963 topographic map with post-1966 aerial photographs and site maps, it appears that during construction of the marina, the tip of the former peninsula was incorporated into the current peninsula existing on the northern side of Flamingo Bay. There is no documentation of any

remnants of testing being recovered during the construction activities. Additionally, the northern part of Test Area 4 suffered substantial erosion during Hurricane Hugo and Hurricane Marilyn.

4.1.1.8 Starting in the early 1990's, the southern portion of Test Area 4 has been used as an open dump and contains household trash, abandoned automobiles, construction debris, appliances, a tanker trailer, paint cans, car batteries, gas cans, and solvent containers.

4.1.2 Test Area 5

4.1.2.1 Test Area 5 was used for Phases 3 and 4 of the static test of HD-filled M70 bombs (Test Number 136). Test Area 5 was used as a "wooded area with offshore winds." The tests were conducted on December 9 and 21, 1948, with the bombs placed nose down.

4.1.2.2 Previous studies state that a "burn pit" was excavated and used by the former master lessee to dispose of debris generated by Hurricane Hugo in 1989. The Environmental Assessment notes that water was present in the pit in early 1994. No signs of contamination (i.e., stressed vegetation, barren spots, or stains) were present.

4.1.2.3 This test area was the location of the Water Island Solid Waste Transfer Site, administered by the Virgin Islands Department of Public Works. As such, several dumpsters were staged there for collection of household garbage and bulk garbage as well as several piles of loose trash and debris. The sign at the site states that the bins are transported weekly to Bovoni Landfill, located on eastern St. Thomas Island. The site was also used for disposal of debris generated from several hurricanes and the demolition of the hotel. The hotel debris includes a substantial amount of concrete rubble and other various types of debris.

4.1.3 Test Area 8

4.1.3.1 Test Area 8 was near the location where Water Isle Hotel would be built. The 1954 aerial photography indicates there were military buildings within this test area at that time. According to existing records, Phases 5 and 6 of the static, HD-filled, M70 bomb test (Test Number 136) were conducted in a wooded area with offshore winds within this test area (USACE, 2002). Test Area 8 has been significantly disturbed since the deactivation of the San Juan Project. The former bar and dinning facility for the Water Isle Hotel and some other support structures were built in this area. Following being damaged by hurricanes, the hotel has been completely demolished.

4.1.3.2 According to the ASR, a toxic storage yard was located in the vicinity of Test Area 8. T-3 H/HD-filled bombs and aged CK-filled, M70, M78 and M79 bombs involved in the surveillance tests were stored outside in this area; all other items were stored inside buildings (USACE, 2002). Agent transfer operations to support the tests were reportedly conducted in this area.

4.1.4 Flamingo Bay Landfill Area

4.1.4.1 Available information indicates that no CWM testing was conducted in the Flamingo Bay Landfill Area. However, the adjacent deepwater dock was used to deliver equipment and munitions during the Tropical Test Program and at least two suspect chemical bombs (identified as M70 and M78 bombs) were uncovered in this area in 1966 (U.S. Army Chemical Materiel Destruction Agency, 1993).

4.1.4.2 In addition to the static testing of the M70 chemical bomb described earlier, the M70 (115-pound), M78 (500-pound), and M79 (1,000-pound) chemical bombs were used for Test Number 135, which consisted of the surveillance of unstabilized CK in those bombs. The idea of the test was to determine stability of CK bombs stored in a tropical environment. The actual sampling work for this test began in December 1948 and continued with periodic sampling of the agent in the bombs until January 1950. Thirty-three M78 500-pound chemical bombs were originally involved in the test. Four of the bombs could not be sampled because the valves were clogged. Tapping the bombs revealed that they were largely solid. One bomb was vented, sampled, and found to be 12.9-percent non-soluble residue and was destroyed. No information was provided on where or how the bomb was destroyed. The other three bombs were not sampled in follow-up tests. Because these bombs were used for surveillance tests, it is unlikely that they were explosively configured. The surveillance testing was conducted in the Toxic Storage Yard; however, M70 and M78 bombs found in the Flamingo Bay Landfill Area may have been used in that test (U.S. Army Chemical Materiel Destruction Agency, 1993).

4.1.4.3 An approximately 10-foot deep saltwater pond existed in the area in the 1950s. Compacted vehicles and trash were placed in the salt pond in a single layer and covered with dirt. Subsequent layers of trash and dirt cover were disposed of in this area until the pond was filled.

4.1.4.4 In 1966, the Water Isle Colony Club used a backhoe and dragline to excavate a “swampy area” for burying cans and bottles. During this operation, two bombs were uncovered. At the time the bombs were uncovered, the dragline was operating approximately 20 feet below ground surface. The Explosive Ordnance Disposal (EOD) team from Roosevelt Roads Naval Air Station was summoned to remove the bombs. According to the 1993 Scoping Study, the EOD report noted that “several” bombs had been unearthed and that all but one had been vented. The unvented bomb was detonated without noticeable release of any chemicals. EOD identified the bombs as suspect M70 and M78 chemical bombs. Following removal of the bombs, the Water Isle Colony Club buried the cans and bottles and covered the area with approximately three feet of borrowed soil (U.S. Army Chemical Materiel Destruction Agency, 1993).

4.1.4.5 A 500-pound M78 chemical bomb filled with concrete was found on the shore west of the deep-water dock during the 1991 ASR site visit. The bomb reportedly had a shipping plug in the nose and a vacant tail fuse well. A 12- by 18-inch hole was apparent in one side of the bomb. This concrete bomb was likely used as an anchor and washed up onshore during a hurricane. Approximately 10 feet inland a smaller rusted

metal object was found that was suspected to be a 2-½ inch or 3-inch Stokes mortar, but the identification was not confirmed.

4.1.4.6 A fence was installed around the landfill area in September 1991 by Ebasco Services, Inc. for USAESCH. During installation of the fence, several postholes on the northern face were terminated approximately three feet below ground surface due to encountering gray ash and a black oily substance. One fence hole on the southwestern face of the fence was terminated approximately 2.5 feet below the surface due to encountering an unknown, orange waxy substance. The precise locations of these fence holes are not known.

4.1.4.7 A metal warehouse to support the hotel was constructed, north of the landfill for storage of vehicles and materials. A small sewage treatment facility was also located on the site. The area was also used for the fabrication and repair of fiberglass boats (MTA, 1994). The warehouse was heavily damaged during hurricanes and has since been demolished (DOI, 1996).

4.2 PERSONAL INTERVIEWS CONDUCTED

4.2.1 Test Area 4

An interview was conducted in February 1993 with Mr. Jamie Mains a former Toxic Gas Handler who worked full time for the military on Water Island during the testing. Mr. Mains recalled that a test was conducted in an open area of Test Area 4 and that the test involved the electrical firing of a GA-filled smoke pot. Mr. Mains also stated that he detonated hundreds of burster charges in the area between the road and the current marina (U.S. Army Chemical Materiel Destruction Agency, 1993).

4.2.2 Test Area 5

No information regarding Test Area 5 was obtained from the interviews conducted.

4.2.3 Test Area 8

An interview was conducted in February 1993 with Mr. Jamie Mains a former Toxic Gas Handler who worked full time for the military on Water Island during the testing. Mr. Mains reported that all chemical items were stored on Water Island near the road where the Water Island Hotel was located. Bombs involved in surveillance were stored outside. All other items were stored inside buildings. Mr. Mains' office was located in close proximity to the toxic storage yard. Test animals were also stored in this area. Items stored in the yard were carefully maintained since the workers were in close proximity to this area. Valves were checked frequently and changed as required. Transfer operations also occurred in this area.

4.2.4 Flamingo Bay Landfill Area

A long-time Water Island resident, Mr. Walter Phillips, was interviewed during the 1993 site visit. Mr. Phillips originally arrived on Water Island in 1951 and stated that at that time there were a few empty poison gas shells at the Flamingo Bay Warehouse Area.

Mr. Phillips did not know what happened to the shells, but the 1993 Scoping Study stated that the Navy was called and took them away. Mr. Phillips believes that the fence was installed in the wrong area and that if any items remain they would be found closer to shore.

4.3 AERIAL PHOTOGRAPHIC ANALYSIS

In September 2001, the TEC published a report on the historical aerial photographic analysis of Water Island (TEC, 2001). While the report covered all of Water Island, it focused on Test Area 4, Test Area 5, and the Flamingo Bay Landfill Area. A total of 13 aerial photos and six digital orthophotos spanning from 1945 through 1999 were used for the analysis. The TEC analysis objective was to identify the potential areas of concern. The TEC identified features from the aerial photography such as ground scars, cleared areas, or areas more clearly defined such as gun emplacements. Supplemental data such as ground photographs and historical documents were also incorporated into the analysis.

4.4 PREVIOUS INVESTIGATIONS

Previous investigations have been limited to record searches, interviews, surface assessments and generally non-intrusive activities. A summary of these investigations is provided below.

4.4.1 1966 Ordnance Discovery at Flamingo Bay Landfill Area

4.4.1.1 In 1966, a Naval Ordnance Disposal Detachment at Roosevelt Roads, Puerto Rico, responded to an unearthing of metal objects that appeared to be bombs. The Navy report noted "several" bombs had been unearthed during a dredging operation at the Flamingo Bay Landfill Area, that they believed them to be "Army M70 and M78 (Chemical Bombs)", that all but one had been vented, and that they blew the unvented bomb without noticeable release of any chemical (USACE, 2002).

4.4.1.2 Eyewitnesses described two bombs as 18 to 24 inches in diameter, both the same size, except that one had fins making it 8 to 12 inches longer. The bomb with fins was about five feet long. The eyewitness accounts did not say that the Navy had blown the items in place, but instead that they had taken the bombs with them and advised that no more excavation be performed at the site (USACE, 2002).

4.4.2 1991 Archives Search Report and Site Visit

In 1991, the USAESCH contracted Ebasco Services, Inc., to conduct an archives search and site visit of the former Fort Segarra (Ebasco, 1991). The final report, outlined the site history, site description, real estate ownership information, results of a visual site inspection and interviews, and evaluation of potential ordnance contamination based on site information and archives search. The sites addressed by the ASR included all of those being addressed by this EE/CA.

4.4.3 1993 Former Fort Segarra Scoping Study

The U.S. Army Chemical Materiel Destruction Agency conducted a scoping study on the former Fort Segarra and submitted the document on December 10, 1993. This study summarized the background information, recorded disposition of CWM, and identified potential strategies for remediating potentially buried CWM. The report also identified regulatory and technical issues associated with efforts to clean up potentially buried CWM at the former Fort Segarra in the U.S. Virgin Islands (U.S. Army Chemical Materiel Destruction Agency, 1993).

4.4.4 1993 MTA Site Characterization

4.4.4.1 In March 1993, MTA was awarded a contract to perform non-intrusive site characterization and debris removal operations at former Fort Segarra. All field operations were completed by June 9, 1994 (MTA, 1994).

4.4.4.2 MTA conducted a surface investigation of Test Areas 4, 5, 6, 8, Tamarind Bay, and the Flamingo Bay Landfill Area. Tamarind Bay is a separate area not directly related to CWM training and is located south of Test Area 1. Tamarind Bay was deemed suspect after stressed vegetation was observed in the area during an archeological investigation. Test Areas 2, 3, and 7 were not investigated because interviewees indicated that no CWM testing was conducted at the northern end of Water Island. The MTA investigation of all sites included surface inspection, magnetometer sweeps, and select surface soil sampling.

4.4.4.3 The results of the investigation concluded that there were no suspect anomalies or surface debris at Tamarind Bay, Test Area 6, Test Area 8, the portion of Test Area 4 north of the road, or the portions of the Flamingo Bay Landfill Area outside the fence. The remainder of Test Area 4, Test Area 5, and the fenced Flamingo Bay Landfill Area were further characterized by completing 100% magnetometer surveys, selecting areas or anomalies for investigation, and collecting surface soil samples. Chemical warfare agent or ABP's were not detected during field screening or laboratory analysis of any of the surface soil samples collected at former Fort Segarra.

4.4.4.4 MTA submitted recommendations for intrusive investigation for consideration by the Anomaly Review Board (ARB) in September 1994. MTA recommended specific anomalies and representative "hot" areas in Test Area 5 for intrusive investigation, as well as 10% of the 20-foot by 20-foot grid squares dividing the southern portion of Test Area 4 and the fenced portion of the Flamingo Bay Landfill Area. MTA also recommended sampling of the circular depression in Test Area 4 and the suspected trench area in the Flamingo Bay Landfill Area. The ARB approved MTA's recommendations in January 1995.

4.4.5 1995 Environmental Assessment

In 1995, the U.S. Department of the Interior, Bureau of Reclamation conducted an EA of Water Island for the Office of Territorial and International Affairs to fulfill a requirement for the Water Island title transfer to one or more entities. The final version

included a finding of no significant impacts (FONSI), and concluded that an environmental impact statement was not required to implement the title transfer of Water Island from the Department of the Interior to former sub-lessees and the Virgin Islands Government (DOI, 1996).

4.4.6 July 2000 Site Visit

In July 2000, Parsons conducted a Site Visit to Water Island to assess sites presented in the ASR (Ebasco, 1991). The Visit focused on the Flamingo Bay Landfill Area, Test Area 4, and Test Area 5. Observations made during the site visit include:

- Test Area 5 is currently the site for solid waste staging on Water Island including dumpsters, household trash, and recycling containers; and
- Test Area 4 is covered with junk cars and trucks.

4.4.7 June 2001 Revised Archives Search Report

The U.S. Army Corps of Engineers, Saint Louis District, completed revising the ASR for former Fort Segarra in June 2001. The revised ASR updated the 1991 ASR by Ebasco to include information made available in the last decade (USACE, 2002).

4.5 2003 EE/CA INVESTIGATION

4.5.1 Overview

4.5.1.1 As defined in Section 3.1, the objective of this EE/CA is to identify and evaluate appropriate response alternatives that reduce the public safety risk from CWM or chemical agent contaminated media for Test Area 4, Test Area 5, Test Area 8, and the Flamingo Bay Landfill Area. To achieve this objective, each site required sufficient characterization with regards to the presence of residual CWM or chemical agent contaminated media in the subsurface. This residual contamination was estimated based on the data collected during the field investigation and from previous investigations. The characterization goals included the characterization of the nature and extent of CWM and chemical agent contaminated media, assessing the risk posed by any CWM or chemical agent contaminated media, studying risk management alternatives and identifying the appropriate response alternative and future recurring reviews. The characterization data were used to determine if contamination existed at each site and for planning potential response alternatives. No CWM was identified at any of the areas investigated during this EE/CA investigation; however, material that is potentially chemical agent contaminated media in the form of 3X scrap was found at the Flamingo Bay Landfill Area. A description and photographs of the items identified from the excavations are in Appendix E.

4.5.1.2 As part of this investigation, sampling and analysis was conducted at the sites for selected HTW constituents. Samples were collected via soil borings and from intrusive excavations at suspect anomalies. Samples collected from each of the four AOIs were analyzed for metals, (EPA SW6010B), mercury, (EPA SW7471A), pesticides (EPA SW 8081A), PCB's (EPA SW8082), herbicides (EPA SW8151A), semivolatiles

(EPA SW8270C) and cyanide (EPA SW9012A). Samples collected from Training Area 4 were analyzed for explosives (EPA SW8330) in addition to the other analysis described above. Samples were also analyzed for ABPs, specifically, 1,4-Dithiane; 1,4-Thioxane; and Thiodiglycol (TDG). The sample analysis results are provided in Appendix C. Specific sampling procedures, analytical methods, and quality control procedures are contained in the site-specific SAP for former Fort Segarra (Parsons, 2003a).

4.5.1.3 Four sites were addressed during the 2003 EE/CA investigation: Test Area 4, Test Area 5, Test Area 8 and Flamingo Bay Landfill Area. The objectives of further site investigation at these four sites were to confirm, if possible, the location of past activities related to chemical warfare testing, and to assess whether CWM still remains and may potentially pose a risk to the public. In addition, sampling and analysis was conducted to detect the presence of selected HTW constituents on these sites. The following discussion on the scope for assessment of each of these sites takes into consideration the historical information reviewed for this EE/CA, including past studies.

4.5.2 Test Area 4

4.5.2.1 The work performed by Parsons in Test Area 4 was conducted to determine the level of risk posed by past DoD activities at the site. As described above, this area was used for CWM testing during the Tropical Test Program and previous investigations have identified suspect anomalies. Chemical warfare agents of concern in Test Area 4 included HD, HQ and GA. Suspect anomalies were thought to be possible remnants from the M70 static firing tests and E23 smoke pots. The site was thought to be the location where excess burster charges from the M70 tests were disposed of at the end of the Tropical Test Program. No CWM or chemical warfare agent contamination or related scrap was located during the investigation of Test Area 4. The CWM analytical results of the soil samples collected during this EE/CA investigation are summarized in the ECBC CWM Clearance Report (Appendix B). Figure 4.1 shows the Test Area 4 sample locations. Figure 4.5 shows the locations of the residential samples collected.

4.5.2.2 The Determination of the Applicability of Interim Guidance prepared by USAESCH determined that a “low probability” of CWM contamination exists for Test Area 4; therefore, the Interim Guidance for CWM Response Activities did not apply to Test Area 4. Given this finding, the intrusive investigation of this site was performed under the EE/CA Work Plan with a contingency for encountering CWM.

4.5.2.3 Parsons conducted an intrusive investigation at Test Area 4 consisting of test pits, trenches, and soil borings. The locations of these investigation areas were biased to concentrate on ground scarring seen in historical aerial photographs on documented historical use areas. Soil samples were collected from these locations and analyzed for selected chemical warfare agents, ABP, and selected HTW constituents. The site-specific SAP for the former Fort Segarra detailed the sampling procedures, depths, analytical methods, and quality control procedures used during the collection of analytical samples (Parsons 2003a).

4.5.2.4 Excavations at the test pits were investigated using both manual and mechanical excavation procedures. If the proposed excavation locations were determined to be either one large anomaly or multiple smaller anomalies, they were investigated by trenching across the anomalous areas. Trench lines were limited to a length of ten feet, the width of the excavator bucket (approximately three feet) and to the depth at which saturated soil, native soil, or bedrock was reached.

4.5.2.5 During the intrusive investigation at Test Area 4, 28 samples were collected from 17 test pits and two soil borings. Three of these samples were collected from two soil borings at two sample locations, located within ground scars identified in a 1954 aerial photograph, located north of the gravel road. Three samples were collected from test pits north of the gravel road. South of the road, twenty samples were collected from test pits at twelve locations within the boundary of a cleared area identified on a 1954 aerial photograph. A proposed trench line was not able to be completed across the circular depression identified by MTA in 1994 due to the presence of ACM on the ground surface at the sample site. The one test pit for background sampling, collected south of the road, was placed at the southern end of the site. The test pit for the second background sample was placed at the western edge of the site just north of the road. Air monitoring of the work area and the headspace of soil samples was conducted using the Miniature Chemical Agent Monitoring System (MINICAMS) and the Depot Area Air Monitoring System (DAAMS) air sample pumps.

4.5.2.6 Soil samples were collected from all excavations and borings. These samples were analyzed for chemical warfare agent, ABP, and HTW constituents. No signs of contamination were evident in any of the soils; therefore, at least one soil sample was collected from the lower extent of the excavation (or above water table) and analyzed for chemical warfare agent, ABP, and HTW constituents. Table 4.1 summarizes the activities that were completed at Test Area 4.

Table 4.1
Test Area 4 Investigation Summary

Activity	Components	Method	Analysis
Intrusive Excavation	Intrusively investigated 17 test pits, two soil borings and 2 residential background samples, collected via test pits.	Mechanical or hand excavation	Air monitoring by MINICAMS for HD, GA, CG, and CK. DAAMS air sample monitoring for HD, GA, CG, and CK.
Soil Sampling	28 samples from intrusive excavations (including 2 residential background samples).	Composite Samples	Headspace analysis for chemical warfare agents (HD, GA). Soil analysis for low-level chemical warfare agents (HD, GA), ABP and HTW.

4.5.2.7 Prior to reacquiring and marking the locations selected for investigation, each area was cleared of surface metallic debris and vegetation necessary to perform this effort.

4.5.3 Test Area 5

4.5.3.1 The investigation in Test Area 5 was designed to determine if there is a risk posed by past DoD activities at the site. This area was used for CWM testing during the Tropical Test Program and previous investigations have identified anomalies that the ARB concluded could be indicative of potential CWM or chemical agent contaminated media. This area has also been used over the years as an open dumpsite and was previously the Water Island Solid Waste Transfer Site. Chemical warfare agents of concern at Test Area 5 included only HD. Suspect anomalies included possible remnants from the M70 static firing tests and E23 smoke pots. No CWM, chemical agent contaminated media, or 3X scrap was located during the investigation of Test Area 5. The CWM analytical results of the soil samples collected during this EE/CA investigation are summarized in the ECBC CWM Clearance Report. The ECBC CWM Clearance Report is included as Appendix B of this document. Figure 4.2 shows the Test Area 5 sample locations. Figure 4.5 shows the locations of the residential samples collected.

4.5.3.2 The Determination of the Applicability of Interim Guidance prepared by USAESCH determined that a "low probability" of CWM contamination exists for Test Area 5; therefore, the Interim Guidance for CWM Response Activities did not apply to Test Area 5. Given this finding, the intrusive investigation of this site was performed under an EE/CA Work Plan with a contingency for encountering CWM (Parsons, 2003b).

4.5.3.3 Parsons conducted an intrusive investigation at Test Area 5 consisting of test pits, trenches, and soil borings. The proposed locations of these investigation areas were biased to concentrate on ground scarring seen in historical aerial photographs, documented historical use areas, and MTA findings. Soil samples were collected from these locations and analyzed for chemical warfare agents, ABP, and selected HTW constituents. The site-specific SAP for former Fort Segarra detailed the sampling procedures, depths, analytical methods, and quality control procedures used during the collection of HTW samples.

4.5.3.4 Excavations at the test pits were investigated using both manual and mechanical excavation procedures. If these locations were determined to be either one large anomaly or multiple smaller anomalies, they were investigated by trenching across the anomalous areas. Trench lines were limited to the width of the excavator bucket (approximately three feet) and extended to saturated soil, native soil or bedrock.

4.5.3.5 Parsons excavated four test pits within Test Area 5, one of which was a background sample collected on the northern part of the site. In addition, five trenches were excavated across the area depicted on the 1954 photograph ground scar. Approximately 100 feet of trenches were completed within the boundary of the ground scar. Seven trenches were completed in suspect areas identified by MTA. Soil samples

were collected from all excavations. These samples were analyzed for chemical warfare agent, ABP, and HTW constituents. Although none of the soils in the excavations were deemed suspect, at least one soil sample was collected from the lower extent of the excavation (or above water table) and analyzed for chemical warfare agent, ABP, and HTW constituents.

4.5.3.6 A total of 24 samples were collected from Test Area 5 during this investigation. Seventeen samples were collected from the twelve trenches completed in Test Area 5. Five samples were collected from the three test pits in Test Area 5, including two background samples. Soil samples from two residential background soil borings were collected and analyzed for chemical warfare agents, ABP, and selected HTW constituents. These soil borings were advanced using anomaly avoidance procedures. When the sample collection team was unable to perform anomaly avoidance due to dense anomaly distribution in the area, a test pit was excavated in lieu of a soil boring and a soil sample was collected at the required depth. Table 4.2 summarizes the activities that were completed at Test Area 5.

Table 4.2
Test Area 5 Investigation Summary

Activity	Components	Method	Analysis
Intrusive Excavation	Intrusively investigated four test pits and five trenches across the 1954 ground scar, and seven trenches across anomalous areas identified by MTA. Two residential background samples were collected via soil borings.	Mechanical excavation	Air monitoring by MINICAMS for HD, GA, CG, and CK. DAAMS air sample monitoring for HD, GA, CG, and CK.
Soil Sampling	24 samples were collected within Test Area 5 from excavations and test pits (including 2 residential background samples).	Composite samples	Headspace suspect scrap for high level chemical warfare agent (HD, and GA). Suspect soils analyzed for low level chemical warfare agent (HD, GA), ABP and HTW.

4.5.4 Test Area 8

4.5.4.1 The investigation in Test Area 8 was designed to determine if there is a risk posed by past DoD activities at the site. This area was used for CWM testing during the Tropical Test Program. This area was also the location of the previously demolished Water Isle Hotel. Chemical warfare agents of concern at Test Area 8 include only HD. No CWM, chemical warfare agent contamination, or 3X scrap was located during the investigation of Test Area 8. All samples collected in Test Area 8 were collected via test pits using a backhoe. Test pits were used in place of soil borings due to the compaction of the soil which prevented efficient use of a hand auger. The sample identifications

(IDs) for samples collected in Test Area 8 were not changed from soil boring to test pit to be consistent with the Work Plan. The CWM analytical results of the soil samples collected during this EE/CA investigation are summarized in the ECBC CWM Clearance Report. The ECBC CWM Clearance Report is included as Appendix B of this document. Figure 4.3 shows the Test Area 8 sample locations.

4.5.4.2 The Determination of the Applicability of Interim Guidance prepared by USAESCH determined that a "low probability" of CWM contamination exists for Test Area 8; therefore, the Interim Guidance for Conducting CWM Response Activities did not apply to Test Area 8. Given this finding, the intrusive investigation of this site was performed under an EE/CA Work Plan with a contingency for encountering CWM.

4.5.4.3 Parsons conducted an intrusive investigation at Test Area 8 consisting of 12 test pits, two of which were background samples. The locations of these investigation areas were randomly distributed. A total of 24 soil samples were collected from these 12 locations and analyzed for chemical warfare agents, ABP, and selected HTW constituents. The site-specific SAP for former Fort Segarra detailed the sampling procedures, depths, analytical methods, and quality control procedures used during the collection of HTW samples. These test pits were advanced using anomaly avoidance procedures. Table 4.3 summarizes the activities that were completed at Test Area 8.

Table 4.3
Test Area 8 Investigation Summary

Activity	Components	Method	Analysis
Intrusive Excavation	Intrusively investigated 12 test pits.	Mechanical excavation	Air monitoring by MINICAMS for HD, GA, CG, and CK. DAAMS air sample monitoring for HD, GA, CG, and CK.
Soil Sampling	10 samples from test pits and 2 background samples	Composite samples	Headspace suspect scrap for chemical warfare agent (HD, GA). Suspect soils for chemical warfare agent (HD, GA), ABP and HTW.

4.5.5 Flamingo Bay Landfill Area

4.5.5.1 The investigation in the Flamingo Bay Landfill Area was designed to determine the level of risk posed by past DoD activities at the site. This area was not used for CWM testing during the Tropical Test Program, but suspect chemical bombs were uncovered in this area during dredging operations conducted in 1966. Two chemical agent contaminated media items were identified during the 2003 field

investigation: a vented 1-ton container was discovered on the surface of the landfill, and a concrete-filled M78 500-lb. bomb casing was identified at the water line adjacent to the Flamingo Bay Landfill Area. The CWM analytical results of the soil samples collected during this EE/CA investigation are summarized in the ECBC CWM Clearance Report. The ECBC CWM Clearance Report is included as Appendix B of this document. Figure 4.4 shows the Flamingo Bay Landfill Area sample locations. Figure 4.5 shows the locations of the residential samples collected.

4.5.5.2 The Determination of the Applicability of Interim Guidance prepared by USAESCH determined that a "low probability" of CWM contamination exists for Flamingo Bay Landfill Area; therefore, the Interim Guidance for Conducting CWM Response Activities did not apply to the Flamingo Bay Landfill Area. Given this finding, the intrusive investigation of this site was performed under an EE/CA Work Plan with a contingency for encountering CWM.

4.5.5.3 Parsons conducted an intrusive investigation at Flamingo Bay Landfill Area consisting of fifteen test pits, and five trenches. The locations of these investigation areas were biased to concentrate on the former salt pond location and the 1994 MTA findings. Soil samples were collected from these locations and analyzed for chemical warfare agents, ABP, and selected HTW constituents. The site-specific SAP for former Fort Segarra detailed the sampling procedures, depths, analytical methods, and quality control procedures used during the collection of HTW samples.

4.5.5.4 Excavations at the test pits and soil borings were investigated using mechanical excavation procedures. If these locations were determined to be either one large anomaly or multiple smaller anomalies, they were investigated by trenching across the anomalous areas. Trench lines were limited to the width of the excavator bucket (approximately 3 feet) and extended to saturated soil, native soil or bedrock. Parsons investigated the locations of five of the 21 grids proposed by MTA in 1994, and the suspected trench area identified by MTA, were investigated by Parsons. Three of the grid areas were located north of the former salt pond, one grid area was located just south of the former salt pond, and one grid area was located at the western edge of the former salt pond adjacent to the 1-ton container. Two trench lines were completed across the suspected trench area. The intent of investigating these areas was to determine the contents of the landfill in that area and the approximate depth of the material. Soil samples were collected from all excavations. These samples were analyzed for chemical warfare agent, ABP, and HTW constituents. Although none of the soils in the excavations were deemed suspect, at least one soil sample was collected from the lower extent of the excavation (or above water table) and analyzed for chemical warfare agent, ABP, and HTW constituents.

4.5.5.5 Thirty soil samples were collected within the Flamingo Bay Landfill Area. Seven soil samples were collected from the five trenches and 23 soil samples were collected from the 13 test pits, the two residential samples were collected via soil boring. These samples were collected and analyzed for chemical warfare agents, ABP, and selected HTW constituents. These trenches and test pits were advanced using anomaly

avoidance procedures. Table 4.4 summarizes the activities completed at the Flamingo Bay Landfill Area.

Table 4.4
Flamingo Bay Landfill Area Investigation Summary

Activity	Components	Method	Analysis
Intrusive Excavation	5 trenches in the grid areas identified by MTA. 13 test pit including 2 background test pits and 2 residential background soil borings.	Mechanical or hand excavation	Air monitoring by MINICAMS for HD, GA, CG, and CK. DAAMS Tube monitoring for HD, GA, CG, and CK.
Soil Sampling	26 samples from excavations, 2 samples from background locations, 2 residential sample locations.	Hand excavation (or mechanical if required) of composite samples	Headspace suspect scrap for chemical agent (HD, and GA). Suspect soils for chemical agent (HD, GA), ABP and HTW.

4.6 SOURCE, NATURE, AND EXTENT OF CWM

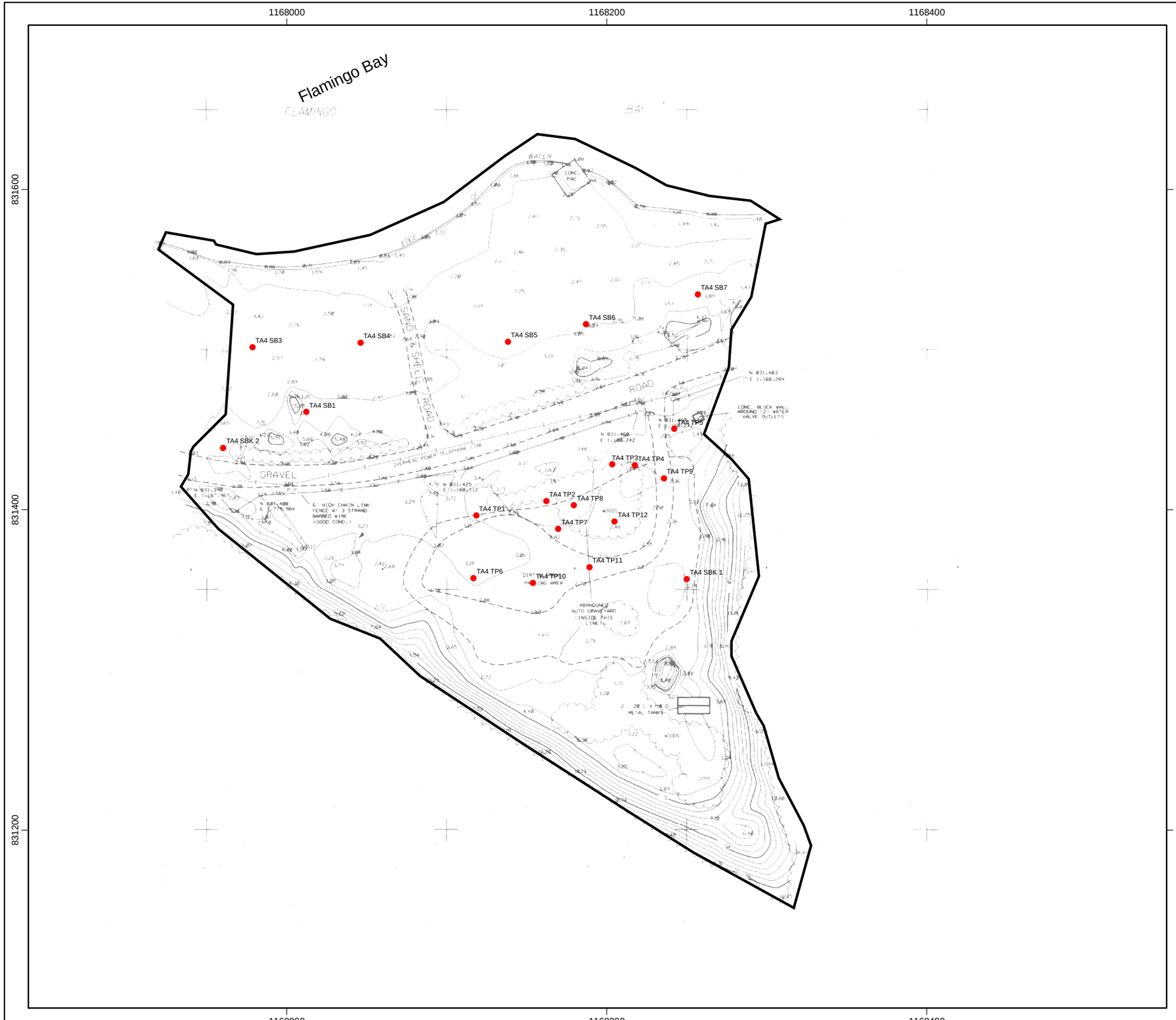
4.6.1 Two items suspected of being chemical agent contaminated media were identified at the Flamingo Bay Landfill Area during the 2003 field investigation: a vented 1-ton container was discovered on the surface of the landfill, and a concrete-filled M78 500-lb. bomb casing was identified at the water line adjacent to the Flamingo Bay Landfill Area. Soil samples collected from underneath the 1-ton container tested negative for chemical agent. The original contents of these containers are unknown; because there is a possibility that these items contained chemical agent, they are considered to be 3X scrap.

4.6.2 No CWM was identified at Flamingo Bay Landfill Area. No CWM or chemical agent contaminated media were found at Test Area 4, Test Area 5, or Test Area 8.

Figure 4.1

Sample Locations
Test Area 4

Former Fort Segarra
Water Island, U.S. Virgin Islands



Legend

- Sample Location
- Test Area 4 Boundary

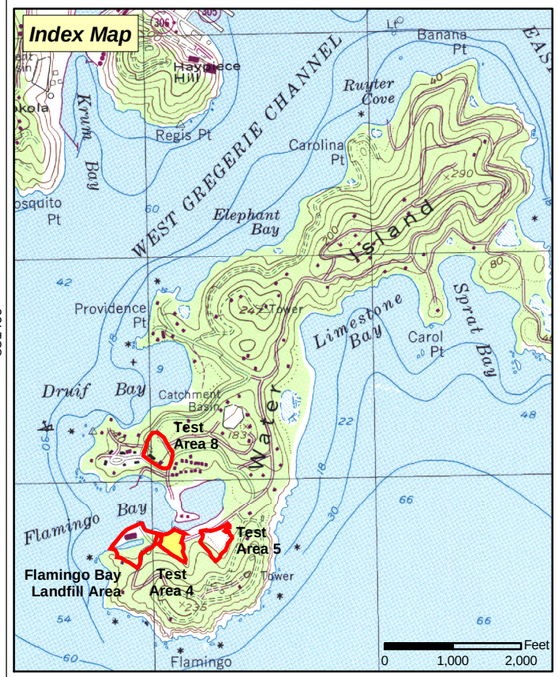


Image Source: MTA Investigation, 1994.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

60 30 0 60 Feet

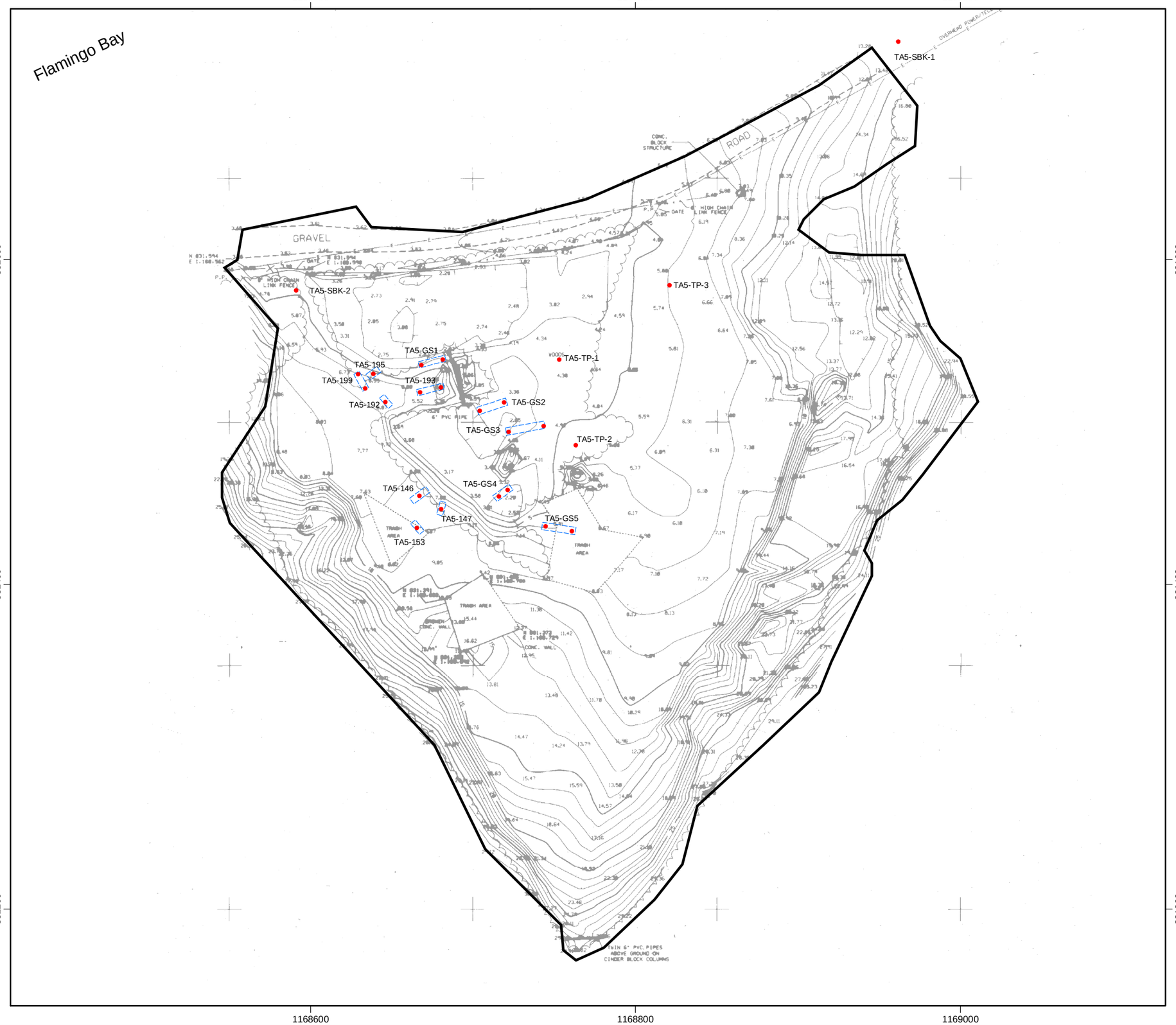
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DRAWN BY: BT	
CHECKED BY: JM	SCALE: As Shown — PROJECT NUMBER: 742325
SUBMITTED BY: TR	DATE: December 2003 — PAGE NUMBER: 4 - 15
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Figure 4.2

Sample Locations Test Area 5

Former Fort Segarra
Water Island, U.S. Virgin Islands



Legend

- Sample Location
- Trench/Test Pit
- Test Area 5 Boundary

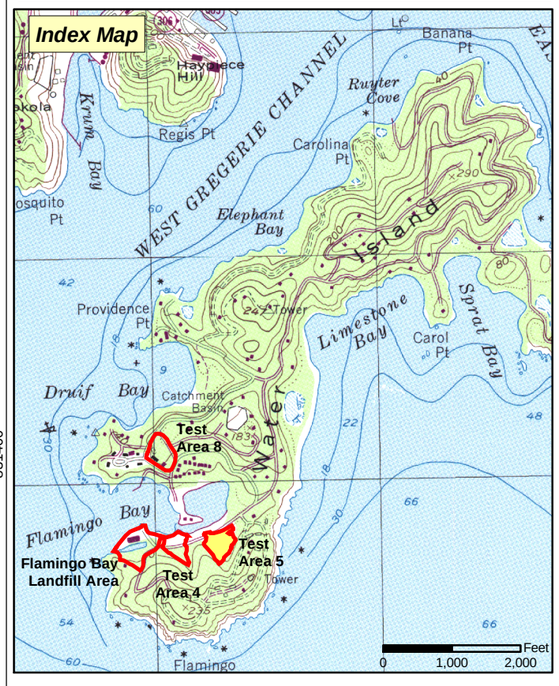


Image Source: MTA Investigation, 1994.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

60 30 0 60 Feet

N

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DESIGNED BY: BT	Sample Locations Test Area 5
DRAWN BY: BT	
CHECKED BY: JM	SCALE: As Shown; PROJECT NUMBER: 732325
SUBMITTED BY: TR	DATE: December 2003; PAGE NUMBER: 4 - 16
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Figure 4.3

Sample Locations
Test Area 8

Former Fort Segarra
Water Island, U.S. Virgin Islands

1167600 1167800 1168000 1168200

833000 832800 832600

TA8 SB01
TA8 SB02
TA8 SB03
TA8 SB04
TA8 SB05
TA8 SB06
TA8 SB07
TA8 SB08
TA8 SB09
TA8 SB10
TA8 SBK1
TA8 SBK2

Legend

- Sample Location
- Test Area 8 Boundary

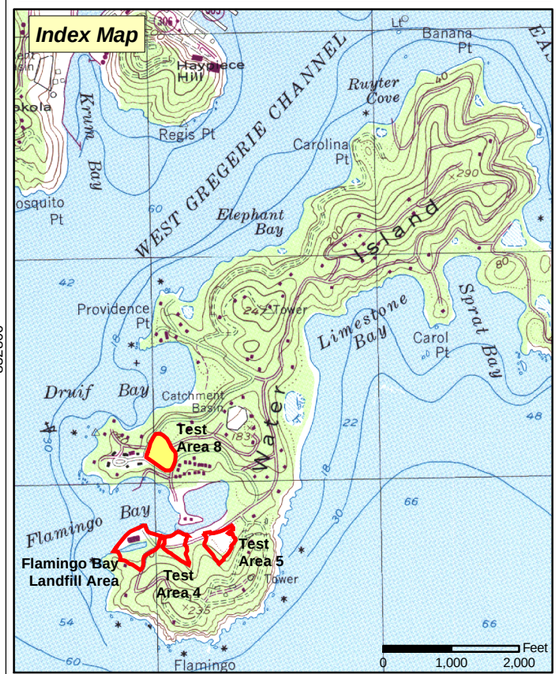


Image Source: Engineering Drawings, Dated 1991, by Lowe Engineers, and Mosaicked by TEC.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

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60 30 0 60 Feet

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	Sample Locations Test Area 8		
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SUBMITTED BY: TR	DATE: December 2003	PAGE NUMBER: 4 - 17	
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1167200 1167400 1167600 1167800

831600 831400 831200

FBL-G-20W
FBL-G-1W
FBL-G-1E
FBL-G-6W
FBL-G-6E
FBL-SB-7
FBL-SB-4
FBL-SB-5
FBL-SB-9
FBL-SBK-1
FBL-SB-10
FBL-SB-8
FBL-SBK-2
FBL-SB-2
FBL-SB-6
FBL-G-9E
FBL-G-9W
FBL-G-15W
FBL-G-15E
FBL-SB-3
FBL-SB-1
FBL-ST-2
FBL-ST-1
FBL-1T

Figure 4.4

Sample Locations
Flamingo Bay Landfill Area

Former Fort Segarra
Water Island, U.S. Virgin Islands

Legend

- Sample Location
- Flamingo Bay Landfill Area Boundary

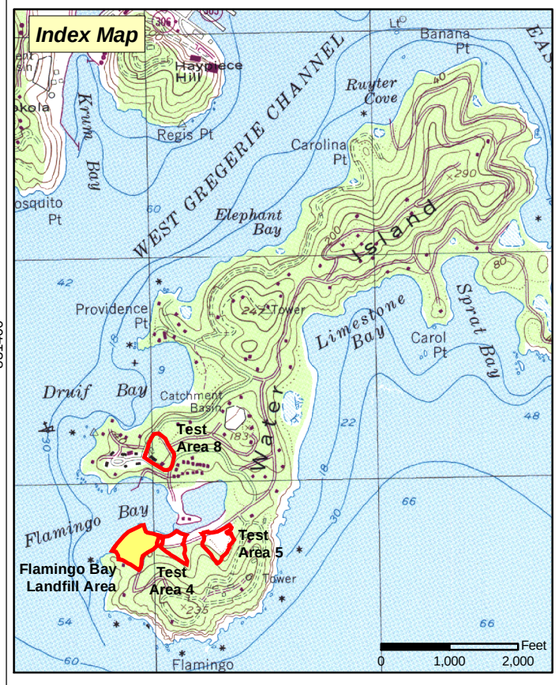


Image Source: MTA Investigation, 1994.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

70 35 0 70 Feet

N

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER
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DRAWN BY: BT	
CHECKED BY: JM	SCALE: As Shown — PROJECT NUMBER: 732325
SUBMITTED BY: TR	DATE: December 2003 — PAGE NUMBER: 4 - 18
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Figure 4.5

Residential Sample Locations

Former Fort Segarra
Water Island, U.S. Virgin Islands



Legend

- Residential Sample Location
- Residential Sample Location (Approximate)
- Boundary of Area of Interest

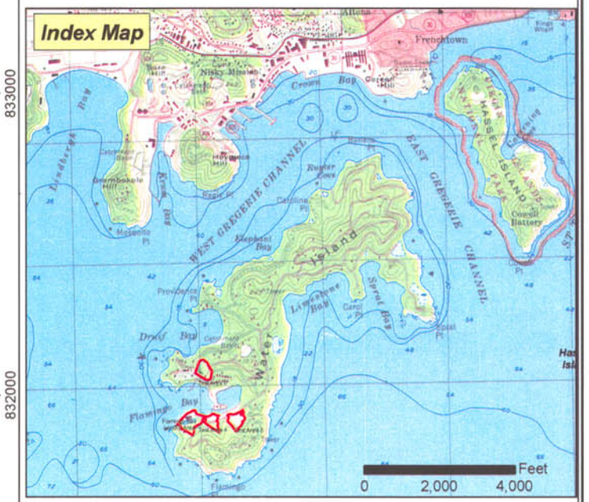


Image Source: USGS Topographic Map.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

500 250 0 500 Feet

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SECTION 5
RISK EVALUATION

5.1 INTRODUCTION

5.1.1 A CWM safety risk is the probability for CWM to be released and potentially cause harm as a result of human activities. A CWM safety risk exists if a person can come near or into contact with CWM or chemical warfare agent and act on it to cause a release. The potential for a CWM safety risk depends upon the presence of three critical elements: a source (presence of CWM), a receptor or person, and interaction between the source and receptor (such as picking up the item or disturbing the item by digging). There is no risk if any one element is missing. Each of the three elements provides a basis for implementing effective risk-management response actions.

5.1.2 The exposure route for CWM to a receptor is primarily direct contact as a result of some human activity. Activities involving subsurface intrusion are examples of human activities that will increase the likelihood for direct contact with buried CWM. A CWM will tend to remain in place unless disturbed by human or natural forces, such as erosion or frost heave. Movement of the CWM may increase the probability for direct human contact but not necessarily result in a direct contact or exposure.

5.2 CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) developed for the former Fort Segarra identifies the types of CWM-related activities that took place within each of the AOIs identified for this investigation. In addition to CWM-related activity, the CSM describes the primary sources of CWM contamination and the primary release mechanism associated with each of these sources. The expected type of CWM contamination is described relative to the primary release mechanism. The type of CWM-related activity, primary source, release mechanism and expected CWM contamination are identified for each AOI investigated (Table 5.1).

5.3 DEFINITION OF RISK EVALUATION FACTORS, CATEGORIES, AND SUBCATEGORIES

5.3.1 Introduction

The potential risk posed by CWM was characterized qualitatively by evaluating three primary risk factors. The three primary risk factors include:

1) Presence of a CWM source,

2) Site characteristics that affect the accessibility or pathway between the source and human receptor, and

3) Human factors that define the number of receptors and type of activities that may result in direct contact between a receptor and CWM source.

By performing a qualitative assessment of these three factors, an overall assessment of the safety risk posed by CWM was evaluated. The following paragraphs describe the components of each of the primary risk factors.

Table 5.1
CWM Summary Table

CWM Related Activity	Primary Source	Primary Release Mechanism	Possible CWM Contamination	Secondary Source Location
CWM Storage	Storage Magazines/ Transfer Point	Residual Soil Contamination Resulting from Mishandling, Loss or Decontamination	None	None
CWM Testing	Static Test Areas	Mishandling, Loss or Abandonment	Non-deployed munitions	Soil
		Burial of 3X Scrap	Residual Soil Contamination	None
			ABP Contamination	Soil
		Residual Soil Contamination	Residual Soil Contamination	None
		ABP Contamination	ABP Contamination	Soil
	Smoke Pot Test Areas	Mishandling, Loss or Abandonment	Deployed Munitions that failed to function as designed	Soil
			Residual Soil Contamination	Soil
		Burial of 3X Scrap	Deployed Munitions that failed to function as designed	Soil
			Residual Soil Contamination	Soil
		Residual Soil Contamination	Residual Soil Contamination	None
		ABP Contamination	ABP Contamination	Soil

Table 5.1 (continued)
CWM Summary Table

CWM Related Activity	Primary Source	Primary Release Mechanism	Possible CWM Contamination	Secondary Source Location
CWM Disposal/ Decontamination	Testing Areas	Mishandling, Loss or Abandonment	Non-deployed munitions	Soil
		Burial of 3X Scrap	Deployed Munitions that failed to function as designed	Soil
			Residual Soil Contamination	Soil
		Residual Soil Contamination	Inadequate Decontamination	None
	Storage and Decontamination Areas	Mishandling, Loss or Abandonment	Non-deployed munitions	Soil
			Residual Soil Contamination	Soil
		Residual Soil Contamination	Inadequate Decontamination	None
			ABP Contamination	None

5.3.2 Presence of CWM Factors

5.3.2.1 There are four categories that are used to evaluate the presence of CWM risk. These include the CWM type, CWM sensitivity, CWM density, and CWM depth distribution.

5.3.2.2 **Type**. The CWM type affects the likelihood of injury and the severity of exposure. If multiple CWM items are identified in an area, that item which poses the greatest risk to public health is selected for risk evaluation. There are four subcategories of CWM type, as shown in Table 5.2. These subcategories are presented in order of severity from highest to lowest risk.

5.3.2.3 **Sensitivity.** CWM sensitivity affects the likelihood of release and the severity of exposure. Factors considered in evaluating sensitivity include fuzing, environmental factors such as weathering, and the potential contamination levels associated with the nature of the documented CWM, chemical agent contaminated media, and 3X scrap. There are four potential subcategories of CWM sensitivity. The category of sensitivity is based on the results of the EE/CA field investigation as well as the results of archival searches. When multiple subcategories of CWM types are discovered in an area, the highest risk subcategory is used in the risk evaluation. The subcategories of sensitivity are defined and presented in order from highest to lowest in Table 5.3.

Table 5.2
CWM Type Subcategories

Subcategory	CWM Type Description
Most severe	CWM that may be lethal if disturbed by an individual's activities.
Moderately severe	CWM that may cause major injury to an individual or is likely to cause a release of chemical warfare agent if disturbed by an individual's activities.
Least severe	CWM that may cause minor injury to an individual or is unlikely to cause a release of chemical warfare agent if disturbed by an individual's activities. This subcategory includes 3X scrap.
No injury	Inert scrap, will cause no injury.

5.3.2.4 **Density.** CWM density affects the likelihood that an individual will be exposed to CWM. There exists a direct relationship between density and potential for harm. For example, the more CWM per acre, the greater the likelihood of exposure to a CWM item or chemical warfare agent and thereby the more likely interaction between source and receptor will occur. Density can be estimated either qualitatively or quantitatively.

5.3.2.5 **Depth Distribution.** The CWM depth distribution refers to where the CWM is located vertically in the subsurface. The CWM depth distribution affects the likelihood that an individual will be exposed to CWM. There exists a direct relationship between the depth at which CWM are found and the likelihood of exposure to the CWM. That is, the greater the depth where the CWM are found, the lower the risk of exposure. There are two subcategories within the CWM depth distribution category: surface and subsurface. The surface subcategory includes those items identified either on the ground surface, or identified during preliminary intrusive investigation. The subsurface subcategory includes those items identified from beneath the ground surface. Assessment of this risk category reflects the findings of the EE/CA field investigation.

5.3.3 Site Characteristics Factors

5.3.3.1 There are two categories that are evaluated in the site characteristics risk factor. These are site accessibility and site stability.

Table 5.3
CWM Sensitivity Subcategories

Subcategory	CWM Sensitivity
Very Sensitive	CWM that is very sensitive, i.e., electronic fuzing, land mines
Less sensitive	CWM that has standard fuzing, corroded casings or low order residual contamination
Insensitive	CWM that may have functioned correctly, or is unfuzed, but has a residual risk This subcategory includes 3X scrap and other chemical agent contaminated media.
Inert	Inert scrap, will cause no injury

5.3.3.2 **Site Accessibility.** The accessibility of an AOI affects the likelihood of encountering CWM. Natural or physical barriers can limit accessibility. Natural barriers can include the terrain or topography of the site as well as the vegetation. Physical barriers can include walls and fences that limit public access to the AOI. Both the physical and natural barriers found at an AOI are considered when evaluating this category. Site accessibility has three subcategories. These subcategories are presented in Table 5.4.

5.3.3.3 **Site Stability.** This category relates to the probability of being exposed to CWM by natural processes. These natural processes include recurring natural events (e.g., sand movement, erosion) or extreme natural events (e.g., hurricanes). The local soil type, topography, climate, and vegetation affect stability of the site. The soil type and climate primarily affects the depth or persistence of the CWM or chemical warfare agent. Over time, the soil type and climate will also affect the degree of erosion that takes place at a site. Topography and vegetation in the area will also affect the rate of erosion that takes place in an area. Site stability has three subcategories. Table 5.5 describes these subcategories.

5.3.4 Human Factors

5.3.4.1 There are two categories that are evaluated in the human risk factor. These categories are Site Activity and Population.

5.3.4.2 **Site Activity.** The types of activities conducted at a site affect the likelihood of encountering CWM. The types of activities may be generally classified as recreational and occupational. This category examines whether the contact level from an activity on CWM is significant, moderate, or low. In order to assign such a contact level, the general guidelines presented in Table 5.6 were considered. First, the type of activity should be identified. Then, the depth of the activity must also be considered. For example, at a site where CWM or chemical warfare agent is at the surface, all activities that can impact

Table 5.4
Site Accessibility Subcategories

Subcategory	Accessibility Description
No Restriction to Site	No man-made barriers, gently sloping terrain, no vegetation that restricts access, no water that restricts access
Limited Restriction to Access	Man-made barriers, vegetation that restricts access, water, snow or ice cover, and/or terrain restricts access
Complete Restriction to Access	All points of entry are controlled

Table 5.5
Site Stability Subcategories

Subcategory	Stability Description
Stable	CWM should not be exposed by natural events
Moderately Stable Site	CWM may be exposed by natural events
Site Unstable	CWM most likely will be exposed by natural events

Table 5.6
CWM Contact Probability Levels

Examples of Activities	Actual Depth of CWM	Contact Level
Child Play, Picnic, Short Cuts, Hunting, Fishing, Hiking, Swimming, Jogging, Ranching, Surveying, Off-Road Driving,	Surface	Significant
	Below Surface -12”	Low
	>12”	Low
Camping, Metal Detecting	Surface	Significant
	Below Surface -12”	Moderate
	>12”	Low
Construction, Archaeology, Crop Farming	Surface	Significant
	Below Surface -12”	Significant
	>12”	Moderate

CWM at the surface are considered activities that have a significant contact level. Conversely, if all CWM is located at depths greater than one foot and only surface activities are being performed then the activities are considered as moderate or low contact level. After the type of activity and depth of CWM are identified, then a score of significant, moderate or low may be assigned.

5.3.4.3 **Population.** This category refers to the number of people that can potentially access the AOI on a daily basis. The number of people using the AOI affects the likelihood of encountering CWM. A direct relationship exists between the number of people and the risk of exposure. An estimate of the number of people accessing the AOI on a daily basis was made using census data and best professional judgment based on knowledge of the type of site, land use, and site accessibility.

5.4 RISK EVALUATION

5.4.1 Introduction

Each of the primary risk factors identified above was evaluated using the data collected during the EE/CA field investigation and the data presented in the ASR. The risk evaluation for Test Area 4, Test Area 5, Test Area 8 and Flamingo Bay Landfill Area are presented in Table 5.7. The following sections discuss the risk evaluation by each primary risk factor.

5.4.2 Test Area 4

According to the ASR, Test Area 4 was used for the testing of 23 items containing live agent. All tests were performed statically on the ground surface in the approximate location of the current Flamingo Bay lagoon. In addition to the CWM tests conducted in Test Area 4, excess burster charges were reportedly detonated within Test Area 4. By 1999, a dredging operation that began in the mid 1960's had essentially removed all of the soil where the tests had been conducted.

5.4.2.1 Presence of CWM Factor

5.4.2.1.1 Historical CWM

According to the ASR, several types of CWM tests were preformed within Test Area 4. These tests, described in detail in Section 4.1.1, included testing of M70 HD-filled bombs, E23 HD-filled smoke pots, E23 GA-filled smoke pots, and E23 HQ-filled smoke pots. In addition to the CWM testing conducted within Test Area 4, excess burster charges were reportedly detonated within Test Area 4 as well.

Table 5.7
Risk Evaluation

AOI	Ordnance and Explosives Factors					Site Characteristics Factors		Human Factors		Summary
	Type[\1]		Sensitivity	CWM Found	Number of CWM by Depth	Accessibility	Stability	Contact Level / Activities	Population	Qualitative OE RIA Safety Risk
Test Area 4	Static tests of M70 chemical bombs and E23 Smoke Pots	Moderately Severe	Insensitive	None	None	No Restriction	Stable	Low	80-100	Low
Test Area 5	Static tests of M70 chemical bombs	Moderately Severe	Insensitive	None	None	No Restriction	Stable	Low	80-100	Low
Test Area 8	Static tests of M70 chemical bombs and Toxic Storage Area	Least Severe	Insensitive	None	None	No Restriction	Stable	Low	80-100	Low
Flamingo Bay Landfill Area	Possible disposal area for M70 and M78 bombs	Least Severe	Insensitive	None	None	No Restriction	Stable	Low	80-100	Low

[\1] Denotes items historically tested within each AOI.

5.4.2.1.2 Type

To date, no CWM or chemical agent contaminated media have been identified within what remains of Test Area 4 after the suspension of military activity on Water Island. The possibility exists that 3X scrap or residual soil contamination remains within Test Area 4 despite the fact that no evidence of CWM contamination was identified during the EE/CA investigation. The types of CWM used within Test Area 4 combined with the possibility of conventional UXO constitute a "moderate severity" subcategory as described on Table 5.2.

5.4.2.1.3 Sensitivity

A subcategory of "insensitive," as defined in Table 5.3, was assigned to Test Area 4 based on the types of known munitions fired within Test Area 4 that reportedly functioned correctly. There is no evidence suggesting that intact munitions exist within Test Area 4. Sensitivity affects the likelihood of a release and the severity of exposure.

5.4.2.1.4 Density

No evidence was identified by this EE/CA investigation to suggest that there is any residual contamination associated with the CWM activity conducted within Test Area 4.

5.4.2.1.5 Depth

No evidence was identified by this EE/CA investigation to suggest that there is any residual contamination associated with the CWM activity conducted within Test Area 4.

5.4.2.2 Site Characteristics Factors

5.4.2.2.1 Site Accessibility

Test Area 4 is accessible by road, boat, and foot. Test Area 4 contains a dirt road that traverses the Test Area. The portion of Test Area 4 that lies north of the road contains dense vegetation, which makes walking through that area difficult. The portion of Test Area 4 which is south of the road has been cleared for the storage of abandoned vehicles and various other types of debris. Test Area 4 is readily accessible to the public. In accordance with Table 5.4, Test Area 4 is assigned a subcategory of "no restriction" as the entire area is accessible by road, boat, and foot.

5.4.2.2.2 Site Stability

Because the majority of Test Area 4 has relatively flat topography and no major streams, the possibility that CWM may become exposed through erosion is low. Although heavy rainfall and hurricanes are fairly common, there is a low potential that CWM or chemical warfare agent may become unearthed due to these natural recurring events. In accordance with Table 5.5, the site stability is assigned a subcategory of "stable" for Test Area 4.

5.4.2.3 Human Factors

5.4.2.3.1 Site Activities

5.4.2.3.1.1 The type of activities conducted at Test Area 4 in combination with the depth distribution of CWM is related to the likelihood of individuals encountering CWM, and results in a contact probability level. Table 5.6 describes the contact probability based on the type of activity expected in each AOI and the depth of CWM based on the current land use. The future land use is anticipated to continue along the existing land use trends currently in place as discussed in Chapter 2.

5.4.2.3.1.2 Test Area 4 is an undeveloped area. There are residences located to the south as well as several undeveloped lots around the perimeter; thus, there is the potential for future development within and surrounding this area. Current activities in this area are primarily associated with debris disposal. The fact that there was no detection of CWM combined with the current site activity and potential for future residential development results in a "low" contact level rating for Test Area 4, based on Table 5.6.

5.4.2.3.2 Population

Currently, there are no residents living within the boundaries of Test Area 4. The population of Water Island is approximately 80 full time residences. Due to the fact that Test Area 4 is currently accessible by foot, boat, and vehicle, all residence and visitors to Water Island have access to Test Area 4.

5.4.3 Test Area 5

Test Area 5 is located adjacent to Test Area 4, and subsequently contains similar geographic features and vegetation. According to the ASR, one CWM test was conducted within Test Area 5. Historical documentation indicates that part of Test No. 136, which involved the static test of two M70 HD-filled bombs, was the only CWM related test conducted within this area. The M70 bomb was placed vertically with the nose down and fired with offshore winds in a wooded area.

5.4.3.1 Presence of CWM Factor

5.4.3.1.1 Historical CWM

According to the ASR, only one CWM test was preformed within Test Area 5. This test, described in detail in Section 4.1.2, included the static firing of two, M70 HD-filled bombs. There is no indication that any other CWM or conventional OE tests were conducted within Test Area 5.

5.4.3.1.2 Type

To date, no CWM or 3X scrap has been identified within Test Area 5 after the conclusion of military activity on Water Island. However remote, the possibility does exist that 3X scrap, and or residual soil contamination does remain within Test Area 5 despite the fact that no evidence of CWM contamination was identified during the

EE/CA investigation. The types of CWM used within Test Area 5 constitute a "least severity" subcategory based on Table 5.2.

5.4.3.1.3 Sensitivity

A subcategory of "insensitive", as defined in Table 5.3, was assigned to Test Area 5 based on the types of known munitions fired within Test Area 5 that reportedly functioned correctly. There is no evidence to suggest that CWM or residual chemical warfare agent currently exist or were historically abandoned within Test Area 5. Sensitivity affects the likelihood of a release and the severity of exposure.

5.4.3.1.4 Density

No evidence was identified by this EE/CA investigation to suggest that there is any residual contamination associated with the CWM activity conducted within Test Area 5.

5.4.3.1.5 Depth

No evidence was identified by this EE/CA investigation to suggest that there is any residual contamination associated with the CWM activity conducted within Test Area 5.

5.4.3.2 Site Characteristics Factors

5.4.3.2.1 Site Accessibility

Test Area 5 contains a dirt road that traverses the Test Area. The portion of Test Area 5 that is south of the road has been cleared for the storage of rubble produced by the demolition of the former hotel on Water Island and various other types of debris. Test Area 5 is readily accessible to the general public. In accordance with Table 5.4, Test Area 5 is assigned a subcategory of "no restriction" as the entire area is accessible by road, boat, and foot.

5.4.3.2.2 Site Stability

Due to the fact that the majority of Test Area 5 has relatively flat topography, the possibility that CWM may become exposed through erosion is low. Although, heavy rainfall and hurricanes are fairly common, the potential that CWM may become unearthed due to these natural recurring events is low. In accordance with Table 5.5, the site stability is assigned a subcategory of "stable" for Test Area 5.

5.4.3.3 Human Factors

5.4.3.3.1 Site Activities

5.4.3.3.1.1 The type of activities conducted at Test Area 5 in combination with the depth distribution of CWM is related to the likelihood of individuals encountering CWM. Table 5.6 describes the contact probability based on the type of activity expected in each AOI and the depth of CWM based on the current land use. The future land use is anticipated to continue along the existing land use tracks currently in place as discussed in Section 2.

5.4.3.3.1.2 Test Area 5 is an undeveloped area. There are residences located to the south as well as several undeveloped lots; thus, there is the potential for future development surrounding this area. Current activities in this area are primarily associated with debris disposal. The fact that there was no detection of CWM combined with the current site activity and potential for future residential development results in a "low" contact level rating for Test Area 5.

5.4.3.4 Population

Currently, there are no residences of Water Island that live within the boundaries of Test Area 5. The population of Water Island is approximately 80 full time residences. Due to the fact that Test Area 5 is currently accessible by foot, boat, and vehicle, all residence and visitors to Water Island have access to Test Area 5.

5.4.4 Test Area 8

Test Area 8 is located near the top of a ridgeline directly north of Flamingo Bay, and is located in the vicinity of the former hotel on Water Island. Test Area 8 and the adjacent area were used as a general storage facility for the CWM activities conducted on Water Island.

5.4.4.1 Presence of CWM Factor

5.4.4.1.1 Historical CWM

5.4.4.1.1.1 According to the ASR, only one type of CWM test was preformed within Test Area 8. This test, described in detail in Section 4.1.3, was Phases 5 and 6 Test Number 136, which was the static firing of M70 HD-filled chemical bombs.

5.4.4.1.1.2 In addition to the CWM testing conducted within Test Area 8, a toxic storage yard was located in the vicinity of Test Area 8. T-3 H/HD-filled chemical bombs and aged, CK-filled, M70, M78 and M79 chemical bombs were involved in surveillance tests and were stored outside in this area. Additionally, test animals were stored within a fence in this area.

5.4.4.1.2 Type

To date, no CWM or 3X scrap has been identified within Test Area 8 after the suspension of military activity on Water Island. However remote, the possibility does exist that 3X scrap, and or residual soil contamination does remain within Test Area 8 despite the fact that no evidence of CWM contamination was identified during the EE/CA investigation. The types of CWM used within Test Area 8 constitute a "low severity" subcategory as defined on Table 5.2.

5.4.4.1.3 Sensitivity

A subcategory of "insensitive", as defined in Table 5.3, was assigned to Test Area 8 based on the type of known munition fired within Test Area 8 that reportedly functioned correctly. There is no evidence to suggest that intact rounds currently exist or were

historically abandoned within Test Area 8. Sensitivity affects the likelihood of a release and the severity of exposure.

5.4.4.1.4 Density

No evidence was identified by this EE/CA investigation to suggest that there is any residual contamination associated with the CWM activity conducted within Test Area 8.

5.4.4.1.5 Depth

No evidence was identified by this EE/CA investigation to suggest that there is any residual contamination associated with the CWM activity conducted within Test Area 8.

5.4.4.2 Site Characteristics Factors

5.4.4.2.1 Site Accessibility

Test Area 8 is bounded by paved roads. Test Area 8 is readily accessible to the general public. In accordance with Table 5.4, Test Area 8 is assigned a subcategory of "no restriction" as the entire area is accessible by road and by foot.

5.4.4.2.2 Site Stability

The fact that the majority of Test Area 8 has relatively flat topography, the possibility that CWM may become exposed through erosion is low. Although, heavy rainfall and hurricanes are fairly common, the potential that CWM may become unearthed due to these natural recurring events is low. In accordance with Table 5.5, the site stability is assigned a subcategory of "stable" for Test Area 8.

5.4.4.3 Human Factors

5.4.4.3.1 Site Activities

5.4.4.3.1.1 The type of activities conducted at Test Area 8 in combination with the depth distribution of CWM is related to the likelihood of individuals encountering CWM. Table 5.6 describes the contact probability based on the type of activity expected in each AOI and the depth of CWM based on the current land use. The future land use is anticipated to continue along the existing land use trends as discussed in Section 2.

5.4.4.3.1.2 Test Area 8 is an undeveloped area, and it has been significantly disturbed with the construction and subsequent demolition of the Water Island Hotel. There are residences located around the perimeter as well as several undeveloped lots; thus, there is the potential for future development surrounding this area. Current activities in this area are primarily associated with recreation and vehicle storage. The fact that there was no detection of CWM combined with the current site activity and potential for future residential development results in a "low" contact level rating for Test Area 8, as described on Table 5.6.

5.4.4.3.2 Population

Currently, there are no residents of Water Island that live within the boundaries of Test Area 8. The population of Water Island is approximately 80 full-time residents. Due to the fact that Test Area 8 is currently accessible by foot, and vehicle, all residents and visitors to Water Island have access to Test Area 8.

5.4.5 Flamingo Bay Landfill Area

Flamingo Bay Landfill Area is located on the southwest corner of Water Island, directly south of Flamingo Bay, adjacent to the deepwater dock. During the military activity on Water Island, the deep-water dock and the area now occupied by the Flamingo Bay Landfill Area was used to deliver equipment and munitions. The Flamingo Bay Landfill Area was not used for CWM testing; however, during excavations in that area in 1966 at least two bombs were unearthed from an approximate depth of 20 feet. U.S. Navy EOD personnel from Roosevelt Roads responded and identified the two bombs as M70 and M78 chemical bombs. Upon inspection, the EOD team reported that one of the bombs was vented and the other was not. The unvented bomb was vented at that point with reportedly no noticeable release of agent. Historical documentation revealed that there had been four CK-filled M78 bombs that were removed from the CWM inventory because the CWM filler had solidified. One of these was destroyed while the other three were reported as being "eliminated from observation" due to the fact that they were no longer serviceable. The possibility exists that the bombs identified as a result of the excavation in 1966 were two of these bombs.

5.4.5.1 Presence of CWM Factor

5.4.5.1.1 Historical CWM

5.4.5.1.1.1 No CWM has been confirmed to be present at the Flamingo Bay Landfill Area. Chemical agent contaminated media, in the form of 3X scrap, has been identified.

5.4.5.1.1.2 In 1966, two bombs were uncovered during dredging operations. At the time the bombs were uncovered, the dragline was located approximately 20 feet below ground surface. The EOD team from Roosevelt Roads Naval Air Station was summoned to remove the bombs. According to the 1993 Scoping Study, the EOD report noted that "several" bombs had been unearthed and that all but one had been vented. The unvented bomb was detonated without noticeable release of any chemicals. EOD identified the bombs as suspect M70 and M78 chemical bombs. These items were suspected to be CK-filled bombs that had been used in surveillance tests and were taken out of the CWM inventory because the CWM filler had solidified. The bombs are classified as 3X scrap because solidified CK is not CWM.

5.4.5.1.1.3 A 500-pound chemical bomb filled with concrete was found on the shore west of the deep-water dock during the 1991 ASR site visit. The bomb reportedly had a shipping plug in the nose and a vacant tail fuse well. A 12- by 18-inch hole was apparent in one side of the bomb. This concrete bomb was likely used as an anchor and washed up onshore during a hurricane. The original contents of this item are unknown; because there is a possibility that this item contained chemical agent, it is classified as 3X scrap.

5.4.5.1.1.4 A vented 1-ton container was identified on the surface of the landfill during the 2003 EE/CA field investigation. The original contents of this container are unknown; because there is a possibility that this item contained chemical agent, it is classified as 3X scrap.

5.4.5.1.2 Type

5.4.5.1.2.1 No CWM has been confirmed to be present at the Flamingo Bay Landfill Area. The following types of chemical agent contaminated media, in the form of 3X scrap, have been identified:

- Two suspect M70 and M78 bombs, thought to formerly contain solidified CK (removed from site prior to EE/CA field investigation);
- One 500-lb. concrete-filled bomb, former contents unknown (present at waterline near landfill during EE/CA field investigation); and
- One 1-ton vented container, former contents unknown (present on landfill surface during EE/CA field investigation).

5.4.5.1.2.2 A "least severe" subcategory was assigned to "types of CWM" in Table 5.2 due to the fact that only 3X scrap has been identified, and because any additional items that could potentially be present, if not empty or vented, would likely contain only solidified material.

5.4.5.1.3 Sensitivity

A subcategory of "insensitive," as defined in Table 5.3, was assigned to the Flamingo Bay Landfill Area based on the recovery of munitions in these areas not being explosively configured. Sensitivity affects the likelihood of detonation and the severity of exposure.

5.4.5.1.4 Density

Density was estimated qualitatively for Flamingo Bay Landfill Area based on the number of 3X items found and the number of acres investigated. It is possible that 3X scrap, in the form of two additional M78 bombs, may remain within the Flamingo Bay Landfill Area.

5.4.5.1.5 Depth

The CWM depth distribution affects the likelihood that an individual will be exposed to CWM. There is a direct relationship between the depth at which CWM or 3X scrap items are found and the likelihood of exposure to the live agent. There are two subcategories within the distribution depth category: surface and subsurface. The two 3X scrap items found at Flamingo Bay Landfill Area prior to the field investigation were located at a depth of approximately 20 feet. The items recovered could have originated from anywhere within the soil horizon and are categorized as subsurface. The two existing 3X scrap items identified during the EE/CA field investigation were found on the ground surface.

5.4.5.2 Site Characteristics Factors

5.4.5.2.1 Site Accessibility

All areas investigated during the EE/CA are accessible by both road and foot. The Flamingo Bay Landfill Area is currently encircled by a chain link fence. However, the gate is apparently rarely locked and has several breaches in the fabric and is therefore not considered a barrier for individuals intent on entering the property. In accordance with Table 5.4, the Flamingo Bay Landfill Area is assigned a subcategory of "no restriction" as the entire area is accessible by road and foot.

5.4.5.2.2 Site Stability

Because the majority of Flamingo Bay Landfill Area has relatively flat topography, the possibility that CWM may become exposed through erosion is low. Although heavy rainfall and hurricanes are fairly common, the potential that CWM may become unearthed due to these natural recurring events is low. The site stability is assigned a subcategory of "stable" for the Flamingo Bay Landfill Area as described on Table 5.5.

5.4.5.3 Human Factors

5.4.5.3.1 Site Activities

5.4.5.3.1.1 The type of activities conducted at Flamingo Bay Landfill Area in combination with the depth distribution of CWM is related to the likelihood of individuals encountering CWM. Table 5.6 describes the contact probability based on the type of activity expected in each AOI and the depth of CWM based on the current land use. The future land use is anticipated to continue along the existing land use tracks currently in place as discussed in Section 2.

5.4.5.3.1.2 Flamingo Bay Landfill Area is undeveloped; however it has been significantly disturbed by the refuse disposal activities in addition to the excavation activities that resulted in the discovery of the 3X scrap discussed above. There are residences located around the perimeter as well as several undeveloped lots; thus, there is the potential for future development surrounding this area. Current activities in this area are primarily associated with activities of refuse disposal. The fact that there was no detection of CWM, combined with the current site activity and potential for future residential development, results in a "low" contact level rating for the Flamingo Bay Landfill Area.

5.4.5.3.2 Population

Currently, there are no residences of Water Island that live within the boundaries of Flamingo Bay Landfill. The population of Water Island is approximately 80 full-time residences. Because Flamingo Bay Landfill Area is currently accessible by foot and vehicle, all residence and visitors to Water Island have access to the Flamingo Bay Landfill Area.

5.5 RISK ASSESSMENT SUMMARY

The risk to public safety associated with the presence of CWM was evaluated for each of the AOIs. The CWM safety risk is a combination of each of the primary risk factors that are presented above. The CWM safety risk in Test Area 4, Test Area 5, Test Area 8, and the Flamingo Bay Landfill Area is considered "low" due the fact that that there is no indication that CWM contamination exists at these AOIs. Also, the presence of two 3X scrap items at the Flamingo Bay Landfill Area pose only an extremely low threat to public safety or the human environment.

SECTION 6
RESPONSE ACTION EVALUATION

6.1 INTRODUCTION

The EE/CA findings for each of the four CWM sites at the former Fort Segarra were qualitatively evaluated to determine the overall risk posed to public safety and the environment; this evaluation was presented in Section 5. In this section, alternatives for addressing these potential risks are evaluated concerning their effectiveness, implementability, and cost.

6.2 IDENTIFICATION OF POSSIBLE RESPONSE ACTION ALTERNATIVES

6.2.1 Introduction

6.2.1.1 The following response alternatives were developed in Section 3 of this EE/CA Report:

- No DoD Action Indicated (NDAI) (relative to CWM),
- Institutional Controls (IC), and
- Removal Actions.

6.2.1.2 Section 121(c) of CERCLA, as amended by SARA, and Section 300.430 (f) (4) (ii) of the NCP requires that periodic (no less often than every five years) reviews be conducted for sites where hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure following completion of all removal or response actions.

6.2.1.3 The three response action alternatives listed above were considered for the former Fort Segarra and were also evaluated independently for each of the AOIs investigated in this EE/CA. This approach has been taken to ensure that a tailored response action alternative suitable for each site is developed based on the anticipated future land use and results of the CWM investigation.

6.2.2 Alternative 1: No DoD Action Indicated

Alternative 1 is for the government to take no action in regards to locating, removing, and disposing of any potential CWM or chemical agent contaminated media present within a specific site at the former Fort Segarra. In addition, no public awareness or education training would be initiated. If the potential exposure and hazards associated with the site are compatible with current and future development in the area as well as the

response action objectives, then NDAI may be warranted. It is important to note that the government will respond to any future CWM or chemical agent contaminated media discovery on the former Fort Segarra property regardless of whether the affected parcel was designated for NDAI. The NDAI alternative is a potential candidate alternative for each of the CWM sites within the former Fort Segarra.

6.2.3 Alternative 2: Institutional Controls

6.2.3.1 Implementation of an Institutional Controls response alternative would provide a means for the DoD and it's representatives to coordinate with current and future private landowners on education, notification, and land use restrictions of potentially affected properties. The Institutional Controls response alternative can be used in combination with other CWM response alternatives. Successful implementation of Institutional Controls is contingent on the cooperation and active participation of the existing powers and authorities of other government agencies. Instead of direct removal of the CWM or chemical agent contaminated media from the site, the Institutional Controls response alternative relies on access control strategies to reduce or eliminate potential risk.

6.2.3.2 Aside from conventional CWM response actions, risks related to potential CWM or chemical agent contaminated media may be managed through land use restrictions, access control, public awareness programs, or a combination of strategies. It is important to understand that the risk associated with CWM or chemical agent contaminated media is associated with three primary elements and if one of these elements is not present then there is no risk of exposure. These three elements are: source, receptor, and source-receptor interaction. If there is no CWM or chemical agent contaminated media within the site, then there is no possibility of a CWM-related exposure. An exposure requires all three events or circumstances to be present. No exposure will occur if any one element is missing. Each element provides the basis for a separate implementation strategy.

6.2.4 Alternative 3: Removal Action

This alternative involves the removal of all CWM or chemical agent contaminated media from a specified site or portion of a site. Under this alternative, suspected CWM will be assessed and, if found to contain chemical agent, will be destroyed. Chemical agent contaminated media, such as soil and ground water, would be sampled and analyzed for chemical agent and agent breakdown products. 3X items would be transported and converted to 5X and disposed of. The scale of the removal action can vary from intrusive investigation of suspected CWM burial locations under a revised Work Plan and Chemical Safety Submission to simple removal and disposal of surface 3X items using existing Work Plans

6.3 DESCRIPTION OF ALTERNATIVE SCREENING PROCESS

6.3.1 Each of the three response action alternatives was analyzed on its own against three general categories of effectiveness, implementability, and cost. If the alternative

failed either the effectiveness or the implementability category, it was eliminated from further consideration. The remaining alternatives were then qualitatively compared to one using a numeric scale with "1" representing the best or ideal choice and "3" representing the least desirable choice. In this manner, the appropriate response action alternatives were identified for each site.

6.3.2 The effectiveness of an alternative refers to its ability to meet the clean-up objective within the scope of the CWM response action. The effectiveness category is divided into four evaluation criteria. These include protection of public safety and the human environment, compliance with ARARs, long-term effectiveness, and short-term effectiveness.

6.3.3 The implementability category addresses the technical and administrative feasibility of implementing an alternative as well as the availability of various services and materials required during its implementation. The implementability category is divided into three evaluation criteria: technical feasibility, administrative feasibility, and availability of services and materials.

6.3.4 Finally, each alternative was evaluated to determine the projected overall implementation cost. Cost estimates were prepared based on extrapolation of field costs incurred during the EE/CA intrusive activities and actual cost data for other CWM projects with similar CWM response action alternatives. Each of the evaluation criteria introduced above are discussed in detail in the following paragraphs.

6.4 POTENTIAL RESPONSE ACTION ALTERNATIVE SCREENING CRITERIA

6.4.1 Effectiveness

6.4.1.1 Effectiveness is the threshold criteria. The following two components of effectiveness are mandatory requirements that must be evaluated in order for a response action alternative to be selected:

1) **Protection of Public Safety and the Human Environment** is the ability of the response action alternative to reduce the risk of exposure that could adversely affect members of the public.
2) **Compliance with ARARs** is the ability of the response action alternative to satisfy the requirements of the applicable or relevant and appropriate requirements (ARARs) identified for the site. The assessment should also include consideration of the To Be Considered (TBC) criteria. Table 6.1 presents a summary of the ARARs and TBC criteria identified for consideration during selection of a response action for the sites at the Former Fort Segarra.

Each of the components above was evaluated for its ability to achieve the response action goals for effectiveness in both the short-term and the long-term.

Table 6.1
Potential ARARs for CWM Sites
Former Fort Segarra, Water Island, USVI

Activity	ARAR/TBC	Citation	Applicability or Relevance
Chemical-Specific			
None			
Location-Specific			
Location of an action within an area where it may cause irreparable harm, loss or destruction of significant artifacts or historic landmarks	National Historic Preservation Act	36 CFR Part 65, and 800	During removal action, any material that may be considered historical will be reported pursuant to requirements
	Protection of Wetlands	33 CFR 320 et. seq. Executive Order 11988	Requires action to be taken to minimize loss or degradation of wetlands.
	Endangered Species Act	16 USC δ 1531 et. seq.	Requires that authorized actions do not jeopardize the continued existence of endangered or threatened species, or their habitats.
	Protection of Archaeological Resources	43 CFR Part 7 (also: 36 CFR Part 296, 32 CFR Part 229, and 18 CFR Part 1312 – same regulations)	Requires a permit to excavate, remove, or otherwise alter any archaeological resource
	Preservation of American Antiquities	43 CFR Part 3	Requires a permit for the examination of ruins, excavation of archaeological sites, and gathering of objects of antiquity
Action-Specific			
Excavation	Department of Defense Ordnance Safety Standards	DoD 6055.9-STD	Requires specialized personnel be employed in the detection, removal, and disposal of CWM and establishes depth for removal.
	Chemical Accident or	DA Pam 50-6	Policies and procedures for medical support, environmental monitoring,

Table 6.1 (Continued)
Potential ARARs for CWM Sites
Former Fort Segarra, Water Island, USVI

Activity	ARAR/TBC	Citation	Applicability or Relevance
	Incident Response and Assistance Operations		and training requirements on CWM sites.
	The Army Chemical Agent Safety Program	AR 385-61	Policy on management of the chemical agent safety program.
	U.S. Army Explosives Safety Program	AR 385-64	Protection policies for sites involving CWM.
Treatment	General requirements for hazardous waste management facilities	40 CFR 264.10	Potential ARAR for the on-site detonation of CWM, or the on-site treatment of CWM
	CWM Scrap Disposal	DA PAM 385-61 Chapter 5, 5-1 C (3)	Governs treatment of CWM scrap (3X) to attain (5X) criteria for disposal. Applicable to U.S. Army, Reserve and U.S. Army contractors.
Transportation	D.O.T. Hazardous Material Transportation Regulations	49 CFR 107, 171-177, 100-199	Regulates transportation of hazardous materials such as ordnance.
	E.P.A. Hazardous Materials Manifesting Requirements	40 CFR 262, 263	Manifesting for transportation of ordnance items may be required pursuant to RCRA.
Disposal	Disposal of Ordnance Items	40 CFR 264, Subpart X	Established ordnance disposal requirements.

6.4.1.2 Long-Term Effectiveness: This criterion measures how a response action alternative maintains the protection of the public after the response objectives have been met. The analysis focuses on:

- The permanence of the response action alternative;
- The reduction in risk as a result of the response action alternative, measured against the risk that would exist if no actions were taken;
- The magnitude of residual risk following completion of the response action; and
- The adequacy and reliability of controls, if any, used to manage the treated residuals or untreated wastes that remain following the response action.

6.4.1.3 Short-Term Effectiveness: This criterion addresses the effects of an alternative during the implementation phase. Alternatives are evaluated for their effects on public safety prior to the response objectives being met. More specifically, each alternative will be examined for:

- Protection of the community and workers during the response action;
- Adverse impacts resulting from construction and implementation; and
- The time required to meet the response action objectives.

6.4.2 Implementability

6.4.2.1 Implementability is a primary balancing criteria that is used to compare the major trade-offs between the identified response action alternatives. Implementability includes the technical and administrative services required to implement a given response alternative as well as the property owner, local agency and community acceptance of the response alternative. Each response action alternative was assessed to determine the ease or difficulty of implementation by considering the following factors:

1) **Technical Feasibility**, including technical difficulties and uncertainties associated with the removal or response action;
2) **Administrative Feasibility** of the response action alternative;
3) **Availability of Services and Materials** for implementation of the response action alternative;
4) **Property Owner Acceptance** of the response alternative;
5) **Community Acceptance** of the response alternative; and
6) **Local Agency Acceptance** of the response alternative.

6.4.2.2 The technical feasibility criterion evaluates the ease of implementing a specific alternative. The analysis of the technical feasibility for each course of action focuses on difficulties in:

- The operation and construction of the response action alternative;
- The reliability of the response action alternative in relation to implementation; and
- The need and ease of conducting future response actions/requirements following the initial undertaking.

6.4.2.3 The administrative feasibility criterion focuses on the planning for a course of action. The evaluation of this criterion considers difficulties in:

- Obtaining permits applicable to a proposed alternative;
- Coordinating services needed to carry out an alternative; and
- Arranging the delivery of services in a timely manner.

6.4.2.4 The availability of services and materials needed to carry out a response action alternative must be assessed prior to selection. Two issues are of primary importance under this criterion:

- Can the services and materials be delivered conveniently?
- Are the quantities needed to implement the response action alternative available in a timely manner?

6.4.2.5 To the extent they are known, the property owner, community, and local agency acceptance of a response action alternative are factored into the analysis of alternatives. Any formal input received from the property owner, community, and local agency, as part of the public response period for this EE/CA report, will be factored into the final report.

6.4.3 Cost

6.4.3.1 Cost is a primary balancing criteria. Cost is also used to compare the major trade-offs between the response action alternatives. Cost is the amount of funds required to conduct and maintain the response action alternatives. Each response action alternative was assessed to determine the capital and operating costs that would be required:

1) **Capital Costs** are the response action costs and any costs for implementing an Institutional Control.
2) **Operating Costs** are any costs associated with long-term administrative controls or maintenance.

6.4.3.2 As the scope of work for each alternative is developed, an order of magnitude cost estimate is calculated for costs associated with the implementation of each response action. These costs include the direct and indirect capital costs as well as the operating costs incurred in implementing the response action. As part of this assessment, a time frame for completion of each of the proposed alternatives is also developed.

6.5 RESPONSE ACTION ALTERNATIVE SCREENING

For the response action alternative screening process, each of the potential response action alternatives was evaluated in terms of effectiveness, implementability and cost. If any response action alternative was determined to be either not effective or not implementable, then the response action alternative was eliminated from consideration. The response action alternatives were evaluated independently of each other. The result of the response action alternative screening process is described for each AOI below.

6.5.1 Test Area 4

6.5.1.1 Although Test Area 4 was historically used for CWM testing, the area where the majority of the testing occurred has been removed by dredging operations. During

the EE/CA investigation, there was no indication that CWM or chemical agent contaminated media remains on the site. The NDAI alternative was evaluated based on the current knowledge of the site conditions and the historical information pertaining to the potential CWM or chemical agent contaminated media within this area. The NDAI alternative is considered effective and implementable at no cost for Test Area 4.

6.5.1.2 The implementation of ICs for Test Area 4 was evaluated in terms of effectiveness, implementability and cost. Institutional controls are generally considered effective and implementable at Test Area 4; specific types of ICs are further evaluated in Section 7 of this EE/CA Report. The cost associated with the implementation of ICs within Test Area 4 is not considered prohibitive to implementation.

6.5.1.3 Implementation of the Removal Action alternative would not provide any additional protection of public safety and the human environment based on historical studies and the results of this EE/CA investigation. No CWM was identified, nor were any chemical agents detected at Test Area 4. The Removal Action alternative is not effective because it would not provide any reduction in the already low risk of exposure by the public to CWM or chemical agents. Therefore, no further analysis of this alternative was performed.

6.5.2 Test Area 5

6.5.2.1 Although Test Area 5 was historically used for CWM testing, historical documentation of the CWM testing conducted within Test Area 5 indicated that two CWM tests were conducted. During the EE/CA investigation, there was no indication that CWM or chemical agent contaminated media remains on the site. The NDAI alternative was evaluated based on the current knowledge of the site conditions and the historical information pertaining to the potential CWM or chemical agent contaminated media within this area. The NDAI alternative is considered effective and implementable at no cost for Test Area 5.

6.5.2.2 The implementation of ICs for Test Area 5 was evaluated in terms of effectiveness, implementability and cost. Institutional controls are generally considered effective and implementable at Test Area 5; specific types of ICs are further evaluated in Section 7 of this EE/CA Report. The cost associated with the implementation of ICs within Test Area 5 is not considered prohibitive to implementation.

6.5.2.3 Implementation of the Removal Action alternative would not provide any additional protection of public safety and the human environment based on historical studies and the results of this EE/CA investigation. No CWM was identified nor were any chemical agents detected at Test Area 5. The Removal Action alternative is not effective because it would not provide any reduction in the already low risk of exposure by the public to CWM or chemical agents. Therefore, no further analysis of this alternative was performed.

6.5.3 Test Area 8

6.5.3.1 Although Test Area 8 was historically used for CWM testing, documentation of the CWM testing conducted within Test Area 8 indicated that only one CWM test was conducted. During the EE/CA investigation, there was no indication that CWM or chemical agent contaminated media remains on the site. The NDAI alternative was evaluated based on the current knowledge of the site conditions and the historical information pertaining to the potential CWM or chemical agent contaminated media within this area. The NDAI alternative is considered effective and implementable at no cost for Test Area 8.

6.5.3.2 The implementation of ICs for Test Area 8 was evaluated in terms of effectiveness, implementability and cost. Institutional controls are generally considered effective and implementable at Test Area 8; specific types of ICs are further evaluated in Section 7 of this EE/CA Report. The cost associated with the implementation of IC within Test Area 8 is not considered prohibitive to implementation.

6.5.3.3 Implementation of the Removal Action alternative would not provide any additional protection of public safety and the human environment based on historical studies and the results of this EE/CA investigation. No CWM-related items were identified or chemical agents detected at Test Area 8. The Removal Action alternative is not effective because it would not provide any reduction in the already low risk of exposure by the public to CWM or chemical agents. Therefore, no further analysis of this alternative was performed.

6.5.4 Flamingo Bay Landfill Area

6.5.4.1 Although the Flamingo Bay Landfill Area was not historically used for CWM testing, suspected chemical agent contaminated media in the form of 3X scrap was historically identified on the site and is currently present on the landfill surface (vented 1-ton container) and at the waterline near the landfill (concrete-filled 500-lb. bomb). The NDAI alternative was evaluated based on the current knowledge of the site conditions and the historical information pertaining to the potential CWM or chemical agent contaminated media within this area. The NDAI alternative is considered effective and implementable at no cost for the Flamingo Bay Landfill Area.

6.5.4.2 The implementation of ICs for Flamingo Bay Landfill Area was evaluated in terms of effectiveness, implementability and cost. Institutional controls are generally considered effective and implementable at Flamingo Bay Landfill Area; specific types of ICs are further evaluated in Section 7 of this EE/CA Report. The cost associated with the implementation of IC within the Flamingo Bay Landfill Area is not considered prohibitive to implementation.

6.5.4.3 Implementation of the Removal Action alternative would consist of proper disposal by incineration, at an off-site facility of the vented 1-ton container on the landfill surface and the concrete-filled 500-lb. bomb at the waterline near the landfill. Removal

of these 3X scrap items is effective and implementable, and could be performed for a reasonable cost. Therefore, this alternative will be further evaluated.

6.6 SITE-WIDE INSTITUTIONAL CONTROLS

6.6.1 There are several possible components that could be implemented as part of an IC alternative. These individual components were evaluated in terms of effectiveness, implementability, and cost, in order to select those components that would best comprise an IC response. Table 6.2 provides a summary of the evaluation of potential IC components.

6.6.2 The following IC components were determined to be applicable to use in an IC response alternative based on their effectiveness, implementability, and cost:

- Signage; and
- Brochures and/or fact sheets

The remaining IC components were determined to be of little or no effectiveness, and difficult or not possible to implement.

6.7 COMPARATIVE ANALYSIS OF RESPONSE ACTION ALTERNATIVES

6.7.1 Overview

6.7.1.1 For each AOI, the applicability of three CWM response action actions were evaluated in Subsection 6.5 based on effectiveness, implementability, and cost. This evaluation was performed in order to screen the alternatives based on their compliance with the minimum requirements of the evaluation criteria. In this subsection, the response actions that passed the preliminary screening for each AOI are further analyzed and compared against each other for relative effectiveness, implementability, and cost. For the evaluation criteria, the response actions at each AOI are ranked in order to develop the best response alternative for each AOI.

6.7.1.2 The evaluation under the effectiveness category involves the consideration of four criteria. These four criteria are protection of public safety and the human environment, compliance with ARARs, long-term effectiveness, and short-term effectiveness.

6.7.1.3 The evaluation under the implementability category involve the consideration of six criteria. These criteria include: technical feasibility; administrative feasibility; availability of services and materials; property owner acceptance; local agency acceptance; and community acceptance.

6.7.1.4 The evaluation under the effectiveness category involves the consideration of four criteria. These four criteria are protection of public safety and the human

environment, compliance with ARARs, long-term effectiveness, and short-term effectiveness.

6.7.1.5 The evaluation under the implementability category involves the consideration of six criteria. These criteria include technical feasibility, administrative feasibility, availability of services and materials, property owner acceptance, local agency acceptance, and community acceptance.

6.7.1.6 The cost estimates for each response action are based on the best currently available information.

6.7.2 Comparative Analysis for Test Area 4

Only the NDAI and IC response alternatives met the minimum requirements of the screening evaluation criteria. The IC alternative includes only components that would be implemented on a site-wide basis, not at an individual AOI. The comparative analysis evaluation factors for the NDAI and the site-wide IC alternatives are discussed below.

6.7.2.1 Effectiveness

6.7.2.1.1 Overall Protection of Public Safety and Human Environment

The NDAI alternative implements no action at the site. Therefore, this alternative would have no impact on the overall protection of public safety and human environment. The site-wide IC alternative provides a greater level of protection of public safety and human environment by educating residents and visitors of Water Island about the location of Test Area 4 and the associated potential hazards.

6.7.2.1.2 Compliance with ARARs

No special considerations or ARARs have been identified for implementation of either the NDAI alternative or the site-wide ICs.

6.7.2.1.3 Long-Term Effectiveness

The NDAI alternative provides long-term effectiveness since no CWM sources were identified during the EE/CA field investigation. The site-wide IC alternative provides greater long-term effectiveness by identifying the location of Test Area 4 and stating the associated potential risk.

6.7.2.1.4 Short-Term Effectiveness

Because no action would be implemented, there are no risks associated with the safety of workers during the implementation period for the NDAI alternative. Very little risk is associated with the safety of workers during the implementation of the site-wide IC alternative.

Table 6.2
Summary of Institutional Control Components

Component	Effectiveness	Implementation	Initial Cost	Annual Cost
Access Control				
Fencing	Limited effectiveness; trespassers can easily breach fences, especially in remote areas such as Water Island. Damage from storms and hurricanes could allow access until repairs are made. Therefore, fencing would not provide any significant reduction in risk.	Implementable, but harsh climate would result in extensive repairs and early replacement; access road through the Flamingo Bay Landfill Area would be blocked to through traffic	NA	NA
Signs	Effective in warning residents and visitors of potential hazards.	Implementable; few signs would have to be produced and maintained.	$12,700	$4,750[a]
Land Use Restrictions & Regulatory Control	Limited effectiveness; there is limited oversight of land uses due to remoteness of the island, and DoD has no enforcement authority.	Difficult to implement; would require local government action that cannot be controlled or enforced by DoD.	NA	NA
Notice				
Deed Notification	Limited effectiveness; notifications not always found during property transfers.	Difficult to implement; DoD has no regulatory authority to enforce notification procedures.	NA	NA
Notice At Permitting	Limited effectiveness; permits are not always obtained for construction activities.	Same as above	NA	NA
Tax Bill Notification	Limited effectiveness; notification does not extend to visitors or to residents who are not property owners.	Implementable if cooperation is obtained from local government.	NA	NA
Printed Media				
Brochures/Fact Sheets	Effective in warning residents and visitors of potential hazards.	Implementable	$4,500[b]	$1,000[b]
Press Releases	Limited effectiveness for non-residents; most visitors will not have read local newspapers when articles are published.	Implementable	NA	NA

Table 6.2 (continued)
Summary of Institutional Control Components

Alternative	Effectiveness	Implementation	Initial Cost	Annual Cost
Classroom Education	Limited effectiveness; visitors would not be reached and there are no businesses on the island whose workers would need to be trained.	Difficult to implement due to the high number of non-resident and seasonal visitors to the island.	NA	NA
Visual Media Videotapes and television	Limited effectiveness for non-residents; visitors would not be reached.	Implementable	NA	NA
Exhibits/Displays (Stationary & Mobile)	Not effective because there are no museums or other public areas on Water Island where an exhibit could be displayed.	Implementable	NA	NA
Internet Web Site	Limited effectiveness; most visitors would not see the website prior to visiting.	Implementable	NA	NA
Ad hoc Committee	Limited effectiveness; visitors would not be reached by the committee.	Implementable	NA	NA

a – Assumes replacement of both signs every 2 years on average.
b – Includes initial design and printing of 1000 copies; annual cost is average for reprinting and shipping, and replacement of damaged holders.
NA – Not applicable; costs were not determined for alternative components that are of limited effectiveness or limited implementability.

6.7.2.2 Implementability

The NDAI and site-wide IC response alternative were evaluated as being implementable based on a subjective analysis of six criteria listed below.

6.7.2.2.1 Technical Feasibility

In this criterion, the NDAI alternative was evaluated as being implementable from a technical standpoint. The implementation of the site-wide IC is technically feasible.

6.7.2.2.2 Administrative Feasibility

The NDAI alternative requires no administrative effort at all. Administratively, the NDAI alternative is implementable. The implementation of site-wide ICs would require minimal administrative effort for procurement of materials and services, and in local coordination for installation of signs and distribution of brochures.

6.7.2.2.3 Availability of Services and Materials

The NDAI alternative requires no specialized services or materials to implement. Services and materials are readily available for the implementation of the site-wide ICs.

6.7.2.2.4 Local Agency Acceptance

The local agency acceptance of either the NDAI or the site-wide IC alternative is unknown at this time. Input received from the local government agencies, as part of the public response period for this EE/CA report, will be incorporated into the final report, as appropriate.

6.7.2.2.5 Community Acceptance

The community acceptance of either the NDAI or site-wide IC alternatives is not clear at this time. Input received from the community, as part of the public response period for this EE/CA report, will be incorporated into the final report, as appropriate.

6.7.2.3 Cost

There is no cost associated with the NDAI alternative. The cost associated with the implementation of site-wide ICs is considered cost-effective.

6.7.2.4 Overall Evaluation

The overall evaluation of the NDAI alternative indicates it is effective, implementable and has no additional costs. In the overall evaluation of the site-wide ICs, they are considered to be effective, implementable and cost effective. It is recommended that site-wide ICs be implemented. Further input from stakeholders will be solicited during subsequent public meetings, and incorporated where appropriate into the recommendations.

6.7.3 Comparative Analysis for Test Area 5

Only the NDAI and IC response alternatives met the minimum requirements of the screening evaluation criteria. The IC alternative includes only components that would be implemented on a site-wide basis, not at an individual AOI. The comparative analysis evaluation factors for the NDAI and the site-wide IC alternatives are discussed below.

6.7.3.1 Effectiveness

6.7.3.1.1 Overall Protection of Public Safety and Human Environment

The NDAI alternative implements no action at the site. Therefore, this alternative would have no impact on the overall protection of public safety and human environment. The site-wide IC alternative provides a greater level of protection of public safety and human environment by educating residents and visitors of Water Island about the location of Test Area 5 and the associated potential hazards.

6.7.3.1.2 Compliance with ARARs

No special considerations or ARARs have been identified for implementation of either the NDAI alternative or the site-wide ICs.

6.7.3.1.3 Long-Term Effectiveness

The NDAI alternative provides long-term effectiveness since no CWM sources were identified during the EE/CA field investigation. The site-wide IC alternative provides greater long-term effectiveness by identifying the location of Test Area 5 and stating the associated potential risk.

6.7.3.1.4 Short-Term Effectiveness

Because no action would be implemented, there are no risks associated with the safety of workers during the implementation period for the NDAI alternative. Very little risk is associated with the safety of workers during the implementation of the site-wide IC alternative.

6.7.3.2 Implementability

The NDAI and site-wide IC response alternative were evaluated as being implementable based on a subjective analysis of six criteria listed below.

6.7.3.2.1 Technical Feasibility

In this criterion, the NDAI alternative was evaluated being implementable from a technical standpoint. The implementation of the site-wide IC is technically feasible.

6.7.3.2.2 Administrative Feasibility

The NDAI alternative requires no administrative effort at all. Administratively, the NDAI alternative is implementable. The implementation of site-wide ICs would require minimal administrative effort.

6.7.3.2.3 Availability of Services and Materials

The NDAI alternative requires no specialized services or materials to implement. Services and materials are available for the implementation of the site-wide ICs.

6.7.3.2.4 Local Agency Acceptance

The local agency acceptance of either the NDAI or site-wide IC alternative is unknown at this time. Input received from the local government agencies, as part of the public response period for this EE/CA report, will be incorporated into the final report, as appropriate.

6.7.3.2.5 Community Acceptance

The community acceptance of either the NDAI or site-wide IC alternatives is not clear at this time. Input received from the community, as part of the public response period for this EE/CA report, will be incorporated into the final report, as appropriate.

6.7.3.3 Cost

There is no cost associated with the NDAI alternative. The cost associated with the implementation of site-wide ICs is not considered preventative.

6.7.3.4 Overall Evaluation

The overall evaluation of the NDAI alternative indicates it is effective, implementable and has no additional costs. In the overall evaluation of the site-wide ICs, they are considered to be effective, implementable and cost effective. It is recommended that site-wide ICs be implemented. Further input from stakeholders will be solicited during subsequent public meetings, and incorporated where appropriate into the recommendations.

6.7.4 Comparative Analysis for Test Area 8

Only the NDAI and IC response alternatives met the minimum requirements of the screening evaluation criteria. The IC alternative includes only components that would be implemented on a site-wide basis, not at an individual AOI. The comparative analysis evaluation factors for the NDAI and the site-wide IC alternatives are discussed below.

6.7.4.1 Effectiveness

6.7.4.1.1 Overall Protection of Public Safety and Human Environment

The NDAI alternative implements no action at the site. Therefore, this alternative would have no impact on the overall protection of public safety and human environment. The site-wide IC alternative provides a greater level of protection of public safety and human environment by educating residents and visitors of Water Island about the location of Test Area 8 and the associated potential hazards.

6.7.4.1.2 Compliance with ARARs

No special considerations or ARARs have been identified for implementation of either the NDAI alternative or the site-wide ICs.

6.7.4.1.3 Long-Term Effectiveness

The NDAI alternative provides long-term effectiveness since no CWM sources were identified during the EE/CA field investigation. The site-wide IC alternative provides greater long-term effectiveness by identifying the location of Test Area 8 and stating the associated potential risk.

6.7.4.1.4 Short-Term Effectiveness

Because no Removal Action would be implemented, there are no risks associated with the safety of workers during the implementation period for the NDAI alternative. Very little risk is associated with the safety of workers during the implementation of the site-wide IC alternative.

6.7.4.2 Implementability

The NDAI and site-wide IC response alternative were evaluated as being implementable based on a subjective analysis of six criteria listed below.

6.7.4.2.1 Technical Feasibility

In this criterion, the NDAI alternative was evaluated being implementable from a technical standpoint. The implementation of the site-wide IC is technically feasible.

6.7.4.2.2 Administrative Feasibility

The NDAI alternative requires no administrative effort at all. Administratively, the NDAI alternative is implementable. The implementation of site-wide ICs would require minimal administrative effort.

6.7.4.2.3 Availability of Services and Materials

The NDAI alternative requires no specialized services or materials to implement. Services and materials are available for the implementation of the site-wide ICs.

6.7.4.2.4 Local Agency Acceptance

The local agency acceptance of either the NDAI or site-wide IC alternative is unknown at this time. Input received from the local government agencies, as part of the public response period for this EE/CA report, will be incorporated into the final report, as appropriate.

6.7.4.2.5 Community Acceptance

The community acceptance of either the NDAI or site-wide IC alternatives is not clear at this time. Input received from the community, as part of the public response period for this EE/CA report, will be incorporated into the final report, as appropriate.

6.7.4.3 Cost

There is no cost associated with the NDAI alternative. The cost associated with the implementation of site-wide ICs is not considered preventative.

6.7.4.4 Overall Evaluation

The overall evaluation of the NDAI alternative indicates it is effective, implementable and has no additional costs. In the overall evaluation of the site-wide ICs, they are considered to be effective, implementable and cost effective. It is recommended that site-wide ICs be implemented. Further input from stakeholders will be solicited during subsequent Public Meetings, and incorporated where appropriate into the recommendations.

6.7.5 Comparative Analysis for Flamingo Bay Landfill Area

The NDAI, IC, and Removal Action response alternatives all met the minimum requirements of the screening evaluation criteria. The IC alternative includes only components that would be implemented on a site-wide basis, not at an individual AOI. A comparative analysis was performed between the NDAI, site-wide ICs and Removal Action response alternatives. The comparative analysis evaluation factors are discussed below.

6.7.5.1 Effectiveness

6.7.5.1.1 Overall Protection of Public Safety and Human Environment

The NDAI alternative implements no action at the site. Therefore, this alternative would have no impact on the overall protection of public safety and human environment. The Removal Action alternative would result in the removal of known 3X scrap from the site. The 3X scrap that has been identified at the site poses little or no threat to public safety and the human environment, so there would be little effect on overall protection.

6.7.5.1.2 Compliance with ARARs

Current DoD policy for 3X scrap specifies how the material should be controlled and disposed of. Removal of existing 3X scrap would comply with DoD guidance for final disposition of such items, whereas NDAI would result in non-compliance with DoD policy.

6.7.5.1.3 Long-Term Effectiveness

The 3X scrap that has been identified on the site poses little, if any, threat to public safety or the human environment. However, removal of such items would reduce the risk of non-CWM physical injuries that could result from the presence of the scrap.

6.7.5.1.4 Short-Term Effectiveness

Because no action would be implemented, there are no risks associated with the safety of workers during the implementation period for the NDAI alternative. The Removal Action alternative would pose small risks to onsite workers responsible for packaging and moving the 3X scrap from the site to its final disposition. Such risks, however, would not result from exposure to chemical agent, but from physical injuries related to moving heavy items.

6.7.5.2 Implementability

Both response alternatives were determined to be implementable based on a subjective analysis of six criteria listed below.

6.7.5.2.1 Technical Feasibility

In this criterion, the NDAI alternative was evaluated being implementable from a technical standpoint. Removal is also technically feasible, as the required equipment and personnel are readily available.

6.7.5.2.2 Administrative Feasibility

The NDAI alternative requires no administrative effort at all. Administratively, the NDAI alternative is implementable. The Removal Action alternative requires coordination with and oversight by DoD representatives and/or contractors. Shipping through United States Customs would require the completion of appropriate paperwork.

6.7.5.2.3 Availability of Services and Materials

The NDAI alternative requires no specialized services or materials to implement. The required equipment and personnel are readily available for the Removal Action alternative.

6.7.5.2.4 Local Agency Acceptance

The local agency acceptance of either alternative is unknown at this time. Input received from the local government agencies, as part of the public response period for this EE/CA report, will be incorporated into the final report, as appropriate.

6.7.5.2.5 Community Acceptance

The community acceptance of either alternative is not clear at this time. Input received from the community, as part of the public response period for this EE/CA report, will be incorporated into the final report, as appropriate.

6.7.5.3 Cost

There is no cost associated with the NDAI alternative. The cost for removal of 3X scrap is estimated to be approximately $35,900 as shown in Table 6.3. This cost includes coordination, travel, onsite personnel and equipment for packaging of the scrap, shipment of the scrap by barge from Water Island to St. Thomas Island, transfer from the barge to a cargo ship, shipping to the U.S. mainland, and truck transport to an approved facility for incineration and final disposal. Additional costs for government oversight and for a USACE representative on site for signing shipping manifests at the waste generator are not included in this estimate.

6.7.5.4 Overall Evaluation

6.7.5.4.1 The overall evaluation of the NDAI alternative indicates it is effective, implementable and has no additional costs. The Removal Action alternative is also effective and implementable. Although the cost for removal of 3X scrap is greater than that for NDAI, only the Removal Action alternative complies with DoD policy for final disposition of the scrap.

6.7.5.4.2 Further input from stakeholders will be solicited during subsequent Public Meetings, and incorporated where appropriate into the recommendations.

Table 6.3
Cost Estimate for 3X Removal
Flamingo Bay Landfill Area, Former Fort Segarra

Description	Total Cost
Contractor Field Oversight[1]	$13,200
Contractor Coordination and Management[2]	$5,100
Cutting and Handling Subcontractor (Water Island)[3]	$5,000
Disposal Contractor[4]	$10,400
Documentation[5]	$2,200
TOTAL ESTIMATED COST:	**$35,900**

Notes:

[1]Includes mobilization and demobilization for 2 persons, 3 days in the USVI

[2]Includes coordination, procurement, and management

[3]Subcontractor to cut up the 3X items, package them and stage to St. Thomas Island

[4]Estimate for waste disposal contractor to ship the 3X items to the US, convert to 5X and dispose of the remains in a landfill

[5]Letter report describing 3X removal and verification of disposal

SECTION 7
INSTITUTIONAL CONTROL PLAN

7.1 INTRODUCTION

The institutional control plans of action are called Institutional Control (IC) strategies. These strategies rely on existing powers and authorities of other government agencies to protect the public at large from CWM risks.

7.2 METHODOLOGY

The methodology used to analyze potential institutional control strategies included the review of government institutions and non-government entities that exercise jurisdiction or ownership of the AOIs investigated at the former Fort Segarra. The results of the study determined the primary governmental agency having control over the AOIs investigated at the former Fort Segarra is the DOI or the USVI government when and if the property is transferred.

7.3 RECOMMENDATIONS

7.3.1 Overview

7.3.1.1 The recommended institutional control strategies were based on discussions with the USACE, Parsons professional experience with ICs, and overall knowledge of the site and conditions. The recommendations are considered to be appropriate methods for reducing CWM risks to the public. The recommended institutional control strategies are considered to be an effective complement to the other potential response action alternatives discussed in this EE/CA. The following subsections discuss the potential institutional control strategies. The alternatives are presented in the recommended order of importance.

7.3.1.2 This subsection provides an analysis of the IC response action alternative with respect to the selection criteria specified. Many of the components within the IC Alternative (Alternative 2) do not need to be applied to the all of the AOIs investigated as a whole, and, therefore individual components were evaluated on a "site-specific" basis.

7.3.1.3 The following subsections provide an analysis of each component with respect to effectiveness, implementability, and cost. Because CWM or chemical agent contaminated media was not identified and potential unidentified 3X scrap will not be removed as a result of implementation of the IC Alternative, a reduction in risk over the NDAI Alternative cannot be quantified. However, the inherent goal of the ICs is to favorably modify the public's behavior, thereby decreasing the risk.

7.3.2 Access Control – Fencing, Signs, Land Use Restrictions and Regulatory Control

7.3.2.1 **Effectiveness**: Fencing can reduce the risk of exposure to CWM contamination because it provides restraint to inadvertent entry based on the concept of respect for property rights; however, fencing would be of limited effectiveness at the former Fort Segarra for several reasons. A fence cannot keep out those determined to enter a property, especially in remote, unguarded locations such as the AOIs on Water Island. The harsh natural environment, including tropical storms and hurricanes, could result in frequent damage to fencing, which would allow access until repairs are made. This factor is especially critical over the long-term as the fencing materials age and corrode.

7.3.2.2 The posting of signs would provide warnings of the potential presence of CWM-related items on Water Island. Posted at the two docks, all island residents and visitors would receive notification of potential hazards. The signs can include instructions regarding how a CWM discovery should be reported. Signs often become convenient targets for vandalism and are also subject to the effects of the harsh environment. However, maintenance and replacement of the signs is simple to accomplish.

7.3.2.3 Land use restrictions and regulatory control can be effective in some circumstances. Regulatory powers can be used to control the type, location, design, and construction materials and techniques of all development that occurs within the AOI investigated. These controls provide the owner the ability to inform prospective developers about the potential of CWM, require additional CWM surveys if necessary, and deny clearing and construction where significant CWM is thought to exist. It is possible to recommend that the land uses be revised to prohibit development entirely or to restrict development to lower intensities. However, land use restrictions and regulatory controls would be of limited effectiveness at the former Fort Segarra. Due to the remoteness of Water Island, there is limited oversight of development by local regulatory agencies, and DoD has no enforcement powers of its own in this regard.

7.3.2.4 **Implementability:** Fencing can be installed at the AOIs, and fencing was previously installed around a portion of the Flamingo Bay Landfill Area. However, the harsh environment on Water Island would necessitate frequent inspections and repairs, and fencing may have a limited lifespan, necessitating frequent replacement. Access roads may also have to be blocked in some areas in order to completely control access.

7.3.2.5 Posting of signs would be easy to implement. Signs could easily be transported to Water Island and erected at each of the docks using local labor. Likewise, repair and replacement of the signs could be easily accomplished with local labor and materials.

7.3.2.6 Implementation of land use restrictions would be difficult. The restrictions would have to be put into place by the authority of the local government, and regulatory

oversight would have to be conducted by local agencies. DoD has no authority to enact or enforce such restrictions on Water Island.

7.3.2.7 **Cost:** The initial cost to produce and install a sign at each dock would be approximately $12,700.

7.3.3 Notice – Deed Notifications, Notification during Property Transfers, Notification during Permitting, Tax Bill Notification

7.3.3.1 **Effectiveness:** Appropriate notice can exert a strong influence on individual behavior. When notice of potential CWM contamination is given, it can affect the expectations of potential users. Notices can be placed on a property by deed notification, notification during property transfers, notification during permitting processes, and notification by tax bill.

7.3.3.2 However, the overall effectiveness of these notice procedures is expected be low at this location. There are a large number of visitors to the island who would not receive any notification through these methods. Also, notifications are not always found during property transfers, and permits are not always obtained for construction activities, further limiting the effectiveness.

7.3.3.3 **Implementability:** Local governments can implement permitting requirements but may be unlikely to do so if they are perceived as an obstacle to new growth. Also, property owners may be resistant to any restrictions that could be perceived to the permitted uses of properties. Therefore, these notifications may be difficult to implement without the full cooperation of local government.

7.3.3.4 **Cost:** Costs were not estimated for these components because they are of limited effectiveness and their implementability is difficult.

7.3.4 Printed Media

7.3.4.1 **Effectiveness:** Providing information via printed media may be effective in modifying behavior by educating the public at-large and public officials about the potential presence of CWM or chemical agent contaminated media within the AOIs investigated and its potential impact. Much of the local populace is somewhat familiar with the historical significance of the former Fort Segarra and the type of testing conducted there, but newcomers and visitors to the area are unlikely familiar with the past activities on the island. Therefore brochures/fact sheets would need to be made available through various distribution points for public dissemination. Distribution of the brochures or fact sheets on a one-time basis would not be effective. These would need to be restocked to the appropriate distribution sources at regularly scheduled intervals. In addition to brochures/fact sheets, newspaper articles concerning the former Fort Segarra and the potential for CWM or chemical agent contaminated media in the area could to be submitted to the local papers for circulation. Newspaper articles and brochures/fact sheets would have to be updated as conditions change in the area. However, newspaper

articles would not be effective in reaching visitors to the island, or residents who don't read the local newspaper.

7.3.4.2 **Implementability:** Information concerning the potential chemical warfare contamination at the AOIs investigated has been distributed in newspaper articles and in public meetings with island residents. A fact sheet describing the EE/CA investigation and the site history of the former Fort Segarra has been distributed during previous public meetings concerning the EE/CA investigation. Continued public dissemination is readily implementable and can be easily augmented to include brochures/fact sheets as discussed above. Local institutions would likely be agreeable to assist in distribution of the information.

7.3.4.3 **Cost:** The existing fact sheet is a professional quality, two-sided color sheet designed as an 8 ½ x 11 inch mailer or handout. The estimated cost to update the existing fact sheet and print copies is approximately $4,500. After the first update is completed and submitted, additional updates are not anticipated, although reprinting at a cost of $1,000 per 1,000 copies would be necessary on an occasional basis.

7.3.5 Classroom Education

7.3.5.1 **Effectiveness:** The presentation of programs at the private school on Water Island would be of limited effectiveness in educating the public about the potential presence of CWM at the AOIs investigated. Visitors to the island would not be reached by this method, and there are no schools are businesses on Water Island where large numbers of the population would be educated at one time.

7.3.5.2 **Implementability:** Providing classroom education would be difficult to implement due to the large number of visitors and seasonal residents.

7.3.5.3 **Cost:** Costs were not estimated for this component because they are of limited effectiveness and their implementability is difficult.

7.3.6 Visual Media

7.3.6.1 **Effectiveness:** Visual media programs for television, classroom, civic clubs, and other groups would be of limited effectiveness because they would not reach visitors to the island.

7.3.6.2 **Implementability:** Providing information via the visual media would be easily implementable.

7.3.6.3 **Cost:** Costs were not estimated for this component because it is of limited effectiveness.

7.3.7 Exhibits/Displays

7.3.7.1 **Effectiveness:** Placing exhibits or displays in museums or other area where the public will be exposed to educational information can be an effective method of

increasing and preserving general awareness and educating the public about the possible risk associated with CWM on the AOIs investigated. The presentation of information through exhibits and displays is not considered an effective approach for the AOIs investigated because there are no museums or other public facilities on Water Island where an exhibit could be displayed. The cost of producing, maintaining, and updating this kind of display is significant. The use of other methods of public education described in this section is considered more effective.

7.3.7.2 **Implementability:** The implementation of exhibits and mobile displays is not recommended for the former Fort Segarra.

7.3.7.3 **Cost:** The cost for the implementation of exhibits and mobile displays was not developed as this form of public education was not considered effective for the former Fort Segarra.

7.3.8 Internet Web Site

7.3.8.1 **Effectiveness:** An internet web page would be less effective than some of the other alternatives in facilitating public awareness because it provides information only to those who access the web page. Visitors and many residents would not be reached by a Web Site.

7.3.8.2 **Implementability:** Creation of a web site should be easily implementable.

7.3.8.3 **Cost:** Costs were not estimated for this component because they are of limited effectiveness and their implementability is difficult.

7.3.9 Ad Hoc Committee

7.3.9.1 **Effectiveness:** The creation of an ad hoc committee would be of limited effectiveness because the large number of visitors, and many seasonal residents, would not be reached.

7.3.9.2 **Implementability:** Creation of an ad hoc committee should be easily implementable.

7.3.9.3 **Cost:** Costs were not estimated for this component because it is of limited effectiveness.

7.4 IC SUMMARY

Table 7.1 presents a summary of the IC analysis.

Table 7.1
Summary of Institutional Control Components

Alternative	Effectiveness	Implementation	Initial Cost	Annual Cost
Access Control				
Fencing	Limited effectiveness; trespassers can easily breach fences, especially in remote areas such as Water Island. Damage from storms and hurricanes could allow access until repairs are made.	Implementable, but harsh climate would result in extensive repairs and early replacement; access road through the Flamingo Bay Landfill Area would be blocked to through traffic	NA	NA
Signs	Effective in warning residents and visitors of potential hazards.	Implementable; few signs would have to be produced and maintained.	$12,700	$4,750[a]
Land Use Restrictions & Regulatory Control	Limited effectiveness; there is limited oversight of land uses due to remoteness of the island, and DoD has no enforcement authority.	Difficult to implement; would require local government action that cannot be controlled or enforced by DoD.	NA	NA
Notice				
Deed Notification	Limited effectiveness; notifications not always found during property transfers.	Difficult to implement; DoD has no regulatory authority to enforce notification procedures.	NA	NA
Notice At Permitting	Limited effectiveness; permits are not always obtained for construction activities.	Same as above	NA	NA
Tax Bill Notification	Limited effectiveness; notification does not extend to visitors or to residents who are not property owners.	Implementable if cooperation is obtained from local government.	NA	NA
Printed Media				
Brochures/Fact Sheets	Effective in warning residents and visitors of potential hazards.	Implementable	$4,500[b]	$1,000[b]
Press Releases	Limited effectiveness for non-residents; most visitors will not have read local newspapers when articles are published.	Implementable	NA	NA

Table 7.1 (continued)
Summary of Institutional Control Components

Alternative	Effectiveness	Implementation	Initial Cost	Annual Cost
Classroom Education	Limited effectiveness; visitors would not be reached and there are no businesses on the island whose workers would need to be trained.	Difficult to implement due to the high number of non-resident and seasonal visitors to the island.	NA	NA
Visual Media Videotapes and television	Limited effectiveness for non-residents; visitors would not be reached	Implementable	NA	NA
Exhibits/Displays (Stationary & Mobile)	Not effective because there are no museums or other public areas on Water Island where an exhibit could be displayed	Implementable	NA	NA
Internet Web Site	Limited effectiveness; most visitors would not see the website prior to visiting.	Implementable	NA	NA
Ad hoc Committee	Limited effectiveness; visitors would not be reached by the committee.	Implementable	NA	NA

a – Assumes replacement of the signs every 2 years on average.
b – Includes initial design and printing of 5000 copies; annual cost is average for reprinting and shipping, and replacement of damaged holders.
NA – Not applicable; costs were not determined for alternative components that are of limited effectiveness or limited implementability.

SECTION 8
RECOMMENDED RESPONSE ACTION ALTERNATIVES

8.1 INTRODUCTION

Each of the identified AOIs was screened as to the applicability of the three CWM response action alternatives based on effectiveness, implementability, and cost. After elimination of the response action alternatives that failed the above criteria, the remaining alternatives for each AOI were qualitatively compared in relative terms against one another. In this manner, the most appropriate response action alternative for a specific AOI was recommended.

8.2 RECOMMENDED SITE-WIDE INSTITUTIONAL CONTROLS

8.2.1 Site-wide institutional controls are recommended for addressing all of the AOIs investigated at the former Fort Segarra. These site-wide ICs would inform residents and visitors at Water Island about the historical activities conducted within each of the AOIs. Specific ICs would consist of an informational sign at each of the two docks on Water Island with accompanying informational brochures.

8.2.2 Because of the very low probability that any CWM or chemical agent contaminated media may remain at the former Fort Segarra, the implementation of ICs will provide a sufficient level of protection of public safety and the human environment.

8.3 RECOMMENDED RESPONSE ACTION ALTERNATIVE FOR TEST AREA 4

8.3.1 The EE/CA investigation did not confirm that the AOI contained any CWM or chemical agent contaminated media. Although no CWM or chemical agent contaminated media were identified at Test Area 4 during the EE/CA investigation, and there is no historical documentation indicating burial of CWM on Water Island there can never be 100% assurance that no DoD related hazards exist anywhere on Water Island. Therefore, the implementation of site-wide ICs to inform residents and visitors of potential hazards from historical DoD activities was considered appropriate and passed the CWM response alternative screening process. **The site-wide IC response alternative is recommended for implementation.**

8.3.2 The effectiveness of the recommended response alternatives should be evaluated during the recurring review process as described in Section 8.8, below. Modifications to the recommended response alternative should be considered if it is determined that the recommended response alternative is ineffective.

8.4 RECOMMENDED RESPONSE ACTION ALTERNATIVE FOR TEST AREA 5

8.4.1 The EE/CA investigation did not confirm that the AOI contained any CWM or chemical agent contaminated media. Although no CWM or chemical agent contaminated media were identified at Test Area 5 during the EE/CA investigation, and there is no historical documentation indicating burial of CWM on Water Island, there can never be 100% assurance that no DoD-related hazards exist anywhere on Water Island. Therefore, the implementation of site-wide ICs to inform residents and visitors of potential hazards from historical DoD activities was considered appropriate and passed the CWM response alternative screening process. **The site-wide IC response alternative is recommended for implementation.**

8.4.2 The effectiveness of the recommended response alternatives should be evaluated during the recurring review process as described in Section 8.8, below. Modifications to the recommended response alternative should be considered if it is determined that the recommended response alternative is ineffective.

8.5 RECOMMENDED RESPONSE ACTION ALTERNATIVE FOR TEST AREA 8

8.5.1 The EE/CA investigation did not confirm that the AOI contained any CWM or chemical agent contaminated media. Although no CWM or chemical agent contaminated media were identified at Test Area 8 during the EE/CA investigation, and there is no historical documentation indicating burial of CWM on Water Island, there can never be 100% assurance that no DoD related hazards exist anywhere on Water Island. Therefore, the implementation of site-wide ICs to inform residents and visitors of potential hazards from historical DoD activities was considered appropriate and passed the CWM response alternative screening process. **The site-wide IC response alternative is recommended for implementation.**

8.5.2 The effectiveness of the recommended response alternatives should be evaluated during the recurring review process as described in Section 8.8, below. Modifications to the recommended response alternative should be considered if it is determined that the recommended response alternative is ineffective.

8.6 RECOMMENDED RESPONSE ACTION ALTERNATIVE FOR FLAMINGO BAY LANDFILL AREA

8.6.1 The EE/CA investigation did not confirm that the AOI contained any CWM. Chemical agent contaminated media, in the form of 3X scrap, was identified during this investigation. Specifically, a vented one-ton container was identified on the landfill surface, and a concrete-filled 500-lb. bomb casing was identified at the waterline near the landfill. The former contents of both are unknown; therefore, they are assumed to be 3X scrap.

8.6.2 It is recommended that these 3X scrap items be removed from the site and properly incinerated in accordance DoD policies and regulations. This action is

recommended in addition to the site–wide ICs. **The Removal response alternative is recommended for implementation at the Flamingo Bay Landfill Area, in conjunction with the implementation of site-wide institutional controls.**

8.6.3 The effectiveness of the recommended response alternatives should be evaluated during the recurring review process as described in Section 8.8, below. Modifications to the recommended response alternative should be considered if it is determined that the recommended response alternative is ineffective.

8.7 RESPONSE ACTION COST ESTIMATES

8.7.1 Site-Wide Institutional Controls

The initial cost to implement the recommended site-wide Institutional Controls for the former Fort Segarra is estimated to be approximately $17,200. The average annual cost is estimated to be $4,750. The initial costs include construction and installation of two permanent signs, and design and printing of informational brochures. The average annual costs include periodic replacement of the signs due to weather damage, vandalism, and aging, and periodic reprinting of the brochures.

8.7.2 Flamingo Bay Landfill Area

The estimated cost for removal of existing 3X scrap items at the Flamingo Bay Landfill Area is approximately $35,900 for removal from the site, transportation to a facility on the U.S mainland that can convert it to 5X and dispose of it, and documentation of the removal.

8.8 RESPONSE ACTION PERFORMANCE CRITERIA

8.8.1 Site-Wide IC Objectives

The effectiveness of the recommended response action will be evaluated as part of the required five-year review of the selected action. Performance criteria will be used in an attempt to determine whether the response action has been effective in meeting the following objectives of the site-wide ICs:

- To inform the public of potential risks resulting from historical DoD activities on Water Island and at the four specific areas of concern addressed by the EE/CA;
- To prevent exposure to potentially hazardous DoD-related items that may remain onsite as a result of historical DoD activities; and
- To ensure proper notification of authorities in the event that potentially hazardous DoD-related items are found.

8.8.2 Performance Criteria

At the five-year review, a subjective analysis will be conducted using the following performance criteria:

1. The information signs still in place, legible, and in locations where they are visible to arriving residents and visitors at Water Island.
2. Brochures still in stock and readily available to residents and visitors.
3. Residents and visitors knowledgeable that Water Island was historically used for DoD activities, and that potentially hazardous DoD-related items may remain on Water Island.
4. Residents and visitors knowledgeable that unknown items found in areas historically used for military activities should not be handled or disturbed.
5. Residents and visitors knowledgeable in procedures for notification of proper authorities in the event that potentially hazardous items are found.
6. If DoD-related items were found during the preceding five years, that proper notification procedures were followed.
7. That no injuries or chemical agent exposures resulted from the discovery of DoD-related items.

8.8.3 Performance Criteria Analysis

8.8.3.1 The above analysis of performance criteria may be performed through various means, including:

- Interviewing local governmental officials, police authorities, and military commands to determine whether any known or suspicious DoD-related items were reported on Water Island during the preceding review period;
- Interviewing local residents and leaders of Water Island civic associations to determine whether any injuries or other incidents relating to DoD-related items were known to have occurred;
- Surveying randomly-selected residents and visitors at Water Island about their knowledge of past DoD activities, potential risks resulting from historical military activities, and proper avoidance and notification procedures to be followed in the event a suspicious item is detected.

8.8.3.2 In addition to evaluating the effectiveness of the implemented response action, the results of the analysis will be used as one factor in determining whether the institutional controls need to be continued beyond the initial five-year period.

SECTION 9
QUALITY CONTROL

9.1 INTRODUCTION

The Quality Control Plan (Parsons, 2003b) developed for the former Fort Segarra intrusive investigation provided procedures for controlling and measuring the quality of all work performed during site activities. This plan provided the organization, responsibilities, policies, and procedures for maintaining the highest possible standards. Quality control procedures for environmental sampling performed at the AOIs in conjunction with this investigation were included in the Site-Specific Sampling and Analysis Plan for the former Fort Segarra (Parsons, 2003a). This site-specific plan was designed to provide for:

- Testing and standardizing equipment used to perform work;
- Determining the effectiveness of work performed;
- Inspecting the maintenance and accuracy of site records;
- Determining compliance with site safety, environmental, and operational plans.

9.2 REQUIREMENTS

The Parsons Quality Control Plan for the former Fort Segarra was written to encourage positive communication throughout the Parsons project team. It was also intended to foster clear communication between Parsons and the USAESCH. Honest and effective communication among the project team required that all parties clearly understand the project requirements. This QC plan dictated the methods and procedures that were used during this EE/CA, addressing personnel, equipment testing and calibration, QC inspection and audits, and data reduction and reporting. The QC plan has been written to encourage positive communication throughout the project team and was prepared in accordance with DID OE-005-11.

9.3 QC METHODS USED

9.3.1 Instruments and equipment used to gather and generate environmental data were tested with sufficient frequency and in such a manner that accuracy and reproducibility of results were consistent with the manufacturer's specifications.

9.3.2 At the beginning and end of each day's work, the operator tested for correct function of the Schonstedt magnetic locator using a specially designed test plot containing 2 or 3 metallic items and a standard procedure that was easily repeated. The items were buried at depths of one or two feet and the locations were marked. The

distance from the device determines the signal level, so the instrument can be tested at a range of amplitudes. If the response was not comparable to the initial response, the instrument would have been repaired or removed from service.

9.3.3 Global Positioning System (GPS) equipment was tested by occupying a known location such as a survey monument and recording the coordinates in a log book. The location was visited at the beginning and end of each day that the GPS unit was used.

9.3.4 Mechanized excavation equipment, such as backhoes, were inspected daily before use and the proper function was tested upon receipt by the operator. An inspection form was filled out for all heavy equipment and kept on file.

9.3.5 Testing, repair, or replacement records were filed and maintained by the Site Manager and were audited by the QC Manager. Testing records of the field instrumentation were filed with the Parsons Project Manager after the fieldwork was completed.

9.4 GEOGRAPHIC INFORMATION SYSTEM QUALITY CONTROL PROCEDURES

9.4.1 The accuracy of the geographic analysis is only as good as the underlying data being analyzed. Certain guidelines were necessary to ensure data quality. The Quality Assurance guidelines presented in this chapter pertain only to Geographic Information System (GIS) data that was loaded into the system.

9.4.2 Potential data problems included source data errors, data entry errors that were corrected, data editing errors that were corrected, data corruption errors that were prevented, and user errors that were anticipated.

9.4.3 QC measures were implemented to ensure that the data were within acceptable spatial accuracy parameters. The spatial accuracy of the intrusive investigative data (excavation and sampling locations) was determined by surveys of the site and sample locations in accordance with the NAD83 referenced to the State Plane Coordinate System.

9.5 CORRECTIVE ACTION

9.5.1 The following procedures were established to assure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, were promptly investigated, documented, evaluated, and corrected.

9.5.2 Adverse Conditions and Corrective Actions. When a significant condition adverse to quality was noted in the field or at other subcontractor locations, the cause of the condition was determined and corrective action taken to preclude repetition. Condition identification, cause, reference documents, and corrective action were documented and reported to the Site Manager, Project Manager, QC Manager, and Senior UXO Supervisor (SUXOS). Implementation of corrective actions was verified by documented follow-up action. All project personnel had the daily responsibility to

promptly identify problem areas, solicit approved corrective actions, and report any condition adverse to quality.

9.5.3 Corrective actions were initiated at a minimum:

- When predetermined acceptance standards were not attained,
- When procedures or data compiled was determined to be faulty,
- When equipment or instrumentation was found faulty,
- When quality assurance requirements were violated,
- As a result of system and performance audits, or
- As a result of management assessment.

9.6 QUALITY CONTROL REPORTS

9.6.1 During the project, the QC Manager prepared a QC report which discussed:

- The periodic assessment of measurement data accuracy, precision, and completeness; and
- Significant quality assurance problems and corrective actions taken.

9.6.2 In addition, the Parsons Project Manager received periodic updates concerning QC in the field or with the GIS. A separate data assessment report summarizing data quality information was prepared and submitted to the Parsons Project Manager.

9.7 OVERALL QC MANAGEMENT

9.7.1 It was the overall responsibility of the Parsons QC Manager for implementing QC activities for this project. Responsibility for field CWM operations QC rests with the Parsons QC Manager.

9.7.2 The Parsons Project Manager had overall responsibility for assigning QC responsibilities and ensuring that QC programs were implemented in accordance with the USAESCH SOW.

9.7.3 Quality Conformance Inspections (QCI) were conducted as outlined in the QCI Schedule (Parsons 2003b). The Site QC Manager had the latitude to modify this schedule based on the quality of the work being performed and his presence on site.

9.8 FIELD INVESTIGATION DOCUMENTATION

9.8.1 Daily Field Activity Records

Field activity logbooks were maintained daily and all entries were recorded in ink. All personnel used bound and numbered field logbooks with consecutively numbered pages. The following logs were maintained.

Table 9.1
QCI Schedule
Former Fort Segarra EE/CA

Tasks	Daily	Weekly	Bi-Weekly	As-Needed	100%
Personnel Qualifications					x
Accident-Incident Reporting					x
Search Effectiveness					x
Turn-in of Recovered 3X Scrap				x	
Preventive (Operator) Maintenance	x				
Safety Inspections		x			
Personal Protective Equipment		x			
Communication Effectiveness		x			
Surveying & Mapping		x			
CWM Accountability				x	
Fire Protection- Prevention		x			
Project Administration		x			
Safety & Health Program			x		
Management of GFP/CAP			x		
Work Plan and SSHP Up-to-Date			x		
Visitor Briefings				x	
Site-Specific Training				x	
Hazard Assessment				x	

9.8.1.1 Daily Activity/SITE MANAGERLog

- Date and recorder of field information;
- Start and end time of work activities including breaks, lunch, and down times;
- Visitors;
- Weather conditions;
- Relevant events;
- Important phone calls;
- Changes from approved or planned work instructions; and
- Signature of the Parsons SM.

9.8.1.2 Safety Log

- Date and recorder of log,
- Tailgate safety briefing (time conducted and by whom),

- Weather conditions,
- Significant site events relating to safety,
- Personal health information of downrange individuals,
- Accidents,
- Stop work due to safety,
- Safety audits, and
- Signature of the Parsons SITE MANAGERindicating concurrence.

9.8.1.3 Training Log

- Date and recorder of log,
- Nature of training (personnel completed the Parsons and the UXO documentation of training form),
- Visitor training, and
- Signature of both the Site Manager and the Site Safety and Health Officer indicating concurrence.

9.8.1.4 QC Activity Log

- Date and recorder of log,
- Downrange radio transmissions,
- Equipment testing,
- Equipment monitoring results,
- QC audits,
- Nonconformance reports, and
- Signature of the Site Manager indicating concurrence.

9.8.1.5 CWM Accountability Log

- Date and recorder of log,
- Assigned identification number,
- Type, condition, and location,
- Disposition, and
- Signature of the Site Manager indicating concurrence.

9.8.2 Photographic Records

Site personnel maintained photographic records. Digital photographs were used to document significant activities. Photographic records were used to supplement information recorded in the daily activity logs, including photographs of equipment prior to use, typical items located during excavation, and the condition of sites prior, during, and after any activity. Photographs were maintained in a folder on the Site Manager's

project computer during the course of the field investigation. After the conclusion of the field investigation, digital photographs were transferred to the Parsons computer network and stored under the project folder.

9.8.3 Dig Sheets

A written record was kept by the QC Manager of each anomaly investigated and the results of intrusive investigation.

9.8.4 Records of Inert Items

9.8.4.1 Inert items and nonhazardous scrap were disposed of by returning them to the location that they were found.

9.8.4.2 Except for the one-ton container (3X scrap) identified on the ground surface in the Flamingo Bay Landfill Area, and the concrete filled M78 500-lb. bomb casing located at the waterline adjacent to the Flamingo Bay Landfill Area, no CWM, or additional chemical agent contaminated media was identified during the EE/CA investigation.

9.8.5 Field Office and Communications

Field QC procedures included establishing field office entry requirements and communication protocols. A field office was established in the command post. All official visitors reported to the field office to sign in. No official visitors were allowed to visit any portion of the site without an escort. All official visitors were announced to the site via a two-way radio if the visitors were touring the actual site work areas. All internal communications were by use of Motorola portable and base station equipment. All official external communications were conducted via cellular telephone from the field office.

9.9 FIELD INVESTIGATION QC PROCEDURES

9.9.1 QC Objectives

The QC procedures described in this section were used for all fieldwork performed during the EE/CA at the project site. These procedures were designed to manage, control, and document performance of work efforts. This section of the QC Plan achieved the following objectives:

1. Identified QC procedures and responsibilities for EE/CA investigation.
2. Ensured USAESCH and Parsons notifications as required by the SOW.
3. Documented the quality of work efforts via audits and independent staff reviews of deliverables.
4. Ensured data integrity through implementation of data management QC procedures.
5. Ensured data precision through implementation of field equipment maintenance and use procedures.

6. Outlined an inspection system.

9.9.2 Corrective Action

When a condition adverse to quality was noted at the main office, mobile field office, or field, the cause of the condition was determined and immediate corrective actions were implemented. Quality improvement measures were also taken to preclude repetition. Condition identification, cause, reference documents, and corrective action were documented and reported to the Project manager and Site QC Manager. All project personnel had the responsibility, as part of their work duties, to promptly identify, solicit approved corrections, and report conditions adverse to quality.

9.9.3 QC of Anomaly Excavations

As a final step in the intrusive investigation of anomalies, the Site QC Manager verified that the excavation has been checked for any remaining anomalies or that the excavation has been satisfactorily completed. The USAESCH Site Representative was also provided an opportunity to perform a QA check.

9.9.4 Field Data Management QC

The Site Manager was the onsite field data manager and was responsible for tabulating all data collected or produced by intrusive teams, and placing the data under the custody and control of the project data management system.

9.9.5 Equipment Checkout and Receiving Inspections

9.9.5.1 Equipment pre-operation procedures were observed by the Site QC Manager and recorded in the daily log. If equipment field checks indicated that any piece of equipment was operating correctly and field repair could not be made, the equipment was removed from service. The Site Manager was notified and a request for replacement equipment was made. Replacement equipment met the same specifications for accuracy and sensitivity as the equipment removed from service.

9.9.5.2 Specific procedures for before, during and after checks of radios and cellular phones included the following:

1. Before operation, communication checks were conducted to insure the equipment was operating correctly.
2. During operation, communication checks were conducted during the normal cource of personnel communication.
3. After operation, maintenance included cleaning of equipment and turning off before inserting into the battery charger.

9.9.5.3 When Contractor Acquired Property (CAP) or Government Furnished Property (GFP) was received, it was examined to detect damage in transit, for completeness and to insure that the equipment was adequate to perform its intended task. CAP and GFP are considered government property. Inventories of CAP and GFP were

performed by the designated individual. The Site QC Manager conducted audits to verify that the appropriate procedures were being followed.

9.9.6 Nonconformance/Corrective Action Reports

Any nonconformance to Work Plan or contractual requirements was documented. Nonconformance included the following items:

1. Errors made in following work instructions or improper work instructions.
2. Unforeseeable or unplanned circumstances that resulted in items or services that did not meet quality, contractual, and/or technical requirements.
3. Technical modifications to the project by individuals without responsibility and authority.
4. Errors in craftsmanship and trade skills.

9.10 QC RESULTS

9.10.1 The QC results of the CWM analysis of the soil samples collected at the former Fort Segarra are included in the CWM clearance report provided to Parsons by ECBC. The ECBC CWM Clearance Report is provided in Appendix C of this document. The QC data for the CWM samples collected during this investigation include: Laboratory Control Spikes, Laboratory Control Spike Duplicates, Method Blanks, Matrix Spikes and Matrix Spike Duplicates. A dada validation was performed by Parsons for the CWM sample analysis results. The Data Validation Report (DVR) for the CWM data is provided in Appendix D of this document.

9.10.2 The results of the HTW analytical analysis of the soil samples collected at each of the AOIs during this EE/CA investigation were validated by Parsons. The resulting DVR is included as Appendix D of this document.

9.10.3 During the course of the EE/CA investigation, several of the samples sent to laboratories within the U.S. were detained by U.S. customs for inspection. The inspection process caused 35 of the 103 samples collected to exceed the holding time as specified by the analytical method. This information is discussed in detail in the DVR.

9.11 LESSONS LEARNED

9.11.1 ACM identification

Had Parsons been aware, prior to the field investigation, of the potential to encounter ACM within the AOCs, sample locations could have been adjusted to preclude sampling from areas known to possess ACM.

9.11.2 Equipment Problems

Due to the logistical problems associated with conducting an EE/CA investigation in a remote area, and the typical state of repair of the heavy equipment able to be obtained on St. Thomas Island or Water Island, Parsons should have had secondary pieces of

heavy equipment on-site ready to use when and if the primary piece of equipment failed. There were several instances where the failure of key pieces of heavy equipment caused delays while the inoperable equipment was either being repaired or replaced. It should be noted however, that additional costs would be incurred for standby equipment that may not be necessary.

9.11.3 Shipment of Foreign Soils

Future field investigations conducted at former Fort Segarra, if any, that require soil samples to be shipped to the continental U.S. for analysis should consider the critical nature of coordination between all laboratories involved with sample analysis. Special consideration should be given to the logistical difficulty of shipping sample coolers from St. Thomas Island to the continental U.S. Laboratories in the continental U.S. must be permitted by USDA to receive imported soil, which includes soil samples collected from the USVI. USDA requirements for the shipping of soil in sealed containers must be followed to assure the timely delivery of samples to the recipient laboratory. USDA also has the right to inspect all shipments, which may lead to delays in delivery and could compromise the integrity of the sample chain of custody. Potential delays due to shipping and inspection problems may be alleviated by securing the cooperation of the local USDA office on St. Thomas Island and having the packages inspected and sealed by USDA prior to sending off-island. Arrangements should be made prior to field investigations to ensure efficient transport of the sample coolers to prevent samples from exceeding holding time requirements. Sample shipments should be coordinated with U.S. Customs to ensure that there will be no delays involved with the U.S. Customs inspection requirements.

SECTION 10
REFERENCES

29 CFR 1910.120 Hazardous Waste Operations and Emergency Response.

49 CFR 100-199, Title 49 – Transportation, Subtitle B – Other Regulations Relating to Transportation, Chapter I, Parts 100 to 199.

AR 200-1, Environmental Effects of Army Actions.

AR 385-64. U.S. Army Explosives Safety Program.

DA PAM 385-61. Toxic Chemical Agent Safety Standards.

DID OE-010.01 Engineering Evaluation/Cost Analysis (EE/CA) Report

DID OE-100.01 Analysis of Institutional Controls.

DoD 6055.9-STD. DoD Ammunition and Explosives Safety Standards

Department of the Interior (DOI), 1996. Water Island U.S. Virgin Islands Title Transfer, Final Environmental Assessment and Finding of No Significant Impact.

Ebasco, 1991. Archives Search Report, The San Jose Project in the U.S. Virgin Islands.

EM 385-1-1 USACE Safety and Health Requirements Manual.

ER 385-1-92 Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities.

MTA, 1994. Site Characterization, Former Fort Segarra (Draft Final).

Parsons, 2003a. Site-Specific Sampling and Analysis Plan for Former Fort Segarra.

Parsons 2003b. Final Engineering Evaluation/Cost Analysis Work Plan

TEC, 2001, Water Island, Historical Photo Analysis, U.S. Army Corps of Engineers, Engineering Research and Development Center, Topographic Engineering Center, Alexandria, Virginia, September 2001.

U.S. Army Chemical Materiel Destruction Agency, 1993. Former Fort Segarra Scoping Study., Draft, August 2, 1993.

U.S. Army Corps of Engineers, St. Louis District (USACE), 2002. Final Version Archives Search Report for Former Fort Segarra, St. Thomas, U.S. Virgin Islands.

U.S. Census Bureau, 2002. Population and Housing Profile: 2000, Geography: Water Island Subdistrict.

USEPA, July 2002. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review"

USEPA, 1999. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review"

USEPA, November 2002. "USEPA Guidance on Environmental Data Verification and Data Validation"

USEPA, October 1989, Region II CERCLA Quality Assurance Manual

APPENDIX A
STATEMENT OF WORK

- Phase I SOW, August 2000
- Phase II SOW, March 2002

APPENDIX A

ANNEX AAW

SCOPE OF WORK

ENGINEERING EVALUATION/COST

ANALYSIS (EE/CA)

FOR THE FORMER FORT SEGARRA,

WATER ISLAND, ST. THOMAS, U.S.V.I.

1.0 BACKGROUND

The work required under this Scope of Work (SOW) falls under the Defense Environmental Restoration Program/Formerly Used Defense Sites (DERP/FUDS). Chemical Warfare Material (CWM) are suspected to exist at the Former Fort Segarra, Water Island, St. Thomas, U.S.V.I. This property, used for the San Jose Project by the U.S. Army Chemical Corps, was involved in CWM storage and testing for the Department of Defense. Water Island is now owned by the Virgin Islands of the United States, with the exception of plots purchased by individuals. The areas under investigation were retained under the Department of Interior ownership.

1.1 GENERAL

Uncontrolled CWM is a safety hazard and constitutes an imminent and substantial endangerment to the general public, on site personnel and the environment. The work performed under this task order will be performed consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the National Contingency Plan (NCP). For any actions on site, administrative requirements of Federal, or Local permits are not required, but applicable or relevant and appropriate requirements will be met. The provisions of 29 CFR 1910.120 shall apply to all actions taken at this site.

1.2 ROLE OF GOVERNMENT PROJECT PARTICIPANTS.

1.2.1 U.S. Army Engineer District, Jacksonville District Office (CESAJ) - This office is the Life Cycle Project Manager for all work at the Former Fort Segarra and is responsible for public affairs, real estate rights of entry, overall coordination of the work, etc.

1.2.2 U.S. Army Engineering and Support Center, Huntsville (CEHNC) - This office is responsible for addressing the chemical warfare material (CWM) hazards at the site.

1.2.3 U.S. Army's Soldier and Biological-Chemical Command (SBCCOM) - Command for TEU and ECBC.

1.2.3.1 U.S. Army Technical Escort Unit (TEU) - TEU shall provide support in excavation, handling, assessment, and transportation of CWM.

1.2.3.2 Edgewood Chemical Biological Center (ECBC) - ECBC provides support in air monitoring for agents, establish and maintain engineering controls, conduct drill and drain operations for CK items, and laboratory analysis for CWM. Monitoring and analysis for industrial chemicals is the responsibility of the A-E.

1.2.4 Product Manager, Non-Stockpile Chemical Material (PMNSCM) - PMNSCM is responsible for the storage (i.e. interim holding facility (IHF)), transportation, and disposal of CWM.

1.3 SUSPECTED CHEMICAL WARFARE MATERIEL (CWM) SITE

This site is a suspected Chemical Warfare Material (CWM) site. Various forms of mustard (H) and nerve (G) agents have been involved in testing at the Former Fort Segarra. The following CWM items reported to have been tested or stored at the Former Fort Segarra (see reference 9.59):

- M47A2 100 lb chemical bombs filled with H
- T3, 125 lb. chemical bombs filled with H, HD, or GA
- AN-M78 500 lb chemical bombs filled with CG and CK
- AN-M79 1000 lb chemical bombs filled with CG, CK and AC
- M2A1 & M1 4.2" mortars, filled with GA,H, HE, HD, Ht, CG, CK, WP, PWP, CNS, CNB, FS
- One-ton containers filled with CG
- 500 lb drums (thought to be 55 gal. drums)
- M70A1 bombs filled with HD or GA

- E23 smoke pot filled with GA, HD and HQ
- German KC 250kg III Gr bombs filled with GA.

Records indicate the E46 bombs (modified 115 lb M70) GA filled and E52 bombs (modified M70 125 lb) GA filled were removed from St. Thomas when the San Jose Project moved.

1.4 SITE DESCRIPTION

1.4.1 The U.S. Army Chemical Corps moved its San Jose Project (tropical test site) from the Island of San Jose, Panama to St. Thomas, U.S.V.I., in 1948 and occupied the facilities there until 1950 when operations were moved to Dugway Proving Grounds, UT. Chemical testing areas and a Toxic Storage Yard were located on Water Island.

During non-military construction excavation in 1966 two or more bombs identified as M70 and M78 were unearthed. Standard M70 is filled with H (mustard) and the standard M78 can be filled with either Phosgene (CG), Cyanogen Chloride (CK), or Hydrogen Cyanide (AC). Reportedly, the recovered bombs were vented with no release of agent.

The areas included in this SOW are numbered test areas 1 through 8. The Flamingo Bay Landfill area, once used as a scrap yard, will also be included in this investigation. This area is where the bombs were reported to have been dug up in 1966 and was fenced by CEHNC in October 1991.

1.4.2 An Archives Search Report (ASR) by Ebasco was completed in July, 1991. Risk assessment is included in the ASR. U.S. Army Engineer District, St. Louis is currently performing, in conjunction with the Topographic Engineering Center (TEC), an additional archive search.

1.4.3 MTA, Inc. was contracted by CEHNC to conduct non-intrusive and intrusive work. Approval to conduct a geophysical investigation was given. Upon completion of the geophysical investigation, an Anomaly Review Board was convened to determine which anomalies would be further investigated. A Site Characterization was then prepared. The Anomaly Review Board (ARB) results are contained in this Site Characterization report.

1.4.4 A Site Safety Submission was started, however, because of technical reasons regarding CK bombs, the SS was placed on hold. These documents will be provided to the A-E for review and use as needed.

2.0 OBJECTIVES

The objectives of this SOW include the following:

2.1 DOCUMENT REVIEW, DATA REVIEW AND PREPARE CONCEPTUAL SITE PLAN

The A-E shall review previous reports, documents, aerial photographs, and data. Prepare a Conceptual Site Plan identifying all sites that are to be evaluated and the type of evaluation that shall be conducted on each. Sites that can be released based on previous documentation and investigations shall be identified and justified in the Conceptual Site Plan.

2.2 PREPARE PLANS

The A-E shall prepare and coordinate with the various agencies, the Work Plans and Site-Specific Safety and Health Plan as identified in this Statement of Work. These plans shall be prepared using the format provided in section 7.

2.3 SAFETY SUBMISSION

Prepare and maintain the DOD Safety Submission (SS) for the site throughout the project. These plans shall be prepared using the format provided in section 7.

3.0 TASKS

The A-E shall write a Conceptual Site Plan for all sites including the sites that can be closed based on previous documentation and investigations review. The A-E shall prepare and coordinate with the various agencies, the Work Plans (WP), Site-Specific Safety and Health Plan (SSHP) IAW this Statement of Work. The A-E shall prepare the Department of Defense (DOD) Safety Submission (SS) for this site.

The A-E will incorporate the following requirements into work plans and the safety and health plan. The A-E shall include the preparation of the site for intrusive/removal action. The A-E shall include performance of intrusive/removal action in conjunction with TEU. The A-E shall include the support of TEU during assessment of suspect CWM and support as required the removal of suspect CWM, packaging of material determined or suspected to contain chemical agent and transportation of these items to the Interim

Holding Facility (IHF) at this site. The A-E shall incorporate responsibility for the laboratory analysis of all environmental samples collected (i.e., by ECBC, TEU or by the A-E). The A-E shall incorporate responsibility for the disposal of hazardous waste, agent contaminated media (i.e. soil and scrap) and investigative derived waste (IDW) in an approved RCRA treatment, storage, and disposal facility (TSDF). The A-E shall incorporate responsibility for the characterization and ultimate disposal of hazardous waste or solid waste generated by the intrusive operations including agent analysis by ECBC. PMNSCM shall be responsible for the temporary storage (i.e. interim holding facility (IHF)), transportation to the final destination, and ultimate disposal of CWM items recovered. The A-E shall also incorporate responsibility for the back filling of the excavation with clean fill and site restoration. The A-E shall include Hazardous ,Toxic, and Radioactive Waste (HTRW) soil sampling and analysis required by DOI. The A-E shall submit all Draft and Final plans for review IAW section 4 of this SOW.

3.1 TASK 1 - RECORDS REVIEW, SITE VISIT, AND CONCEPTUAL SITE PLAN

3.1.1 Records Review

The A-E shall review pertinent records and interview personnel knowledgeable of site conditions. The purpose of this task is to permit the A-E staff with direct project responsibility to gain necessary information about site conditions. It is not intended that this task be a "records locating task" where new information is located or developed. Previous documents to be reviewed may include but not limited to: historical aerial photographs, letters, memorandums, geophysical data, and various maps.

3.1.2 Site Visit

The site visit attended on 11 July 2000 will be considered adequate to carry out the requirements of this SOW.

3.1.3 Conceptual Site Plan

The A-E shall, upon reviewing existing documentation, write a conceptual plan for all sites especially test area 4 and the Flamingo Bay Landfill area. The A-E shall provide in the plan rationale for future work and rationale for site closure. Conceptual site work shall be proposed for suspect CWM location in the report.

3.2 TASK 2 – LOCAL APPROVED WORK PLAN

The A-E shall prepare and submit a Local Approved Work Plan for approval by CEHNC and CESAJ prior to commencing work at the site. This work plan shall describe in detail the site background and history, mobilization and demobilization activities, brush clearing, environmental protection measures, site preparation activities, etc. This work plan is to be prepared separate from the Safety Submission required in Task 3.

3.2.1 Site Mobilization/Demobilization and Support Plan

The A-E shall prepare a plan that details mobilization/demobilization activities. These activities shall be those actions necessary to prepare the site for work prior to work crew arrival and those actions necessary to shut down the site at demobilization. Such activities shall include but are not limited to communications, power to site office(s), arrangements, site security, explosives acquisition and storage, demolition area preparation, access road construction and removal, Interim Holding Facility preparation, engineering controls, and helicopter pad construction and removal.

3.2.2 Brush Clearing and Debris Removal Plan

The A-E shall plan for removal of specified trees and brush clearing operations as required. Vehicles and other debris to be removed in order to accomplish the mission shall be included in the plan. All fluids shall be drained from vehicles and items deemed environmentally hazardous waste shall be disposed of IAW environmental standards. The A-E shall identify in the work plan all known cultural feature disturbances (i.e. fences, trees destroyed, etc.). This shall be clearly identified in the work plan for presentation to the landowner.

3.2.3 Site-Specific Environmental Protection Plan

The A-E shall provide those measures to be taken, as required, to protect against further contamination and environmental damage that may result from the field work. The A-E shall prepare the plan IAW OT-005-12 (see section 9).

3.2.4 Property Equipment Plan (PEP)

The A-E shall prepare and submit a detailed PEP describing the equipment to be employed to perform all necessary operations. The use of Government furnished equipment shall be utilized to the maximum extent for this project execution. The A-E shall prepare the plan IAW OT-005-09 (see section 9).

3.2.5 Work, Data, And Cost Management Plan (WDCMP)

The A-E shall prepare and submit a WDCMP IAW OT-005-08 (see section 9).

3.2.6 Anomaly Reacquisition Plan (ARP)

The A-E shall prepare and submit an ARP for test area 4 based on ARB requirements found in previously reviewed documentation. Reacquisition shall be acquired through use of approved devices. The A-E shall include a description sheet with illustration for each CWM item tested or stored at the Former Fort Segarra (see section 1.3).

3.3 TASK 3 - SAFETY SUBMISSION (SS)

3.3.1 As directed by CEHNC, the A-E shall prepare and maintain the official SS after coordination and approval by the Department of Defense Explosive Safety Board (DDESB). CESAJ shall be responsible for the coordination (i.e. distribution of the required copies of the SS) and approval of the SS by DDESB. The SS will consist of a Work Plan, a Site-Specific Safety and Health Plan, and Supporting Plans. The SS shall be prepared using the format provided in section 7 of this SOW and shall contain all plans required to accomplish site investigation. Though several of these documents (Supporting Plans) are prepared by other agencies the A-E shall be responsible for their incorporation into the SS, keeping all incorporated documents current, and preserving document control so that all copies remain identical throughout the life of this project. The A-E shall provide document control of each copy of the SS.

3.3.2 The A-E shall provide detailed discussions on the process to evaluate intact CK items. The A-E shall discuss engineering controls to conduct site operations on intact CK items.

3.4 TASK 4 – HTRW SOIL SAMPLING AND ANALYSIS PLAN

DOI may require soil sampling and analysis of non-CWM related areas that are possibly contaminated with hazardous waste. The A-E shall prepare and submit a HTRW soil sampling and analysis plan that describes the locations and how the soil sampling and analysis required by DOI is to be managed and accomplished. The A-E shall identify the number of samples, depth taken at, the analytical methods to be performed and QA/QC methodologies (see section 6). This plan shall be included in the SS.

3.5 TASK 5 – MEETINGS AND PUBLIC INVOLVEMENT

The A-E shall provide a minimum of two professionals thoroughly familiar with the project, to attend meetings as required. Provide, in your cost proposal, the cost per meeting. Assume three one day meetings will be held in St. Thomas, U.S.V.I., and two meetings will be held at Huntsville, AL. The A-E shall be prepared to show overheads or use other presentation techniques to convey plans, findings and recommendations.

3.6 TASK 6 – PROJECT MANAGEMENT

The A-E shall, during the life of the Task Order (TO), manage the TO to accomplish the Statement of Work. All project management associated with this Task Order, with the exception of direct technical oversight of work described in the preceding tasks, shall be accounted for in this task. As part of this task, the A-E shall prepare and submit a Work Task Proposal that outlines the manner in which the A-E intends to accomplish each Task in this SOW. The A-E shall provide a scope or level of effort required for the task, milestones, expected completion dates, and any other planning data the A-E will use to accomplish each task. The A-E shall provide a detailed schedule of all anticipated tasks in hard copies and electronic form in Microsoft Project, per section 4.

4.0 SCHEDULE AND SUBMITTALS

The A-E shall submit all deliverable data to the Contracting Officer and other reviewers shown in Section 4.2 in accordance with the following schedule. All submittals shall be delivered to all addressees no later than the close of business on the day indicated in this paragraph. Note that CESAJ shall be responsible for distribution of the SS.

4.1 SCHEDULE

DOCUMENT	DATE DUE
Work Task Proposal	30 days following TO award
Draft Conceptual Site Plan	TBD
Final Conceptual Site Plan	TBD
Draft Local Approved Work Plan	TBD
Final Local Approved Work Plan	TBD
Initial Draft SS	TBD
Final Draft SS	TBD
Final SS	TBD
Public Meeting	TBD
Monthly Report	NLT 10th of Following Month
Minutes of Meetings	NLT 2 days after each Meeting/Presentation

The overall completion date of this Task Order is estimated as January 2003.

* days are working days not calendar days

4.2 ADDRESSES

The following addresses shall be used in mailing submittals:

ADDRESSEE	Submittals
Commander US Army Engineering and Support Center, Huntsville ATTN: CEHNC-OE-DC-C , Roger Fitzpatrick 4820 University Square Huntsville, Alabama 35816-1822	As directed by CEHNC PM
HQUSACE ATTN: CESO-E 441 G. Street Washington, DC 20314-1000	As directed by CEHNC PM
U.S. Army Engineer District, Jacksonville ATTN: CESAJ-DP-S (Robert Bridgers) P.O. Box 4970 Jacksonville, FL 32232-0019	As directed by CEHNC PM
USATCES Savanna Army Depot ATTN: SIOAC-ESM 1 C Tree Road McAlester, OK 74501-9053	As directed by CEHNC PM
Program Manager for Chemical Demilitarization, Environmental Monitoring ATTN: SFAE-CD-ME APG-EA, MD 21010-5401	As directed by CEHNC PM
Program Manager for Chemical Demilitarization, Risk/Surety Management ATTN: SFAE-CD-SQ APG-EA, MD 21010-5401	As directed by CEHNC PM
Program Manager for Chemical Demilitarization, Public Affairs ATTN: SFAE-CD-P APG-EA, MD 21010-5401	As directed by CEHNC PM
Program Manager for Chemical Demilitarization, Product Manager, Non-Stockpile Chemical Material ATTN: SFAE-CD-NM, Mr. Steven Bird APG-EA, MD 21010-5401	As directed by CEHNC PM
COMMANDER SBCCOM 5232 Fleming Road ATTN: SMCTE-OP Aberdeen Proving Grounds EA, MD 21010-5423	As directed by CEHNC PM

ECBC/Chemical Support Division ATTN: SCBRD-ODC-M, Tim Blades Aberdeen Proving Grounds EA, MD 21010-5423	As directed by CEHNC PM
COMMANDER USATEU 5422 Hoadey Road ATTN: SMCTE-OP Aberdeen Proving Grounds EA, MD 21010-5423	As directed by CEHNC PM
COMMANDER SBCCOM 5232 Fleming Road ATTN: AMSCB-RA (LTC David Mukai) Aberdeen Proving Grounds EA, MD 21010-5423	As directed by CEHNC PM
Robert J. Wing Federal Facilities Section United States Environmental Protection Agency, Region II 290 Broadway New York, NY 10007	As directed by CEHNC PM
Edgar A. Johnson U.S. Virgin Islands Desk Officer Technical Assistance Division Office of Insular Affairs U.S. Department of the Interior 1849 C St., NW Washington, D.C. 20240	As directed by CEHNC PM

4.3 FORMAT AND CONTENT WP AND SSHP

All drawings shall be of engineering quality with sufficient details. The submittal shall consist of 8 1/2" X 11" paper. The submittal covers shall consist of durable binders and shall hold pages firmly while allowing easy removal, addition, or replacement of pages. A title shall identify the site, the A-E, the CEHNC, the CESAJ, and the date. The A-E identification shall not dominate the title page.

4.4 REVIEW COMMENTS

The A-E shall review all comments received through the CEHNC Project Manager and evaluate their appropriateness based upon their merit. The A-E shall incorporate all applicable comments and provide a written response to each comment no later than 21 days after the A-E receives the comment.

4.5 IDENTIFICATION OF RESPONSIBLE PERSONNEL

Each submittal shall identify the specific members and title of the subcontractor and A-E's staff that had significant input into the report. All final submittals shall be sealed by a registered Professional Engineer-In-Charge.

4.6 PRESENTATIONS

The A-E shall make presentations of work performed accordingly as directed by the CO. The presentation shall consist of a summary of the work accomplished and will be followed by an open discussion.

4.7 MINUTES OF MEETINGS

Following the presentation and the meetings, the A-E shall prepare and submit minutes of the meeting within 10 working days to the CO IAW OT-045 (see section 9).

4.8 CORRESPONDENCE

The A-E shall keep a record of phone conversations and written correspondence affecting decisions relating to the performance of this task order IAW OT-045 (see section 9).

4.9 MONTHLY PROGRESS REPORT

The A-E shall prepare and submit monthly progress reports describing the work performed since the previous report, work currently underway and work anticipated. The report shall state whether current work is on schedule. If the work is not on schedule, the A-E shall state what actions are taken in order to get back on schedule. The report shall be

submitted to the CO not later than the 10th day of each calendar month. The A-E shall provide IAW OT-080 (see section 9).

4.10 COMPUTER FILES

All final text files generated by the A-E under this task order shall be furnished to the Contracting Officer in MSWord 7.0, IBM PC compatible format. All drawings shall be on reproducible (mylar) and digitized 3D design file (*.dgn) in Intergraph Corporation format, compatible with CEHNC Graphics system. Each submittal shall contain a compact disk (CD) for the contents of the submittal. The CD shall be provided for draft, draft-final, and final documents. The CD shall be appropriately labeled as to its contents and dated. All project related submittals and project correspondence shall be provided on a secured Website. CEHNC shall approve requests for a password.

5.0 SAFETY REQUIREMENTS

The A-E shall develop and maintain a Health and Safety Program in compliance with the requirements of OSHA standard 29 CFR 1910.120(b)(1) through (b)(4). Written certification that the HSP has been developed and implemented shall be submitted to the Contracting Officer and the plans shall be made available upon request.

The A-E shall prepare and submit a Site-Specific Safety and Health Plan (SSHP) to the CO for review and approval prior to commencement of any field work.

The SSHP shall be prepared in accordance with the requirements specified in this section and shall comply with all federal, and local health and safety requirements, e.g., the Occupational Safety and Health Administration (OSHA) requirements (29 CFR 1910 and 1926), the U.S. Environmental Protection Agency (EPA) hazardous waste requirements (40 CFR 260 - 270), and the U.S. Army Corps of Engineers Safety and Health Requirements Manual (EM 385-1-1) and the U.S. Army Corps of Engineers Safety and Occupational Health Document Requirements for HTRW and OE Activities (ER 385-1-92), and applicable Army regulations. The A-E shall submit versions of this document in accordance with the schedule provided in this SOW. The A-E shall revise and re-submit this document as necessary to address all comments and deficiencies.

The SSHP shall address the elements as described in this section. The level of detail provided shall be tailored to the type of work, complexity of operations to be accomplished, and the hazards anticipated. Where a specific element is not applicable, make a negative declaration in the plan to establish that adequate consideration was given the topic and provide a brief justification for its omission.

5.1 GENERAL

The SSHP shall be reviewed, approved, and implemented by a board certified or board eligible Industrial Hygienist with at least two (2) years hazardous waste site operations experience. Board certification or eligibility shall be documented by written confirmation from the American Board of Industrial Hygiene (ABIH) and submitted to the Contracting Officer for review. A fully trained and experienced site safety and health officer (SSHO) responsible to the A-E shall be delegated to implement the on-site elements of the SSHP. The SSHP shall be in a form usable by authorized U.S. Government representatives and other authorized visitors to the site during site operations.

5.2 STAFF ORGANIZATION, QUALIFICATIONS AND RESPONSIBILITIES

The operational and health and safety responsibilities of each key person shall be provided. The organizational structure, with lines of authority and overall responsibilities for safety and health of the A-E and all subcontractors, including Government agencies and their contractors shall be discussed. An organizational chart showing the lines of authority for safety shall be provided. Each person assigned specific safety and health responsibilities shall be identified and his/her qualifications and experience documented by a resume in the SSHP.

5.3 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

The A-E shall provide a description of the site based on results of previous studies, site history and prior site uses and activities. Describe the location topography and approximate size of the site, the on-site job tasks to be performed and the duration of planned activities. The A-E shall also compile a summary of hazardous substances and safety and health hazards likely to be encountered on site. Include ordnance and chemical/biological names, concentration ranges, media in which found, locations on-site

and estimated quantities/volumes to be impacted by site work. The site descriptions shall be based on results of previous studies, and the history of prior site uses and activities conducted under this Scope of Work.

5.4 PUBLIC SAFETY

This section shall include a discussion on the maximum credible event (MCE), No Significant Effects (NOSE) distance and the procedures to be used to keep the public out of the NOSE. The A-E, based on historical records, shall recommend an MCE to CEHNC. If a site has several operable units, an MCE shall be determined for each site. Documentation (downwind hazard calculations) from the D2PC modeling shall be provided by CEHNC for inclusion into the plan. The A-E shall make recommendations on the evacuation procedures to be used to protect the general public from the NOSE. This section shall include, but is not limited to, such details as the evacuation procedures for civilian personnel and reimbursement of expenses for evacuees, as applicable.

5.5 HAZARD ASSESSMENT AND RISK ANALYSIS

In the SSHP, the A-E shall provide a complete description of the work to be performed at each site. The A-E shall identify the chemical, physical, safety and biological hazards that may be encountered for each task and/or site operation to be performed. Each task/operation is to be discussed separately. Routes and sources of exposure for chemical hazards anticipated on-site will be identified along with chemical/biological names, concentration ranges, media in which found, locations on-site, estimated quantities/volumes, and the applicable regulatory standards (PELs) and recommended protective exposure levels (TLVs) shall be provided. Action levels shall be specified and justified for implementation of engineering controls and/or work practice controls, for emergency evacuation of on-site personnel, and for the prevention and/or minimization of public exposure to hazards created by on-site activities.

5.6 ACCIDENT PREVENTION

The SSHP may serve as the Accident Prevention plan provided it addresses all content requirements of both 29 CFR 1910.120 and EM 385-1-1 (Appendix A). All Accident

Prevention Plan elements required by EM 385-1-1, but not specifically covered by these elements shall be addressed in this section of the SSHP. Daily safety and health inspections shall be conducted to determine if site operations are conducted in accordance with the approved plans and contract requirements.

5.7 TRAINING

All general site workers shall receive 40 hours of initial off-site health and safety training which is relevant to hazardous waste site activities, plus three days of supervised field experience, in compliance with 29 CFR 1910.120 (e). In addition, site-specific, supervisory, refresher and visitor training and training IAW the aforementioned regulation and training IAW DA PAM 385-61 shall be addressed. The content, duration and frequency of all training shall be described. The A-E shall provide written certification that the required training has been received by the A-E's affected personnel to the CO prior to engaging in on-site activities.

5.8 PERSONAL PROTECTIVE EQUIPMENT

A written Personal Protective Equipment (PPE) Program shall be provided in the SSHP. The program shall address all the elements of 29 CFR 1910.120 (g)(5), 29 CFR 1910.132, and 29 CFR 1910.134. Minimum levels of protection necessary for each task/operation to be performed at each site based on probable site conditions, potential occupational exposure (including heat/cold stress) and the hazard assessment/risk analysis required above. Include specific types and materials for protective clothing and respiratory protection. Establish and justify upgrade/downgrade criteria based upon the action levels as required.

5.8.1 As a minimum and as appropriate the following emergency and first aid equipment shall be immediately available for on-site use: (1) First aid equipment and supplies approved by the consulting physician; (2) Emergency eyewashes/showers which comply with ANSI Z-358.1; (3) Emergency use respirators (worst case appropriate); (4) Spill control materials and equipment and (5) Fire extinguishes (specify type, size and locations).

5.8.2 The A-E shall prepare and submit for approval a PPE matrix to the CO through the Department of Army Safety Office. In this matrix the A-E shall discuss Level A & B suits and respirators to use on site and the scenarios. The format for this matrix may be obtained from the CEHNC Safety Office. The PPE matrix will be a separate submittal and is not part of the Safety Submission. Several level A & B suits and respirators have already been approved by the Army for use at chemical agent sites. The A-E may contact CEHNC Safety Office to obtain a list of the approved suites.

5.9 MEDICAL SUPPORT

This section shall discuss the medical support arrangements made for the treatment of chemical casualties. The signed MOAs shall be in an appendix to the SSHP.

5.9.1 Medical Surveillance

All personnel performing on-site activities shall participate in an ongoing medical surveillance program meeting the requirements of 29 CFR 1910.120, ANSI Z-88.2 and DA Pams 40-8 and 40-173, as applicable. The medical examination protocols and results shall be overseen by a licensed physician who is certified in Occupation Medicine by the American Board of Preventive Medicine, or who by necessary training and experience is board eligible. Minimum specific exam content and frequency based on probable site conditions, potential occupational exposures and required protective equipment shall be specified. A written medical opinion from the examining physician as to fitness to perform the required work shall be made available to the CO upon request for any site employee.

5.10 ENVIRONMENTAL AND PERSONAL MONITORING

This section shall include all information on air monitoring to be conducted on-site. The A-E shall coordinate with ECBC and TEU to get specific information on the agent monitoring to be conducted. The A-E is responsible for monitoring industrial chemicals and SBCCOM is responsible for monitoring chemical agent. An air-monitoring summary shall be included in this section. This table, shall include, but is not limited to, the following: contaminant of concern, instrument to monitor, location of instrument, frequency, agency conducting monitoring, action level and actions to be taken. Where it has been determined

that there may be employee exposures to on and/or off site migration potentials of hazardous airborne concentrations of hazardous substances, appropriate direct reading (real-time) air monitoring and integrated (time weighted average) air sampling shall be conducted in accordance with applicable federal, state, and local requirements. Both air monitoring and air sampling must accurately represent concentration of air contaminants encountered on and leaving the site. The types and frequency of monitoring/sampling to be performed shall be specified for on-site and perimeter, where applicable. Where perimeter monitoring is not deemed necessary, provide suitable justification for its exclusion. When applicable, NIOSH and /or EPA sampling and analytical methods shall be used. Personal samples, where necessary, shall be analyzed by laboratories successfully participating in and meeting the requirements of the American Industrial Hygiene Association's (AIHA) Proficiency Analytical Test (PAT) or laboratory Accreditation Program. Include, as appropriate, real-time (direct-read) monitoring and integrated Time Weighted Average (TWA) sampling for specific contaminants of concern, meteorological, noise, and radiation monitoring shall be conducted as needed depending upon the site hazard assessment. All monitoring and sampling protocol shall be specified to include instrumentation to be used and calibration of instruments. All monitoring and sampling protocol shall be specified to include instrumentation to be used and calibration of instruments. All monitoring results shall be compared to action levels to determine the need for corrective actions. CWM monitoring shall use ECBC protocols. Action levels will be in accordance with AR and DA PAM 385-61. Air Monitoring Plan. A-E shall coordinate with SBCCOM as to the placement and number of monitoring devices for intrusive operations. SBCCOM shall provide continuous monitoring of the identified hazards associated with the sites for controlling worker exposure for chemical agent during field operations. The A-E shall be responsible for continuous monitoring of the identified hazards associated with the sites for controlling worker exposure for industrial chemicals and dust during field operations. The A-E may coordinate information requests on hazards believed to be present on site with SBCCOM and CEHNC.

5.11 HEAT/COLD STRESS MONITORING

Heat and cold stress monitoring protocols, as appropriate, shall be described in detail. Work/rest schedules shall be determined based upon ambient temperature, humidity, wind speed (wind chill), solar radiation intensity, duration and intensity of work and protective equipment ensembles. Minimum required physiological monitoring protocols which will affect work schedules shall be developed. In cases where impervious clothing is worn the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" protocol for prevention of heat stress shall be followed and heat stress monitoring shall commence at temperatures of 70 degrees Fahrenheit and above. Where impervious clothing is not worn, the ACGIH heat stress standard (TLV) shall be used. For cold stress monitoring to help prevent frostbite and hypothermia, the ACGIH cold stress standard shall be referenced and followed, as a minimum.

5.12 SITE CONTROL

The A-E shall describe site control measures which include site maps, the work zone delineation and access points, the on/off site communication system, general site access controls and security procedures (physical and procedural).

5.13 PERSONNEL AND EQUIPMENT DECONTAMINATION

The A-E shall develop and specify decontamination procedures in accordance with 29 CFR 1910.120, AR 385-61 and DA PAM 385-61 for personnel, personal protective equipment, monitoring instruments, sampling equipment, and heavy equipment. Decontamination procedures shall address specific measures to ensure that contamination is confined to the work site. Necessary facilities and their locations, detailed standard operating procedures, frequencies, supplies and materials to accomplish decontamination of site personnel and to determine adequacy of equipment decontamination shall be discussed.

5.14 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES (ON-SITE AND OFF-SITE)

An Emergency Response Plan as required by 29 CFR 1910.120 and DA PAM 50-6 shall be developed and implemented. As a minimum it shall address the following elements:

(1) Pre- emergency planning and procedures for reporting incidents to appropriate government agencies for potential chemical exposure, personal injuries, fire/explosions, environmental spills and releases;

(2) Personnel roles, lines of authority, communications;

(3) Posted instructions and list of emergency contact: physician; nearby notified medical facility, fire and police departments, ambulance service, local/federal environmental agencies, CIH, and Contracting Officer;

(4) Emergency recognition and prevention;

(5) Site topography, layout and prevailing weather conditions;

(6) Criteria and procedures for site evacuation (emergency alerting procedures/ employee alarm system, emergency PPE and equipment, safe distance, place of refuge, evacuation routes, site security and control;

(7) Specific procedures for decontamination and medical treatment of injured personnel;

(8) Route maps to nearest pre-notified medical facility;

(9) Criteria for initiating community alert program, contacts and responsibilities;

(10) Critique of emergency responses and follow-up. Material Safety Data Sheets (MSDS) for each hazardous substances anticipated to be encountered on site shall be made accessible to site personnel at all times and shall be submitted in an appendix to the SSHP.

5.14.1 On-Site Emergency and First Aid Equipment

At a minimum, as applicable, the following emergency and first aid equipment shall be on-site:

(1) First aid equipment and supplies approved by the consulting physician;

(2) Emergency eye washes/showers which comply with ANSI Z-358.1l

(3) Emergency-use respirators (worse case appropriate);

(4) Fire extinguishes (specify type and size)

(5) Spill control materials and equipment.

Specify in the plan the location(s) of these materials.

5.15 STANDING OPERATING PROCEDURES, ENGINEERING CONTROLS AND WORK PRACTICES

The A-E shall develop Standing Operating Procedures to protect field personnel, prevent accidents, minimize hazards and to take action to correct hazards where necessary. Site rules and prohibitions for safe work practices shall be discussed and shall include such topics as use of the buddy system, smoking restrictions, material handling procedures, confined space entry, excavation safety, physiological and meteorological monitoring for heat/cold stress, illumination, sanitation, and daily safety inspections, etc. This list of topics is not intended to be all inclusive.

5.16 LOGS, REPORTS AND RECORD KEEPING

Record keeping procedures for training logs, daily safety inspection logs, employee/visitor registers, medical surveillance records and certifications, air monitoring results and personal exposure records shall be specified. All personnel exposure and medical monitoring records shall be maintained in accordance with applicable OSHA standards, CFR 1904, 1910 and 1926. The A-E shall develop, retain and submit training logs, daily safety inspection logs as part of the daily QC Reports, employee/visitor registration and medical opinions/certifications as part of the final contract file. All accidents/injuries/illnesses shall be reported to the CO in accordance with Engineering Manual 385-1-1 and AR 385-40 with USACE Supplement. A completed ENG 3394, Accident Investigation Report, shall be submitted within two working days in accordance with AR 385-40 and USACE Supplement 1 to that regulation.

5.17 EXPLOSIVE ORDANCE SAFETY

The facility was a former military installation. If known or suspect explosives configured chemical warfare materiels are discovered at any time during operations at the site, the A-E shall mark the location and notify the CEHNC on-site Safety Specialist and

TEU. If not available, the contracting officer shall be notified. The A-E shall have on-site capability to evaluate any OE encountered. The A-E may be directed to continue operations in another location or suspend operations until further notice upon the direction of the CEHNC on-site Safety Specialist. TEU shall be responsible for the assessment, packaging, and transportation of ordnance items suspected to contain agent. If the OE encountered is determined to have a conventional, i.e. high explosive, white phosphorous, or smoke charge, the A-E shall provide the necessary actions to dispose of the OE.

5.18 EXPLOSIVES MANAGEMENT PLAN

The A-E shall prepare an explosive management Plan in accordance with OT-005-03 (see section 9).

6.0 CHEMICAL DATA AND LABORATORY REQUIREMENTS

6.1 QUALITY ASSURANCE PROJECT PLAN (QAPP)

The A-E shall prepare the QAPP. The QAPP shall describe the sampling and analyses, quality assurance and quality control methods, equipment, evaluations, reports and procedures as required for the work specified in this SOW. The plan shall describe field and laboratory procedures. The plan shall clearly describe how the A-E shall ensure that sample integrity and chain of custody of all samples are not compromised prior to delivery to the laboratory, and should describe the procedures which will be used to document and report precision, accuracy and completeness of data results. The plan shall be a brief and concise description of the field and laboratory work required. Previously prepared work plans for similar type of work shall be utilized as much as possible in the preparation of the plan. The data quality and quality control applies to both the field and laboratory efforts. Results of the field and laboratory controls shall be evaluated and placed in the analytical data submittal, and the draft and final Engineering Reports. The A-E shall provide the laboratory QA/QC plan as an appendix to the QAPP. The plan shall address each requirement as identified in ER 1110-1-263 (Reference 9.15).

6.2 LABORATORY QUALIFICATIONS

The analytical laboratory utilized by the A-E for contaminants of concern (COC) analysis must be validated by the Corps of Engineers and must have the capability to perform the analytical methods required by this SOW. The laboratory shall be an EPA contract lab or be familiar with the Contract Laboratory Program (CLP) requirements and can perform CLP work.

6.3 COORDINATION WITH GOVERNMENT QUALITY ASSURANCE LABORATORY

The A-E must provide coordination and quality assurance samples to the Government Quality Assurance (GQA) lab. Each field control sample collected shall be divided equally, one portion sent to the GQA lab and the remainder sent to the A-E's lab. GQA samples include all sample matrices and analysis parameters. The A-E shall provide the GQA laboratory a two week notice of sample shipment. The Government will identify the GQA laboratory.

6.4 DATA REPORTING REQUIREMENTS

The A-E shall provide the following data reporting elements: sample ID, sample receipt, organic and inorganic reporting, internal quality control reporting (lab blanks, surrogate spike samples, lab duplicates or matrix spikes) and field duplicates and blanks. Data shall be provided IAW USACE requirements and EPA requirements. This data shall be included in the raw data submittal as well as in electronic form in the engineering reports. The A-E laboratory must hold and make available all project raw data for a period of five years after completion of this contract. The A-E must validate all the data. Complete data validation shall be performed on 10% of the sample analysis packages.

6.4.1 Minimum Raw Data Reporting Requirements:

6.4.1.1 Sample IDs

The A-E shall prepare a tabular presentation which matches contract laboratory sample IDs to QA laboratory sample IDs. This table shall identify all Field Duplicates and Field Blanks (including rinsates and trip blanks) as such. This table shall also match all rinsates with

their corresponding field samples as well as matching each trip blank with the samples that accompanied it during shipment.

6.4.1.2 Sample Receipt

The A-E shall complete and report a "Cooler Receipt Form" for all shipments for purposes of noting problems in sample packaging, chain-of-custody, and sample preservation. An example form is available from CEMRD-ED-GL.

6.4.1.3 General Organic and Inorganic Reporting

For each analytical method run, the A-E shall report all analytes for each sample as a detected concentration or as less than the specific limits of quantitation. Generally, all samples with out-of-control spike recoveries being attributed on matrix interferences shall be designated as such. All soil/sediment and solid waste samples shall be reported on a dry-weight basis with percent moisture also reported. The A-E shall also report dilution factors for each sample as well as the date of extraction (if applicable) and date of analysis.

6.4.1.4 Internal Quality Control Reporting

At a minimum, internal quality control samples shall be analyzed at rates specified in the specific methods or as specified in the SOW if higher rates are required to meet project specific Data Quality Objectives:

6.4.1.4.1 Laboratory Blanks (Method Blanks and Instrument Blanks)

All analytes shall be reported for each laboratory blank. All non-blank sample results shall be designated as corresponding to a particular laboratory blank in terms of analytical batch processing.

6.4.1.4.2 Surrogate Spike Samples

Surrogate Spike Recoveries shall be reported with all organic method reports where appropriate (i.e. when the method requires surrogate spikes). The report shall also specify the control limits for surrogate spike results as well as the spiking concentration. Any out-of-control recoveries (as defined in the specified method) shall result in the sample being rerun (both sets of data are to be reported) or data being flagged.

6.4.1.4.3 Matrix Spike Samples.

Matrix Spike Recoveries shall be reported for all organic and inorganic analyses. All general sample results shall be designated as corresponding to a particular matrix spike

sample. The report shall indicate what field sample was spiked even if it was not a Corps of Engineers project sample. The report shall also specify the control limits for matrix spike results for each method for each matrix.

6.4.1.4.4 Laboratory Duplicates and/or Matrix Spike Duplicate Pairs

Relative Percent Difference shall be reported for all duplicate pairs as well as analyte/matrix specific control limits.

6.4.1.4.5 Laboratory Control Standard's

When run for internal quality control, Laboratory Control Standard's (LCS) results shall be reported with the corresponding field sample data. Control limits for LCSs shall also be specified.

6.4.1.4.6 Field Duplicates and Field Blanks

These samples shall be identified as such by the A-E and reported as any other field sample. Relative Percent Differences shall be reported for all field duplicate pairs.

7.0 SAFETY SUBMISSION OUTLINE

7.1 GENERAL

The following format is only an example and is not all-inclusive to the topics that must be addressed in a Safety Submission. However, it is very important to keep the submission to a manageable size. There shall be no redundancies in the safety submission. If a topic is covered elsewhere in the plan, do not repeat the information. Refer the reader to that section. The main portion of the safety submission must fit into one or two small volumes. Detailed information may be contained in Volume III or placed onto a compact disk (CD). Discussions on quality control should be placed throughout the work plan. This discussion should include such topics as field instrument and equipment calibration, project specific QC objectives and maintenance procedures.

7.2 SAFETY SUBMISSION OUTLINE

Volume I & II

I Executive Summary
II List of Acronyms
III Work Plan

a. Project Overview
    (1) Introduction
        (a) Project Authorization
        (b) Scope and Objective
        (c) Operations
        (d) Disposal
    (2) Document Organization
    (3) Background
        (a) Site Location and History
        (b) Previous Investigations
        (c) Environmental Setting
b. Project Organization
    (1) Organization
    (2) Corps of Engineers, Jacksonville District (CESAJ)
    (3) U.S. Army Engineering and Support Center, Huntsville (USAESCH)
    (4) Product Manager for Non-Stockpile Chemical Materiel (PMNSCM)
    (5) U.S. Army Technical Escort Unit (TEU)
    (6) Edgewood Chemical and Biological Center (ECBC)
    (7) Contractor
    (8) Subcontractors
    (9) Federal, State, and Local Agencies
    (10) Responsibility Matrix (Operational)
    (11) Safety and Health Responsibility Chart
c. Intrusive Excavation
    (1) Introduction
    (2) Maximum Credible Event
    (3) No Significant Effects (NOSE) Distance
    (4) Evacuation
        (a) Evacuation

(Note: The discussion on items 2 – 4 above should be brief. The detailed information for the MCE will be contained in Volume II in the "MCE Analysis" Plan and for more information on the engineering controls see that section in Volume III.)

    (5) Equipment Needs
    (6) Staff
    (7) Daily Operations
    (8) Site Layout (general)
    (9) Project Flow (operational)
    (10) QA/QC of Excavation
    (11) Soil Sifting Operations (as required)
    (10) Backfill Operations and Site Restoration
d. Contingency Plan
    (1) Introduction
    (2) Suspect CWM Item
    (3) Suspect OE Items

(4) Contingency Procedures
(a) Initial Response
(b) CWM Assessment
(c) OE Assessment
(b) HTW Assessment

e. Chemical Data, Laboratory and Field Work Sampling
(1) Introduction
(2) Analysis
(a) CWM/Agent Breakdown Products
(b) Hazardous and Toxic Waste (HTW)
(3) Site Specific Sampling
(a) CWM
(b) HTW
(c) Scrap
(d) Investigative Waste (IW)
(e) Intact Containers
(f) Soil Disposal Characterization Samples
(g) Location and Survey Information
(4) Sample Designation
(a) CWM/ABP/HTW
(b) Aqueous IW Disposal Characterization Samples
(c) Scrap Samples
(d) Non-agent Intact Containers
(5) Sample Handling and Shipment
(6) Field Procedures

f. Disposal Procedures
(1) Intact Containers
a. Handling Procedures
- General
- Initial Assessment/Overview
- Closed Cavity Assessment

b. Disposal
- CWM
- HTW Intact Containers
- Non-HTW Intact Containers
- Scrap
- Conventional OE

c. Containers
- On-Site Tracking
- Transportation

d. Disposal Documentation
- Waste Profile Sheet
- Shipping Labels
- Manifesting

- Weights Slips
- Notification of Waste Shipped
- Certification of Disposal/Destruction

(2) Scrap Disposal
   a. Introduction
   b. Scrap Handling Procedures
   c. Disposal
      - Containers
      - On-site Tracking
      - Transportation
   d. Disposal Documentation
      - Waste Profile Sheet
      - Shipping Labels
      - Manifesting
      - Weight Slips
      - Notification of Waste Shipped
      - Certificate of Disposal/Destruction

(3) Soil Monitoring and Disposal
   a. Introduction
   b. Soil Handling Procedures
   c. Disposal
      - Containers
      - On-site Tracking
      - Transportation
   d. Disposal Documentation
      - Waste Profile Sheet
      - Shipping Labels
      - Manifesting
      - Weight Slips
      - Notification of Waste Shipped
      - Certification of Disposal/Destruction

(4) Investigative Derived Waste Disposal
   a. Introduction
   b. Monitoring Methods
   c. Decontamination Water
   d. Surface Water
   e. Used PPE
   f. Handling Procedures
   g. Disposal
      - Containers
      - On-site Tracking

- Transportation

h. Disposal Documentation
- Waste Profile Sheet
- Shipping Labels
- Manifesting
- Weight Slips
- Notification of Waste Shipped
- Certificate of Disposal/Destruction

IV Site Safety and Health Plan

a. Introduction
(1) Purpose
(2) Applicability

b. Site Organization
(1) Site Location and History
(2) Previous Investigations

c. Project Scope and Objective

d. Staff Organization, Qualifications and Responsibilities

(Note: Generally, the topics in a – d above are covered in the work plan. If so, refer the reader to the appropriate section in the plan. Do not duplicate the information in the SSHP.)

e. Site Description and Contamination Characterization
(include site contaminates and MCE/NOSE for each site if there are multiple sites.)

f. Hazard Analysis and Risk Assessment

g. Public Safety
(1) Maximum Credible Event
(2) No Significant Effects (NOSE) Distance (include NOSE Maps and weather data)
(3) D2PC Calculations
(4) Public Safety Protocols
(a) Intrusive Excavations
(b) Evacuation

(Note: This section is to inform the general public what procedures are in place to protect them. This is not the section to have a detailed discussion on the MCE and engineering controls. These plans shall be located in Volume III.)

h. Training
(1) General
(a) Initial Training
(b) Supervisory Training

(c) Refresher Training
(2) Site-Specific Training
(3) Tailgate Safety Meetings
(4) Bloodborne Pathogens and CPR/First Aid
(5) Emergency Response Procedures
6) Hazard Communication
(7) CWM Training
(8) Visitor Training

i. Personal Protective Equipment
(1) Personal Protective Equipment (PPE) Summary
(a) General Requirements
(2) Task Specific Levels of PPE
(a) Special PPE Considerations
(b) PPE Matrices
(c) Level D PPE
(d) Modified Level D PPE
(e) Level C PPE
(f) Level B PPE
(g) Level A PPE
(3) Respiratory Protection Requirements
(a) Respirator Selection
(b) Selection Criteria
(c) Special Considerations for Respirator Selection
(d) Task-Specific Respiratory Assignment
(e) Emergency Escape Breathing Apparatus
(f) Respirator Training
(g) Respirator Fit-Testing
(4) PPE Inspection, Cleaning, Maintenance, and Storage
(a) PPE Inspection
(b) PPE Maintenance, Cleaning, and Storage
(5) Respirator Inspection, Cleaning, Storage, And Maintenance
(a) General Requirements
(b) Escape SCBAs
(c) Emergency Respiratory Equipment

(This section and the section on monitoring must discuss criteria for upgrading and downgrading PPE. It must be presented in a easy to follow format that can readily be utilized in the field.)

j. Medical Surveillance and Medical Support
(1) Medical Surveillance
(2) Medical Support

k. Environmental and Personnel Monitoring

(1) Air Monitoring
(2) Air Monitoring Methods
    (a) CWM
    (b) HTW
(3) Air Monitoring Locations
    (a) Within Exclusion Zone (EZ) (when filtration system is used)
    (b) Perimeter of Site
(4) MINICAMS Ringoffs (Alarms)
    (a) Immediate Actions
    (b) Ringoff (Alarm) Notification
    (c) Ringoff Confirmation

(This is the section in the safety submission where all discussion on air monitoring is placed. It must discuss both industrial and agent monitoring. A chart that shows all of the air monitoring to be performed, frequency, instrumentation, action levels and actions to be taken must be incorporated into this section. The contractor must coordinate with and get input from ECBC for the agent monitoring. Details on agent monitoring that are discussed in the ECBC plan shall not be duplicated in this section.)

l. Site Control
    (1) Introduction
    (2) Site Work Zones
        (a) Exclusion Zone.
        (b) Contamination Reduction Zone.
        (c) Support Zone (SZ).
    (3) Emergency Protocol

m. Personnel and Equipment Decontamination
    (1) Introduction
    (2) Procedures for Handheld Equipment Decontamination
    (3) Headspace Procedures (refer reader to ECBC plan)
    (4) Procedures for Heavy Equipment and Vehicle Decontamination
    (5) Decontamination Procedures for Personnel
        (a) General
        (b) Personnel Decontamination Procedures
        (c) Personnel Decontamination Station (PDS) Attendant Duties.
        (d) Daily PDS Shutdown Procedures
    (6) Emergency Decontamination Procedures
    (7) Contamination Control

n. Emergency Response and Contingency Plan

o. Confined Space Entry
p. Spill Containment

q. Heat and Cold Stress Monitoring
r. Standing Operating Procedures and Work Practices
s. Logs, Reports and Record Keeping

(Note: MSDSs required to be onsite shall not be submitted with the safety submission. Checking that the required MSDSs are onsite will be done during the Pre-Operational Survey.)

Volume III or Compact Disk (CD)

V TEU Assessment Plan

(Note: TEU will not include any SOPs or Letters of Instruction in the Safety Submission. They will be maintained onsite by TEU. This will be verified during the Pre-Operational Survey.)

VI Edgewood Chemical and Biological Center (ECBC) Air Monitoring & Analysis Plan
a. Air Monitoring Plan
b. Environmental Sample Analysis Plan

VII Product Manager Non-Stockpile (PMNS) Plans
a. Interim Holding Facility (IHF) Plan
b. Transportation Plan

VIII Sampling and Analysis Quality Assurance Plan
(CWM & HTRW Laboratory)
(a) Introduction
(b) Levels of Analytical Data Quality
(c) Project-Specific QA Objectives

IX Explosive Safety Submission (ESS)

X Memorandum of Agreement
(1)*Hospital or Medical Facility
(2)* On-Site Medical Support
(3) Helicopter Support (if necessary)
(4) Local Fire Department (if designated as emergency response)
(5) Local Law Enforcement agencies (if to be used for public control/evacuation)
(6) Local HAZMAT Responders (if going to be used for emergency response)
* Required

XI Evacuation/Shelter in Place Plan, as required
(This plan shall include emergency actions to be taken in the event of a release)

XII APPENDICES

a. Glossary
b. Maps
    (1) Regional Map
    (2) Site Map(s)
    (3) Q-D Map(s)
    (4) Soil Sampling Map(s)
    (4) Plume Maps
c. MCE Analysis
   (Including the D2PC Modeling, wind rose and average wind speed information)
d. Engineering Control Design and Specification Information
e. SOPs for Contractor Programs
   (ie. Heat Stress, confined space and PPE)
g. Blank Forms
h. Safety Concepts and Basic Considerations for UXO Operations (ETL 385-1-1)
i. Chemical Event Report
j. Geophysical Plan(if applicable)
k. Explosive Management Procedures (as necessary)
l.. Site-Specific Environmental Protection

8.0 PUBLIC AFFAIRS

The A-E shall not publicly disclose any data generated or reviewed under this contract. The A-E shall refer all requests for information concerning the site condition to the Public Affairs Office (PAO). Reports and data generated under this task order are the property of the Department of Defense and distribution to any other sources by the A-E, unless authorized by the Contracting Officer, is prohibited.

9.0 REFERENCES

9.1 "U.S. Army Corps of Engineers Safety and Health Requirements Manual," U.S. Army Engineer Manual EM 385-1-1, 3 September 1996.

9.2 "Engineering Transmittal Letter 385-1-1, Safety Concepts and Basic Considerations for Unexploded Ordnance (UXO) Operations," 16 Feb 1996, Huntsville Division, U.S. Army Corps of Engineers.

9.3 "Environmental Chemistry and Fate of Chemical Warfare Agents." Southwest Research Institute. Prepared for Corps of Engineers, Huntsville Division, March 3, 1994.

9.4 "Field Manual on Environmental Chemistry and Fate of Chemical Warfare Agents." Southwest Research Institute. Prepared for Corps of Engineers, Huntsville Division, July 7, 1994.

9.5 Army Regulation 385-40, Accident Reporting and Records with USACE Supplement, 1 November 1994 w/chgs.

9.6 Ammunition and Explosive Standards, TM 9-1300-206, 30 August 1973 w/chgs.

9.7 "Safety and Occupational Health Document Requirements for Hazardous Waste Site Remedial Actions," Engineer Regulations 385-1-92, 18 March 1994.

9.8 "Chemical Data Quality Management for Hazardous Waste Remedial Activities," Engineer Regulation 1110-1-263, 1 Oct 90.

9.9 Occupational Safety and Health Administration Standards (29 CFR 1910 and 1926).

9.10 "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, October 1985.

9.11 "Emergency Eyewash and Shower Equipment," ANSI Z-358.1, 1990.

9.12 "Practices for Respiratory Protection," ANSI Z-288.2, 1980.

9.13 "Test Methods for Evaluating Solid Wastes," EPA Pub. No. SW-846, Latest Ed.

9.14 "Annual Book of ASTM Standards," Current edition.

9.15 Engineering Regulation (ER) 1110-1-263 "Chemical Data Quality Management for Hazardous, Toxic Radioactive Waste Remediation Activities," U.S. Army Engineering Regulation, April 1996.

9.16 "CERCLA Compliance With Other Laws Manual. Parts I and II," U.S. Environmental Protection Agency (EPA). 1988b.

9.17 "Methods for Evaluation the Attainment of Cleanup Standards. Volume I - Soils and Solid Media," U.S. Environmental Protection Agency (EPA). 1989e.

9.18 "Methods for the Determination of Organic Compounds in Drinking Water," U.S. Environmental Protection Agency (EPA), December 1988.

9.19 "Cost Engineering Policy," U.S. Army Engineering Regulation No. 1110-3-1301, April 1994.

9.20 Code of Federal Regulations. 40 CFR, Parts 190-299. latest edition.

9.21 "Hazardous Waste Operations and Emergency Response." Code of Federal Regulations. [n.d.] CFR 1910.120, Final Rule.

9.22 "Minimum Chemistry Data Reporting Requirements for DERP and Superfund HTW Projects." U.S. Army Corps of Engineers Memorandum, CEMRD-ED-GL. August 1989.

9.23 "Compendium of Superfund Field Operations Methods," U.S. Environmental Protection Agency (EPA). 1987

9.24 "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," U.S. Environmental Protection Agency (EPA). EPA 540/g89/004. October 1988.

9.25 "Army Toxic Chemical Agent Safety Program," AR 385-61, 28 February 1997.

9.26 "Toxic Chemical Agent Safety Standards," DA PAM 385-61, 31 March 1997.

9.27 "Chemical Accident or Incident Response and Assistance (CAIRA) Operations," DA PAM 50-6, 17 May 1991 w/chgs.

9.28 "Occupational Health Guidelines for Evaluation and Control of Occupational Exposure to Mustard Agents H, HD, and HT," DA PAM 40-173, 30 August 1991 w/chgs.

9.29 "Chemical Surety," AR 50-6, 1 February 1995.

9.30 EECA-FMC-090, "EE/CA Report Description."

9.31 TAB EECA006, "*Analysis of Institutional Control Alternatives.*"

The following references are available on the CEHNC Web Page at http://www.hnd.usace.army.mil/oew/policy/dids/didindx.html

9.32 CEHND-OE-CX, (28 NOV 94), OE Quality Management Plan

9.33 CEHNC Data Item Description OT-005-01 990205 Work Plan

9.34 CEHNC Data Item Description OT-005-02 990205 Technical Management Plan

9.35 CEHNC Data Item Description OT-005-03 990205 Explosives Management Plan

9.36 CEHNC Data Item Description OT-005-04 990205 Explosives Siting Plan

9.37 CEHNC Data Item Description OT-005-05 990205 Geophysical Investigation Plan

9.38 CEHNC Data Item Description OT-005-06 990205 Site Safety and Health Plan

9.39 CEHNC Data Item Description OT-005-07 990205 Location Surveys and Mapping Plan

9.40 CEHNC Data Item Description OT-005-08 990205 Work, Data, and Cost Management Plan

9.41 CEHNC Data Item Description OT-005-09 990205 Property Management Plan

9.42 CEHNC Data Item Description OT-005-10 990205 Sampling and Analysis Plan

9.43 CEHNC Data Item Description OT-005-11 990205 Quality Control Plan

9.44 CEHNC Data Item Description OT-005-12 990205 Environmental Protection Plan

9.45 CEHNC Data Item Description OT-005-13 990205 Investigative Derived Waste Plan

9.46 CEHNC Data Item Description OT-015 990205 Accidents/Incidents Reports

9.47 CEHNC Data Item Description OT-025 990205 Personnel/Work Standards

9.48 CEHNC Data Item Description OT-030 990205 Site Specific Removal Report

9.49 CEHNC Data Item Description OT-040 990205 Disposal Feasibility Report

9.50 CEHNC Data Item Description OT-045 990205 Report/Minutes, Record of Meetings

9.51 CEHNC Data Item Description OT-055 990205 Telephone Conversation/Correspondence Records

9.52 CEHNC Data Item Description OT-060 990205 Conventional Explosives Safety Submission

9.53 CEHNC Data Item Description OT-080 990205 Monthly Status Report

9.54 CEHNC Data Item Description OT-085 990205 Weekly Status Report

9.55 CEHNC Data Item Description OT-090 990427 Ordnance Filler Report

9.56 "Archive Search Report, Former Military Properties in the U.S. Virgin Islands", by Ebasco Environmental, July 1991.

9.57 "Site Characterization, Former Fort Segarra, U.S.V.I.", by MTA, Inc., January 19, 1996.

9.58 "Former Fort Segarra Scoping Study, Draft", by U.S. Army Chemical Materiel Destruction Agency, August 2 1993.

9.59 "Site Safety Submission", by MTA, Inc., June 15, 1998.

10.0 ACRONYMS

ABIH	American Board of Industrial Hygiene
ACGIH	American Conference of Governmental Industrial Hygienist
A-E	Architect-Engineer
AIHA	American Industrial Hygiene Association's
AR	Army Regulation
ARB	Anomaly Review Board
CAIRA	Chemical Accident or Incident Response and Assistance
CD	Compact Disk
CEHNC	US Army Engineering and Support Center, Huntsville
CEMRO	Corps of Engineers' Missouri River Omaha
CESAJ	U.S. Army Engineer District, Jacksonville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulation
CIH	Certified Industrial Hygienist
CLP	Contract Laboratory Program
CO	Contracting Officer
COC	Contaminants of Concern
CWM	Chemical Warfare Materiel
DA	Department of the Army
DDESB	Department of Defense Explosive Safety Board
DERP/FUDS	Defense Environmental Restoration Program/Formerly Used Defense Site
DOD	Department of Defense
DOI	Department of Interior
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
ECBC	Edgewood Chemical and Biological Command
EZ	Exclusion Zone
GA, GB	Nerve Agent
GFE	Government furnished equipment
GQA	Government Quality Assurance
H, HD	Mustard
HSWA	Hazardous and Solid Waste Amendment
HTRW	Hazardous, Toxic, and Radioactive Waste
HTW	Hazardous and Toxic Waste
IAW	In accordance with
ID	Identification
IDW	Investigative Derived Waste
IHF	Interim Holding Facility
IW	Investigative Waste
IWP	Intrusive Work Plan
LCS	Laboratory Control Standard's
MCE	Maximum Credible Event
MSDS	Material Safety Data Sheets
NCP	National Contingency Plan
NFRAP	No Further Remedial Action Planned

NIOSH	National Institute for Occupational Safety and Health
NOSE	No Significant Events
NWP	Non-intrusive Work Plan
NTP	Notice to Proceed
OE	Ordnance and Explosive
OSHA	Occupational Safety and Health Administration
PAM	Pamphlet
PAT	Proficiency Analytical Testing
PEL	Permissible Exposure Limits
PEP	Property Equipment Plan
PC	Personal computer
PDS	Personnel Decontamination Station
PMNSCM	Product Manager Non-Stockpile Chemical Material
PPE	Personnel Protective Equipment
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RCRA	Resource Conservation and Recovery Act
SBCCOM	U.S. Army Soldier and Biological Chemical Command
SOW	Statement Of Work
SSHO	Site safety and health officer
SSHP	Site Safety and Health Plan
SS	Safety Submission
SWMU	Solid Waste Management Units
SZ	Support Zone
TEC	Topographic Engineering Center
TEU	Technical Escort Unit
TLV	Threshold Limit Values
TO	Task Order
TSDF	Treatment, Storage, or Disposal Facility
TWA	Time Weighted Average
USACE	US Army Corps of Engineers
USCG	U.S. Coast Guard
UXO	Unexploded ordnance
WDCMP	Work, Data, and Cost Management Plan
WP	Work Plan

FINAL

PHASE II

SCOPE OF WORK

ENGINEERING EVALUATION/

COST ANALYSIS (EE/CA)

FOR THE

FORMER FORT SEGARRA,

WATER ISLAND,

ST. THOMAS, U.S.V.I.

1.0 BACKGROUND

The work required under this Scope of Work (SOW) falls under the Defense Environmental Restoration Program/Formerly Used Defense Sites (DERP/FUDS). Recovered Chemical Warfare Materiel (RCWM) are suspected to exist at the Former Fort Segarra, Water Island, St. Thomas, U.S.V.I. This property, used for a tropical test program site by the U.S. Army Chemical Corps, was involved in RCWM storage and testing for the Department of Defense. Water Island is now owned by the Virgin Islands of the United States, with the exception of plots purchased by individuals. The areas under investigation were retained under the Department of Interior ownership.

1.1 GENERAL

Uncontrolled RCWM is a safety hazard and constitutes an imminent and substantial endangerment to the general public, on site personnel and the environment. The work performed under this task order will be performed consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the National Contingency Plan (NCP). For any actions on site, administrative requirements of Federal, or Local permits are not required, but applicable or relevant and appropriate requirements will be met. The provisions of 29 CFR 1910.120 shall apply to all actions taken at this site.

1.2 ROLE OF GOVERNMENT PROJECT PARTICIPANTS.

1.2.1 U.S. Army Engineer District, Jacksonville District Office (CESAJ) - This office is the Project Manager for all work at the Former Fort Segarra and is responsible for public affairs, real estate rights of entry, overall coordination of the work, etc.

1.2.2 U.S. Army Engineering and Support Center, Huntsville (CEHNC) - This office is responsible for addressing the RCWM hazards at the site.

1.2.3 U.S. Army's Soldier and Biological-Chemical Command (SBCCOM) - Command for TEU and ECBC.

1.2.3.1 U.S. Army Technical Escort Unit (TEU) - TEU shall provide emergency response if a suspect RCWM round is found which includes excavation, handling, assessment, and transportation of RCWM.

1.2.3.2 Edgewood Chemical Biological Center (ECBC) - ECBC provides monitoring for agent at non-RCWM sites. Monitoring and analysis for industrial chemicals is the responsibility of the Contractor.

1.3 SUSPECTED RECOVERED CHEMICAL WARFARE MATERIEL SITE

This site is a suspected Recovered Chemical Warfare Material site. Various forms of mustard (H) and nerve agents (G) have been involved in testing at the Former Fort Segarra. The following RCWM items reported to have been tested or stored at the Former Fort Segarra (see reference 6.34):

- M47A2 100 lb chemical bombs filled with H
- T3, 125 lb. chemical bombs filled with H, HD, or GA
- AN-M78 500 lb chemical bombs filled with CG and CK
- AN-M79 1000 lb chemical bombs filled with CG, CK and AC
- M2A1 & M1 4.2" mortars, filled with GA,H, HE, HD, Ht, CG, CK, WP, PWP, CNS, CNB, FS
- One-ton containers filled with CG
- 500 lb drums (thought to be 55 gal. drums)
- M70A1 bombs filled with HD or GA
- E23 smoke pot filled with GA, HD and HQ
- German KC 250kg III Gr bombs filled with GA.

Records indicate the E46 bombs (modified 115 lb M70) GA filled and E52 bombs (modified M70 125 lb) GA filled were removed from St. Thomas when the San Jose Project moved. A determination of applicability of the Interim Guidance was performed in February 2002. Based on the probability of finding a suspect RCWM item being seldom or unlikely, all sites shall be investigated as non-RCWM sites with RCWM contingencies in order to provide safety and health precautions due to a potential for being exposed to chemical agent.

1.4 SITE DESCRIPTION

1.4.1 The U.S. Army Chemical Corps moved its San Jose Project (tropical test site) from the Island of San Jose, Panama to St. Thomas, U.S.V.I., in 1948 and occupied the facilities

there until 1950 when operations were moved to Dugway Proving Grounds, UT. Chemical testing areas and a Toxic Storage Yard were located on Water Island.

During non-military construction excavation in 1966 two bombs identified as M70 and M78 were unearthed. Standard M70 is filled with H (mustard) and the standard M78 can be filled with either Phosgene (CG), Cyanogen Chloride (CK), or Hydrogen Cyanide (AC). One bomb had been vented the other was blown with no noticeable release of agent.

The areas included in this SOW are numbered test areas 1 through 8. The Flamingo Bay Landfill area, once used as a scrap yard, will also be included in this investigation. This area is where the bombs were reported to have been dug up in 1966 and was fenced by CEHNC in October 1991.

1.4.2 An Archives Search Report (ASR) by Ebasco was completed in July, 1991. Risk assessment is included in the ASR. U.S. Army Engineer District, St. Louis is currently performing, in conjunction with the Topographic Engineering Center (TEC), an additional archive search. Additional information found during this archive search substantiates the belief that the probability of finding RCWM at Ft Segarra is either 'seldom' or 'unlikely'.

1.4.3 MTA, Inc. was contracted by CEHNC to conduct non-intrusive and intrusive work. Approval to conduct a geophysical investigation was given. Upon completion of the geophysical investigation, an Anomaly Review Board was convened to determine which anomalies would be further investigated. A Site Characterization was then prepared. The Anomaly Review Board (ARB) results are contained in this Site Characterization report.

1.4.4 A Site Safety Submission was started, however, because of technical reasons regarding CK bombs, the SS was placed on hold. These documents will be provided to the Contractor for review and use as needed.

2.0 OBJECTIVES

The objective of this SOW is to authorize the performance of the Local Approved Work Plans and preparation of the EE/CA Report and site investigation report data.

3.0 TASKS

The Contractor shall perform Tasks 1through 6 for Test Areas 4 & 5 in accordance with the Local Approved Work Plans.

- **TASK 1 – SITE MOBILIZATION/DEMOBILIZATION AND SUPPORT – TIME AND MATERIALS**
- **TASK 2 – BRUSH CLEARING AND DEBRIS REMOVAL – FIRM FIXED-PRICE**
- **TASK 3 – ANOMALY REACQUISTION – FIRM FIXED-PRICE**
- **TASK 4 – INTRUSIVE INVESTIGATION – TIME AND MATERIALS**
- **TASK 5 – HTW SOIL SAMPLING AND ANALYSIS – TIME AND MATERIALS**
- **TASK 6 – INVESTIGATIVE DERIVED WASTE – TIME AND MATERIALS**

The Contractor shall perform Optional Tasks 7 through 11 for the Flamingo Bay Landfill in accordance with the Local Approved Work Plans.

- **OPTIONAL TASK 7 – BRUSH CLEARING AND DEBRIS REMOVAL – FIRM FIXED-PRICE**
- **OPTIONAL TASK 8 – ANOMALY REACQUISTION – FIRM FIXED-PRICE**
- **OPTIONAL TASK 9 – INTRUSIVE INVESTIGATION – TIME AND MATERIALS**
- **OPTIONAL TASK 10 – HTW SOIL SAMPLING AND ANALYSIS – TIME AND MATERIALS**
- **OPTIONAL TASK 11 – INVESTIGATIVE DERIVED WASTE – TIME AND MATERIALS**

3.1 TASK 12 - RECORD AND SUBMIT VIDEO TAPE FOR – FIRM FIXED-PRICE

The Contractor shall furnish the necessary personnel and equipment to video tape a sample of each activity from all field tasks of this SOW. Taping shall be of typical activities and accurately depict all work accomplished. The video tape shall be standard VHS 1/2-inch color tape with voice background describing the actions being filmed, containing a maximum of 120 minutes footage. Two copies of the video tape shall be submitted as part of the EE/CA Report.

3.2 TASK 13 - ENGINEERING EVALUATION/COST ANALYSIS (EE/CA) REPORT – FIRM FIXED-PRICE

3.2.1 The Contractor shall prepare and submit an EE/CA report fully documenting the field work and subsequent evaluations and recommendations made by the Contractor per Data

Item Description (DID) OE-010 (Reference 6.37). The EE/CA Report shall describe the site history, briefly describe previous work conducted, the work conducted under this task order, and the results. The report shall also contain the Contractor's conclusions as to the nature and extent of RCWM contamination at the site, and recommendations for future work at the site. It is the Government's intent to pursue and to address any RCWM contamination which may be present. The site should be sufficiently characterized to support an Engineering Evaluation/Cost Analysis (EE/CA). The textual portions of the report shall be fully supported with accompanying maps, charts, and tables as necessary to fully describe and document all work performed and all conclusions and recommendations presented. After the site investigation is complete, the Contractor shall identify and analyze all feasible response alternatives. The Contractor shall evaluate the risk that the site represents to human health and the environment. The risk evaluated shall consider chronic and acute health effects that could result from chemical warfare constituents.

3.2.2 Analysis of Institutional Controls

The EE/CA report shall fully analyze institutional controls. The Contractor shall prepare an institutional analysis to support the development of institutional control alternative plans of action per DID OE-100 (Reference 6.38). Institutional controls rely on the existing powers and authorities of the Government agencies to protect the public. These plans rely on behavior modification and access control strategies to reduce or eliminate risk. The objective of this report is to document the Government agencies that have jurisdiction over the contaminated lands and to assess their capability and willingness to assert control that could protect the public at large from hazards. Additionally, this report should document the obligation of Government to protect citizens at large from safety hazards under tort law.

3.2.3 Alternatives Development

A full range of alternative plans to address project objectives must be developed in the EE/CA report. Screening of alternatives will produce a manageable set of plans that address the concerns of the community, regulators and the DoD. Alternatives should be

distinct, feasible and fully developed. All plans that make the draft report must be developed to the same level of detail. Infeasible plans will be discarded during the screening process. As a minimum the Contractor shall develop the following alternative plans:

- One alternative shall emphasize the basic strategy of access control
- One alternative shall emphasize the basic strategy of physical removal.
- One alternative shall emphasize the basic strategy of behavior modification.
- One alternative shall combine all strategies.
- One alternative shall be the no DOD action indicated.

Several alternatives that address a single strategy may be developed if there are significant differences in plan performance with respect to selection criteria and it is pertinent to the decision process. Only the best of unique strategies will be combined.

3.2.2 Recommendations

In close consultation with the CEHNC Project Team, the Contractor shall recommend a preferred alternative. This EE/CA report shall be prepared in accordance with the guidance contained EP 1110-1-18, Chapter 9 (Reference 6.30) and DID OE-010.

3.3 TASK 14 - ACTION MEMORANDUM – FIRM FIXED-PRICE

The EE/CA will be provided to the public for their review and comments. The Contractor shall evaluate any comments provided by the Contracting Officer from the public and shall incorporate them where directed by the Contracting Officer. Afterwards, the Contractor shall prepare an Action Memorandum describing the selected alternative.

3.4 OPTIONAL TASK 15 - SITE INVESTIGATION REPORT DATA – FIRM FIXED-PRICE

The Contractor shall provide HTW Sampling and Analysis Data formatted for use in an EPA Site Investigation Report. The Contractor shall provide this data to the Department of the Interior (DOI) at the end of this project.

3.5 TASK 16 – MEETINGS AND PUBLIC INVOLVEMENT – FIRM FIXED-PRICE

The Contractor shall provide a minimum of two professionals thoroughly familiar with the project, to attend meetings as required. Provide, in your cost proposal, the cost per meeting. Assume three one day meetings will be held at or close to Water Island, U.S.V.I., and two meetings will be held at Huntsville, AL. The Contractor shall be prepared to show overheads or use other presentation techniques to convey plans, findings and recommendations.

3.6 TASK 17 – PROJECT MANAGEMENT – FIRM FIXED-PRICE

The Contractor shall, during the life of the Task Order (TO), manage the TO to accomplish the Statement of Work for Test Areas 4 & 5. All project management associated with this Task Order, with the exception of direct technical oversight of work described in the preceding tasks, shall be accounted for in this task. As part of this task, the Contractor shall prepare and submit a Work Task Proposal that outlines the manner in which the Contractor intends to accomplish each Task in this SOW. The Contractor shall provide a scope or level of effort required for the task, milestones, expected completion dates, and any other planning data the Contractor will use to accomplish each task. The Contractor shall provide a detailed schedule of all anticipated tasks in hard copies and electronic form in Microsoft Project, per section 4.

3.7 OPTIONAL TASK 18 – PROJECT MANAGEMENT – FIRM FIXED-PRICE

The Contractor shall, during the life of the Task Order (TO), manage the TO to accomplish the Statement of Work for Flamingo Bay Landfill. All project management associated with this Task Order, with the exception of direct technical oversight of work described in the preceding tasks, shall be accounted for in this task

4.0 SCHEDULE AND SUBMITTALS

The Contractor shall submit all deliverable data to the Contracting Officer and other reviewers shown in Section 4.2 in accordance with the following schedule. All submittals shall be delivered to all addressees as directed by the CEHNC Project Manager no later than the close of business on the day indicated in this paragraph.

4.1 SCHEDULE

DOCUMENT	DATE DUE
Execute Work Plans	5 days following NTP
Draft EE/CA	TBD
Comments on Draft EE/CA Report	TBD
Draft-Final EE/CA	TBD
Comments on Draft-Final EE/CA Report	TBD
Final EE/CA	TBD
Comments on Final EE/CA Report	TBD
Draft Action Memorandum	TBD
Public Meeting	TBD
Final Action Memorandum	TBD
Site Investigation Report Data	TBD

The overall completion date of this Task Order is estimated as February 2003.

* days are working days not calendar days

4.2 ADDRESSES

The following addresses shall be used in mailing submittals:

ADDRESSEE	Submittals
Commander US Army Engineering and Support Center, Huntsville ATTN: CEHNC-OE-DC-C , Roger Fitzpatrick 4820 University Square Huntsville, Alabama 35816-1822	As directed by CEHNC PM
U.S. Army Engineer District, Jacksonville ATTN: CESAJ-DP-S (Robert Bridgers) P.O. Box 4970 Jacksonville, FL 32232-0019	As directed by CEHNC PM
COMMANDER SBCCOM 5232 Fleming Road ATTN: SMCTE-OP Aberdeen Proving Grounds EA, MD 21010-5423	As directed by CEHNC PM
ECBC/Chemical Support Division ATTN: SCBRD-ODC-M, Tim Blades Aberdeen Proving Grounds EA, MD 21010-5423	As directed by CEHNC PM
COMMANDER USATEU 5422 Hoadey Road ATTN: SMCTE-OP Aberdeen Proving Grounds EA, MD 21010-5423	As directed by CEHNC PM

COMMANDER SBCCOM 5232 Fleming Road ATTN: AMSCB-RA (LTC David Mukai) Aberdeen Proving Grounds EA, MD 21010-5423	As directed by CEHNC PM
Robert J. Wing Federal Facilities Section United States Environmental Protection Agency, Region II 290 Broadway New York, NY 10007	As directed by CEHNC PM
Edgar A. Johnson U.S. Virgin Islands Desk Officer Technical Assistance Division Office of Insular Affairs U.S. Department of the Interior 1849 C St., NW Washington, D.C. 20240	As directed by CEHNC PM
Commander Ordnance Group TBD	As directed by CEHNC PM

4.3 FORMAT AND CONTENT OF REPORTS

All drawings shall be of engineering quality with sufficient details. The submittal shall consist of 8 1/2" X 11" paper. The submittal covers shall consist of durable binders and shall hold pages firmly while allowing easy removal, addition, or replacement of pages. A

title shall identify the site, the Contractor, the CEHNC, the CESAJ, and the date. The Contractor identification shall not dominate the title page.

4.4 REVIEW COMMENTS

The Contractor shall review all comments received through the CEHNC Project Manager and evaluate their appropriateness based upon their merit. The Contractor shall incorporate all applicable comments and provide a written response to each comment no later than 21 days after the Contractor receives the comment.

4.5 IDENTIFICATION OF RESPONSIBLE PERSONNEL

Each submittal shall identify the specific members and title of the subcontractor and Contractor's staff that had significant input into the report. All final submittals shall be sealed by a registered Professional Engineer-In-Charge.

4.6 PERSONNEL QUALIFICATIONS AND JOB DESCRIPTIONS

The contractor shall furnish a staff that is qualified through education, training and pertinent experience that will accomplish the objective of this SOW. Training and medical screening requirements under 29CFR 1910.120(e) apply to this project. Personnel qualifications shall be IAW DID OE-025 (Reference 6.40)

4.7 PRESENTATIONS

The Contractor shall make presentations of work performed accordingly as directed by the CO. The presentation shall consist of a summary of the work accomplished and will be followed by an open discussion.

4.8 MINUTES OF MEETINGS

Following the presentation and the meetings, the Contractor shall prepare and submit minutes of the meeting within 10 working days to the CO IAW OE-045 (Reference 6.43).

4.9 CORRESPONDENCE

The Contractor shall keep a record of phone conversations and written correspondence affecting decisions relating to the performance of this task order IAW OE-055 (Reference 6.43).

4.10 MONTHLY PROGRESS REPORT

The Contractor shall prepare and submit monthly progress reports describing the work performed since the previous report, work currently underway and work anticipated. The report shall state whether current work is on schedule. If the work is not on schedule, the Contractor shall state what actions are taken in order to get back on schedule. The report shall be submitted to the CO not later than the 10th day of each calendar month. The Contractor shall provide IAW OE-080 and OE-085 (Reference 6.41 & 6.42).

4.11 COMPUTER FILES

All final text files generated by the Contractor under this task order shall be furnished to the Contracting Officer in MSWord 7.0, IBM PC compatible format. All drawings shall be on reproducible (mylar) and digitized 3D design file (*.dgn) in Intergraph Corporation format, compatible with CEHNC Graphics system. Each submittal shall contain a compact disk (CD) with the contents of the submittal. The CD shall be provided for draft, draft-final, and final documents. The CD shall be appropriately labeled as to its contents and dated. All project related submittals and project correspondence shall be provided on a secured Website. CEHNC shall approve requests for a password.

4.11 PERFORMANCE METRICS

The performance and subsequently the evaluation of the Contractor shall be based on certain performance metrics. The metrics include safety, quality, schedule, cost, and customer satisfaction. The specific performance metrics in effect for this Task Order are stated in the Basic Contract Statement of Work

5.0 PUBLIC AFFAIRS

The Contractor shall not publicly disclose any data generated or reviewed under this contract. The Contractor shall refer all requests for information concerning the site condition

to the Public Affairs Office (PAO). Reports and data generated under this task order are the property of the Department of Defense and distribution to any other sources by the Contractor, unless authorized by the Contracting Officer, is prohibited.

6.0 REFERENCES

6.1 "U.S. Army Corps of Engineers Safety and Health Requirements Manual," U.S. Army Engineer Manual EM 385-1-1, 3 September 1996.

6.2 "Interim Guidance Document 01-01," 27 March 01, with transmittal memo, Huntsville Division, U.S. Army Corps of Engineers.

6.3 Basic Safety Concepts and Considerations for Ordnance and Explosives Operations' EP 385-1-95a, 29 June 2001

6.4 "Environmental Chemistry and Fate of Chemical Warfare Agents." Southwest Research Institute. Prepared for Corps of Engineers, Huntsville Division, March 3, 1994.

6.5 "Field Manual on Environmental Chemistry and Fate of Chemical Warfare Agents." Southwest Research Institute. Prepared for Corps of Engineers, Huntsville Division, July 7, 1994.

6.6 Army Regulation 385-40, Accident Reporting and Records with USACE Supplement

6.7 "Safety and Occupational Health Document Requirements for Hazardous Waste Site Remedial Actions," Engineer Regulations 385-1-92, 1 Sept 2000.

6.8 "Chemical Data Quality Management for Hazardous Waste Remedial Activities," Engineer Regulation 1110-1-263, 30 April 2000.

6.9 Occupational Safety and Health Administration Standards (29 CFR 1910 and 1926).

6.10 "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, October 1985.

6.11 "Emergency Eyewash and Shower Equipment," ANSI Z-358.1, 1990.

6.12 "Practices for Respiratory Protection," ANSI Z-288.2, 1980.

6.13 "Test Methods for Evaluating Solid Wastes," EPA Pub. No. SW-846, Latest Ed.

6.14 "Annual Book of ASTM Standards," Current edition.

6.15 "CERCLA Compliance With Other Laws Manual. Parts I and II." U.S. Environmental Protection Agency (EPA). 1988b.

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6.37 CEHNC Data Item Description OE-100 Analysis of Institutional Controls

6.38 CEHNC Data Item Description OE-015 Accidents/Incidents Reports

6.39 CEHNC Data Item Description OE-025 Personnel/Work Standards

6.40 CEHNC Data Item Description OE-080 Monthly Status Report

6.41 CEHNC Data Item Description OE-085 Weekly Status Report

6.42 CEHNC Data Item Description OE-045 Report/Minutes, Record of Meetings

6.43 CEHNC Data Item Description OE-055 Telephone Conversation/Correspondence Records

10.0 ACRONYMS

ABIH	American Board of Industrial Hygiene
ACGIH	American Conference of Governmental Industrial Hygienist
AIHA	American Industrial Hygiene Association's
AR	Army Regulation
ARB	Anomaly Review Board
CAIRA	Chemical Accident or Incident Response and Assistance
CD	Compact Disk
CEHNC	US Army Engineering and Support Center, Huntsville
CEMRO	Corps of Engineers' Missouri River Omaha
CESAJ	U.S. Army Engineer District, Jacksonville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulation
CIH	Certified Industrial Hygienist
CLP	Contract Laboratory Program
CO	Contracting Officer
COC	Contaminants of Concern
DA	Department of the Army
DDESB	Department of Defense Explosive Safety Board
DERP/FUDS	Defense Environmental Restoration Program/Formerly Used Defense SIte
DOD	Department of Defense
DOI	Department of Interior
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
ECBC	Edgewood Chemical and Biological Command
EZ	Exclusion Zone
GA, GB	Nerve Agent
GFE	Government furnished equipment
GQA	Government Quality Assurance
H, HD	Mustard
HSWA	Hazardous and Solid Waste Amendment
HTRW	Hazardous, Toxic, and Radioactive Waste
HTW	Hazardous and Toxic Waste
IAW	In accordance with
ID	Identification
IDW	Investigative Derived Waste
IHF	Interim Holding Facility
IW	Investigative Waste
IWP	Intrusive Work Plan
LCS	Laboratory Control Standard's
MCE	Maximum Credible Event
MSDS	Material Safety Data Sheets
NCP	National Contingency Plan
NDAI	No DOD Action Indicated
NIOSH	National Institute for Occupational Safety and Health

NOSE	No Significant Events
NWP	Non-intrusive Work Plan
NTP	Notice to Proceed
OE	Ordnance and Explosive
OSHA	Occupational Safety and Health Administration
PAM	Pamphlet
PAT	Proficiency Analytical Testing
PEL	Permissible Exposure Limits
PEP	Property Equipment Plan
PC	Personal computer
PDS	Personnel Decontamination Station
PMNSCM	Product Manager Non-Stockpile Chemical Material
PPE	Personnel Protective Equipment
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Material
SBCCOM	U.S. Army Soldier and Biological Chemical Command
SOW	Statement Of Work
SSHO	Site safety and health officer
SSHP	Site Safety and Health Plan
SS	Safety Submission
SWMU	Solid Waste Management Units
SZ	Support Zone
TEC	Topographic Engineering Center
TEU	Technical Escort Unit
TLV	Threshold Limit Values
TO	Task Order
TSDF	Treatment, Storage, or Disposal Facility
TWA	Time Weighted Average
USACE	US Army Corps of Engineers
USCG	U.S. Coast Guard
UXO	Unexploded ordnance
WDCMP	Work, Data, and Cost Management Plan
WP	Work Plan

APPENDIX B
ECBC CWM CLEARANCE REPORTS

- SBCCOM Extraction Samples Clearance Report
- ECBC Daily Situation and Clearance Report

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Report To: Clay Edmondson of Parsons, for PROJECT: Fort Segarra, VI
Phone/Fax: **W:** **F:** (417) 455-0921
Govt Org/Poc: ECBC: John Ditillo

Sample #/Name MB030376-M01 FS-FBL-SB2-1-3' **Date Rec'd** 5/22/2003
Sample Matrix Soil **Sample Date** 5/20/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030376-M01	**03052201**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane		05/22/03	5/22/2003	200	ND	
1,4-Thioxane				200	ND	
BFB (Surrogate)				0	85%	
GA				20	ND	
HD				200	ND	

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030376-M01MS	**03052201**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MS	5/22/2003	5/22/2003	200	83%	
1,4-Thioxane				200	82%	
BFB (Surrogate)				0	85%	
GA				20	85%	
HD				200	85%	

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030376-M01MSD	**03052201**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MSD	5/22/2003	5/22/2003	200	92%	
1,4-Thioxane				200	90%	
BFB (Surrogate)				0	91%	
GA				20	92%	
HD				200	95%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Sample #/Name MB030377-M01 FS-FBL-SB3-2-3' **Date Rec'd** 5/22/2003
Sample Matrix Soil **Sample Date** 5/20/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030377-M01	**03052201**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/22/2003	5/22/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	85%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030378-M01 FS-FBL-SB3-1-0-2' **Date Rec'd** 5/22/2003
Sample Matrix Soil **Sample Date** 5/20/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030378-M01	**03052201**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/22/2003	5/22/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	82%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030379-M01 FS-FBL-SB-7-1-4.5' **Date Rec'd** 5/22/2003
Sample Matrix Soil **Sample Date** 5/19/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030379-M01	**03052201**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/22/2003	5/22/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	85%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Sample #/Name MB030380-M01 FS-FBL-SB-7-S-1-0-2' **Date Rec'd** 5/22/2003
Sample Matrix Soil **Sample Date** 5/19/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030380-M01	**03052201**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/22/2003	5/22/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	79%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030381-M01 FS-FBL-SB-9-1-3.5' **Date Rec'd** 5/22/2003
Sample Matrix Soil **Sample Date** 5/19/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030381-M01	**03052201**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/22/2003	5/22/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	79%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030382-M01 FS-FBL-SB-10-1-0-2' **Date Rec'd** 5/22/2003
Sample Matrix Soil **Sample Date** 5/19/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030382-M01	**03052201**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/22/2003	5/22/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	85%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Sample #/Name MB030383-M01 03052201-LCS **Date Rec'd** 5/22/2003
Sample Matrix Other Laboratory Control Spike **Sample Date** 5/22/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030383-M01LCS	**03052201**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/22/2003	5/22/2003	200	68%	
1,4-Thioxane			200	71%	
BFB (Surrogate)			0	84%	
GA			20	83%	
HD			200	69%	

Sample #/Name MB030384-M01 03052201-LCSD **Date Rec'd** 5/22/2003
Sample Matrix Other Laboratory Control Spike Duplicate **Sample Date** 5/22/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030384-M01LCSD	**03052201**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/22/2003	5/22/2003	200	80%	
1,4-Thioxane			200	81%	
BFB (Surrogate)			0	83%	
GA			20	85%	
HD			200	80%	

Sample #/Name MB030385-M01 03052201-MB **Date Rec'd** 5/22/2003
Sample Matrix Other Method Blank **Sample Date** 5/22/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030385-M01MB	**03052201**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/22/2003	5/22/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	82%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Report To: Clay Edmondson of Parsons, for PROJECT: Fort Segarra, VI
Phone/Fax: **W:** **F:** (417) 455-0921
Govt Org/Poc: ECBC: John Ditillo

Sample #/Name MB030395-M01 FS-FBL-G1-1-4' **Date Rec'd** 5/27/2003
Sample Matrix Soil **Sample Date** 5/20/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030395-M01	**03052701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	05/27/03	5/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	80%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030396-M01 FS-FBL-G6-1-3.5' **Date Rec'd** 5/27/2003
Sample Matrix Soil **Sample Date** 5/20/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030396-M01	**03052701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	05/27/03	5/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	74%	
GA			40	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Sample #/Name MB030397-M01 FS-FBL-G9-1-4' **Date Rec'd** 5/27/2003
Sample Matrix Soil **Sample Date** 5/21/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030397-M01	**03052701**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane		5/27/2003	5/27/2003	200	ND	
1,4-Thioxane				200	ND	
BFB (Surrogate)				0	78%	
GA				40	ND	
HD				200	ND	

MB030397-M01MS	**03052701**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MS	05/27/03	5/27/2003	200	70%	
1,4-Thioxane				200	74%	
BFB (Surrogate)				0	88%	
GA				40	90%	
HD				200	67%	

MB030397-M01MSD	**03052701**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MSD	05/27/03	5/27/2003	200	65%	
1,4-Thioxane				200	69%	
BFB (Surrogate)				0	79%	
GA				40	88%	
HD				200	62%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Sample #/Name MB030398-M01 FS-FBL-SB6-1-0'-2' **Date Rec'd** 5/27/2003
Sample Matrix Soil **Sample Date** 5/21/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030398-M01	**03052701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	05/27/03	5/27/2003	2000	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	75%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030399-M01 FS-FBL-SB6-2-3.5' **Date Rec'd** 5/27/2003
Sample Matrix Soil **Sample Date** 5/21/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030399-M01	**03052701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	05/27/03	5/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	81%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB031560-M01 03052701-LCS (Lab Control Spike) **Date Rec'd** 5/27/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031560-M01LCS	**03052701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/27/03	5/27/2003	200	71%	
1,4-Thioxane			200	74%	
BFB (Surrogate)			0	82%	
GA			40	90%	
HD			200	67%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Sample #/Name MB031561-M01 03052701-LCSD (Lab Control Spike) **Date Rec'd** 5/27/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031561-M01LCSD	**03052701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/27/2003	5/27/2003	200	68%	
1,4-Thioxane			200	71%	
BFB (Surrogate)			0	83%	
GA			40	86%	
HD			200	63%	

Sample #/Name MB031562-M01 03052701-MB (Method Blank) **Date Rec'd** 5/27/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031562-M01MB	**03052701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/27/2003	5/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	85%	
GA			40	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Report To: Clay Edmondson of Parsons, for PROJECT: Fort Segarra, VI
Phone/Fax: **W:** **F:** (417) 455-0921
Govt Org/Poc: ECBC: John Ditillo

Sample #/Name MB030400-M01 FS-FBL-G20-1-3.5' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/21/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030400-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/03	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	103%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030401-M01 FS-FBL-SB4-1-3.5' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/22/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030401-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/03	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	103%	
GA			40	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Sample #/Name MB030402-M01 FS-FBL-SB5-1-3.5' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/22/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030402-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	98%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030403-M01 FS-FBL-SB8-1-0-2' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/22/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030403-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	95%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030404-M01 FS-FBL-SB8-2-3.5' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/22/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030404-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	93%	
GA			40	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030405-M01 FS-FBL-SB10-2-3' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/22/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030405-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	97%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030406-M01 FS-FBL-ST2-S-1-0'-2' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030406-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	105%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030407-M01 FS-FBL-ST2-1-3.5' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030407-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	94%	
GA			40	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030408-M01 FS-FBL-ST1-1-3.5' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030408-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	104%	
GA			40	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030409-M01 FS-FBL-SB1-1-0'-2' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030409-M01	**03052801**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane		5/28/2003	5/28/2003	200	ND	
1,4-Thioxane				200	ND	
BFB (Surrogate)				0	117%	
GA				40	ND	
HD				200	ND	

MB030409-M01MS	**03052801**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MS	5/28/2003	5/28/2003	200	113%	
1,4-Thioxane				200	126%	
BFB (Surrogate)				0	109%	
GA				40	86%	
HD				200	117%	

MB030409-M01MSD	**03052801**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MSD	5/30/2003	5/28/2003	200	112%	
1,4-Thioxane				200	121%	
BFB (Surrogate)				0	107%	
GA				40	92%	
HD				200	116%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030410-M01 FS-FBL-SB1-2-3' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030410-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/30/2003	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	100%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030411-M01 FS-FBL-ST1-1-0'-2' **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030411-M01	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	109%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB031563-M01 03052801-LCS (Lab Control Spike) **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031563-M01LCS	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	100%	
1,4-Thioxane			200	113%	
BFB (Surrogate)			0	99%	
GA			40	93%	
HD			200	101%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB031564-M01 03052801-LCSD (Lab Control Spike) **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031564-M01LCSD	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	102%	
1,4-Thioxane			200	115%	
BFB (Surrogate)			0	102%	
GA			40	104%	
HD			200	104%	

Sample #/Name MB031565-M01 03052801-MB (Method Blank) **Date Rec'd** 5/28/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031565-M01MB	**03052801**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/28/2003	5/28/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	120%	
GA			40	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Report To: Clay Edmondson of Parsons, for PROJECT: Fort Segarra, VI
Phone/Fax: **W:** **F:** (417) 455-0921
Govt Org/Poc: ECBC: John Ditillo

Sample #/Name MB030412-M01 FS-FBL-G15-1-2.5' **Date Rec'd** 5/29/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030412-M01	**03052901**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane		5/29/03	5/29/2003	200	ND	
1,4-Thioxane				200	ND	
BFB (Surrogate)				0	109%	
GA				40	ND	
HD				200	ND	

MB030412-M01MS	**03052901**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MS	5/29/2003	5/29/2003	200	114%	
1,4-Thioxane				200	94%	
BFB (Surrogate)				0	108%	
GA				40	72%	
HD				200	121%	

MB030412-M01MSD	**03052901**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MSD	5/29/2003	5/29/2003	200	112%	
1,4-Thioxane				200	94%	
BFB (Surrogate)				0	107%	
GA				40	81%	
HD				200	122%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030413-M01 FS-FBL-IT-1-3' **Date Rec'd** 5/29/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030413-M01	**03052901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/29/2003	5/29/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	98%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030414-M01 FS-FBL-SR-2-0'-2' **Date Rec'd** 5/29/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030414-M01	**03052901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/29/2003	5/29/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	93%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030415-M01 FS-FBL-SR-1-0'-2' **Date Rec'd** 5/29/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030415-M01	**03052901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/29/2003	5/29/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	102%	
GA			40	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030416-M01 FS-FBL-SB3-1-0'-2' **Date Rec'd** 5/29/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030416-M01	**03052901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/29/2003	5/29/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	100%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030417-M01 FS-FBL-SB3-2-3' **Date Rec'd** 5/29/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030417-M01	**03052901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/29/2003	5/29/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	98%	
GA			40	ND	
HD			200	ND	

Sample #/Name MB030418-M01 FS-FBL-SB7-1-4.5' **Date Rec'd** 5/29/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030418-M01	**03052901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/29/2003	5/29/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	93	
GA			40	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB031566-M01 03052901-LCS (Lab Control Spike) **Date Rec'd** 5/29/2003
Sample Matrix Soil **Sample Date** 5/29/2003
Headspace Clearance # **Remarks** Sample leaked from autosampler vial. Leaky vial allowed solvent evaporation.

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031566-M01LCS	**03052901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/29/03	5/29/2003	200	135%	
1,4-Thioxane			200	142%	
BFB (Surrogate)			0	129%	
GA			40	139%	
HD			200	145%	

Sample #/Name MB031567-M01 03052901-LCSD (Lab Control Spike **Date Rec'd** 5/29/2003
Sample Matrix Soil **Sample Date** 5/29/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031567-M01LCSD	**03052901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/29/2003	5/29/2003	200	118%	
1,4-Thioxane			200	127%	
BFB (Surrogate)			0	109%	
GA			40	112%	
HD			200	127%	

Sample #/Name MB031568-M01 03052901-MB (Method Blank) **Date Rec'd** 5/29/2003
Sample Matrix Soil **Sample Date** 5/29/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031568-M01MB	**03052901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	5/29/2003	5/29/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	106%	
GA			40	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Report To: Clay Edmondson of Parsons, for PROJECT: Fort Segarra, VI
Phone/Fax: **W:** **F:** (417) 455-0921
Govt Org/Poc: ECBC: John Ditillo

Sample #/Name MB030419-M01 FS-FBL-SBK-1-0'-2' **Date Rec'd** 6/4/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030419-M01	**03060402**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane		06/04/03	6/4/2003	200	ND	
1,4-Thioxane				200	ND	
BFB (Surrogate)				0	90%	
GA				20	ND	
HD				200	ND	

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030419-M01MS	**03060402**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MS	6/4/03	6/4/2003	200	97%	
1,4-Thioxane				200	97%	
BFB (Surrogate)				0	98%	
GA				20	89%	
HD				200	100%	

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030419-M01MSD	**03060402**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MSD	6/4/03	6/4/2003	200	112%	
1,4-Thioxane				200	112%	
BFB (Surrogate)				0	103%	
GA				20	96%	
HD				200	117%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030420-M01 FS-FBL-SBK-2-0'-2' **Date Rec'd** 6/4/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030420-M01	**03060402**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/4/03	6/4/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	96%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030421-M01 FS-TA5-TP3-1-1.5' **Date Rec'd** 6/4/2003
Sample Matrix Soil **Sample Date** 5/29/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030421-M01	**03060402**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/4/03	6/4/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	99%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030422-M01 FS-TA5-TP1-1-14" **Date Rec'd** 6/4/2003
Sample Matrix Water **Sample Date** 5/29/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030422-M01	**03060402**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/4/03	6/4/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	89%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030423-M01 FS-TA5-TP2-1-6' **Date Rec'd** 6/4/2003
Sample Matrix Soil **Sample Date** 5/29/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030423-M01	**03060402**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/4/03	6/4/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	94%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030424-M01 03060402-LCS **Date Rec'd** 6/4/2003
Sample Matrix Other Laboratory Control Spike **Sample Date** 6/4/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030424-M01LCS	**03060402**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	06/04/03	6/4/2003	200	116%	
1,4-Thioxane			200	129%	
BFB (Surrogate)			0	99%	
GA			20	95%	
HD			200	119%	

Sample #/Name MB030425-M01 03060402-LCSD **Date Rec'd** 6/4/2003
Sample Matrix Other Laboratory Control Spike Duplicate **Sample Date** 6/4/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030425-M01LCSD	**03060402**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/4/03	6/4/2003	200	99%	
1,4-Thioxane			200	112%	
BFB (Surrogate)			0	104%	
GA			20	102%	
HD			200	102%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Sample #/Name MB030426-M01 03060402-MB **Date Rec'd** 6/4/2003
Sample Matrix Other Method Blank **Sample Date** 6/4/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030426-M01MB	**03060402**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/4/03	6/4/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	125%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Report To: John Schwarz (at VI) Room 3103 of ECBC, for PROJECT: Fort Segarra, VI
Phone/Fax: **W:** (410) 436-0000 **F:** (340) 776-3426
Govt Org/Poc: ECBC: John Ditillo

Sample #/Name MB030428-M01 FS-FBL-SB3-1-0'-2' **Date Rec'd** 6/6/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks** COC never received.

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030428-M01	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/2003	6/6/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	93%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030429-M01 FS-FBL-SB3-2'-3' **Date Rec'd** 6/6/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks** COC never received

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030429-M01	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/2003	6/6/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	93%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030430-M01 FS-FBL-SB7-1'-4.5' **Date Rec'd** 6/6/2003
Sample Matrix Soil **Sample Date** 5/28/2003
Headspace Clearance # **Remarks** COC never received

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030430-M01	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/2003	6/6/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	91%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030431-M01 FS-FBL-IT-1 **Date Rec'd** 6/6/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks** COC never received

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030431-M01	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/2003	6/6/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	91%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030432-M01 FS-FBL-SR-1-0'-2' **Date Rec'd** 6/6/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks** COC never received

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030432-M01	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/2003	6/6/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	76%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030433-M01 FS-FBL-SR-2-0'-2' **Date Rec'd** 6/6/2003
Sample Matrix Soil **Sample Date** 5/27/2003
Headspace Clearance # **Remarks** COC never received

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030433-M01	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/2003	6/6/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	76%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030434-M01 03060601-LCS **Date Rec'd** 6/6/2003
Sample Matrix Other Laboratory Control Spike **Sample Date** 6/6/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030434-M01LCS	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/2003	6/6/2003	200	99%	
1,4-Thioxane			200	112%	
BFB (Surrogate)			0	93%	
GA			20	96%	
HD			200	103%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB031569-M01 MB030427 - Sample for matrix spiking **Date Rec'd** 6/6/2003
Sample Matrix Soil **Sample Date** 6/6/2003
Headspace Clearance # **Remarks** Parent sample from another client.

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031569-M01MS	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/04	6/6/2004	200	142%	
1,4-Thioxane			200	141%	
BFB (Surrogate)			0	127	
GA			20	131%	
HD			200	149%	

MB031569-M01MSD	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/2003	6/6/2003	200	99%	
1,4-Thioxane			200	99%	
BFB (Surrogate)			0	96%	
GA			20	94%	
HD			200	104%	

Sample #/Name MB031570-M01 03060601-LCSD (Lab Control Spike **Date Rec'd** 6/6/2003
Sample Matrix Soil **Sample Date** 6/6/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031570-M01LCSD	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/2004	6/6/2004	200	94%	
1,4-Thioxane			200	106%	
BFB (Surrogate)			0	90%	
GA			20	102%	
HD			200	98%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB031571-M01 03060601-MB (Method Blank) **Date Rec'd** 6/6/2003
Sample Matrix Soil **Sample Date** 6/6/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB031571-M01MB	**03060601**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/6/2004	6/6/2004	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	97%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Report To: John Schwarz (at VI) Room 3103 of ECBC, for PROJECT: Fort Segarra, VI
Phone/Fax: **W:** (410) 436-0000 **F:** (340) 776-3426
Govt Org/Poc: ECBC: John Ditillo

Sample #/Name MB030473-M01 FS-TA4-SB2-1-2.5' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/4/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030473-M01	**03061203**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane		6/12/03	6/12/2003	200	ND	
1,4-Thioxane				200	ND	
BFB (Surrogate)				0	85%	
GA				20	ND	
HD				200	ND	

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030473-M01MS	**03061203**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MS	6/12/2003	6/12/2003	200	95%	
1,4-Thioxane				200	104%	
BFB (Surrogate)				0	90%	
GA				20	110%	
HD				200	103%	

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030473-M01MSD	**03061203**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MSD	6/12/2003	6/12/2003	200	97%	
1,4-Thioxane				200	105%	
BFB (Surrogate)				0	83%	
GA				20	108%	
HD				200	107%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030474-M01 FS-TA4-SB7-1-3.5' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/4/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030474-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	89%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030475-M01 FS-TA4-SB6-1-3' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/4/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030475-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	95%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030476-M01 FS-TA4-SB5-1-3' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/5/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030476-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	92%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030477-M01 FS-TA4-TP6-S1-0'-2' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/5/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030477-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	90%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030478-M01 FS-TA4-TP6-1-5.5' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/5/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030478-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	95%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030479-M01 FS-TA4-TP1-1-4.5' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/5/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030479-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	85%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Sample #/Name MB030480-M01 FS-TA4-TP10-1-3' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/5/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030480-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	86%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030481-M01 FS-TA4-TP8-1-5.5' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/5/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030481-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	86%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030482-M01 FS-TA5-GS5-1-4' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/9/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030482-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/03	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	123%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030483-M01 FS-TA5-GS5-S1-0'-2' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/9/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030483-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	106%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030484-M01 FS-TA5-GS5-S2-3.5' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/9/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030484-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	94%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030485-M01 FS-TA5-GS4-1-3' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/9/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030485-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	96%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030486-M01 FS-TA5-GS4-2-1.5' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/9/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030486-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	88%	
GA			20	ND	
GD			200	ND	

Sample #/Name MB030487-M01 FS-TA5-GS3-S1-0'-2' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/10/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030487-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	87%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030488-M01 FS-TA5-GS3-1'-2' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/10/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030488-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	96%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030489-M01 FS-TA5-GS2-1'-1.5' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/10/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030489-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	90%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030490-M01 FS-TA5-GS1-S1-0'-2' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/10/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030490-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	101%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030491-M01 FS-TA5-GS1-1'-4' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/10/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030491-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	95%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030492-M01 FS-TA5-199-1-1.5' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/10/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030492-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	88%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030493-M01 FS-TA5-193-1-4' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/10/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030493-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	90%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030494-M01 FS-TA5-147-1-1' **Date Rec'd** 6/12/2003
Sample Matrix Soil **Sample Date** 6/11/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030494-M01	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/03	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	85%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030495-M01 03061203-LCS **Date Rec'd** 6/12/2003
Sample Matrix Other Laboratory Control Spike **Sample Date** 6/11/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030495-M01LCS	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	76%	
1,4-Thioxane			200	86%	
BFB (Surrogate)			0	71%	
GA			20	82%	
HD			200	83%	

Sample #/Name MB030496-M01 03061203-LCSD **Date Rec'd** 6/12/2003
Sample Matrix Other Laboratory Control Spike Duplicate **Sample Date** 6/11/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030496-M01LCSD	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	76%	
1,4-Thioxane			200	86%	
BFB (Surrogate)			0	79%	
GA			20	82%	
HD			200	82%	

Sample #/Name MB030497-M01 03061203-MB **Date Rec'd** 6/12/2003
Sample Matrix Other Method Blank **Sample Date** 6/11/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030497-M01MB	**03061203**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/12/2003	6/12/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	71%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Report To: John Schwarz (at VI) Room 3103 of ECBC, for PROJECT: Fort Segarra, VI
Phone/Fax: **W:** (410) 436-0000 **F:** (340) 776-3426
Govt Org/Poc: ECBC: John Ditillo

Sample #/Name MB030504-M01 FS-TA8-SB3-1-0'-2' **Date Rec'd** 6/18/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030504-M01	**03061901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	06/19/03	6/19/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	82%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030505-M01 FS-TA8-SB2-1-0'-2' **Date Rec'd** 6/18/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030505-M01	**03061901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/19/2003	6/19/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	70%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030506-M01 FS-TA8-SB1-1-0'-2' **Date Rec'd** 6/18/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030506-M01	**03061901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/19/2003	6/19/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	75%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030507-M01 FS-TA8-SB5-1-0'-2' **Date Rec'd** 6/18/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030507-M01	**03061901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/19/2003	6/19/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	74%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030508-M01 FS-TA8-SB4-1-0'-2' **Date Rec'd** 6/18/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030508-M01	**03061901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/19/2003	6/19/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	72%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030509-M01 FS-TA8-SB7-1-0'-2' **Date Rec'd** 6/18/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030509-M01	**03061901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/19/2003	6/19/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	78%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030510-M01 FS-TA8-SB9-1-0'-2' **Date Rec'd** 6/18/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030510-M01	**03061901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/19/2003	6/19/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	75%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030511-M01 FS-TA8-SBK-2-0'-2' **Date Rec'd** 6/18/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030511-M01	**03061901**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane		6/19/2003	6/19/2003	200	ND	
1,4-Thioxane				200	ND	
BFB (Surrogate)				0	78%	
GA				20	ND	
HD				200	ND	

MB030511-M01MS	**03061901**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MS	6/19/2003	6/19/2003	200	80%	
1,4-Thioxane				200	92%	
BFB (Surrogate)				0	79%	
GA				20	81%	
HD				200	86%	

MB030511-M01MSD	**03061901**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MSD	6/19/2003	6/19/2003	200	84%	
1,4-Thioxane				200	95%	
BFB (Surrogate)				0	80%	
GA				20	87%	
HD				200	89%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030512-M01 03061901MB **Date Rec'd** 6/18/2003
Sample Matrix Soil Method Blank **Sample Date** 6/19/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030512-M01MB	**03061901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/19/2003	6/19/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	86%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030513-M01 03061901LCS **Date Rec'd** 6/18/2003
Sample Matrix Soil Laboratory Control Spike **Sample Date** 6/19/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030513-M01LCS	**03061901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/19/2003	6/19/2003	200	82%	
1,4-Thioxane			200	92%	
BFB (Surrogate)			0	82%	
GA			20	79%	
HD			200	84%	

Sample #/Name MB030514-M01 03061901LCSD **Date Rec'd** 6/18/2003
Sample Matrix Soil Laboratory Control Spike Duplicate **Sample Date** 6/19/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030514-M01LCSD	**03061901**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	06/19/01	6/19/2001	200	88%	
1,4-Thioxane			200	98%	
BFB (Surrogate)			0	92%	
GA			20	78%	
HD			200	91%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

Report To: John Schwarz (at VI) Room 3103 of ECBC, for PROJECT: Fort Segarra, VI
Phone/Fax: **W:** (410) 436-0000 **F:** (340) 776-3426
Govt Org/Poc: ECBC: John Ditillo

Sample #/Name MB030541-M01 FS-TA5-146-1-1' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/11/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030541-M01	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/03	6/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	90%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030542-M01 FS-TA5-153-1-14' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/11/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030542-M01	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/2003	6/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	100%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030543-M01 FS-TA5-195-1-1' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/11/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030543-M01	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/2003	6/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	97%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030544-M01 FS-TA5-204-1-6' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/11/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030544-M01	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/2003	6/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	94%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030545-M01 FS-TA5-SBK-2-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/11/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030545-M01	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/2003	6/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	96%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030546-M01 FS-TA5-TP1-1-5.5' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/12/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030546-M01	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/2003	6/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	98%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030547-M01 FS-TA5-TP3-1-6.5' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/12/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030547-M01	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/2003	6/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	98%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030548-M01 FS-TA4-TP2-1-4' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/12/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030548-M01	**03062701**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane		6/27/2003	6/27/2003	200	ND	
1,4-Thioxane				200	ND	
BFB (Surrogate)				0	99%	
GA				20	ND	
HD				200	ND	

MB030548-M01MS	**03062701**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MS	6/27/2003	6/27/2003	200	90%	
1,4-Thioxane				200	99%	
BFB (Surrogate)				0	99%	
GA				20	84%	
HD				200	93%	

MB030548-M01MSD	**03062701**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MSD	6/27/2003	6/27/2003	200	78%	
1,4-Thioxane				200	89%	
BFB (Surrogate)				0	103%	
GA				20	85%	
HD				200	82%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

SBCCOM MONITORING BRANCH

CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030549-M01 FS-TA4-TP7-51-0' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/12/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030549-M01	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/2003	6/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	119%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030585-M01 03062701-LCS **Date Rec'd** 6/27/2003
Sample Matrix Other Laboratory Control Spike **Sample Date** 6/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030585-M01LCS	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/2003	6/27/2003	200	79%	
1,4-Thioxane			200	91%	
BFB (Surrogate)			0	92%	
GA			20	85%	
HD			200	82%	

Sample #/Name MB030586-M01 03062701-LCSD **Date Rec'd** 6/27/2003
Sample Matrix Other Laboratory Control Spike Duplicate **Sample Date** 6/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030586-M01LCSD	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/2003	6/27/2003	200	87%	
1,4-Thioxane			200	98%	
BFB (Surrogate)			0	97%	
GA			20	88%	
HD			200	91%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030587-M01 03062701-MB **Date Rec'd** 6/27/2003
Sample Matrix Other Method Blank **Sample Date** 6/27/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030587-M01MB	**03062701**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/27/2003	6/27/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	88%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

MB-FORM 41 Revision 10 July 2003

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Govt Org/Poc: ECBC: John Ditillo

Sample #/Name MB030550-M01 FS-TA4-SBK-1-3' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/13/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030550-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/03	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	109%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030551-M01 FS-TA4-TP12-1-3' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/13/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030551-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	108%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030552-M01 FS-TA4-TP9-S1-0'-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/13/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030552-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	108	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030553-M01 FS-TA4-TP9-1-2.5' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/13/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030553-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			20	ND	
BFB (Surrogate)			0	117%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030554-M01 FS-TA4-TP3-1-3.5' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/13/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030554-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	119%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030555-M01 FS-TA4-TP4-1-10' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/13/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030555-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	118%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030556-M01 FS-TA4-TP5-1-1.5' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/13/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030556-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	120%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030557-M01 FS-TA4-SBK-2-2.5' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/13/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030557-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	121%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030558-M01 FS-TA4-TP7-1-3' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/13/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030558-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	119%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030559-M01 FS-TA5-SBK-1-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/16/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030559-M01	**03063001**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane		6/30/2003	6/30/2003	200	ND	
1,4-Thioxane				200	ND	
BFB (Surrogate)				0	125%	
GA				20	ND	
HD				200	ND	

MB030559-M01MS	**03063001**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MS	6/30/2003	6/30/2003	200	119%	
1,4-Thioxane				200	128%	
BFB (Surrogate)				0	119%	
GA				20	105%	
HD				200	125%	

MB030559-M01MSD	**03063001**	**MT8**

Analyte		*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	MSD	6/30/2003	6/30/2003	200	103%	
1,4-Thioxane				200	113%	
BFB (Surrogate)				0	104%	
GA				20	96%	
HD				200	108%	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030560-M01 FS-TA5-SR-1-0'-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/16/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030560-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	90%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030561-M01 FS-TA5-SR2-0-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/16/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030561-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	75%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030562-M01 FS-TA4-SR2-0-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/16/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030562-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	92%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030563-M01 FS-TA4-SR1-0-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/16/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030563-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	105%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030564-M01 FS-TA8-SB6-1-0'-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030564-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	102%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030565-M01 FS-TA8-SBK-1-0-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030565-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	95%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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Sample #/Name MB030566-M01 FS-TA8-SB8-1-0-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030566-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	107%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030567-M01 FS-TA8-SB10-1-0-2' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/17/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030567-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	98%	
GA			20	ND	
HD			200	ND	

Sample #/Name MB030568-M01 FS-TA4-TP11-1-3' **Date Rec'd** 6/27/2003
Sample Matrix Soil **Sample Date** 6/13/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030568-M01	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	108%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

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CLEARANCE EXTRACTION SAMPLES

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Sample #/Name MB030588-M01 03063001-LCS **Date Rec'd** 6/30/2003
Sample Matrix Other Laboratory Control Spike **Sample Date** 6/30/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030588-M01LCS	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	113%	
1,4-Thioxane			200	122%	
BFB (Surrogate)			0	118%	
GA			20	95%	
HD			200	116%	

Sample #/Name MB030589-M01 03063001-LCSD **Date Rec'd** 6/30/2003
Sample Matrix Other Laboratory Control Spike Duplicate **Sample Date** 6/30/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030589-M01LCSD	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	104%	
1,4-Thioxane			200	115%	
BFB (Surrogate)			0	114%	
GA			20	94%	
HD			200	108%	

Sample #/Name MB030590-M01 03063001-MB **Date Rec'd** 6/30/2003
Sample Matrix Other Method Blank **Sample Date** 6/30/2003
Headspace Clearance # **Remarks**

Extraction Number(s)	*Batch Number*	*IOP Number*
MB030590-M01MB	**03063001**	**MT8**

Analyte	*Extraction Date*	*Analysis Date*	*PQL*	*Result*	*Remarks*
1,4-Dithiane	6/30/2003	6/30/2003	200	ND	
1,4-Thioxane			200	ND	
BFB (Surrogate)			0	119%	
GA			20	ND	
HD			200	ND	

MS = Matrix Spike; MSD = Matrix Spike Duplicate; Dup = Duplicate; ND = Not Detected at or above the Practical Quantitation Limit (PQL); Detection limits and sample results are in ppb. MS/MSD results are in % recovery. J = Detected above the method detection limit but below the PQL. Result is an estimated value.

APPENDIX C
DATA SUMMARY TABLES

- HTW Soil Sample Analysis Summation Tables
- HTW Soil Sample Analysis Summary of Analytes Detected
- CWM Soil Sample Analysis Summation Tables
- Quality Assurance Sample Summation Tables

Summary of Analytes Detected
Test Area 4 - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA4-SB1-1-3' 6/3/2003	FS-TA4-SB2-1-2.5' 6/4/2003	FS-TA4-SB2-1-2.5' FIELD DUPLICATE FS-TA4-SB2B-1-2.5' 6/4/2003	FS-TA4-SB2-S1-0-2' 6/3/2003	FS-TA4-SB3-1-18' 6/2/2003	FS-TA4-SB3-S1-0-2' 6/2/2003	FS-TA4-SB4-1-2.5' 6/4/2003	FS-TA4-SB5-1-3' 6/5/2003	FS-TA4-SB6-1-3' 6/4/2003	FS-TA4-SB7-1-3.5' 6/4/2003	FS-TA-4-SBK-1 6/13/2003	FS-TA-4-SBK-2 6/13/2003	FS-TA4-SR-1-0'-2' 6/16/2003	FS-TA4-SR-2-0'-2' 6/16/2003	FS-TA4-TP6-S1-0'-2' 6/5/2003
Metals, mg/kg																	
SW6010B	Aluminum		13000	29000	29000	14000	20000	31000	36000	5300	11000	9400	11000	10500	23000	18000	10000
	Arsenic		6.9	6.2 J	4.4 J	16	4.2	5.5	1.5 J	4.9 J	1.6 J	4.9 J			1.7 J	0.98 J	4
	Barium		23	40	34	29	32	77	43	19	23	17	19.4	19.9	40	34	21
	Beryllium		0.15 J	0.27 J	0.31 J	0.15 J	0.22 J	0.24 J	0.32 J	0.085 J	0.13 J	0.13 J	0.2 J	0.1 J	0.27 J	0.29 J	0.19 J
	Calcium		220000	29000	37000	200000	140000	87000	26000	300000	260000	260000	142000	202000	13000	11000	220000
	Cadmium		0.69 J	1.3	1.2	0.63 J	0.83 J	1 J	0.72	0.29 J	0.63	0.5 J	1.0	0.85	0.98	1	1.2
	Cobalt		7	24	20	12	16	26	18 J	2.2	7.2	5.3	5.4	5.5	15	14	5.1
	Chromium		18	23 J	26 J	28	18	19	28	22 J	8.8 J	8.8 J	5.7	13	7.3	17	12
	Copper		34	40	37	91	74	50	37	9.9	16	16	12	16	51	45	33
	Iron		19000	48000	49000	26000	41000	50000	51000	6400	16000	14000	15400	13900	35000	33000	20000
	Potassium		1200	1000 J	1400 J	1000	1100	1200	2000	750 J	840 J	810 J	1650	1200	1700	1300	1400
	Magnesium		15000	31000 J	22000 J	15000	19000	29000	25000	9000 J	13000 J	12000 J	8650	10500	14000	14000	12000
	Manganese		340	910 J	780 J	580	670	1000	820	170 J	410 J	280 J	289	303	930	990	330
	Sodium		3600	1400	1600	2300	2600	2200	5700 J	4600	3900	3500	3550	4080	390	360	3300
	Nickel		5.9	14	12	8.3	12	15	15	2.6 J	5.3	3.9 J	3.5	4.1	7.4	9.8	7.4
	Lead		22	2.1	2.5	9.1	15	5.8	2.5	5.3	5.8	2.7	6.4	4.7	3.5	6.3	46
	Antimony																0.79 J
	Strontium		3000	370	470	3300	1900	1300	180	4400	3500	4000			120	98	2900
	Thallium																
	Vanadium		67	200	210	94	130	210	190	19	59	56	37	42.3	100	91	48
	Zinc		160 J	61	48	65 J	170 J	70 J	49	23	28	25	45.8	38.8	82	92	60
Mercury, mg/kg																	
SW7471A	Mercury		0.019 J	0.0079 J	0.0075 J	0.012 J	0.016 J	0.012 J	0.022 J	0.0081 J	0.014 J	0.0065 J	0.013	0.02	0.0069 J	0.014 J	0.016 J
Pesticides, ug/kg																	
SW8081A	4,4'-DDT						0.44 J										
	Dieldrin											6.8 J					
	Heptachlor																
Herbicides, ug/kg																	
SW8151A	2,4-D			62 J	71 J												
	2,4,5-T			2.4 J				2.2 J	8.2 J							4.6 J	
	Dicamba			4.1 J	6.8 J				8.2 J						31 J	24 J	
	MCPP					390 J			5100 J						15000 J	14000 J	
Semivolatiles, ug/kg																	
SW8270C	Benzo(g,h,i)perylene										39 J						
	bis(2-Ethylhexyl)phthalate		91 J			99 J	110 J	86 J	280 J				90 J		68 J	76 J	700
	Butylbenzylphthalate																84 J
	Di-n-butylphthalate					56 J								400 J			
	Di-n-octylphthalate																
	Indeno(1,2,3-cd)pyrene										210 J						
	Naphthalene																120 J
	Pyrene									21 J							
	Benzoic acid												700 J				

Flag definitions:
U = The compound was analyzed for but was not detected.
J = The compound was positively identified but the reported concentration should be considered an estimated value.
UJ = The compound was analyzed for but was not detected. The reported quantitation level should be considered an estimated value.
R = The compound was analyzed for but the result was rejected because the method-required hold time for extraction was grossly exceeded.

Summary of Analytes Detected
Test Area 4 - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	FS-TA4-TP1-1-4.5' 6/5/2003	FS-TA4-TP-2-1-4' 6/12/2003	FS-TA-4-TP3 6/13/2003	FS-TA-4-TP4 6/13/2003	FS-TA-4-TP5 6/13/2003	FS-TA4-TP6-1-5.5' 6/5/2003	FS-TA4-TP-7-S1 6/12/2003	FS-TA4-TP8-1-5.5' 6/5/2003	FS-TA4-TP10-1-3' 6/5/2003	FS-TA4-TP-7-1 6/12/2003	FS-TA-4-TP9-S1 6/13/2003	FS-TA-4-TP9 6/13/2003	This data from USACE lab FS-TA4-TP11-1-3' 6/13/2003	FS-TA-4-TP12 6/13/2003	FS-TA4-TP12-1/QA-3' 6/13/2003	FS-TA-4-TP12 FIELD DUPLICATE FS-TA-4-TP12B 6/13/2003
Metals, mg/kg																	
SW6010B	Aluminum	14000	8600	5590 J	6670 J	8350 J	9400	8000	11000	9700	6200	6560 J	4810 J	6210 J	18600 J	5800	9620 J
	Arsenic	3.6		2.0 J	0.7 J	2.0 J	1.8 J	4	2.4 J	3.6	1.9 J	2.0 J	2.0 J	0.7 J	3.8	2.6 J	2.0 J
	Barium	21	22	12.6 J	16.5 J	20.7 J	23	16	18	19	18	14.6 J	13.7 J	19.0 J	21.9 J	16	15.5 J
	Beryllium	0.23 J	0.15 J			0.1 J	0.16 J	0.13 J	0.17 J	0.15 J	0.1 J			0.1 J	0.2 J	0.095 J	0.2 J
	Calcium	210000	300000	251000 J	230000 J	217000 J	270000	230000	210000	220000	300000	216000 J	221000 J	229000 J	153000 J	270000	203000 J
	Cadmium	0.87	0.33 J	0.54	0.62	0.8	0.53 J	0.73	0.72	0.72	0.41 J	0.65	0.53	0.58	1.6	0.5 J	1.3
	Cobalt	5.2	1.9	3.0 J	3.1 J	4.4 J	3.2	4.9	4.2	4.8	2.2	4.2 J	3 J	3.0 J	8.5 J	2.9	4.9 J
	Chromium	12	7	5.8 J	6.6 J	12 J	9.4	5.6	9.9	8.1	6.7	6.3 J	7.7 J	6.3 J	16 J	5.2	11 J
	Copper	19	6.6	6.0 J	8.7 J	18 J	15	13	15	14	9.6	12 J	4.4 J	8.0 J	23.9 J	9.4	13 J
	Iron	17000	8800	7010 J	8430 J	12400 J	11000	13000	14000	15000	8200	10500 J	8900 J	8300 J	23600 J	8700	12100 J
	Potassium	2000	1500	580 J	634 J	714 J	1700	740	1500	1300	900	644 J	626 J	881 J	2000 J	790 J	935 J
	Magnesium	13000	8200	9000 J	9660 J	11600 J	10000	11000	12000	13000	9200	9990 J	9870 J	10300 J	14900 J	9100	10900 J
	Manganese	340	170	135 J	175 J	221 J	220	230	270	350	150	180 J	184 J	196 J	444 J	210	290 J
	Sodium	5100	4700	2800	2630	2180	5600	3600	3300	3200	4800	2290	2370	3640	2000	2900	2260
	Nickel	6.4	2.5 J	2.2	2.8	3.8	4.1 J	4.2 J	4.9 J	5.1	2.7 J	2.7	3.8	3.0	8.3	2.6 J	8.5
	Lead	11	2.3	3.2 J	3.9 J	8.9 J	16	7.8	10	8.7	3.7	5.9 J	0.7 J	1.0 J	19 J	5.8	9.2 J
	Antimony																
	Strontium	2700	4500				3500	3400	2600	2900	4400					3800	
	Thallium											1.0 J			1.0		
	Vanadium	47	16	23 J	23 J	32 J	28	43	43	45	22	31 J	21 J	22 J	74.6 J	26	39 J
	Zinc	40	24	19 J	29.1 J	61.3 J	40	65	35	31	28	34 J	21.9 J	25.0 J	54.4 J	30	30.7 J
Mercury, mg/kg																	
SW7471A	Mercury	0.022 J	0.02 J	0.0083 J	0.011 J	0.016 J	0.013 J	0.012 J	0.013 J	0.017 J	0.01 J	0.0078 J	0.0057 J	0.0084 J	0.025 J	0.015 J	0.014 J
Pesticides, ug/kg																	
SW8081A	4,4'-DDT							0.72 J									
	Dieldrin																
	Heptachlor							0.59 J									
Herbicides, ug/kg																	
SW8151A	2,4-D																
	2,4,5-T																
	Dicamba																
	MCPP																
Semivolatiles, ug/kg																	
SW8270C	Benzo(g,h,i)perylene																
	bis(2-Ethylhexyl)phthalate	72 J	100 J	80 J	300 J						61 J	80 J	170 J	150 J	80 J		90 J
	Butylbenzylphthalate											110 J					
	Di-n-butylphthalate												30 J	40 J			
	Di-n-octylphthalate				50 J							180 J					40 J
	Indeno(1,2,3-cd)pyrene																
	Naphthalene				50 J												
	Pyrene																
	Benzoic acid			200 J	200 J										1000 J		1200 J

Flag definitions:
U = The compound was analyzed for bu
J = The compound was positively identif
UJ = The compound was analyzed for b
R = The compound was analyzed for bu

Summary of Analytes Detected
Test Area 5 - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA5-146-1-1' 6/11/2003	FS-TA5-147-1-1' 6/11/2003	FS-TA5-153-1-14' 6/11/2003	FS-TA5-193-1-4' 6/10/2003	FS-TA5-195-1-1' 6/11/2003	FS-TA5-199-1-1.5' 6/10/2003	FS-TA5-204-1-6' 6/11/2003	FS-TA5-GS1-S1-0'-2' 6/10/2003	FS-TA5-GS1-1-4' 6/10/2003	FS-TA5-GS2-1-1.5' 6/10/2003	FS-TA5-GS3-S1-0'-2' 6/10/2003	FS-TA5-GS3-S1-0'-2' FIELD DUPLICATE FS-TA5-GS3B-S1-0'-2' 6/10/2003	FS-TA5-GS3-1-2' 6/10/2003
Metals, mg/kg															
SW6010B	Aluminum		29000	33000	33000	39000	37000	32000	31000	20000	33000	38000	32000	33000	32000
	Arsenic		2.7	2.5	0.77 J	1.4 J	1.7 J	2.1 J	1.5 J	3.3 J	1.7 J	1 J	3.1 J	3.9 J	5.8 J
	Barium		14	12	20	36	14	16	26	34 J	36 J	15 J	33 J	44 J	55 J
	Beryllium		0.23 J	0.27 J	0.29 J	0.24 J	0.21 J	0.18 J	0.26 J	0.17 J	0.28 J	0.2 J	0.24 J	0.26 J	0.22 J
	Calcium		36000	15000	11000	19000	13000	19000	11000	190000 J	14000 J	13000 J	42000 J	29000 J	44000 J
	Cadmium		1.7	1.8	2.1	1.8	1.7	2.1	1.7	1.1	1.5	1.6	1.3	1.1	1.6
	Cobalt		29	36	18	30	34	28	29	16 J	30 J	30 J	22 J	21 J	24 J
	Chromium		9.8	14	10	12	14	15	9.6	14 J	14 J	16 J	20 J	20 J	25 J
	Copper		51	60	53	50	53	39	40	29 J	42 J	47 J	46 J	46 J	52 J
	Iron		52000	63000	66000	60000	57000	72000	59000	31000	55000	58000	44000	47000	47000
	Potassium		530	440	530	510	390	390	380	700	520	420	1100	1200	1000
	Magnesium		35000	37000	37000	44000	38000	36000	35000	22000	33000	46000	33000	32000	36000
	Manganese		1600	1700	2500	1500	1500	2100	1400	980	1200	770	870	810	930
	Sodium		2500	2800	1900	2500	2600	2200	2100	2200	880	870	1600	1400	1900
	Nickel		14	18	18	17	18	12	11	9.8	15	18	15	14	15
	Lead		7.3	3.5 J		2.2	2.7 J	3 J	4.1	5 J	3.5 J	1.4 J	14 J	16 J	43 J
	Antimony				0.73 J			0.85 J	0.71 J						0.75 J
	Strontium		220	120	35	150	64	140	79	2800 J	160 J	49 J	440 J	260 J	450 J
	Vanadium		220	250	260	250	230	220	230	120	240	220	190	190	200
	Zinc		78	160	85	73	67	110	75	50 J	67 J	68 J	86 J	100 J	120 J
Mercury, mg/kg															
SW7471A	Mercury		0.0062 J	1.0					0.0049 J	0.0095 J	0.007 J	0.023 U	0.022	0.015 J	0.015 J
Pesticides, ug/kg															
SW8081A	4,4'-DDT		0.83 J	1.6 J											
	Endosulfan I														
	4,4'-DDE														
	Dieldrin		2.9 J	2.2 J				0.45 J	0.4 J				2.8 J	2.9 J	18
	Heptachlor		1.3 J						0.39 J					0.51 J	
	Heptachlor epoxide			3.7					0.27 J						
PCBs, ug/kg															
SW8082	Aroclor-1254														
Herbicides, ug/kg															
SW8151A	2,4,5-TP (Silvex)						8.9 R	1.2 J	8.9 R						
	2,4-DB						10 R		10 R	3.2 J			6.4 J	11 J	16
	2,4,5-T					5.8 J	8.9 R		8.9 R	1.2 J		0.84 J	0.84 J		1.8 J
	Dicamba		6.4 J	16 J		12 J	22 R	5.2 J	5.2 R	3 J	20 J		8.9 J	15 J	18 J
	MCPP		9800 J	100000 J	4800 J	20000 J	3700 R	23000 J	12000 R	5600 J	30000 J	1500 J	2000 J	3800 J	6100 J
Semivolatiles, ug/kg															
SW8270C	Diethylphthalate				47 J										
	Benzo(g,h,i)perylene		80 J										92 J		
	bis(2-Ethylhexyl)phthalate		110 J	62 J	62 J	79 J	50 J	110 J	67 J	85 J	110 J	100 J	60 J	110 J	100 J
	Butylbenzylphthalate		81 J	51 J									130 J		
	Dibenzo(a,h)anthracene		55 J										200 J		
	Indeno(1,2,3-cd)pyrene		63 J												

Flag definitions:
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R = The compound was analyzed for but the result was rejected because the method-required hold time for extraction was grossly exceeded.

Parameter, Units	Compound / Analyte	FS-TA5-GS3-1-2' FIELD DUPLICATE FS-TA5-GS3B-1-2' 6/10/2003	FS-TA5-GS4-1-3' 6/9/2003	FS-TA5-GS4-2-1.5' 6/9/2003	FS-TA5-GS5-1-4' 6/9/2003	FS-TA5-GS5-S1-0'-2' 6/9/2003	FS-TA5-GS5-S2-3.5' 6/9/2003	FS-TA5-SBK-1-2' 6/16/2003	FS-TA5-SBK-1-2' FIELD DUPLICATE FS-TA5-SBK-1B-2' 6/16/2003	QA SAMPLE SHIPPED TO PRIMARY LAB FS-TA5-SBK-1/QA-2' 6/16/2003	FS-TA5-SBK-2-2' 6/11/2003	FS-TA5-SR-1-0'-2' 6/16/2003	FS-TA5-SR-2-0'-2' 6/16/2003	FS-TA5-TP-1-1-5.5' 6/12/2003	FS-TA5-TP2-1-6' 5/29/2003	FS-TA5-TP-3-1-6.5' 6/12/2003
Metals, mg/kg																
SW6010B	Aluminum	31000	19000	32000	38000	33000	32000	29000	28000	27000	37000	20000	18000	46000	45000	20000
	Arsenic	2.8 J	1.1 J	0.99 J	3.2	3.1	1.5 J	4.1	4.3	4	1.4 J	1.3 J	1.1 J	1.6 J	3.5	2.3 J
	Barium	35 J	29	26	8.8	19	18	98	86	120	60	45	26	20	29	110
	Beryllium	0.18 J	0.15 J	0.22 J	0.22 J	0.24 J	0.23 J	0.28 J	0.29 J	0.24 J	0.29 J	0.4 J	0.29 J	0.27 J	0.17 J	0.39 J
	Calcium	32000 J	45000	18000	24000	25000	20000	5000 J	3000 J	4400 J	9200 J	37000	2900	1800	20000	3000
	Cadmium	1.6	1.1	1.4	1.7	1.4	1.4	1.5	1.5	1.5	1.6	1.3	0.98	1.7	1	1
	Cobalt	26 J	19	4.7 J	35	28	28	31	28	29	30	20	15	25	34	34
	Chromium	15 J	15	8.6	130	22	12	7.6	8.3	9	7.1	11	22	8.9	98 J	12
	Copper	37 J	35	41	68	85	60	39	38 J	36	34	52	20	63	79 J	26
	Iron	48000	31000	55000	58000	57000	57000	57000	58000	52000	59000	45000	36000	73000	54000	49000
	Potassium	670	590	390	390	670	540	700	810	630	850	1400	2300	420	460	1100
	Magnesium	44000	39000	40000	54000	41000	43000	33000	31000	31000	37000	14000	12000	61000	53000	17000
	Manganese	1000	930	1400	930	950	920	2100	2000	2000	1100	1100	940	930	1200	1900
	Sodium	2000	3000	2600	3400	2800	3300	900	830	840	980	590	330	6300	3800 J	2000
	Nickel	14	14 J	14 J	39 J	20 J	17 J	14	12	12	12	9.1	8.8	18	49 J	11
	Lead	18 J	3.7	5.3 J	2.1 J	6.7	3.5	5.7	6.4	5.7	3.5	8	3.3	1.6	74 J	6.6
	Antimony			0.8 J		0.75 J		0.73 J	0.81 J	0.81 J						
	Strontium	220 J	270	190	150	280	94	57 J	38	59 J	150 J	580	32	23	83 J	43
	Vanadium	190	160	240	250	240	260	250	250	230	240	150	110	300	190	170
	Zinc	82 J	52 J	69 J	64 J	87 J	75 J	74	80	74	61	69	65	86	80 J	66
Mercury, mg/kg																
SW7471A	Mercury	0.033	0.0086 J	0.018 J		0.011 J		0.012 J	0.015 J	0.0049 J	0.019 J	0.011 J	0.023	0.0064 J	0.023	0.02 U
Pesticides, ug/kg																
SW8081A	4,4'-DDT					2.3 J										
	Endosulfan I											0.93 J				
	4,4'-DDE											0.96 J				
	Dieldrin	11	1.8 J	0.93 J	0.97 J	31 J	15 J		0.59 J			0.51 J		0.71 J	4.5	3.3 J
	Heptachlor				0.31 J			0.83 J				1.4 J				
	Heptachlor epoxide						0.21 J	0.51 J								0.39 J
PCBs, ug/kg																
SW8082	Aroclor-1254					39 J	87 J								14 J	
Herbicides, ug/kg																
SW8151A	2,4,5-TP (Silvex)					0.86 J	0.71 J				9.2 R					
	2,4-DB										10 R					
	2,4,5-T				0.8 J	2.5 J	1.8 J				9.2 R				4.5 J	
	Dicamba	3.2 J		7.2 J	3.1 J	8 J	7 J	17 J	12 J	18 J	11 R	11 J	33 J	4.1 J	13 J	
	MCPP	620 J	2600 J	53000 J	11000 J	4200 J	5000 J	40000 J	24000 J	37000 J	9900 R	4800 J	21000 J		77000 J	
Semivolatiles, ug/kg																
SW8270C	Diethylphthalate															
	Benzo(g,h,i)perylene															
	bis(2-Ethylhexyl)phthalate	85 J	63 J			600	85 J	73 J	72 J		78 J	56 J	72 J	75 J	180 J	62 J
	Butylbenzylphthalate					1000	86 J									
	Dibenzo(a,h)anthracene															
	Indeno(1,2,3-cd)pyrene															

Flag definitions:
U = The compound was analyzed for bu
J = The compound was positively identi
UJ = The compound was analyzed for b
R = The compound was analyzed for bu

Summary of Analytes Detected
Test Area 8 - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA8-SB1-1-0'-2' 6/17/2003	FS-TA8-SB2-1-0'-2' 6/17/2003	FS-TA8-SB2B-1-0'-2' (FS-TA8-SB2-1-0'-2' FIELD DUPLICATE) 6/17/2003	FS-TA8-SB3-1-0'-2' 6/17/2003	FS-TA8-SB4-1-0'-2' 6/17/2003	FS-TA8-SB5-1-0'-2' 6/17/2003	FS-TA8-SB-6-1-0'-2' 6/17/2003	FS-TA8-SB7-1-0'-2' 6/17/2003	FS-TA8-SB-8-1-0'-2' 6/17/2003	FS-TA8-SB9-1-0'-2' 6/17/2003	FSA-TA8-SB-10-1-0'-2' 6/17/2003	FS-TA8-SBK-1-0'-2' 6/17/2003	FS-TA8-SBK-2-0'-2' 6/17/2003
Metals, mg/kg															
SW6010B	Aluminum		8000	7700	6600	13000	5500	11000	36000	14000	13000	19000	13000	9700	15000
	Arsenic		0.93 J			4.1	0.75 J	1.8 J	2.5	4.7	2.6	1.3 J	0.87 J	1.6 J	2.4
	Barium		31	24	23	60	36	76	150	68	420	84	62	78	72
	Beryllium		0.19 J	0.16 J	0.14 J	0.28 J	0.15 J	0.25 J	0.33 J	0.36 J	0.35 J	0.29 J	0.29 J	0.18 J	0.23 J
	Calcium		1200	1500	1200	11000	3200	25000	8500	42000	37000	12000	4900	100000	67000
	Cadmium		0.32 J	0.29 J	0.24 J	0.75	0.21 J	0.74	1.7	1	0.91	0.87	0.53	0.57	0.9
	Cobalt		6.3 J	4.1 J	3 J	6.1 J	4 J	7.6 J	36	9.9 J	8.8	18 J	6.4	5.3	14
	Chromium		5.9	4.5	4.1	7.1	2.5	7.2	130	19	11	43	11	10	16
	Copper		7.6	3.9	3.1	27	9.3	24	130	30	22	34	14	24	32
	Iron		16000	15000	12000	23000	11000	26000	61000	29000	31000	35000	24000	18000	29000
	Potassium		1600 J	1400 J	1200 J	1600 J	1000 J	1900 J	800	1400 J	1500	1700 J	1100	1400	1600 J
	Magnesium		3100	3900	3200	7900	1500 J	5800	25000	7800	6000	13000	4200	6300	9400
	Manganese		390	240	200	610	340	410	1200	840	1000	920	460	400	950
	Sodium		220 J	190 J	180 J	270 J	160 J	330 J	800	620	770	350	1300	1200	710
	Nickel		2.2 J	2.1 J	1.8 J	3.9 J	0.79 J	5.6	84	10	5.5	31	5.3	3.6 J	9.5
	Lead		21	1.5	1.1	20	4.2	5.1	3	27	6.3	5.6	2.9	23	15
	Antimony					0.73 J			0.7 J						
	Strontium		14	19	15	170	40	360	46	520	530	120	59	1300	850
	Vanadium		25	19	17	25	12	37	240	66	49	100	33	35	78
	Zinc		31 J	24 J	19 J	230 J	32 J	73 J	69	150 J	67	63 J	39	41	78 J
Mercury, mg/kg															
SW7471A	Mercury		0.014 J	0.0093 J	0.008 J	0.11	0.0085 J	0.04	0.014 J	0.042	0.012 J	0.032	0.0077 J	0.03	0.022
Pesticides, ug/kg															
SW8081A	Aldrin												0.7 J		
	4,4'-DDT									9.7 J			2.6 J		
	Endosulfan I												1.7 J		
	4,4'-DDE						2.5 J			24 J					
	Dieldrin		260 J	17 J	8.2 J	230 J	91 J	700 J	140 J	1100 J	300 J	180 J	160 J	420 J	610
	Heptachlor epoxide												3.4 J		7.9 J
PCBs, ug/kg															
SW8082	Aroclor-1254						41 J				100 J		91 J	670 J	
Herbicides, ug/kg															
SW8151A	2,4,5-TP (Silvex)													1.4 J	
	2,4-DB		17 J	60 J	36 J							26 J			11 J
	2,4,5-T		8.1 J	12	6.7 J	6.1 J	12	2 J		4.3 J		7.8 J		5.9 J	4 J
	Pentachlorophenol		6.8 J				4.7 J	18 U							
	Dicamba		32 J	9 J	7.2 J	10 J	7.6 J	8 J	12 J	11 J	3.2 J	26 J	5.6 J	4 J	6.4 J
	MCPP					7800 J			17000 J				8800 J	1300 J	
Semivolatiles, ug/kg															
SW8270C	bis(2-Ethylhexyl)phthalate				49 J				72 J	340 J	110 J	110 J	72 J	61 J	
	Butylbenzylphthalate						93 J								
Cyanide, mg/kg															
SW9012A	Cyanide								0.41 J						

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J = The compound was positively identified but the reported concentration should be considered an estimated value.
UJ = The compound was analyzed for but was not detected. The reported quantitation level should be considered an estimated value.
R = The compound was analyzed for but the result was rejected because the method-required hold time for extraction was grossly exceeded.

Summary of Analytes Detected
Flamingo Bay Landfill Area - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-FBL-G1-1-4' 5/20/2003	FS-FBL-G6-1-3.5' 5/20/2003	FS-FBL-G9-1-4' 5/21/2003	FS-FBL-G15-1-2.5' 5/27/2003	FS-FBL-G15-1-205' FIELD DUPLICATE FS-FBL-G15B-1-2.5' 5/27/2003	FS-FBL-G20-1-3.5' FIELD DUPLICATE FS-FBL-G20B-S-1-3.5' 5/21/2003	FS-FBL-G20-1-3.5' 5/21/2003	FS-FBL-SB1-1-0'-2' 5/27/2003	FS-FBL-SB1-2-3' 5/27/2003	FS-FBL-SB2-1-3' 5/20/2003	FS-FBL-SB3-1-0'-2' 5/28/2003
Metals, mg/kg													
SW6010B	Silver		0.72 J			1.3 J	1.7			2	1 J	0.94 J	
	Aluminum		12000	25000	12000	19000 J	21000 J	35000	34000	18000	34000	36000	41000
	Arsenic		120	19	0.88 J	52	60	5.1 J	16 J	28	110	180	2 J
	Barium		190 J	75	26	380 J	270 J	42	43	200 J	120 J	1100	64
	Beryllium		0.16 J	0.2 J	0.27 J	0.22 J	0.23 J	0.27 J	0.23 J	0.19 J	0.17 J	0.24 J	0.26 J
	Calcium		160000	150000	1400	94000 J	140000 J	47000	37000	83000 J	310000 J	150000	7700
	Cadmium		5.1	1.6	0.27 J	9.9	11	1.4	1.4	10	21	11	0.62
	Cobalt		15	15	7.1	13 J	9.8 J	35 J	29 J	14	12	15 J	29 J
	Chromium		180	52	9.7	80	67	22 J	30 J	62	70	180 J	78
	Copper		590	99	13	420	420	81	62	500 J	790 J	650	73
	Iron		160000	36000	23000	130000 J	73000 J	69000	73000	190000	240000	41000	58000
	Potassium		1400 J	1000 J	2100 J	1800	2100	680	770	2200	1200	2100	790
	Magnesium		9600	21000	5600	12000	9800	37000	33000	9600	9100	11000	43000
	Manganese		920	830	630	1200 J	810 J	1300	1300	1100	1000	1300	1200
	Sodium		2700 J	1800 J	1300 J	1800 J	2400	2500	2300	2100	2100	3400	1000
	Nickel		95 J	14 J	2.6 J	33	32	21	26	47 J	67 J	37	31
	Lead		890	250	10	5300 J	21000 J	20	24	1300 J	5700	1200	14
	Antimony		9.3 J	1.2 J		22 J	760 J		0.9 J	8.1 J	39 J	8.3	
	Strontium		1900	2300	18	1200 J	1800 J	530	500	890	4100	1900	38
	Vanadium		53	120	49	67 J	45 J	240	200	42	130	66	230 J
	Zinc		910 J	260 J	68 J	1600	1700	110	110	890 J	6700 J	3900 J	100 J
Mercury, mg/kg													
SW7471A	Mercury		0.23	0.06	0.017 J	0.35	0.41	0.012 J	0.0096 J	0.57	0.22	0.58	0.011 J
Pesticides, ug/kg													
SW8081A	gamma-BHC (Lindane)												
	delta-BHC								0.18 J				
	4,4'-DDT						130 J		9.6		6.4 J		
	Endosulfan I												
	4,4'-DDE												
	Dieldrin		300	12 J		14 J	86 J	8.8 J	38 J	23 J	16 J	72	1.2 J
	Heptachlor								2.9		0.7 J		
	Heptachlor epoxide						4.8 J		7.8 J	8.2 J	2.6 J		
PCBs, ug/kg													
SW8082	Aroclor-1254		870 J	86 J		100 J	290 J			190	120	380	16 J
Herbicides, ug/kg													
SW8151A	2,4,5-TP (Silvex)												
	2,4-DB												
	2,4-D			4 J									
	2,4,5-T			1.6 J	1.9 J			1.8 J			0.75 J		
	Pentachlorophenol												
	Dicamba				5 J			2.5 J					18 J
	MCPP			800 J	15000 J			1600 J	470 J	530 J	510 J		15000 J
Semivolatiles, ug/kg													
SW8270C	Acetophenone					38 J	42 J			33 J	330 J		
	Benzo(g,h,i)perylene										27 J		
	bis(2-Ethylhexyl)phthalate		56 J			140 J	230 J	220 J	63 J	210 J	130 J	160 J	
	4-Bromophenylphenyl ether												
	Butylbenzylphthalate						42 J				150 J	44 J	
	Di-n-butylphthalate		160 J	92 J	99 J								
	2,4-Dinitrotoluene												
	2,6-Dinitrotoluene												
	Di-n-octylphthalate												
	Benzo(k)fluoranthene									19 J	28 J		
Cyanide, mg/kg													
SW9012A	Cyanide					0.55 J	0.58 J			0.32 J	0.45 J	0.55 J	

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R = The compound was analyzed for but the result was rejected because the method-required hold time for extraction was grossly exceeded.

Summary of Analytes Detected
Flamingo Bay Landfill Area - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	FS-FBL-SB3-2-3' 5/28/2003	FS-FBL-SB4-1-3.5' 5/22/2003	FS-FBL-SB4-1-3.5' FIELD DUPLICATE FS-FBL-SB4B-S-1-3.5' 5/22/2003	FS-FBL-SB5-1-3.5' 5/22/2003	FS-FBL-SB5-1-3.5' FIELD DUPLICATE FS-FBL-SB5B-1-3.5' 5/22/2003	FS-FBL-SB6-1-0'-2' 5/21/2003	FS-FBL-SB6-2-3.5' 5/21/2003	FS-FBL-SB7-1-4.5' 5/28/2003	FS-FBL-SB7-S-1-0'-2' 5/19/2003	FS-FBL-SB8-1-0'-2' 5/22/2003	FS-FBL-SB8-2-3.5' 5/22/2003	FS-FBL-SB9-1-3.5' 5/19/2003
Metals, mg/kg													
SW6010B	Silver	0.47 J											
	Aluminum	24000	24000	24000	25000	24000	36000	15000	30000	36000	13000	12000	25000
	Arsenic	45	31	36	65	61	2.2 J	2 J	3.6	2.6	1.2 J	1.5 J	1.3 J
	Barium	140	120 J	91 J	180 J	130 J	100	64	63	59 J	25 J	32 J	38
	Beryllium	0.23 J	0.17 J	0.17 J	0.23 J	0.23 J	0.24 J	0.22 J	0.3 J	0.23 J	0.22 J	0.24 J	0.28 J
	Calcium	110000	180000	180000	100000 J	75000 J	59000	6700	15000	27000	3400 J	8700 J	5900
	Cadmium	6.9	2.1	2	1.7	1.5	0.95	0.59	0.67	1.1	0.29 J	0.46 J	0.51 J
	Cobalt	20 J	15	15	19	17	30	12	23 J	26 J	7.3	7.9	18 J
	Chromium	120	55	51	61	50	18	7.1	23	18 J	4.4	8.6	28 J
	Copper	310	200 J	520 J	190 J	120 J	59	28	49	58	51 J	61 J	35
	Iron	110000	46000	41000	48000	39000	48000	29000	56000	58000	26000	26000	39000
	Potassium	1300	1100	1200	1000	960	680	1800	980	730	1500	1500	1400
	Magnesium	16000	18000	15000	20000	20000	32000	10000	24000	34000	7600	6800	18000
	Manganese	1100	820	940	1000	1000	1800	930	1200	1300	690	750	1000
	Sodium	2100	3200	3100	2500	2200	2300	1100	2300	1700	270	370	2000
	Nickel	43	23	21	22 J	15 J	14	5.2	16	15	2.6 J	3.6 J	14
	Lead	1300	370	310	290	9600	12	9.4	12	54	13 J	14 J	3.9
	Antimony	8 J	3	3	1.9 J	36	2.1			0.84 J			
	Strontium	1400	2700	2800	1400	1100	900	94	160	380	48	130	47
	Vanadium	94 J	100	79	140	130	200	61	170 J	200	58	56	130
	Zinc	770 J	620	650	320 J	520 J	120 J	160	130 J	130 J	82 J	80 J	65 J
Mercury, mg/kg													
SW7471A	Mercury	0.38	0.096	0.09	0.12	0.12	0.0049 J	0.02 J	0.0092 J	0.0056 J	0.0093 J	0.014 J	0.015 J
Pesticides, ug/kg													
SW8081A	gamma-BHC (Lindane)												
	delta-BHC												
	4,4'-DDT	16 J								1.1 J			
	Endosulfan I									64			
	4,4'-DDE												
	Dieldrin	82	200 J	340 J	1400 J	1200 J	2.1 J	1.3 J	2.2 J	2.7 J			
	Heptachlor												
	Heptachlor epoxide			11 J									
PCBs, ug/kg													
SW8082	Aroclor-1254	700			1800 J	940 J							
Herbicides, ug/kg													
SW8151A	2,4,5-TP (Silvex)		0.91 J										
	2,4-DB		0.83 J										
	2,4-D												
	2,4,5-T		0.9 J	0.82 J	1.2 J		2.2 J			5.9 J			1.1 J
	Pentachlorophenol				9.2 J	6.2 J							
	Dicamba						9 J	35		32	22	27	
	MCPP	510 J	490 J		1700 J	930 J	7500 J	43000 J	34000 J	27000 J	42000 J	28000 J	12000 J
Semivolatiles, ug/kg													
SW8270C	Acetophenone												
	Benzo(g,h,i)perylene												
	bis(2-Ethylhexyl)phthalate	200 J	29000 J	1700 J	20000 J	130 J			140 J	140 J	51 J	540	
	4-Bromophenylphenyl eth												
	Butylbenzylphthalate	67 J	74 J		36 J			1000					
	Di-n-butylphthalate								68 J	49 J			
	2,4-Dinitrotoluene												
	2,6-Dinitrotoluene												
	Di-n-octylphthalate				220 J								
	Benzo(k)fluoranthene												
Cyanide, mg/kg													
SW9012A	Cyanide				0.28 J								

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Summary of Analytes Detected
Flamingo Bay Landfill Area - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	FS-FBL-SB10-1-0'-2' 5/19/2003	FS-FBL-SB10-2-3' 5/22/2003	FS-FBL-SBK-1-0'-2' 5/28/2003	FS-FBL-SBK-2-0'-2' 5/28/2003	FS-FBL-SR-1-0'-2' 5/27/2003	FS-FBL-SR-2-0'-2' 5/27/2003	FS-FBL-ST1-S-1-0'-2' 5/27/2003	FS-FBL-ST1-1-3.5' 5/27/2003	FS-FBL-ST2-S-1-0'-2' 5/27/2003	FS-FBL-ST2-1-3.5' 5/27/2003	FS-FBL-IT-1-3' 5/27/2003
Metals, mg/kg												
SW6010B	Silver								0.14 J	0.67 J		
	Aluminum	36000	36000	9900	25000	7300	18000	20000	17000	14000	11000	14000
	Arsenic	1.8 J	1.5 J	2 J	1.5 J		1.8 J	3.9	19	14	1.9 J	9.9
	Barium	88	52 J	22	32	21	32	49	47	120	26	87
	Beryllium	0.29 J	0.31 J	0.11 J	0.32 J	0.15 J	0.25 J	0.36 J	0.32 J	0.2 J	0.23 J	0.28 J
	Calcium	8600	5400 J	260000	14000	530	41000	4700	12000	54000	3800	57000
	Cadmium	0.71	0.69	0.34 J	0.69	0.14 J	0.62	0.83	1.2	3.6	0.37 J	1.6
	Cobalt	27 J	25	5.5 J	22 J	7.6	14	19	14	7.4	9.4	9.2
	Chromium	32 J	41	9	20	5	11	14	26	26	4.8	24
	Copper	50	53 J	17	29	8.3	36	92	84	190	15	41
	Iron	52000	52000	15000	44000	17000	36000	51000	37000	35000	23000	45000
	Potassium	1100	1400	760	1200	1600	1700	3100	2800	1400	1600	1800
	Magnesium	31000	34000	11000	21000	2300	13000	10000	8900	6300	4100	6700
	Manganese	1300	1100	310	1500	910	770	1000	900	660	830	620
	Sodium	1800	1900	3500 J	2100 J	170	510	850	950	660	380	1000
	Nickel	21	25 J	4.3 J	14	1.9 J	7.6	8.8	6.8	13	2.2 J	13
	Lead	3.5	2.2 J	7	4.3	2.5	5.8	52	97	720	84	68
	Antimony									7.2		
	Strontium	98	48	3600	210	8	570	51	130	650	62	850
	Vanadium	190	180	53	160	36	120	180	120	43	43	60
	Zinc	83 J	87 J	36	98	40	65	100	150	600	67	160
Mercury, mg/kg												
SW7471A	Mercury	0.0063 J	0.0047 J	0.008 J	0.017 J	0.018 J	0.012 J	0.055	0.069	0.87	0.097	0.048
Pesticides, ug/kg												
SW8081A	gamma-BHC (Lindane)			0.34 J								
	delta-BHC								0.18 J			
	4,4'-DDT						8.8		1.2 J	6.3 J		
	Endosulfan I								0.5 J			
	4,4'-DDE									1.3 J		
	Dieldrin							1 J	4.6	7.9		3.8
	Heptachlor											
	Heptachlor epoxide					0.23 J						0.23 J
PCBs, ug/kg												
SW8082	Aroclor-1254											
Herbicides, ug/kg												
SW8151A	2,4,5-TP (Silvex)	0.82 J										
	2,4-DB											
	2,4-D											
	2,4,5-T	2 J		2.1 J	7.2 J				1.6 J			
	Pentachlorophenol											4.2 J
	Dicamba	28 J	10 J		16 J	26	3.8 J	20 J	10 J	2.8 J	19 J	1.9 J
	MCPP	29000 J	9300 J		24000 J	32000 J		2200 J	870 J	1900 J	4400 J	
Semivolatiles, ug/kg												
SW8270C	Acetophenone									33 J		
	Benzo(g,h,i)perylene											
	bis(2-Ethylhexyl)phthalate			280 J	320 J					4600		140 J
	4-Bromophenylphenyl eth									56 J		
	Butylbenzylphthalate									230 J		
	Di-n-butylphthalate											
	2,4-Dinitrotoluene									430		
	2,6-Dinitrotoluene									660		
	Di-n-octylphthalate											
	Benzo(k)fluoranthene									25 J		16 J
Cyanide, mg/kg												
SW9012A	Cyanide									0.28 J	0.41 J	3.7

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Equipment Blanks Analysis Summary
Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID Date Collected	FS-TA4-EB-1 6/16/2003	FS-TA5-EB-S1 6/10/2003	FS-FBL-EB-S-1 5/19/2003
Metals, mg/l					
SW6010B	Calcium		0.083 J	0.078 J	0.58
	Chromium		0.0015 J		
	Iron		0.053 J		
	Manganese		0.0039 J	0.012	0.0018 J
	Strontium		0.0012 J		0.0081 J
	Zinc			0.0015 J	0.0016 J
Pesticides, ug/l					
SW8081A	alpha-BHC				0.027 J
	gamma-BHC (Lindane)				0.004 J
Semivolatiles, ug/l					
SW8270C	4-Chloro-3-methylphenol		1.8 J		
	Di-n-butylphthalate		4.7 J	4.4 J	2.3 J

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UJ = The compound was analyzed for but was not detected. The reported quantitation level should be considered an estimated value.
R = The compound was analyzed for but the result was rejected because the method-required hold time for extraction was grossly exceeded.
NR = Not Reported. The compound was not analyzed for.

CWM Analytical Results Summary
Test Area 4 - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	FS-TA4-SB1-1-3' 6/3/2003	FS-TA4-SB2-S1-0-2' 6/3/2003	FS-TA4-SB2-1-2.5' 6/4/2003	FS-TA4-SB3-S1-0-2' 6/2/2003	FS-TA4-SB3-1-18' 6/2/2003	FS-TA4-SB4-1-2.5' 6/4/2003	FS-TA4-SB5-1-3' 6/5/2003	FS-TA4-SB6-1-3' 6/4/2003
CWM , ppb									
	1,4-Dithiane	NR	NR	200 U	NR	NR	NR	200 U	200 U
	1,4-Thioxane	NR	NR	200 U	NR	NR	NR	200 U	200 U
	GA	NR	NR	20 U	NR	NR	NR	20 U	20 U
	HD	NR	NR	200 U	NR	NR	NR	200 U	200 U

Parameter, Units	Compound / Analyte	FS-TA4-SB7-1-3.5' 6/4/2003	FS-TA4-SBK-1 6/13/2003	FS-TA-4-SBK-2 6/13/2003	FS-TA4-SR-1-0'-2' 6/16/2003	FS-TA4-SR-2-0'-2' 6/16/2003	FS-TA4-TP1-1-4.5' 6/5/2003	FS-TA4-TP-2-1-4' 6/12/2003
CWM , ppb								
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-TA-4-TP3 6/13/2003	FS-TA-4-TP4 6/13/2003	FS-TA-4-TP5 6/13/2003	FS-TA4-TP6-S1-0'-2' 6/5/2003	FS-TA4-TP6-1-5.5' 6/5/2003	FS-TA4-TP-7-S1 6/12/2003	FS-TA4-TP-7-1 6/12/2003
CWM , ppb								
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-TA4-TP8-1-5.5' 6/5/2003	FS-TA4-TP9-S1 6/13/2003	FS-TA-4-TP9 6/13/2003	FS-TA4-TP10-1-3' 6/5/2003	FS-TA4-TP11-1-3' 6/13/2003	FS-TA4-TP12-1/QA-3' 6/13/2003	FS-TA4-TP12 6/13/2003
CWM , ppb								
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U	200 U

NR = Not Reported. The sample was not analyzed.

Parameter, Units	Compound / Analyte	FS-TA5-146-1-1' 6/11/2003	FS-TA5-147-1-1' 6/11/2003	FS-TA5-153-1-14' 6/11/2003	FS-TA5-193-1-4' 6/10/2003	FS-TA5-195-1-1' 6/11/2003	FS-TA5-199-1-1.5' 6/10/2003
CWM , ppb							
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-TA5-204-1-6' 6/11/2003	FS-TA5-GS1-1-4' 6/10/2003	FS-TA5-GS1-S1-0'-2' 6/10/2003	FS-TA5-GS2-1-1.5' 6/10/2003	FS-TA5-GS3-S1-0'-2 6/10/2003	FS-TA5-GS3-1-2' 6/10/2003
CWM , ppb							
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-TA5-GS4-1-3' 6/9/2003	FS-TA5-GS4-2-1.5' 6/9/2003	FS-TA5-GS5-1-4' 6/9/2003	FS-TA5-GS5-S1-0'-2 6/9/2003	FS-TA5-GS5-S2-3.5 6/9/2003	FS-TA5-SBK-1-2' 6/16/2003
CWM , ppb							
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-TA5-SBK-2-2' 6/11/2003	FS-TA5-SR-1-0'-2' 6/16/2003	FS-TA5-SR-2-0'-2' 6/16/2003	FS-TA5-TP-1-1-5.5' 6/12/2003	FS-TA5-TP2-1-6' 5/29/2003	FS-TA5-TP-3-1-6.5' 6/12/2003
CWM , ppb							
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-TA8-SB1-1-0'-2' 6/17/2003	FS-TA8-SB2-1-0'-2' 6/17/2003	FS-TA8-SB3-1-0'-2' 6/17/2003	FS-TA8-SB4-1-0'-2' 6/17/2003	FS-TA8-SB5-1-0'-2' 6/17/2003	FS-TA8-SB-6-1-0'-2' 6/17/2003
CWM , ppb							
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-TA8-SB7-1-0'-2' 6/17/2003	FS-TA8-SB-8-1-0'-2' 6/17/2003	FS-TA8-SB9-1-0'-2' 6/17/2003	FSA-TA8-SB-10-1-0'-2 6/17/2003	FS-TA8-SBK-1-0'-2' 6/17/2003	FS-TA8-SBK-2-0'-2' 6/17/2003
CWM , ppb							
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-FBL-SB1-1-0'-2' 5/27/2003	FS-FBL-SB1-2-3' 5/27/2003	FS-FBL-SB2-1-3' 5/20/2003	FS-FBL-SB3-1-0'-2' 5/28/2003	FS-FBL-SB3-2-3' 5/28/2003	FS-FBL-SB4-1-3.5' 5/22/2003
CWM , ppb							
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-FBL-SB6-1-0'-2' 5/21/2003	FS-FBL-SB5-1-3.5' 5/22/2003	FS-FBL-SB6-2-3.5' 5/21/2003	FS-FBL-SB7-1-4.5' 5/28/2003	FS-FBL-SB7-S-1-0' 5/19/2003	FS-FBL-SB8-1-0'-2' 5/22/2003
CWM , ppb							
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-FBL-SB10-2-3' 5/22/2003	FS-FBL-SBK-1-0'-2' 5/28/2003	FS-FBL-SBK-2-0'-2' 5/28/2003	FS-FBL-SR-1-0'-2' 5/27/2003	FS-FBL-SR-2-0'-2' 5/27/2003	FS-FBL-ST1-S-1-0'-2' 5/27/2003
CWM , ppb							
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U

Parameter, Units	Compound / Analyte	FS-FBL-SB8-2-3.5' 5/22/2003	FS-FBL-SB9-1-3.5' 5/19/2003	FS-FBL-SB10-1-0'-2' 5/19/2003	FS-FBL-ST1-1-3.5' 5/27/2003	FS-FBL-ST2-1-3.5' 5/27/2003	FS-FBL-ST2-S-1-0'-2' 5/27/2003
CWM , ppb							
	1,4-Dithiane	200 U	200 U	200 U	200 U	200 U	200 U
	1,4-Thioxane	200 U	200 U	200 U	200 U	200 U	200 U
	GA	20 U	20 U	20 U	20 U	20 U	20 U
	HD	200 U	200 U	200 U	200 U	200 U	200 U

Quality Assurance Sample Results
Test Area 4 - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA4-SB2-1-2.5' 6/4/2003	FS-TA4-SB2-1-2.5' FIELD DUPLICATE FS-TA4-SB2B-1-2.5' 6/4/2003	FD RPD
Metals, mg/kg					
SW6010B	Aluminum		29000	29000	0%
	Antimony		2.2 U	2 U	NC
	Arsenic		6.2 J	4.4 J	34%
	Barium		40	34	16%
	Beryllium		0.27 J	0.31 J	14%
	Cadmium		1.3	1.2	8%
	Calcium		29000	37000	24%
	Chromium		23 J	26 J	12%
	Cobalt		24	20	18%
	Copper		40	37	8%
	Iron		48000	49000	2%
	Lead		2.1	2.5	17%
	Magnesium		31000 J	22000 J	34%
	Manganese		910 J	780 J	15%
	Nickel		14	12	15%
	Potassium		1000 J	1400 J	33%
	Selenium		2.6 U	2.4 U	8%
	Silver		1.1 U	1 U	10%
	Sodium		1400	1600	13%
	Strontium		370	470	24%
	Thallium		3 U	2.8 U	NC
	Vanadium		200	210	5%
	Zinc		61	48	24%
Mercury, mg/kg					
SW7471	Mercury		0.0079 J	0.0075 J	5%
Pesticides, ug/kg					
SW8081A	Aldrin		1.9 U	1.9 U	NC
	alpha-BHC		1.9 U	1.9 U	NC
	beta-BHC		1.9 U	1.9 U	NC
	gamma-BHC (Lindane)		1.9 U	1.9 U	NC
	delta-BHC		1.9 U	1.9 U	NC
	Chlordane (technical)		19 U	19 U	NC
	4,4'-DDT		3.7 U	3.7 U	NC
	Endosulfan I		1.9 U	1.9 U	NC
	Endosulfan II		3.7 U	3.7 U	NC
	4,4'-DDE		3.7 U	3.7 U	NC
	4,4'-DDD		3.7 U	3.7 U	NC
	Dieldrin		3.7 U	3.7 U	NC
	Endosulfan sulfate		3.7 U	3.7 U	NC
	Endrin		3.7 U	3.7 U	NC
	Endrin aldehyde		3.7 U	3.7 U	NC
	Heptachlor		1.9 U	1.9 U	NC
	Heptachlor epoxide		1.9 U	1.9 U	NC
	Toxaphene		190 U	190 U	NC
	Endrin ketone		3.7 U	3.7 U	NC
	Methoxychlor		19 U	19 U	NC
PCBs, ug/kg					
SW8082	Aroclor-1242		37 U	37 U	NC
	Aroclor-1254		37 U	37 U	NC
	Aroclor-1221		75 U	74 U	NC
	Aroclor-1232		37 U	37 U	NC
	Aroclor-1248		37 U	37 U	NC
	Aroclor-1260		37 U	37 U	NC
	Aroclor-1016		37 U	37 U	NC
Herbicides, ug/kg					
SW8151A	2,4,5-TP (Silvex)		9.3 U	9.2 U	NC
	2,4-DB		10 U	10 U	NC
	2,4-D		62	71	14%
	2,4,5-T		**2.4 J**	9.2 U	NC
	Pentachlorophenol		19 U	19 U	NC
	Dalapon		2200 U	2200 U	NC
	Dicamba		4.1 J	6.8 J	50%
	Dichloroprop		110 U	110 U	NC
	Dinoseb		110 U	110 U	NC
	MCPA		2200 U	2200 U	NC
	MCPP		2200 U	2200 U	NC

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA4-SB2-1-2.5' 6/4/2003	FS-TA4-SB2-1-2.5' FIELD DUPLICATE FS-TA4-SB2B-1-2.5' 6/4/2003	FD RPD
Semivolatiles, ug/kg					
SW8270(	32 1,2,4,5-Tetrachlorobenzene		370 U	370 U	NC
	71 1,2,4-Trichlorobenzene		370 U	370 U	NC
	47 1,2-Dichlorobenzene		370 U	370 U	NC
	56 1,2-Diphenylhydrazine		370 U	370 U	NC
	48 1,3-Dichlorobenzene		370 U	370 U	NC
	49 1,4-Dichlorobenzene		370 U	370 U	NC
	3 2,2'-Oxybis(1-Chloropropane		370 U	370 U	NC
	33 2,4,5-Trichlorophenol		370 U	370 U	NC
	38 2,4,6-Trichlorophenol		370 U	370 U	NC
	7 2,4-Dichlorophenol		370 U	370 U	NC
	10 2,4-Dimethylphenol		370 U	370 U	NC
	18 2,4-Dinitrophenol		1900 U	1900 U	NC
	53 2,4-Dinitrotoluene		370 U	370 U	NC
	25 2,6-Dichlorophenol		370 U	370 U	NC
	54 2,6-Dinitrotoluene		370 U	370 U	NC
	43 2-Chloronaphthalene		370 U	370 U	NC
	1 2-Chlorophenol		370 U	370 U	NC
	5 2-Methylnaphthalene		370 U	370 U	NC
	6 2-Methylphenol (o-Cresol)		370 U	370 U	NC
	29 2-Naphthylamine		470 U	470 U	NC
	4 2-Nitroaniline		1900 U	1900 U	NC
	19 2-Nitrophenol		370 U	370 U	NC
	50 3,3'-Dichlorobenzidine		740 U	730 U	NC
	15 3-Methylphenol/4-Methylphe		370 U	370 U	NC
	9 3-Nitroaniline		1900 U	1900 U	NC
	12 4,6-Dinitro-2-methylphenol		1900 U	1900 U	NC
	41 4-Bromophenylphenyl ether		370 U	370 U	NC
	14 4-Chloro-3-methylphenol		370 U	370 U	NC
	13 4-Chloroaniline		740 U	730 U	NC
	44 4-Chlorophenylphenyl ether		370 U	370 U	NC
	16 4-Nitroaniline		1900 U	1900 U	NC
	21 4-Nitrophenol		1900 U	1900 U	NC
	2 Acenaphthene		370 U	370 U	NC
	8 Acenaphthylene		370 U	370 U	NC
	22 Acetophenone		370 U	370 U	NC
	23 Aniline		370 UJ	370 UJ	NC
	11 Anthracene		370 U	370 U	NC
	17 Benzidine		3000 UJ	3000 UJ	NC
	24 Benzo(a)anthracene		370 U	370 U	NC
	20 Benzo(a)pyrene		370 U	370 U	NC
	26 Benzo(b)fluoranthene		370 U	370 U	NC
	34 Benzo(g,h,i)perylene		370 U	370 U	NC
	72 Benzo(k)fluoranthene		370 U	370 U	NC
	73 Benzoic acid		1900 U	1900 U	NC
	74 Benzyl alcohol		370 U	370 U	NC
	37 bis(2-Chloroethoxy)methane		370 U	370 U	NC
	39 bis(2-Chloroethyl)ether		370 U	370 U	NC
	40 bis(2-Ethylhexyl)phthalate		370 U	370 U	NC
	42 Butylbenzylphthalate		370 U	370 U	NC
	45 Chrysene		370 U	370 U	NC
	46 Dibenzo(a,h)anthracene		370 U	370 U	NC
	75 Dibenzofuran		370 U	370 U	NC
	27 Diethylphthalate		370 U	370 U	NC
	51 Dimethylphthalate		370 U	370 U	NC
	52 Di-n-butylphthalate		370 U	370 U	NC
	55 Di-n-octylphthalate		370 U	370 U	NC
	57 Fluoranthene		370 U	370 U	NC
	58 Fluorene		370 U	370 U	NC
	59 Hexachlorobenzene		370 U	370 U	NC
	60 Hexachlorobutadiene		370 U	370 U	NC
	61 Hexachlorocyclopentadiene		910 UJ	900 UJ	NC
	62 Hexachloroethane		370 U	370 U	NC
	28 Hexachloropropene		370 U	370 U	NC
	63 Indeno(1,2,3-cd)pyrene		370 U	370 U	NC
	64 Isophorone		370 U	370 U	NC
	65 Naphthalene		370 U	370 U	NC
	66 Nitrobenzene		370 U	370 U	NC
	67 N-Nitrosodimethylamine		670 U	670 U	NC
	76 N-Nitroso-di-n-propylamine		370 U	370 U	NC
	68 N-Nitrosodiphenylamine		370 U	370 U	NC
	30 N-Nitrosopyrrolidine		370 U	370 U	NC
	35 Pentachlorophenol		1900 U	1900 U	NC
	69 Phenanthrene		370 U	370 U	NC
	36 Phenol		370 U	370 U	NC
	70 Pyrene		370 U	370 U	NC
	31 Pyridine		370 UJ	370 UJ	NC

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA4-SB2-1-2.5' 6/4/2003	FS-TA4-SB2-1-2.5' FIELD DUPLICATE FS-TA4-SB2B-1-2.5' 6/4/2003	FD RPD
Cyanide, mg/kg					
SW9012A	Cyanide		0.83 U	0.81 U	NC
Explosives, ug/kg					
SW8330	2,4,6-Trinitrotoluene		250 U	250 U	NC
	2-Nitrotoluene		250 U	250 U	NC
	3-Nitrotoluene		420 U	420 U	NC
	4-Nitrotoluene		390 U	390 U	NC
	Nitrobenzene		390 U	390 U	NC
	Octahydro-1,3,5,7-tetranitro-		500 U	500 U	NC
	Hexahydro-1,3,5-trinitro-1,3,		500 U	500 U	NC
	Methyl-2,4,6-trinitrophenylnitr		660 U	660 U	NC
	1,3,5-Trinitrobenzene		250 U	250 U	NC
	2,4-Dinitrotoluene		250 U	250 U	NC
	2,6-Dinitrotoluene		500 U	500 U	NC
	1,3-Dinitrobenzene		250 U	250 U	NC
	4-Amino-2,6-Dinitrotoluene		500 U	500 U	NC
	2-Amino-4,6-Dinitrotoluene		250 U	250 U	NC

Bold values indicate a detection by one lab and a non-detect reported by the alternate lab.
NR = Not Reported. The compound was not analyzed for.
NC = Not Calculated. The RPD calculation could not be performed.

Quality Assurance Sample Results
Test Area 4 - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA5-GS3-S1-0'-2' 6/10/2003	FS-TA5-GS3-S1-0'-2' FIELD DUPLICATE FS-TA5-GS3B-S1-0'-2' 6/10/2003	FD RPD	FS-TA5-GS3-1-2' 6/10/2003	FS-TA5-GS3-1-2' FIELD DUPLICATE FS-TA5-GS3B-1-2' 6/10/2003	FD RPD	FS-TA5-SBK-1-2' FIELD DUPLICATE FS-TA5-SBK-1B-2' 6/16/2003	FD RPD	FS-TA5-SBK-1-2' 6/16/2003	FS-TA5-SBK-1-2' 6/16/2003	QA SAMPLE SHIPPED TO PRIMARY LAB FS-TA5-SBK-1/QA-2' 6/16/2003	FD RPD
Metals, mg/kg														
SW6010B	Aluminum		1.1 U	1.3 U	NC	1.1 U	1 U	NC	1.1 U	NC	0.98 U	0.98 U	0.99 U	NC
	Antimony		32000	33000	3%	32000	31000	3%	28000	4%	29000	29000	27000	7%
	Arsenic		3.1 J	3.9 J	23%	5.8 J	2.8 J	70%	4.3	5%	4.1	4.1	4	2%
	Barium		33 J	44 J	29%	55 J	35 J	44%	86	13%	98	98	120	20%
	Beryllium		0.24 J	0.26 J	8%	0.22 J	0.18 J	20%	0.29 J	4%	0.28 J	0.28 J	0.24 J	15%
	Cadmium		42000 J	29000 J	37%	44000 J	32000 J	32%	3000 J	50%	5000 J	5000 J	4400 J	13%
	Calcium		1.3	1.1	17%	1.6	1.6	0%	1.5	0%	1.5	1.5	1.5	0%
	Chromium		22 J	21 J	5%	24 J	26 J	8%	28	10%	31	31	29	7%
	Cobalt		20 J	20 J	0%	25 J	15 J	50%	8.3	9%	7.6	7.6	9	17%
	Copper		46 J	46 J	0%	52 J	37 J	34%	38 J	3%	39	39	36	8%
	Iron		44000	47000	7%	47000	48000	2%	58000	2%	57000	57000	52000	9%
	Lead		1100	1200	9%	1000	670	40%	810	15%	700	700	630	11%
	Magnesium		33000	32000	3%	36000	44000	20%	31000	6%	33000	33000	31000	6%
	Manganese		870	810	7%	930	1000	7%	2000	5%	2100	2100	2000	5%
	Nickel		1600	1400	13%	1900	2000	5%	830	8%	900	900	840	7%
	Potassium		15	14	7%	15	14	7%	12	15%	14	14	12	15%
	Selenium		14 J	16 J	13%	43 J	18 J	82%	6.4	12%	5.7	5.7	5.7	0%
	Silver		2.2 U	2.6 U	NC	**0.75 J**	2.1 U	NC	0.81 J	10%	0.73 J	0.73 J	0.81 J	10%
	Sodium		2.6 U	3.1 U	NC	2.6 U	2.5 U	NC	2.5 U	NC	2.4 U	2.4 U	2.4 U	NC
	Strontium		440 J	260 J	51%	450 J	220 J	69%	38	40%	57 J	57 J	59 J	3%
	Thallium		3 U	3.6 U	NC	15 U	2.9 U	NC	3 U	NC	2.7 U	2.7 U	2.8 U	NC
	Vanadium		190	190	0%	200	190	5%	250	0%	250	250	230	8%
	Zinc		86 J	100 J	15%	120 J	82 J	38%	80	8%	74	74	74	0%
Mercury, mg/kg														
SW7471	Mercury		0.022	0.015 J	38%	0.015 J	0.033	75%	0.015 J	22%	0.012 J	0.012 J	0.0049 J	84%
Pesticides, ug/kg														
SW8081A	Aldrin		2 U	2.3 U	NC	2 U	2 U	NC	1.8 UJ	NC	1.8 UJ	1.8 UJ	1.9 UJ	NC
	alpha-BHC		2 U	2.3 U	NC	2 U	2 U	NC	1.8 UJ	NC	1.8 UJ	1.8 UJ	1.9 UJ	NC
	beta-BHC		2 U	2.3 U	NC	2 U	2 U	NC	1.8 UJ	NC	1.8 UJ	1.8 UJ	1.9 UJ	NC
	gamma-BHC (Lindane)		2 U	2.3 U	NC	2 U	2 U	NC	1.8 UJ	NC	1.8 UJ	1.8 UJ	1.9 UJ	NC
	delta-BHC		2 U	2.3 U	NC	2 U	2 U	NC	1.8 UJ	NC	1.8 UJ	1.8 UJ	1.9 UJ	NC
	Chlordane (technical)		20 U	23 U	NC	20 U	20 U	NC	18 UJ	NC	18 UJ	18 UJ	19 UJ	NC
	4,4'-DDT		3.8 U	4.4 U	NC	3.9 U	3.8 U	NC	3.6 UJ	NC	3.6 UJ	3.6 UJ	3.6 UJ	NC
	Endosulfan I		2 U	2.3 U	NC	2 U	2 U	NC	1.8 UJ	NC	1.8 UJ	1.8 UJ	1.9 UJ	NC
	Endosulfan II		3.8 U	4.4 U	NC	3.9 U	3.8 U	NC	3.6 UJ	NC	3.6 UJ	3.6 UJ	3.6 UJ	NC
	4,4'-DDE		3.8 U	4.4 U	NC	3.9 U	3.8 U	NC	3.6 UJ	NC	3.6 UJ	3.6 UJ	3.6 UJ	NC
	4,4'-DDD		3.8 U	4.4 U	NC	3.9 U	3.8 U	NC	3.6 UJ	NC	3.6 UJ	3.6 UJ	3.6 UJ	NC
	Dieldrin		2.8 J	2.9 J	4%	18	11	48%	**0.59 J**	NC	3.6 UJ	3.6 UJ	3.6 UJ	NC
	Endosulfan sulfate		3.8 U	4.4 U	NC	3.9 U	3.8 U	NC	3.6 UJ	NC	3.6 UJ	3.6 UJ	3.6 UJ	NC
	Endrin		3.8 U	4.4 U	NC	3.9 U	3.8 U	NC	3.6 UJ	NC	3.6 UJ	3.6 UJ	3.6 UJ	NC
	Endrin aldehyde		3.8 U	4.4 U	NC	3.9 U	3.8 U	NC	3.6 UJ	NC	3.6 UJ	3.6 UJ	3.6 UJ	NC
	Heptachlor		2 U	**0.51 J**	NC	2 U	2 U	NC	1.8 UJ	NC	**0.83 J**	**0.83 J**	1.9 UJ	NC
	Heptachlor epoxide		2 U	2.3 U	NC	2 U	2 U	NC	1.8 UJ	NC	**0.51 J**	**0.51 J**	1.9 UJ	NC
	Toxaphene		200 U	230 U	NC	200 U	200 U	NC	180 UJ	NC	180 UJ	180 UJ	190 UJ	NC
	Endrin ketone		3.8 U	4.4 U	NC	3.9 U	3.8 U	NC	3.6 UJ	NC	3.6 UJ	3.6 UJ	3.6 UJ	NC
	Methoxychlor		20 U	23 U	NC	20 U	20 U	NC	18 UJ	NC	18 UJ	18 UJ	19 UJ	NC
PCBs, ug/kg														
SW8082	Aroclor-1242		38 U	44 U	NC	39 U	38 U	NC	36 UJ	NC	36 UJ	36 UJ	36 UJ	NC
	Aroclor-1254		38 U	44 U	NC	39 U	38 U	NC	36 UJ	NC	36 UJ	36 UJ	36 UJ	NC
	Aroclor-1221		77 U	90 U	NC	79 U	77 U	NC	73 UJ	NC	73 UJ	73 UJ	74 UJ	NC
	Aroclor-1232		38 U	44 U	NC	39 U	38 U	NC	36 UJ	NC	36 UJ	36 UJ	36 UJ	NC
	Aroclor-1248		38 U	44 U	NC	39 U	38 U	NC	36 UJ	NC	36 UJ	36 UJ	36 UJ	NC
	Aroclor-1260		38 U	44 U	NC	39 U	38 U	NC	36 UJ	NC	36 UJ	36 UJ	36 UJ	NC
	Aroclor-1016		38 U	44 U	NC	39 U	38 U	NC	36 UJ	NC	36 UJ	36 UJ	36 UJ	NC
Herbicides, ug/kg														
SW8151A	2,4,5-TP (Silvex)		9.5 U	11 U	NC	9.8 U	9.5 U	NC	9 UJ	NC	9 UJ	9 UJ	9.1 UJ	NC
	2,4-DB		6.4 J	11 J	53%	**16**	11 U	NC	10 UJ	NC	10 UJ	10 UJ	10 UJ	NC
	2,4-D		9.5 U	11 U	NC	9.8 U	9.5 U	NC	9 UJ	0%	9 UJ	9 UJ	9.1 UJ	1%
	2,4,5-T		**0.84 J**	11 U	NC	**1.8 J**	9.5 U	NC	9 UJ	NC	9 UJ	9 UJ	9.1 UJ	NC
	Pentachlorophenol		20 U	23 U	NC	20 U	20 U	NC	18 UJ	NC	18 UJ	18 UJ	19 UJ	NC
	Dalapon		2300 U	2700 U	NC	2400 U	2300 U	NC	2200 UJ	NC	2200 UJ	2200 UJ	2200 UJ	NC
	Dicamba		8.9 J	15 J	51%	18 J	3.2 J	140%	12 J	34%	17 J	17 J	18 J	6%
	Dichloroprop		110 U	140 U	NC	120 U	110 U	NC	110 UJ	NC	110 UJ	110 UJ	110 UJ	NC
	Dinoseb		110 U	140 U	NC	120 U	110 U	NC	110 UJ	NC	110 UJ	110 UJ	110 UJ	NC
	MCPA		2300 U	2700 U	NC	2400 U	2300 U	NC	2200 UJ	NC	2200 UJ	2200 UJ	2200 UJ	NC
	MCPP		2000 J	3800 J	62%	6100 J	620 J	163%	24000 J	50%	40000 J	40000 J	37000 J	8%

Quality Assurance Sample Results
Test Area 4 - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA5-GS3-S1-0'-2' 6/10/2003	FS-TA5-GS3-S1-0'-2' FIELD DUPLICATE FS-TA5-GS3B-S1-0'-2' 6/10/2003	FD RPD	FS-TA5-GS3-1-2' 6/10/2003	FS-TA5-GS3-1-2' FIELD DUPLICATE FS-TA5-GS3B-1-2' 6/10/2003	FD RPD	FS-TA5-SBK-1-2' FIELD DUPLICATE FS-TA5-SBK-1B-2' 6/16/2003	FD RPD	FS-TA5-SBK-1-2' 6/16/2003	FS-TA5-SBK-1-2' 6/16/2003	QA SAMPLE SHIPPED TO PRIMARY LAB FS-TA5-SBK-1/QA-2' 6/16/2003	FD RPD
Semivolatiles, ug/kg														
SW8270C	1,2,4,5-Tetrachlorobenzene		380 U	440 U		390 U	380 U		360 UJ		360 UJ	360 UJ	360 UJ	
	1,2,4-Trichlorobenzene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	1,2-Dichlorobenzene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	1,2-Diphenylhydrazine		2000 U	2300 U	NC	2000 U	2000 U	NC	1800 UJ	NC	1800 UJ	1800 UJ	1900 UJ	NC
	1,3-Dichlorobenzene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	1,4-Dichlorobenzene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	2,2'-Oxybis(1-Chloropropane) (bis-2-chloroisopropyl ethe		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	2,4,5-Trichlorophenol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	2,4,6-Trichlorophenol		2000 U	2300 U	NC	2000 U	2000 U	NC	1800 UJ	NC	1800 UJ	1800 UJ	1900 UJ	NC
	2,4-Dichlorophenol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	2,4-Dimethylphenol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	2,4-Dinitrophenol		2000 U	2300 U	NC	2000 U	2000 U	NC	1800 UJ	NC	1800 UJ	1800 UJ	1900 UJ	NC
	2,4-Dinitrotoluene		760 U	890 U	NC	780 U	760 U	NC	720 UJ	NC	720 UJ	720 UJ	720 UJ	NC
	2,6-Dichlorophenol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	2,6-Dinitrotoluene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	2-Chloronaphthalene		2000 U	2300 U	NC	2000 U	2000 U	NC	1800 UJ	NC	1800 UJ	1800 UJ	1900 UJ	NC
	2-Chlorophenol		3100 U	3600 U	NC	3200 U	3100 U	NC	2900 UJ	NC	2900 UJ	2900 UJ	3000 UJ	NC
	2-Methylnaphthalene		2000 U	2300 U	NC	2000 U	2000 U	NC	1800 UJ	NC	1800 UJ	1800 UJ	1900 UJ	NC
	2-Methylphenol (o-Cresol)		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	2-Naphthylamine		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	2-Nitroaniline		2000 U	2300 U	NC	2000 U	2000 U	NC	1800 UJ	NC	1800 UJ	1800 UJ	1900 UJ	NC
	2-Nitrophenol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	3,3'-Dichlorobenzidine		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	3-Methylphenol/4-Methylphenol (m&p-Cresol)		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	3-Nitroaniline		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	4,6-Dinitro-2-methylphenol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	4-Bromophenylphenyl ether		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	4-Chloro-3-methylphenol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	4-Chloroaniline		480 U	570 U	NC	490 U	480 U	NC	460 UJ	NC	460 UJ	460 UJ	460 UJ	NC
	4-Chlorophenylphenyl ether		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	4-Nitroaniline		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	4-Nitrophenol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Acenaphthene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Acenaphthylene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Acetophenone		2000 U	2300 U	NC	2000 U	2000 U	NC	1800 UJ	NC	1800 UJ	1800 UJ	1900 UJ	NC
	Aniline		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Anthracene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Benzidine		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Benzo(a)anthracene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Benzo(a)pyrene		92 J	110 J	18%	100 J	85 J	16%	72 J	1%	73 J	**73 J**	360 UJ	NC
	Benzo(b)fluoranthene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Benzo(g,h,i)perylene		**60 J**	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Benzo(k)fluoranthene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Benzoic acid		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Benzyl alcohol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	bis(2-Chloroethoxy)methane		**130 J**	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	bis(2-Chloroethyl)ether		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	bis(2-Ethylhexyl)phthalate		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Butylbenzylphthalate		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Chrysene		760 U	890 U	NC	780 U	760 U	NC	720 UJ	NC	720 UJ	720 UJ	720 UJ	NC
	Dibenzo(a,h)anthracene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Dibenzofuran		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Diethylphthalate		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Dimethylphthalate		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Di-n-butylphthalate		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Di-n-octylphthalate		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Fluoranthene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Fluorene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Hexachlorobenzene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Hexachlorobutadiene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Hexachlorocyclopentadiene		930 U	1100 U	NC	950 U	930 U	NC	880 UJ	NC	880 UJ	880 UJ	890 UJ	NC
	Hexachloroethane		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Hexachloropropene		**200 J**	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Indeno(1,2,3-cd)pyrene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Isophorone		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Naphthalene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Nitrobenzene		690 U	810 U	NC	700 U	690 U	NC	650 UJ	NC	650 UJ	650 UJ	660 UJ	NC
	N-Nitrosodimethylamine		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	N-Nitroso-di-n-propylamine		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	N-Nitrosodiphenylamine		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	N-Nitrosopyrrolidine		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Pentachlorophenol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Phenanthrene		2000 U	2300 U	NC	2000 U	2000 U	NC	1800 UJ	NC	1800 UJ	1800 UJ	1900 UJ	NC
	Phenol		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Pyrene		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
	Pyridine		380 U	440 U	NC	390 U	380 U	NC	360 UJ	NC	360 UJ	360 UJ	360 UJ	NC
Cyanide, mg/kg														
SW9012A	Cyanide		0.85 U	0.97 U	NC	0.88 U	0.86 U	NC	0.82 U	NC	0.82 U	0.82 U	0.8 U	NC

Bold values indicate a detection by one lab and a non-detect reported by the alternate lab.
NR = Not Reported. The compound was not analyzed for.
NC = Not Calculated. The RPD calculation could not be performed.

Quality Assurance Sample Results
Test Area 4 - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA8-SB2-1-0'-2' 6/17/2003	FS-TA8-SB2B-1-0'-2' FIELD DUPLICATE 6/17/2003	FD RPD
Metals, mg/kg					
SW6010B	Aluminum		0.95 U	0.94 U	NC
	Antimony		7700	6600	15%
	Arsenic		2.2 U	2.2 U	NC
	Barium		24	23	4%
	Beryllium		0.16 J	0.14 J	13%
	Cadmium		1500	1200	22%
	Calcium		0.29 J	0.24 J	19%
	Chromium		4.1 J	3 J	31%
	Cobalt		4.5	4.1	9%
	Copper		3.9	3.1	23%
	Iron		15000	12000	22%
	Lead		1400 J	1200 J	15%
	Magnesium		3900	3200	20%
	Manganese		240	200	18%
	Nickel		190 J	180 J	5%
	Potassium		2.1 J	1.8 J	15%
	Selenium		1.5	1.1	31%
	Silver		1.9 UJ	1.9 UJ	NC
	Sodium		2.3 U	2.3 U	NC
	Strontium		19	15	24%
	Thallium		2.7 U	2.6 U	NC
	Vanadium		19	17	11%
	Zinc		24 J	19 J	23%
Mercury, mg/kg					
SW7471	Mercury		0.0093 J	0.008 J	15%
Pesticides, ug/kg					
SW8081A	Aldrin		1.8 U	1.8 U	NC
	alpha-BHC		1.8 U	1.8 U	NC
	beta-BHC		1.8 U	1.8 U	NC
	gamma-BHC (Lindane)		1.8 U	1.8 U	NC
	delta-BHC		1.8 U	1.8 U	NC
	Chlordane (technical)		18 U	18 U	NC
	4,4'-DDT		3.4 U	3.4 U	NC
	Endosulfan I		1.8 U	1.8 U	NC
	Endosulfan II		3.4 U	3.4 U	NC
	4,4'-DDE		3.4 U	3.4 U	NC
	4,4'-DDD		3.4 U	3.4 U	NC
	Dieldrin		17 J	8.2 J	70%
	Endosulfan sulfate		3.4 U	3.4 U	NC
	Endrin		3.4 U	3.4 U	NC
	Endrin aldehyde		3.4 U	3.4 U	NC
	Heptachlor		1.8 U	1.8 U	NC
	Heptachlor epoxide		1.8 U	1.8 U	NC
	Toxaphene		180 U	180 U	NC
	Endrin ketone		3.4 U	3.4 U	NC
	Methoxychlor		18 U	18 U	NC
PCBs, ug/kg					
SW8082	Aroclor-1242		34 U	34 U	NC
	Aroclor-1254		34 U	34 U	NC
	Aroclor-1221		70 U	70 U	NC
	Aroclor-1232		34 U	34 U	NC
	Aroclor-1248		34 U	34 U	NC
	Aroclor-1260		34 U	34 U	NC
	Aroclor-1016		34 U	34 U	NC
Herbicides, ug/kg					
SW8151A	2,4,5-TP (Silvex)		8.6 U	8.6 U	NC
	2,4-DB		60 J	36 J	50%
	2,4-D		8.6 U	8.6 U	NC
	2,4,5-T		12	6.7 J	57%
	Pentachlorophenol		18 U	18 U	NC
	Dalapon		2100 U	2100 U	NC
	Dicamba		9 J	7.2 J	22%
	Dichloroprop		100 U	100 U	NC
	Dinoseb		100 U	100 U	NC
	MCPA		2100 U	2100 U	NC
	MCPP		2100 U	2100 U	NC

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA8-SB2-1-0'-2' 6/17/2003	FS-TA8-SB2B-1-0'-2' FIELD DUPLICATE 6/17/2003	FD RPD
Semivolatiles, ug/kg					
SW8270(	32 1,2,4,5-Tetrachlorobenzene		340 U	340 U	
	71 1,2,4-Trichlorobenzene		340 U	340 U	NC
	47 1,2-Dichlorobenzene		340 U	340 U	NC
	56 1,2-Diphenylhydrazine		1800 U	1800 U	NC
	48 1,3-Dichlorobenzene		340 U	340 U	NC
	49 1,4-Dichlorobenzene		340 U	340 U	NC
	3 2,2'-Oxybis(1-Chloropropane		340 U	340 U	NC
	33 2,4,5-Trichlorophenol		340 U	340 U	NC
	38 2,4,6-Trichlorophenol		1800 U	1800 U	NC
	7 2,4-Dichlorophenol		340 U	340 U	NC
	10 2,4-Dimethylphenol		340 U	340 U	NC
	18 2,4-Dinitrophenol		1800 U	1800 U	NC
	53 2,4-Dinitrotoluene		690 UJ	690 UJ	NC
	25 2,6-Dichlorophenol		340 U	340 U	NC
	54 2,6-Dinitrotoluene		340 U	340 U	NC
	43 2-Chloronaphthalene		1800 U	1800 U	NC
	1 2-Chlorophenol		2800 UJ	2800 UJ	NC
	5 2-Methylnaphthalene		1800 U	1800 U	NC
	6 2-Methylphenol (o-Cresol)		340 U	340 U	NC
	29 2-Naphthylamine		340 U	340 U	NC
	4 2-Nitroaniline		1800 U	1800 U	NC
	19 2-Nitrophenol		340 U	340 U	NC
	50 3,3'-Dichlorobenzidine		340 UJ	340 UJ	NC
	15 3-Methylphenol/4-Methylphe		340 U	340 U	NC
	9 3-Nitroaniline		340 U	340 U	NC
	12 4,6-Dinitro-2-methylphenol		340 U	340 U	NC
	41 4-Bromophenylphenyl ether		340 U	340 U	NC
	14 4-Chloro-3-methylphenol		340 U	340 U	NC
	13 4-Chloroaniline		440 U	440 U	NC
	44 4-Chlorophenylphenyl ether		340 U	340 U	NC
	16 4-Nitroaniline		340 UJ	340 UJ	NC
	21 4-Nitrophenol		340 U	340 U	NC
	2 Acenaphthene		340 U	340 U	NC
	8 Acenaphthylene		340 U	340 U	NC
	22 Acetophenone		1800 U	1800 U	NC
	23 Aniline		340 U	340 U	NC
	11 Anthracene		340 U	340 U	NC
	17 Benzidine		340 UJ	340 U	NC
	24 Benzo(a)anthracene		340 U	340 U	NC
	20 Benzo(a)pyrene		340 U	**49 J**	NC
	26 Benzo(b)fluoranthene		340 U	340 U	NC
	34 Benzo(g,h,i)perylene		340 U	340 U	NC
	72 Benzo(k)fluoranthene		340 U	340 U	NC
	73 Benzoic acid		340 U	340 U	NC
	74 Benzyl alcohol		340 U	340 U	NC
	37 bis(2-Chloroethoxy)methane		340 U	340 U	NC
	39 bis(2-Chloroethyl)ether		340 UJ	340 UJ	NC
	40 bis(2-Ethylhexyl)phthalate		340 UJ	340 UJ	NC
	42 Butylbenzylphthalate		340 UJ	340 UJ	NC
	45 Chrysene		690 U	690 U	NC
	46 Dibenzo(a,h)anthracene		340 U	340 U	NC
	75 Dibenzofuran		340 U	340 U	NC
	27 Diethylphthalate		340 U	340 U	NC
	51 Dimethylphthalate		340 U	340 U	NC
	52 Di-n-butylphthalate		340 U	340 U	NC
	55 Di-n-octylphthalate		340 U	340 U	NC
	57 Fluoranthene		340 U	340 U	NC
	58 Fluorene		340 U	340 U	NC
	59 Hexachlorobenzene		340 U	340 U	NC
	60 Hexachlorobutadiene		340 U	340 U	NC
	61 Hexachlorocyclopentadiene		840 U	840 UJ	NC
	62 Hexachloroethane		340 UJ	340 UJ	NC
	28 Hexachloropropene		340 U	340 U	NC
	63 Indeno(1,2,3-cd)pyrene		340 U	340 U	NC
	64 Isophorone		340 U	340 U	NC
	65 Naphthalene		340 U	340 U	NC
	66 Nitrobenzene		620 U	620 U	NC
	67 N-Nitrosodimethylamine		340 U	340 U	NC
	76 N-Nitroso-di-n-propylamine		340 U	340 U	NC
	68 N-Nitrosodiphenylamine		340 U	340 U	NC
	30 N-Nitrosopyrrolidine		340 U	340 U	NC
	35 Pentachlorophenol		340 U	340 U	NC
	69 Phenanthrene		1800 UJ	1800 UJ	NC
	36 Phenol		340 U	340 U	NC
	70 Pyrene		340 U	340 U	NC
	31 Pyridine		340 U	340 U	NC

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA8-SB2-1-0'-2' 6/17/2003	FS-TA8-SB2B-1-0'-2' FIELD DUPLICATE 6/17/2003	FD RPD
Cyanide, mg/kg					
SW9012A	Cyanide		0.77 U	0.75 U	NC

Bold values indicate a detection by one lab and a non-detect reported by the alternate lab.
NR = Not Reported. The compound was not analyzed for.
NC = Not Calculated. The RPD calculation could not be performed.

Quality Assurance Sample Results
Flaming Bay Landfill - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-FBL-G15-1-2.5' 5/27/2003	FS-FBL-G15-1-205' FIELD DUPLICATE FS-FBL-G15B-1-2.5' 5/27/2003	FD RPD	FS-FBL-G20-1-3.5' 5/21/2003	FS-FBL-G20-1-3.5' FIELD DUPLICATE FS-FBL-G20B-S-1-3.5' 5/21/2003	FD RPD	FS-FBL-SB4-1-3.5' 5/22/2003	FS-FBL-SB4-1-3.5' FIELD DUPLICATE FS-FBL-SB4B-S-1-3.5' 5/22/2003	FD RPD	FS-FBL-SB5-1-3.5' 5/22/2003	FS-FBL-SB5-1-3.5' FIELD DUPLICATE FS-FBL-SB5B-1-3.5' 5/22/2003	FD RPD
Metals, mg/kg														
SW6010B	Aluminum		1.3 J	1.7	27%	1 U	1.1 U	NC	1 U	1 U	NC	1 U	1 U	NC
	Antimony		19000 J	21000 J	10%	34000	35000	3%	24000	24000	0%	25000	24000	4%
	Arsenic		52	60	14%	16 J	5.1 J	103%	31	36	15%	65	61	6%
	Barium		380 J	270 J	34%	43	42	2%	120 J	91 J	27%	180 J	130 J	32%
	Beryllium		0.22 J	0.23 J	4%	0.23 J	0.27 J	16%	0.17 J	0.17 J	0%	0.23 J	0.23 J	0%
	Cadmium		94000 J	140000 J	39%	37000	47000	24%	180000	180000	0%	100000 J	75000 J	29%
	Calcium		9.9	11	11%	1.4	1.4	0%	2.1	2	5%	1.7	1.5	13%
	Chromium		13 J	9.8 J	28%	29 J	35 J	19%	15	15	0%	19	17	11%
	Cobalt		80	67	18%	30 J	22 J	31%	55	51	8%	61	50	20%
	Copper		420	420	0%	62	81	27%	200 J	520 J	89%	190 J	120 J	45%
	Iron		130000 J	73000 J	56%	73000	69000	6%	46000	41000	11%	48000	39000	21%
	Lead		1800	2100	15%	770	680	12%	1100	1200	9%	1000	960	4%
	Magnesium		12000	9800	20%	33000	37000	11%	18000	15000	18%	20000	20000	0%
	Manganese		1200 J	810 J	39%	1300	1300	0%	820	940	14%	1000	1000	0%
	Nickel		1800 J	2400	29%	2300	2500	8%	3200	3100	3%	2500	2200	13%
	Potassium		33	32	3%	26	21	21%	23	21	9%	22 J	15 J	38%
	Selenium		5300 J	21000 J	119%	24	20	18%	370	310	18%	290	9600	188%
	Silver		22 J	760 J	189%	**0.9 J**	2.2 U	NC	3	3	0%	1.9 J	36	180%
	Sodium		2.5 U	2.7 U	NC	2.5 U	2.6 U	NC	2.5 U	2.5 U	NC	2.5 U	2.4 U	NC
	Strontium		1200 J	1800 J	40%	500	530	6%	2700	2800	4%	1400	1100	24%
	Thallium		5.9 U	62 U	NC	2.9 U	6 U	NC	2.9 U	2.9 U	NC	2.9 U	2.9 U	NC
	Vanadium		67 J	45 J	39%	200	240	18%	100	79	23%	140	130	7%
	Zinc		1600	1700	6%	110	110	0%	620	650	5%	320 J	520 J	48%
Mercury, mg/kg														
SW7471	Mercury		0.35	0.41	16%	0.0096 J	0.012 J	22%	0.096	0.09	6%	0.12	0.12	0%
Pesticides, ug/kg														
SW8081A	Aldrin		2 U	10 U	NC	2 U	2 U	NC	7.6 U	39 U	NC	47 U	190 U	NC
	alpha-BHC		2 U	10 U	NC	2 U	2 U	NC	7.6 U	39 U	NC	47 U	190 U	NC
	beta-BHC		2 U	10 U	NC	2 U	2 U	NC	7.6 U	39 U	NC	47 U	190 U	NC
	gamma-BHC (Lindane)		2 U	10 U	NC	2 U	2 U	NC	7.6 U	39 U	NC	47 U	190 U	NC
	delta-BHC		2 U	10 U	NC	**0.18 J**	2 U	NC	7.6 U	39 U	NC	47 U	190 U	NC
	Chlordane (technical)		20 U	100 U	NC	20 U	20 U	NC	76 U	390 U	NC	470 U	1900 U	NC
	4,4'-DDT		3.9 UJ	130 J	NC	**9.6**	3.8 UJ	NC	15 UJ	75 UJ	NC	91 UJ	370 UJ	NC
	Endosulfan I		2 U	10 U	NC	2 U	2 U	NC	7.6 U	39 U	NC	47 U	190 U	NC
	Endosulfan II		3.9 U	20 U	NC	3.8 U	3.8 U	NC	15 U	75 U	NC	91 U	370 U	NC
	4,4'-DDE		3.9 U	20 U	NC	3.8 U	3.8 U	NC	15 U	75 U	NC	91 U	370 U	NC
	4,4'-DDD		3.9 U	20 U	NC	3.8 U	3.8 U	NC	15 U	75 U	NC	91 U	370 U	NC
	Dieldrin		14 J	86 J	144%	38 J	8.8 J	125%	200 J	340 J	52%	1400 J	1200 J	15%
	Endosulfan sulfate		3.9 U	20 U	NC	3.8 U	3.8 U	NC	15 U	75 U	NC	91 U	370 U	NC
	Endrin		3.9 U	20 U	NC	3.8 U	3.8 U	NC	15 U	75 U	NC	91 U	370 U	NC
	Endrin aldehyde		3.9 U	20 U	NC	3.8 U	3.8 U	NC	15 UJ	75 UJ	NC	91 UJ	370 UJ	NC
	Heptachlor		2 U	10 U	NC	**2.9**	2 U	NC	7.6 U	39 U	NC	47 U	190 U	NC
	Heptachlor epoxide		2 UJ	4.8 J	NC	**7.8 J**	2 UJ	NC	7.6 U	**11 J**	NC	47 U	190 U	NC
	Toxaphene		200 U	1000 U	NC	200 U	200 U	NC	760 U	3900 U	NC	4700 U	19000 U	NC
	Endrin ketone		3.9 U	20 U	NC	3.8 U	3.8 U	NC	15 U	75 U	NC	91 U	370 U	NC
	Methoxychlor		20 U	100 U	NC	20 U	20 U	NC	76 U	390 U	NC	470 U	1900 U	NC
PCBs, ug/kg														
SW8082	Aroclor-1242		39 U	200 U	NC	38 U	38 U	NC	150 U	750 U	NC	910 U	3700 U	NC
	Aroclor-1254		100 J	290 J	97%	38 UJ	38 UJ	NC	150 U	750 U	NC	1800 J	940 J	63%
	Aroclor-1221		79 U	400 U	NC	77 U	78 U	NC	300 U	1500 U	NC	1800 U	7400 U	NC
	Aroclor-1232		39 U	200 U	NC	38 U	38 U	NC	150 U	750 U	NC	910 U	3700 U	NC
	Aroclor-1248		39 U	200 U	NC	38 U	38 U	NC	150 U	750 U	NC	910 U	3700 U	NC
	Aroclor-1260		39 U	200 U	NC	38 U	38 U	NC	150 U	750 U	NC	910 U	3700 U	NC
	Aroclor-1016		39 U	200 U	NC	38 U	38 U	NC	150 U	750 U	NC	910 U	3700 U	NC
Herbicides, ug/kg														
SW8151A	2,4,5-TP (Silvex)		9.8 U	10 U	NC	9.5 U	9.6 U	NC	**0.91 J**	9.4 U	NC	9.1 U	9.2 U	NC
	2,4-DB		11 U	11 U	NC	11 U	11 U	NC	**0.83 J**	10 U	NC	10 U	10 U	NC
	2,4-D		9.8 U	10 U	NC	9.5 U	9.6 U	NC	9.2 U	9.4 U	NC	9.1 U	9.2 U	NC
	2,4,5-T		9.8 U	10 U	NC	9.5 U	**1.8 J**	NC	0.9 J	0.82 J	9%	**1.2 J**	9.2 U	NC
	Pentachlorophenol		20 U	20 U	NC	20 U	20 U	NC	19 U	19 U	NC	9.2 J	6.2 J	39%
	Dalapon		2400 U	2400 U	NC	2300 U	2300 U	NC	2200 U	2300 U	NC	2200 U	2200 U	NC
	Dicamba		24 U	24 U	NC	23 U	**2.5 J**	NC	22 U	23 U	NC	22 U	22 U	NC
	Dichloroprop		120 U	120 U	NC	110 U	120 U	NC	110 U	110 U	NC	110 U	110 U	NC
	Dinoseb		120 U	120 U	NC	110 U	120 U	NC	110 U	110 U	NC	110 U	110 U	NC
	MCPA		2400 U	2400 U	NC	2300 U	2300 U	NC	2200 U	2300 U	NC	2200 U	2200 U	NC
	MCPP		2400 U	2400 U	NC	470 J	1600 J	109%	**490 J**	2300 U	NC	1700 J	930 J	59%

Quality Assurance Sample Results
Flaming Bay Landfill - Former Fort Segarra, Water Island, USVI

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-FBL-G15-1-2.5' 5/27/2003	FS-FBL-G15B-1-2.5' FIELD DUPLICATE 5/27/2003	FD RPD	FS-FBL-G20-1-3.5' 5/21/2003	FS-FBL-G20B-S-1-3.5' FIELD DUPLICATE 5/21/2003	FD RPD	FS-FBL-SB4-1-3.5' 5/22/2003	FS-FBL-SB4B-S-1-3.5' FIELD DUPLICATE 5/22/2003	FD RPD	FS-FBL-SB5-1-3.5' 5/22/2003	FS-FBL-SB5B-1-3.5' FIELD DUPLICATE 5/22/2003	FD RPD
Semivolatiles, ug/kg														
SW8270C	1,2,4,5-Tetrachlorobenzene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	1,2,4-Trichlorobenzene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	1,2-Dichlorobenzene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	1,2-Diphenylhydrazine		2000 U	2000 U	NC	2000 U	2000 U	NC	1900 U	1900 U	NC	1900 U	1900 U	NC
	1,3-Dichlorobenzene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	1,4-Dichlorobenzene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	2,2'-Oxybis(1-Chloropropane) (bis-2-chloroisopropyl ethe		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	2,4,5-Trichlorophenol		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	2,4,6-Trichlorophenol		2000 U	2000 U	NC	2000 U	2000 U	NC	1900 U	1900 U	NC	1900 U	1900 U	NC
	2,4-Dichlorophenol		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	2,4-Dimethylphenol		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	2,4-Dinitrophenol		2000 U	2000 U	NC	2000 U	2000 U	NC	1900 U	1900 U	NC	1900 U	1900 U	NC
	2,4-Dinitrotoluene		780 U	800 U	NC	760 U	770 U	NC	730 UJ	750 UJ	NC	720 UJ	730 UJ	NC
	2,6-Dichlorophenol		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	2,6-Dinitrotoluene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	2-Chloronaphthalene		2000 U	2000 U	NC	2000 U	2000 U	NC	1900 U	1900 U	NC	1900 U	1900 U	NC
	2-Chlorophenol		3200 U	3200 U	NC	3100 U	3100 U	NC	3000 UJ	3100 UJ	NC	3000 UJ	3000 UJ	NC
	2-Methylnaphthalene		2000 U	2000 U	NC	2000 U	2000 U	NC	1900 U	1900 U	NC	1900 U	1900 U	NC
	2-Methylphenol (o-Cresol)		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	2-Naphthylamine		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	2-Nitroaniline		2000 U	2000 U	NC	2000 U	2000 U	NC	1900 U	1900 U	NC	1900 U	1900 U	NC
	2-Nitrophenol		38 J	42 J	10%	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	3,3'-Dichlorobenzidine		390 U	400 U	NC	380 U	380 U	NC	370 UJ	380 UJ	NC	360 UJ	370 UJ	NC
	3-Methylphenol/4-Methylphenol (m&p-Cresol)		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	3-Nitroaniline		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	4,6-Dinitro-2-methylphenol		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	4-Bromophenylphenyl ether		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	4-Chloro-3-methylphenol		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	4-Chloroaniline		490 U	510 U	NC	480 U	490 U	NC	470 U	480 U	NC	460 U	470 U	NC
	4-Chlorophenylphenyl ether		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	4-Nitroaniline		390 U	400 U	NC	380 U	380 U	NC	370 U	380 UJ	NC	360 UJ	370 UJ	NC
	4-Nitrophenol		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Acenaphthene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Acenaphthylene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Acetophenone		2000 U	2000 U	NC	2000 U	2000 U	NC	1900 UJ	1900 UJ	NC	1900 UJ	1900 UJ	NC
	Aniline		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Anthracene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Benzidine		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Benzo(a)anthracene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Benzo(a)pyrene		140 J	230 J	49%	63 J	220 J	111%	29000 J	1700 J	178%	20000 J	130 J	197%
	Benzo(b)fluoranthene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Benzo(g,h,i)perylene		390 U	**42 J**	NC	380 U	380 U	NC	**74 J**	380 U	NC	**36 J**	370 U	NC
	Benzo(k)fluoranthene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Benzoic acid		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Benzyl alcohol		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	bis(2-Chloroethoxy)methane		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	bis(2-Chloroethyl)ether		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	bis(2-Ethylhexyl)phthalate		390 U	400 U	NC	380 U	380 U	NC	370 UJ	380 UJ	NC	360 UJ	370 UJ	NC
	Butylbenzylphthalate		390 U	400 U	NC	380 U	380 U	NC	370 UJ	380 UJ	NC	360 UJ	370 UJ	NC
	Chrysene		780 U	800 U	NC	760 U	770 U	NC	730 U	750 U	NC	720 U	730 U	NC
	Dibenzo(a,h)anthracene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Dibenzofuran		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Diethylphthalate		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Dimethylphthalate		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Di-n-butylphthalate		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	**220 J**	370 U	NC
	Di-n-octylphthalate		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Fluoranthene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Fluorene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Hexachlorobenzene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Hexachlorobutadiene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Hexachlorocyclopentadiene		950 U	980 U	NC	930 U	940 U	NC	900 UJ	920 UJ	NC	890 UJ	900 UJ	NC
	Hexachloroethane		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Hexachloropropene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Indeno(1,2,3-cd)pyrene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Isophorone		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Naphthalene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Nitrobenzene		700 U	720 U	NC	690 U	700 U	NC	670 U	680 U	NC	660 U	670 U	NC
	N-Nitrosodimethylamine		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	N-Nitroso-di-n-propylamine		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	N-Nitrosodiphenylamine		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	N-Nitrosopyrrolidine		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Pentachlorophenol		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Phenanthrene		2000 U	2000 U	NC	2000 U	2000 U	NC	1900 UJ	1900 UJ	NC	1900 UJ	1900 UJ	NC
	Phenol		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Pyrene		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
	Pyridine		390 U	400 U	NC	380 U	380 U	NC	370 U	380 U	NC	360 U	370 U	NC
Cyanide, mg/kg														
SW9012A	Cyanide		0.55 J	0.58 J	5%	0.85 U	0.86 U	NC	0.82 U	0.84 U	NC	**0.28 J**	0.8 U	NC

Bold values indicate a detection by one lab and a non-detect reported by the alternate lab.
NR = Not Reported. The compound was not analyzed for.
NC = Not Calculated. The RPD calculation could not be performed.

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA4-SB2-S1-0-2' 6/3/2003	FS-TA4-SB2-S-1-0-2'/QA 6/3/2003	QA RPD	FS-TA4-TP12-1/QA-3' 6/13/2003	FS-TA4-TP12-1-3' 6/13/2003	QA RPD
			15 oC					
Metals, mg/kg								
SW6010B	Aluminum		14000	17000	19%	5800	18600	105%
	Antimony		1.9 U	4.0 U	NC	2.3 UJ	4.0 U	NC
	Arsenic		16	13	21%	2.6 J	3.8	38%
	Barium		29	25.6	12%	16	21.9	31%
	Beryllium		0.15 J	0.2 J	29%	0.095 J	0.2 J	71%
	Cadmium		**0.63**	0.5 U	NC	0.5 J	1.6	NC
	Calcium		200000	170000	16%	270000	153000	55%
	Chromium		28	26.3	6%	5.2	16	102%
	Cobalt		12	12	0%	2.9	8.5	98%
	Copper		91	86.2	5%	9.4	23.9	87%
	Iron		26000	25900	0%	8700	23600	92%
	Lead		9.1	9.7	6%	5.8	19	106%
	Magnesium		15000	13700	9%	9100	14900	48%
	Manganese		580	483	18%	210	444	72%
	Nickel		8.3	7.1	16%	2.6 J	8.3	105%
	Potassium		1000	998	0%	790 J	2000	87%
	Selenium		2.3 U	4.0 U	NC	2.8 U	4.0 U	NC
	Silver		0.96 U	1.0 U	NC	1.2 U	1.0 U	NC
	Sodium		2300	1930	17%	2900	2000	37%
	Strontium		3300	NR	NC	3800	NR	NC
	Thallium		2.7 U	6.0 U	NC	3.2 U	**1 J**	NC
	Vanadium		94	92.7	1%	26	74.6	97%
	Zinc		65 J	70.3	8%	30	54.4	58%
Mercury, mg/kg								
SW7471	Mercury		0.012 J	0.013	8%	0.015 J	0.025 J	50%
Pesticides, ug/kg								
SW8081A	Aldrin		1.8 U	2.1 R	NC	2.1 U	2.4 UJ	NC
	alpha-BHC		1.8 U	2.1 R	NC	2.1 U	2.4 UJ	NC
	beta-BHC		1.8 U	2.1 R	NC	2.1 U	2.4 UJ	NC
	gamma-BHC (Lindane)		1.8 U	2.1 R	NC	2.1 U	2.4 UJ	NC
	delta-BHC		1.8 U	2.1 R	NC	2.1 U	2.4 UJ	NC
	Chlordane (technical)		18 U	2.1 R	NC	21 U	NR	NC
	4,4'-DDT		3.5 U	2.1 R	NC	4.1 U	2.4 UJ	NC
	Endosulfan I		1.8 U	2.1 R	NC	2.1 U	2.4 UJ	NC
	Endosulfan II		3.5 U	2.1 R	NC	4.1 U	2.4 UJ	NC
	4,4'-DDE		3.5 U	2.1 R	NC	4.1 U	**14 J**	NC
	4,4'-DDD		3.5 U	2.1 R	NC	4.1 U	2.4 UJ	NC
	Dieldrin		3.5 U	2.1 R	NC	4.1 U	2.4 UJ	NC
	Endosulfan sulfate		3.5 U	2.1 R	NC	4.1 U	2.4 UJ	NC
	Endrin		3.5 U	2.1 R	NC	4.1 U	2.4 UJ	NC
	Endrin aldehyde		3.5 U	2.1 R	NC	4.1 U	2.4 UJ	NC
	Heptachlor		1.8 U	2.1 R	NC	2.1 U	2.4 UJ	NC
	Heptachlor epoxide		1.8 U	2.1 R	NC	2.1 U	2.4 UJ	NC
	Toxaphene		180 U	100 R	NC	210 U	120 UJ	NC
	Endrin ketone		3.5 U	2.1 R	NC	4.1 U	2.4 UJ	NC
	Methoxychlor		18 U	2.1 R	NC	21 U	2.4 UJ	NC
	alpha-Chlordane		NR	NR		NR	2.4 UJ	NC
	gamma-Chlordane		NR	NR		NR	2.4 UJ	NC
PCBs, ug/kg								
SW8082	Aroclor-1242		35 U	21 R	NC	41 U	24 UJ	NC
	Aroclor-1254		35 U	21 R	NC	41 U	24 UJ	NC
	Aroclor-1221		70 U	21 R	NC	83 U	24 UJ	NC
	Aroclor-1232		35 U	21 R	NC	41 U	24 UJ	NC
	Aroclor-1248		35 U	21 R	NC	41 U	24 UJ	NC
	Aroclor-1260		35 U	21 R	NC	41 U	24 UJ	NC
	Aroclor-1016		35 U	21 R	NC	41 U	24 UJ	NC
Herbicides, ug/kg								
SW8151A	2,4,5-TP (Silvex)		8.7 U	20 R	NC	10 U	20 UJ	NC
	2,4-DB		9.8 U	110 R	NC	11 U	120 UJ	NC
	2,4-D		8.7 U	110 R	NC	10 U	120 UJ	NC
	2,4,5-T		8.7 U	20 R	NC	10 U	20 UJ	NC
	Pentachlorophenol		18 U	NR	NC	21 U	NR	NC
	Dalapon		2100 U	110 R	NC	2500 U	120 UJ	NC
	Dicamba		21 U	110 R	NC	25 U	120 UJ	NC
	Dichloroprop		100 U	110 R	NC	120 U	120 UJ	NC
	Dinoseb		100 U	110 R	NC	120 U	120 UJ	NC
	MCPA		2100 U	11000 R	NC	2500 U	12000 UJ	NC
	MCPP		**390 J**	11000 R	NC	2500 U	12000 UJ	NC

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA4-SB2-S1-0-2' 6/3/2003	15 oC FS-TA4-SB2-S-1-0-2'/QA 6/3/2003	QA RPD	FS-TA4-TP12-1/QA-3' 6/13/2003	FS-TA4-TP12-1-3' 6/13/2003	QA RPD
Semivolatiles, ug/kg								
SW8270C	1,2,4,5-Tetrachlorobenzene		350 U	NR	NC	410 U	NR	NC
	1,2,4-Trichlorobenzene		350 U	210 R	NC	410 U	250 UJ	NC
	1,2-Dichlorobenzene		350 U	210 R	NC	410 U	250 UJ	NC
	1,2-Diphenylhydrazine		350 U	NR	NC	410 U	NR	NC
	1,3-Dichlorobenzene		350 U	210 R	NC	410 U	250 UJ	NC
	1,4-Dichlorobenzene		350 U	210 R	NC	410 U	250 UJ	NC
	2,2'-Oxybis(1-Chloropropane) (bis-2-chloroisopropyl ether)		350 U	210 R	NC	410 U	250 UJ	NC
	2,4,5-Trichlorophenol		350 U	210 R	NC	410 U	250 UJ	NC
	2,4,6-Trichlorophenol		350 U	210 R	NC	410 U	250 UJ	NC
	2,4-Dichlorophenol		350 U	210 R	NC	410 U	250 UJ	NC
	2,4-Dimethylphenol		350 U	410 R	NC	410 U	490 UJ	NC
	2,4-Dinitrophenol		1800 U	2100 R	NC	2100 U	2500 UJ	NC
	2,4-Dinitrotoluene		350 U	210 R	NC	410 U	250 UJ	NC
	2,6-Dichlorophenol		350 U	NR	NC	410 U	NR	NC
	2,6-Dinitrotoluene		350 U	210 R	NC	410 U	250 UJ	NC
	2-Chloronaphthalene		350 U	210 R	NC	410 U	250 UJ	NC
	2-Chlorophenol		350 U	210 R	NC	410 U	250 UJ	NC
	2-Methylnaphthalene		350 U	210 R	NC	410 U	250 UJ	NC
	2-Methylphenol (o-Cresol)		350 U	210 R	NC	410 U	250 UJ	NC
	2-Naphthylamine		440 U	NR	NC	520 U	NR	NC
	2-Nitroaniline		1800 U	210 R	NC	2100 U	250 UJ	NC
	2-Nitrophenol		350 U	410 R	NC	410 U	490 UJ	NC
	3,3'-Dichlorobenzidine		690 U	830 R	NC	810 U	980 UJ	NC
	3-Methylphenol/4-Methylphenol (m&p-Cresol)		350 U	210 R	NC	410 U	250 UJ	NC
	3-Nitroaniline		1800 U	2100 R	NC	2100 U	2500 UJ	NC
	4,6-Dinitro-2-methylphenol		1800 U	2100 R	NC	2100 U	2500 UJ	NC
	4-Bromophenylphenyl ether		350 U	210 R	NC	410 U	250 UJ	NC
	4-Chloro-3-methylphenol		350 U	410 R	NC	410 U	490 UJ	NC
	4-Chloroaniline		690 U	410 R	NC	810 U	490 UJ	NC
	4-Chlorophenylphenyl ether		350 U	210 R	NC	410 U	250 UJ	NC
	4-Nitroaniline		1800 U	2100 R	NC	2100 U	2500 UJ	NC
	4-Nitrophenol		1800 U	2100 R	NC	2100 U	2500 UJ	NC
	Acenaphthene		350 U	210 R	NC	410 U	250 UJ	NC
	Acenaphthylene		350 U	210 R	NC	410 U	250 UJ	NC
	Acetophenone		350 U	NR	NC	410 U	NR	NC
	Aniline		350 U	NR	NC	410 U	NR	NC
	Anthracene		350 U	210 R	NC	410 U	250 UJ	NC
	Benzidine		2800 U	NR	NC	3300 UJ	NR	NC
	Benzo(a)anthracene		350 U	210 R	NC	410 U	250 UJ	NC
	Benzo(a)pyrene		350 U	210 R	NC	410 U	250 UJ	NC
	Benzo(b)fluoranthene		350 U	**50 J***	NC	410 U	250 UJ	NC
	Benzo(g,h,i)perylene		350 U	210 R	NC	410 U	250 UJ	NC
	Benzo(k)fluoranthene		350 U	NR*	NC	410 U	250 UJ	NC
	Benzoic acid		1800 U	2100 R	NC	2100 U	**1000 J**	NC
	Benzyl alcohol		350 U	2100 R	NC	410 U	2500 UJ	NC
	bis(2-Chloroethoxy)methane		350 U	210 R	NC	410 U	250 UJ	NC
	bis(2-Chloroethyl)ether		350 U	210 R	NC	410 U	250 UJ	NC
	bis(2-Ethylhexyl)phthalate		99 J	660 J	148%	410 U	**80 J**	NC
	Butylbenzylphthalate		350 U	210 R	NC	410 U	250 UJ	NC
	Chrysene		350 U	**20 J**	NC	410 U	250 UJ	NC
	Dibenzo(a,h)anthracene		350 U	210 R	NC	410 U	250 UJ	NC
	Dibenzofuran		350 U	210 R	NC	410 U	250 UJ	NC
	Diethylphthalate		350 U	210 R	NC	410 U	250 UJ	NC
	Dimethylphthalate		350 U	210 R	NC	410 U	250 UJ	NC
	Di-n-butylphthalate		56 J	80 J	35%	410 U	250 UJ	NC
	Di-n-octylphthalate		350 U	**50 J**	NC	410 U	250 UJ	NC
	Fluoranthene		350 U	210 R	NC	410 U	250 UJ	NC
	Fluorene		350 U	210 R	NC	410 U	250 UJ	NC
	Hexachlorobenzene		350 U	210 R	NC	410 U	250 UJ	NC
	Hexachlorobutadiene		350 U	210 R	NC	410 U	250 UJ	NC
	Hexachlorocyclopentadiene		850 U	830 R	NC	1000 U	980 UJ	NC
	Hexachloroethane		350 U	210 R	NC	410 U	250 UJ	NC
	Hexachloropropene		350 U	NR	NC	410 U	NR	NC
	Indeno(1,2,3-cd)pyrene		350 U	210 R	NC	410 U	250 UJ	NC
	Isophorone		350 U	210 R	NC	410 U	250 UJ	NC
	Naphthalene		350 U	210 R	NC	410 U	250 UJ	NC
	Nitrobenzene		350 U	210 R	NC	410 U	250 UJ	NC
	N-Nitrosodimethylamine		630 U	NR	NC	740 U	NR	NC
	N-Nitroso-di-n-propylamine		350 U	210 R	NC	410 U	250 UJ	NC
	N-Nitrosodiphenylamine		350 U	210 R	NC	410 U	250 UJ	NC
	N-Nitrosopyrrolidine		350 U	NR	NC	410 U	NR	NC
	Pentachlorophenol		1800 U	2100 R	NC	2100 U	2500 UJ	NC
	Phenanthrene		350 U	210 R	NC	410 U	250 UJ	NC
	Phenol		350 U	210 R	NC	410 U	250 UJ	NC
	Pyrene		350 U	210 R	NC	410 U	250 UJ	NC
	Pyridine		350 U	NR	NC	410 U	NR	NC

Parameter, Units	Compound / Analyte	Sample ID / Date Collected	FS-TA4-SB2-S1-0-2' 6/3/2003	15 oC FS-TA4-SB2-S-1-0-2'/QA 6/3/2003	QA RPD	FS-TA4-TP12-1/QA-3' 6/13/2003	FS-TA4-TP12-1-3' 6/13/2003	QA RPD
Explosives, ug/kg								
SW8330	2,4,6-Trinitrotoluene		250 U	500 R	NC	250 U	500 UJ	NC
	2-Nitrotoluene		250 U	1000 R	NC	250 U	1000 UJ	NC
	3-Nitrotoluene		420 U	1000 R	NC	420 U	1000 UJ	NC
	4-Nitrotoluene		390 U	1000 R	NC	390 U	1000 UJ	NC
	Nitrobenzene		390 U	500 R	NC	390 U	500 UJ	NC
	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine		500 U	1800 R	NC	500 U	1800 UJ	NC
	Hexahydro-1,3,5-trinitro-1,3,5-triazine		500 U	4400 R	NC	500 U	4400 UJ	NC
	Methyl-2,4,6-trinitrophenylnitramine		660 U	2300 R	NC	660 U	2300 UJ	NC
	1,3,5-Trinitrobenzene		250 U	330 R	NC	250 U	330 UJ	NC
	2,4-Dinitrotoluene		250 U	1000 R	NC	250 U	1000 UJ	NC
	2,6-Dinitrotoluene		500 U	1000 R	NC	500 U	1000 UJ	NC
	1,3-Dinitrobenzene		250 U	1200 R	NC	250 U	1200 UJ	NC
	4-Amino-2,6-Dinitrotoluene		500 U	2000 R	NC	500 U	2000 UJ	NC
	2-Amino-4,6-Dinitrotoluene		250 U	250 R	NC	250 U	250 UJ	NC
Cyanide, mg/kg								
SW9012A	Cyanide		0.77 U	0.2 U	NC	0.92 U	0.2 UJ	NC

* - Reported as isomeric pair due to insufficient baseline resolution
Bold values indicate a detection by one lab and a non-detect reported by the second lab.
NR = Not Reported. The compound was not analyzed for.
NC = Not Calculated. The RPD calculation could not be performed.

APPENDIX D
PARSONS DATA VALIDATION REPORTS

Parsons STL HTW Data Validation Report

Parsons ECB HTW Data Validation Report

Parsons CWM Data Validation Report

DATA VERIFICATION REPORT

for samples collected from

FORMER FORT SEGARRA

WATER ISLAND, U.S. VIRGIN ISLANDS

Data Verification by: Katherine LaPierre
Parsons - Austin

INTRODUCTION

Samples for this project were collected from June 15, 2003 through July 18, 2003. The samples were assigned to and reported in thirteen (13) different data packages or sample delivery groups (SDGs). The SDGs were numbered sequentially from FSG001 through FSG013. The details of each SDG are provided in the following table:

SDG Number	Soil Samples	Field Duplicates	MS/MSD pairs	Equipment Blanks
FSG001	0	0	0	1
FSG002	4	0	0	0
FSG003	5	0	1	0
FSG004	16	4	0	0
FSG005	3	0	1	0
FSG006	4	0	1	0
FSG007	0	0	0	1
FSG008	4	0	0	0
FSG009	9	1	1	0
FSG010	7	2	0	1
FSG011	6	0	1	0
FSG012	8	1	1	0
FSG013	21	1	2	0
Totals:	87	9	8	3

The total number of samples collected for this project was 115. All samples were analyzed for semivolatile organic compounds (SVOCs), herbicides, pesticides, polychlorinated biphenyls (PCBs), metals and cyanide. In addition, some samples were also analyzed for explosives.

This data set consists of several sample types that were collected from several different locations, as described in section 6.3.1 of the Fort Segarra Field Sampling Plan (FSP). For the purposes of data qualification, samples were considered to be of the same matrix if they were of the same sample type [soil boring (SB), test pit (TP), site background (SBK), etc.] and were collected from the same location [Test Area 4 (TA4), Test Area 5 (TA5), Flamingo Bay Landfill (FBL), etc.].

Data validation was performed for all sample results in accordance with the Fort Segarra SAP, Section 8.2. All SDGs were reviewed for accuracy, precision, representativeness, and completeness using the data presented in the final lab report. In addition, a more thorough review was performed for data package FSG013 which included a complete review of all raw data supplied by the lab. Data package FSG013 was chosen for this in-depth review because it encompassed more than 10% of the field samples collected, as well as a significant number of field quality control (QC) samples and thus was deemed to be representative of the entire data set.

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the Ft. Segarra Sampling and Analysis Plan (SAP), Section 8.2. Data was validated in accordance with the requirements contained in the QAPP, EM 200 1-3, Region II SOPs and the USEPA *National Functional Guidelines for Data Review* (EPA, 1999, 2002). The data qualifiers defined in the Ft. Segarra QAPP were applied to the data based on the review of the data and any non-compliance found. Information reviewed in the data packages included sample results; field and laboratory QC sample results; surrogate recoveries; case narratives; and chain-of-custody (COC) forms. In addition, the raw data for package FSG013 was reviewed. This raw data review included calibrations, initial and continuing calibration verifications, initial and continuing calibration blanks, internal standards, instrument performance checks, second source verifications, post digestion spikes and compound quantitation. The findings presented in this report are based on the reviewed information, and whether guidelines in the specified project documents were met.

The laboratory applied a variety of data qualifiers to denote different situations. Through the verification of these SDGs, all flags were reviewed and changed or removed as necessary in order to reflect the data validation flags listed in the QAPP (U, J, UJ and R). For example, the laboratory used the qualifiers "J" for organics and "B" for inorganics to designate values above the MDL but below the RL. All "B" flags for inorganics were changed to "J" to be consistent with the organic results and the flags designated in the QAPP.

FSG001

FSG001 contained only one equipment blank (FS-FBL-EB-S-1). This equipment blank (EB) was collected by running HPLC-grade water over clean equipment prior to sampling but after the decontamination procedure. The EB was collected on May 19, 2003 and was received at the lab in good condition at a temperature of 1.8^0 C. The EB was analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide.

SVOCs - The EB was extracted and analyzed within hold time. Two analytes were detected in the EB (di-n-butyl phthalate and benzoic acid) but both were detected at a level less than one half the RL so no corrective action was necessary. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes except for benzidine (0%), and pyridine

(0%). The sample, method blank and LCS were re-extracted on June 23, 2003, outside of hold time. The LCS met criteria for benzidine and pyridine in the re-extracted LCS. All results for the EB were non-detect on the re-extraction, which confirmed the original results. Because the re-extract was performed outside of hold time, the original results were used. Benzidine and pyridine were flagged "UJ" due to the possible low bias for these analytes.

Herbicides - The EB was extracted and analyzed within hold time. No analytes were detected in the EB. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes.

Pesticides & PCBs - The EB was extracted and analyzed within hold time. Two analytes were detected in the EB (alpha-BHC and gamma-BHC) but both were detected at a level less than one half the RL, so no corrective action was necessary. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes, except alpha-BHC which was detected at less than one half the RL, so no corrective action was necessary. The LCS met QAPP criteria for all target analytes.

Metals - The EB was digested and analyzed within hold time. The following analytes were detected in the EB: calcium (0.58mg/L), manganese (0.0018 mg/L), strontium (0.0081 mg/L), and zinc (0.0016 mg/L). Manganese and zinc were detected at a level less than one half the RL, so no corrective action was necessary. All soil samples contained calcium and strontium at levels significantly greater than (>10 times) the amount found in the EB, so no corrective action was necessary. The method blank was non-detect for all target analytes except aluminum, which had a slightly negative recovery. No corrective action was necessary. The LCS met QAPP criteria for all target metals.

Cyanide - The EB was analyzed within hold time. Cyanide was not detected in the EB. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria.

FSG002

FSG002 contained four (4) soil samples. The samples were collected on May 19 and 20, 2003 and were received at the lab in good condition at a temperature of 3.2^0 C. The samples were analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide.

SVOCs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes.

Herbicides - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes.

Pesticides & PCBs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria, except for the following: FS-FBL-SB10-1-0'-2' had 2,4,5,6-Tetrachloro-m-xylene (TCMX) 1% low at 39%, the method blank in batch 0602O had TCMX 2% low at 38%, the LCS for Technical Chlordane had TCMX 4% low

at 36% and the PCB LCS had TCMX 8% low at 32%. Due to the low surrogate recoveries, all samples and QC were re-extracted on June 12, 2003. However, because the re-extract was performed outside of hold time, the results from the original extraction were used. The method blank was non-detect for all target analytes. The Pesticide LCS met QAPP criteria for all target analytes. The PCB LCS met QAPP criteria for all target analytes except for Aroclor 1016 which was recovered at 36% (tolerance = 50-130%). All sample results for Aroclor 1016 were flagged "J" if detected or "UJ" if non-detect due to the low bias demonstrated by the LCS.

Metals - The samples were digested and analyzed within hold time. The method blank was non-detect for all target analytes except for the following: barium, cadmium, chromium, sodium and zinc. Barium, chromium and zinc were all detected in the blank at a level less than one half the RL and cadmium was detected at a negative concentration less than one half the RL, so no corrective action was necessary. Sodium was detected at a level greater than one half the RL, but all sample concentrations were significantly higher (>10x) than the blank concentration, so no corrective action was necessary. The LCS met QAPP criteria for all target metals. The case narrative noted that the dilution test failed for chromium, cobalt, and zinc. All sample results were flagged "J" as estimated for these metals.

Cyanide - The samples were analyzed within hold time. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria.

FSG003

FSG003 contained five (5) soils and one MS/MSD pair. The samples were collected on May 20 & 21, 2003 and were received at the lab in good condition at a temperature of 4.6^0 C. The samples were analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide. The MS/MSD was analyzed on sample FS-FBL-G1-1-4'. No corrective action was deemed necessary for analytes that met criteria in either the MS or the MSD.

SVOCs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or the MSD, except for the following: hexachlorocyclopentadiene, pentachlorophenol, aniline, benzidine, and pyridine. These analytes were recovered low in both the MS and MSD. The results for these analytes were flagged "J" if detected or "UJ" if non-detect in all samples with the same matrix as the parent sample due to the low bias demonstrated by the MS/MSD.

Herbicides - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or MSD.

Pesticides & PCBs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria, except for the following: sample FS-FBL-G9-1-4' had TCMX 14% low at 26%, sample FS-FBL-SB6-2-3.5' had TCMX 2% low at 38%, the method blank in batch 0602O had TCMX 2% low at 38%, the LCS for Technical

Chlordane had TCMX 4% low at 36% and the PCB LCS had TCMX 8% low at 32%. Due to the low surrogate recoveries, all samples and QC were re-extracted on June 12, 2003. However, because the re-extract was performed outside of hold time, the results from the original extraction were used. The method blank was non-detect for all target analytes. The Pesticide LCS met QAPP criteria for all target analytes. The PCB LCS met QAPP criteria for all target analytes except for Aroclor 1016 which was recovered at 36% (tolerance = 50-130%). All sample results for Aroclor 1016 were flagged "J" if detected or "UJ" if non-detect due to the low bias demonstrated by the LCS. All PCBs met criteria in the MS and/or the MSD. All pesticides met criteria in the MS and/or the MSD, except for the following: heptachlor epoxide, dieldrin, 4,4'-DDE, and 4,4'-DDT. These analytes were recovered high in both the MS and MSD. The results for these analytes were flagged "J" if detected or "UJ" if non-detect in all samples with the same matrix as the parent sample due to the low bias demonstrated by the MS/MSD.

Metals - The samples were digested and analyzed within hold time. The method blank was non-detect for all target analytes except for the following: barium, cadmium, chromium, sodium and zinc. Barium, chromium and zinc were all detected in the blank at a level less than one half the RL and cadmium was detected at a negative concentration less than one half the RL, so no corrective action was necessary. Sodium was detected at a level greater than one half the RL, but all sample concentrations were significantly higher (>10x) than the blank concentration, so no corrective action was necessary. The LCS met QAPP criteria for all target metals. The case narrative noted that the dilution test failed for zinc. The dilution test was run on sample FS-FBL-G1-1-4'. All zinc results for samples of the same matrix were flagged "J" as estimated. The MS/MSD was deemed not applicable for those metals with a parent sample concentration greater than five times the spike amount (aluminum, calcium, chromium, copper, iron, lead, manganese, strontium, and zinc). All other metals met criteria in the MS and/or MSD except for the following: antimony (above criteria in the MS and below criteria in the MSD), nickel (below criteria in both), potassium (above criteria in both), and sodium (above criteria in the MS and below criteria in the MSD). These metals were flagged "J" as estimated in all samples with a matrix similar to the parent sample.

Cyanide - The samples were analyzed within hold time. Cyanide was not detected in the EB. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria. Cyanide met criteria in both the MS and the MSD.

FSG004

FSG004 contained twenty (20) soil samples (including sixteen normal samples and four field duplicates) and one MS/MSD. The samples were collected on May 21, 22 and 27, 2003 and were received at the lab in good condition. The three coolers were received at temperatures of 4.6, 4.9 and 4.6^0 C. The samples were analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide. The laboratory analyzed an MS/MSD on sample FS-FBL-SB4-1-3.5'. No corrective action was deemed necessary for analytes that met criteria in either the MS or the MSD. The following field duplicate pairs were included in this data package:

Parent Sample	Field Duplicate

FS-FBL-SB4-1-3.5’	FS-FBL-SB4B-S-1-3.5’
FS-FBL-SB5-1-3.5’	FS-FBL-SB5B-1-3.5’
FS-FBL-G15-1-2.5’	FS-FBL-G15B-1-2.5’
FS-FBL-G-20-1-3.5’	FS-FBL-G20B-S-1-3.5’

Only analytes detected above the RL were assessed for precision in the field duplicates.

SVOCs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria, except for the following:

Sample ID	Surrogate	%R	Criteria
FS-FBL-SB4-1-3.5’	Phenol-d5	32	35-140%
	2-Fluorophenol	32	35-140%
	Nitrobenzene-d5	37	45-135%
FS-FBL-SB4B-S-1-3.5’	Phenol-d5	34	35-140%
	2-Fluorophenol	32	35-140%
	Nitrobenzene-d5	33	45-135%
	Terphenyl-d14	41	45-135%
FS-FBL-SB5-1-3.5’	Nitrobenzene-d5	42	45-135%
FS-FBL-ST2-S-1-0’-2’	2-Fluorophenol	33	35-140%
	Nitrobenzene-d5	37	45-135%
	Terphenyl-d14	44	45-135%
FS-FBL-ST1-1-3.5’	Ntirobenzene-d5	40	45-135%
FS-FBL-G15-1-2.5’	2-Fluorophenol	33	35-140%
	Nitrobenzene-d5	40	45-135%
	2-Fluorobiphenyl	42	45-135%
	Terphenyl-d14	43	45-135%
FS-FBL-G-20-1-3.5’	2-Fluorophenol	34	35-140%
	Ntirobenzene-d5	37	45-135%

In addition, the 5x dilution of sample FS-FBL-SB5-1-3.5’ had all surrogates except 2,4,6-Tribromophenol diluted out. Due to the surrogate failures, all samples and QC were re-extracted on June 30, 2003. However, because the re-extract was performed outside of hold time, the results of the original extraction were used. The method allows for one base/neutral and one acid surrogate to fail without need for corrective action. Samples with more than one base/neutral or acid surrogate failing had surrogates that failed by only a few percent, so no corrective action was deemed necessary.

The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or the MSD, except for the following: 1,3-dichlorobenzene, 1,4-dichlorobenznee, 4-chloroaniline, hexachloro-cyclopentadiene, pentachlorophenol, aniline, benzidine, benzoic acid and pyridine. These analytes were recovered low in both the MS and MSD. The results for these

analytes were flagged "J" if detected or "UJ" if non-detect in all samples with the same matrix as the parent sample due to the low bias demonstrated by the MS/MSD.

The field duplicate pair FS-FBL-SB5-1-3.5'/FS-FBL-SB5B-1-3.5' had bis(2-Ethylhexyl)phthalate above the RL in the parent at 22000 ug/kg and below the RL in the field duplicate at 130 ug/kg. This analyte was flagged "J" as estimated in all samples due to the variability shown by the field duplicate pair.

Herbicides - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes.

Pesticides & PCBs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria, except for the following:

Sample ID	Surrogate	%R	Criteria
FS-FBL-SB8-1-0'-2'	TCMX	39	40-140%
FS-FBL-SB10-2-3'	TCMX	28	40-140%
FS-FBL-ST2-1-3.5'	TCMX	37	40-140%

In addition, the following samples were analyzed at a dilution and had both surrogates diluted out: FS-FBL-SB4B-S-1-3.5', FS-FBL-SB5-1-3.5', FS-FBL-SB5B-1-3.5'. No corrective action was necessary since the undiluted samples had the second surrogate (DCB) within tolerance. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes.

The following analytes failed in both the MS and the MSD: Endrin aldehyde (low in both) and 4,4'-DDT (high in the MS and low in the MSD). The results for these analytes were flagged "J" if detected or "UJ" if non-detect in all samples with the same matrix as the parent sample due to the low bias demonstrated by the MS/MSD.

The field duplicate pair FS-FBL-SB4-1-3.5'/FS-FBL-SB4B-S-1-3.5' had an RPD for Dieldrin that exceeded the 35% QAPP criteria at 51%. The field duplicate pair FS-FBL-SB5-1-3.5'/FS-FBL-SB5B-1-3.5' had Aroclor-1254 above the RL in the parent sample at 1800 ug/kg and below the RL in the field duplicate at 940 ug/kg. However, both results were flagged as having significantly different results on the first and second columns (RPD > 40%), so no corrective action was deemed necessary for this compound. The field duplicate pair FS-FBL-G15-1-2.5'/FS-FBL-G15B-1-2.5' had an RPD for Aroclor-1254 above criteria at 97%, and RPD for dieldrin above criteria at 144% and 4,4'-DDT non-detect in the parent, but above the RL at 130ug/kg in the field duplicate. The field duplicate pair FS-FBL-G-20-1-3.5'/FS-FBL-G20B-S-1-3.5' had Heptachlor epoxide above the RL in the parent sample at 7.8 ug/kg but non-detect in the field duplicate, and an RPD for dieldrin that exceeded criteria at 125%. All results for dieldrin were flagged "J" if detected or "UJ" if non-detect in samples starting with "FS-FBL-SB". All results for dieldrin, 4,4'-DDT, heptachlor epoxide and Aroclor-1254 were flagged "J" if detected or "UJ" if non-detect in samples starting with "FS-FBL-G".

Metals - The samples were digested and analyzed within hold time. The method blank was non-detect for all target analytes except aluminum, barium, cadmium,

chromium, sodium and zinc. Barium, chromium, sodium and zinc were all detected in the blank at a level less than one half the RL. Aluminum and cadmium were detected at a negative concentration less than one half the RL. Therefore, no corrective action was necessary. The LCS met QAPP criteria for all target metals. All metals met criteria in either the MS or the MSD.

The field duplicate pair FS-FBL-SB4-1-3.5'/FS-FBL-SB4B-S-1-3.5' had an RPD for barium that exceeded the 25% QAPP criteria at 27.5%, and an RPD for copper that exceeded criteria at 88.9%. The field duplicate pair FS-FBL-SB5-1-3.5'/FS-FBL-SB5B-1-3.5' had RPDs that exceeded criteria for the following metals: antimony (180%), barium (32%), calcium (29%), copper (45%), lead (188%), nickel (38%), and zinc (48%). The field duplicate pair FS-FBL-G15-1-2.5'/FS-FBL-G15B-1-2.5' had RPDs that exceeded criteria for the following metals: aluminum (160%), antimony (189%), barium (34%), calcium (39%), cobalt (28%), iron (56%), lead (119%), manganese (39%), silver (27%), sodium (29%), strontium (40%), and vanadium (39%). The field duplicate pair FS-FBL-G-20-1-3.5'/FS-FBL-G20B-S-1-3.5' had RPDs that exceeded criteria for the following metals: arsenic (103%), chromium (31%), and copper (27%). The non-complaint metals were flagged "J" if detected or "UJ" if non-detect in all soil samples with a matrix similar to the parent/field duplicate pair.

Cyanide - The samples were analyzed within hold time. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria. Cyanide met criteria in the MS/MSD. All field duplicate results met criteria for cyanide.

FSG005

FSG005 contained three (3) soil samples and one MS/MSD pair. The samples were collected on May 28, 2003 and were received at the lab in good condition at a temperature of 6.0^0 C. The samples were analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide. The MS/MSD was analyzed on sample FS-FBL-SB7-1-4.5'. No corrective action was considered necessary for analytes that met criteria in either the MS or the MSD.

SVOCs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or the MSD, except for the following: 1,3-dichlorobenzene, 1,4-dichlorobenznee, 2,4-dinitrophenol, hexachloroethane, hexachlorocyclopentadiene, aniline, benzidine, benzoic acid and pyridine. These analytes were recovered low in both the MS and MSD. The results for these analytes were flagged "J" if detected or "UJ" if non-detect in all samples with the same matrix as the parent sample due to the low bias demonstrated by the MS/MSD. All samples and QC were re-extracted outside of hold time, but the original analysis was used.

Herbicides - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or MSD.

Pesticides & PCBs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria in the samples. The surrogate TCMX was recovered 1% low in the LCS at 39%. No corrective action was deemed necessary. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes, except Aroclor-1016 which was recovered 8% low at 42%. All samples results for this compound were flagged "J" if detected or "UJ" if non-detect due to the low bias demonstrated by the LCS.

Metals - The samples were digested and analyzed within hold time. The method blank was non-detect for all target analytes except sodium which was detected slightly above one half the RL. All samples had sodium well above ten times the blank amount, so no corrective action was necessary. The LCS met QAPP criteria for all target metals. The MS/MSD was considered not applicable for the following metals because the parent sample concentration was greater than five times the spike amount: aluminum, calcium, iron, magnesium and manganese. All other metals met criteria in the MS and/or MSD except for the following: antimony (low in both) and vanadium (high in both). Antimony and vanadium were flagged "J" in all samples of the same matrix as the parent sample.

Cyanide - The samples were analyzed within hold time. Cyanide was not detected in the EB. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria. Cyanide met criteria in the MS and MSD.

FSG006

FSG006 contained four (4) soil samples and one MS/MSD pair. The samples were collected on May 28 & 29, 2003 and June 4, 2003, and were received at the lab in good condition at a temperature of 4.2^0 C. The samples were analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide. Sample FS-TA4-SB4-1-2.5' was also analyzed for explosives. The MS/MSD was analyzed on sample FS-TA5-TP2-1-6'. No corrective action was deemed necessary for analytes that met criteria in either the MS or MSD.

SVOCs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in either the MS or MSD except for the following: aniline, benzidine and pyridine. All three analytes were recovered low in both the MS and MSD. These analytes were flagged "J" if detected or "UJ" if non-detect in all samples with the same matrix as the parent due to the low bias demonstrated by the MS/MSD.

Herbicides - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria, except for the surrogate DCAA in the 10x dilution of sample FS-TA5-TP2-1-6'. No corrective action was necessary because the surrogate failure had an assignable cause (dilution). The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or MSD.

Pesticides & PCBs - The samples were extracted and analyzed within hold time. Two analytes were detected in the EB (alpha-BHC and gamma-BHC) but both were

detected at a level less than one half the RL. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes, except alpha-BHC which was detected at less than one half the RL. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or MSD.

Metals - The samples were digested and analyzed within hold time. The method blank was non-detect for all target analytes except chromium, sodium and zinc. Chromium and zinc were both detected at a concentration less than one half the RL, so no corrective action was necessary. Sodium was detected in all samples at a level greater than ten times the blank concentration, so no corrective action was necessary. Both an LCS and an LCS duplicate (LCSD) were analyzed for metals. All metals met QAPP criteria in both the LCS and LCSD. The MS/MSD was considered not applicable for the following metals because the parent concentration was greater than five times the spike amount: aluminum, calcium, iron, magnesium, manganese and sodium. All other metals met criteria in the MS and/or MSD, except for the following: antimony (low in both), chromium (high in the MS and low in the MSD), lead (low in both) and strontium (high in both). Antimony, chromium and lead were flagged "J" if detected and "UJ" if non-detect in all samples with the same matrix as the parent sample due to the low bias demonstrated by the MS/MSD. Strontium was flagged "J" if detected in samples with the same matrix as the parent sample due to the high bias demonstrated by the MS/MSD. The case narrative indicated that two dilution tests were analyzed in association with this data package. The dilution test analyzed on sample FS-TA5-TP2-1-6' failed for nickel and zinc. The dilution test analyzed on sample FS-FBL-SBK-2-0'-2' failed for cobalt and sodium. These metals were flagged "J" if detected or "UJ" if non-detect in all samples with a matrix similar to the parent sample.

Cyanide - The samples were analyzed within hold time. Cyanide was not detected in the EB. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria.

Explosives - The samples were extracted and analyzed within hold time. All surrogate recoveries met QAPP criteria. All target explosives were non-detect in the method blank. The LCS recoveries met QAPP criteria for all target analytes. No MS/MSD was analyzed for explosives.

FSG007

FSG007 contained only one equipment blank (FS-TA5-EB-S1). This equipment blank (EB) was collected by running HPLC-grade water over sampling equipment after the decontamination procedure was performed. The EB was collected on June 10, 2003 and was received at the lab in good condition at a temperature of 5.2^0 C. The EB was analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide.

SVOCs - The EB was extracted and analyzed within hold time. All analytes were non-detect in the EB, except for di-n-butyl phthalate which was detected at a level less than one half the RL, so no corrective action was necessary. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes except for benzidine (0%), and pyridine (0%). The sample,

method blank and LCS were re-extracted on June 30 2003, outside of hold time. The LCS met criteria for benzidine and pyridine in the re-extracted LCS. All results for the EB were non-detect on the re-extraction, which confirmed the original results. Because the re-extract was performed outside of hold time, the original results were used. Benzidine and pyridine were flagged "UJ" due to the possible low bias for these analytes.

Herbicides - The EB was extracted and analyzed within hold time. No analytes were detected in the EB. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes.

Pesticides & PCBs - The EB was extracted and analyzed within hold time. No analytes were detected in the EB. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes.

Metals - The EB was digested and analyzed within hold time. The following analytes were detected in the EB: calcium (0.078mg/L), manganese (0.012 mg/L), and zinc (0.0015 mg/L). Calcium and zinc were detected at a level less than one half the RL, so no corrective action was necessary. Manganese was detected above the RL of 0.010mg/L but all soil samples contained manganese at levels significantly greater than (>10 times) the amount found in the EB, so no corrective action was necessary. The method blank was non-detect for all target analytes except for the following: aluminum, calcium, iron and lead. Aluminum was detected at a negative concentration less that one half the RL and calcium and iron were detected at less than one half the RL, so no corrective action was necessary for these metals. Lead was detected just below the RL of 0.005 mg/L but was not detected in the EB, so no corrective action was necessary. The LCS met QAPP criteria for all target metals.

Cyanide - The EB was analyzed within hold time. Cyanide was not detected in the EB. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria.

FSG008

FSG008 contained four (4) soil samples. The samples were collected on June 2 & 3, 2003 and were received at the lab in good condition at a temperature of 5.3^0 C. The samples were analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide. All four samples were also analyzed for explosives. It should be noted that three samples listed on the COC were not reported. These samples were: FS-TA4-SB2B-S1-0'-2', FS-TA4-SBK-2-3', and FS-TA4-SB4-1-2.5'. Sample FS-TA4-SB4-1-2.5' was reported in package FSG006. In addition, the case narratives indicate that an MS/MSD was analyzed on sample FS-TA4-SB3-S1-0-2'. However, no MS/MSD results were provided in the data package.

SVOCs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes.

Herbicides - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes.

Pesticides & PCBs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria with the exception of the following: sample FS-TA4-SB3-S1-0-2' had TCMX three percent low at 37%, and the LCS had TCMX 5% low at 35%. The second surrogate met criteria in both analyses, so no corrective action was deemed necessary. The method blank was non-detect for all target analytes. The LCS met QAPP criteria of 50-150% for all target analytes, except for the following: alpha-BHC (39%), gamma-BHC (42%), heptachlor (42%), aldrin (42%) and Endosulfan I (12%). These analytes were flagged "UJ" in all samples due to the low bias demonstrated by the LCS.

Metals - The samples were digested and analyzed within hold time. The method blank was non-detect for all target metals except for the following: aluminum, barium, cadmium, chromium and zinc. Aluminum was detected at a negative concentration less than one half the RL and barium, chromium and zinc were detected at a concentration less than one half the RL, so no corrective action was necessary for these metals. Cadmium was detected at a negative concentration greater than the RL of 0.5 mg/kg. All samples had detections of cadmium just above the RL. The cadmium results were flagged "J" due to the low bias demonstrated by the method blank. The LCS met QAPP criteria for all target metals. Per the case narrative, the dilution test was analyzed on sample FS-TA4-SB3-S1-0-2' failed for zinc. The zinc results in all samples with a matrix similar to the parent sample were flagged "J" as estimated.

Cyanide - The samples were analyzed within hold time. Cyanide was not detected in the EB. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria.

Explosives - The samples were extracted and analyzed within hold time. All surrogate recoveries met QAPP criteria. The method blank was non-detect for all target explosives. The LCS met QAPP criteria for all target analytes.

FSG009

FSG009 contained ten (10) soil samples (including nine normal samples and one field duplicate) and one MS/MSD pair. The samples were collected on June 4 & 5, 2003 and were received at the lab in good condition. The samples in this data package were received with the samples from package FSG010 in four coolers. The coolers were received at temperatures of 3.6, 2.4, 2.9 and 3.0^0 C. The samples were analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide. All samples in this data package were also analyzed for explosives. The MS/MSD was analyzed on sample FS-TA5-SB5-1-3'. No corrective action was deemed necessary for analytes that met criteria in either the MS or MSD. The following field duplicate pair was included in this data package:

Parent Sample	Field Duplicate

FS-TA4-SB2-1-2.5’	FS-TA4-SB2B-1-2.5’

Only analytes detected above the RL were assessed for precision in the field duplicate.

SVOCs - The samples collected June 5, 2003 were extracted and analyzed within hold time. The samples collected June 4, 2003 were extracted one day outside of hold time and the results for these samples were flagged “J” if detected or “UJ” if non-detect due to the hold time exceedance. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or MSD except for the following: hexachlorocyclopentadiene, aniline, benzidine and pyridine. All non-compliant analytes were recovered low in both the MS and MSD. These analytes were flagged “J” if detected or “UJ” if non-detect in all samples with a matrix similar to the parent sample due to the low bias demonstrated by the MS/MSD. All analytes met criteria in the field duplicate pair.

Herbicides - The samples collected June 5, 2003 were extracted and analyzed within hold time. The samples collected June 4, 2003 were extracted one day outside of hold time and the results for these samples were flagged “J” if detected or “UJ” if non-detect due to the hold time exceedance. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or MSD. All analytes met criteria in the field duplicate pair.

Pesticides & PCBs - The samples collected June 5, 2003 were extracted and analyzed within hold time. The samples collected June 4, 2003 were extracted one day outside of hold time and the results for these samples were flagged “J” if detected or “UJ” if non-detect due to the hold time exceedance. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or MSD. All analytes met criteria in the field duplicate pair.

Metals - The samples were digested and analyzed within hold time. The method blank was non-detect for all target analytes except barium, cadmium, chromium, iron, sodium and zinc. Cadmium was detected at a negative concentration less than one half the RL and barium, chromium, iron and zinc were detected at a concentration less than one half the RL, so no corrective action was necessary for these metals. Sodium was detected below the RL of 51 mg/kg at 40 mg/kg. All associated samples had sodium concentrations greater than ten times the amount found in the blank, so no corrective action was necessary. The LCS met QAPP criteria for all target metals. The MS/MSD was considered not applicable for the following metals because the parent concentration was greater than five times the spike amount: aluminum, calcium, iron, magnesium and strontium. All other metals met criteria in the MS and/or MSD, except for chromium and manganese, which were recovered low in both the MS and MSD. These metals were flagged “J” if detected and “UJ” if non-detect in all samples with the same matrix as the parent sample due to the low bias demonstrated by the MS/MSD. All analytes met criteria in the field duplicate pair, except for the following: arsenic, manganese and

potassium. These metals were flagged "J" if detected or "UJ" if non-detect in all samples with a matrix similar to the parent sample.

Cyanide - The samples were analyzed within hold time. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria. The MS/MSD met criteria for cyanide. Cyanide met criteria in the field duplicate pair.

Explosives - The samples collected June 5, 2003 were extracted and analyzed within hold time. The samples collected June 4, 2003 were extracted one day outside of hold time and the results for these samples were flagged "J" if detected or "UJ" if non-detect due to the hold time exceedance. All surrogates met QAPP criteria. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria. All explosives met criteria in the MS and/or MSD. All analytes met criteria in the field duplicate pair.

FSG010

FSG010 contained nine (9) soil samples (including seven normal samples and two field duplicates) and one equipment blank. The samples were collected on June 10 & 16, 2003 and were received at the lab in good condition. The samples in this data package were received with the samples from package FSG009 in four coolers. The coolers were received at temperatures of 3.6, 2.4, 2.9 and 3.0^0 C. The samples were analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide. The equipment blank was also analyzed for explosives. The following field duplicate pairs were included in this data package:

Parent Sample	Field Duplicate
FS-TA5-GS3-S1-0'-2'	FS-TA5-GS3B-S1-0'-2'
FS-TA5-GS3-1'-2'	FS-TA5-GS3B-1'-2'

Only analytes detected above the RL were assessed for precision in the field duplicates.

SVOCs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria, except for the following: sample FS-TA5-GS3B-1-2' had Nitrobenzene-d5 3% low at 42% and 2-Fluorobiphenyl 1% low at 44%, and the soil method blank had Nitrobenzene-d5 1% low at 44%. All soil samples and QC were re-extracted on July 21, 2003. However, because the re-extraction was performed out of hold time, the original results were used. Since the surrogates were only slightly below tolerance, no corrective action was deemed necessary. The soil method blank was non-detect for all target analytes except for bis(2-Ethylhexyl)phthalate which was detected at a concentration less than one half the RL, so no corrective action was necessary. The water method blank was non-detect for all target analytes. The soil LCS met QAPP criteria for all target analytes. The water LCS met QAPP criteria for all target analytes except for aniline (2%), benzidine (0%), and pyridine (0%). The EB, water method blank and water LCS were re-extracted on July 10, 2003. All analytes met criteria in the re-extracted LCS and the results for the EB were confirmed in the re-extraction. Because the re-extract was performed outside of the hold time, the original results were used. Aniline, benzidine and pyridine were not detected in the EB and were flagged "UJ" due

to the low bias demonstrated by the LCS. Only 4-chloro-3-methylphenol and di-n-butylphthalate were detected in the EB and both were at a concentration less than one half the RL, so no corrective action was necessary. All analytes met criteria in both field duplicate pair.

Herbicides - The samples were extracted and analyzed within hold time. No analytes were detected in the EB. All surrogate recoveries met criteria. The soil and water method blanks were non-detect for all target analytes. The soil and water LCS recoveries met QAPP criteria for all target analytes. All analytes met criteria in the field duplicate pairs, except for MCPP. MCPP was significantly different in the parent and FD for both pair, so the results for this analyte were flagged "J" if detected or "UJ" if non-detect in all samples with the same matrix as the parent samples.

Pesticides & PCBs - The samples were extracted and analyzed within hold time. No analytes were detected in the EB. All surrogate recoveries met criteria. The soil and water method blanks were non-detect for all target analytes. The soil and water LCS recoveries met QAPP criteria for all target analytes. All analytes met criteria in both field duplicate pair.

Metals - The samples were digested and analyzed within hold time. The following analytes were detected in the EB: calcium (0.083 mg/L), chromium (0.0015 mg/L), iron (0.053 mg/L), manganese (0.0039 mg/L) and strontium (0.0012 mg/L). Calcium, chromium, manganese and strontium were detected at a level less than one half the RL, so no corrective action was necessary for these metals. Iron was detected slightly above the RL of 0.05 mg/L and was detected around the same level in the water method blank. However, all soil samples contained very high concentrations of iron, so no corrective action was deemed necessary. The soil method blank was non-detect for all target analytes except barium, chromium, iron, sodium and zinc. Barium, chromium and zinc were detected at a concentration less than one half the RL, so no corrective action was necessary. Iron and sodium were detected in all samples at a concentration greater than ten times the amount found in the blank, so no corrective action was necessary. The water method blank was non-detect for all target analytes except iron and manganese. Manganese was detected at a concentration less than one half the RL, so no corrective action was necessary. Iron was detected in the EB at a similar level, but all soil samples contained very high concentrations of iron, so no corrective action was necessary. The soil and water LCS recoveries met QAPP criteria for all target metals. All metals met criteria in the field duplicate pair FS-TA5-GS3-S1-0'-2'/ FS-TA5-GS3B-S1-0'-2' except for barium, calcium and strontium. All metals met criteria in the field duplicate pair FS-TA5-GS3-1-2'/ FS-TA5-GS3B-1-2' except for arsenic, barium, calcium, copper, lead and strontium. The results for these metals were flagged "J" if detected or "UJ" if non-detect in all samples with the same matrix as the parent sample.

Cyanide - The samples were analyzed within hold time. Cyanide was not detected in the EB. The soil and water method blanks were non-detect for cyanide. The soil and water LCS recoveries for cyanide met QAPP criteria. Cyanide met criteria in both field duplicate pair.

Explosives - Only the EB was analyzed for explosives. The EB was extracted and analyzed within hold time. No explosives were detected in the EB. All surrogate

recoveries met QAPP criteria. The water method blank was non-detect for all target analytes. The water LCS met QAPP criteria for all target analytes.

FSG011

FSG011 contained six (6) soil samples and one MS/MSD pair. The samples were collected on June 9 & 11, 2003 and were received at the lab in good condition at a temperature of 2.6^0 C. The samples were analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide. The MS/MSD was analyzed on sample FS-TA5-GS5-1-4'. No corrective action was considered necessary for analytes that met criteria in either the MS or the MSD.

SVOCs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in either the MS or MSD except for pyridine and benzidine which were both recovered low in the MS and MSD. These analytes were flagged "J" if detected or "UJ" if non-detect in all samples with a similar matrix to the parent sample.

Herbicides - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or MSD except 2,4-D, which was recovered high in both the MS and MSD. All samples were non-detect for this analyte, so no corrective action was necessary.

Pesticides & PCBs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or MSD except Dieldrin, which was recovered low in both the MS and MSD. The dieldrin results were flagged "J" if detected or "UJ" if non-detect in all samples with a similar matrix to the parent sample.

Metals - The samples were digested and analyzed within hold time. The method blank was non-detect for all target analytes except sodium. Sodium was present in all samples at a level greater than ten times the amount found in the blank, so no corrective action was necessary. The LCS met QAPP criteria for all target metals. All metals met criteria in the MS and/or MSD except antimony, which was recovered low in both the MS and MSD. The antimony results were flagged "J" if detected or "UJ" if non-detect in all samples with a similar matrix to the parent sample.

Cyanide - The samples were analyzed within hold time. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria. No MS/MSD was analyzed for cyanide.

FSG012

FSG012 contained nine (9) soil samples (including eight normal samples and one field duplicate) and one MS/MSD pair. The samples were collected on June 17, 2003 and were received at the lab in good condition at a temperature of 3.8^0 C. The samples were analyzed for SVOCs, herbicides, pesticides, PCBs, metals and cyanide. The MS/MSD was analyzed on sample FS-TA8-SB4-1-0'-2'. No corrective action was considered necessary for analytes that met criteria in either the MS or the MSD. . The following field duplicate pair was included in this data package:

Parent Sample	Field Duplicate
FS-TA8-SB2-1-0'-2'	FS-TA8-SB2B-1-0'-2'

Only analytes detected above the RL were assessed for precision in the field duplicates.

SVOCs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria, except for the following:

Sample ID	Surrogate	%R	Criteria
FS-TA8-SB3-1-0'-2'	Nitrobenzene-d5	38	45-135%
FS-TA8-SB2-1-0'-2'	Phenol-d5	34	35-140%
	2-Fluorophenol	34	35-140%
	Nitrobenzene-d5	30	45-135%
	2-Fluorobiphenyl	38	45-135%
	Terphenyl-d14	44	45-135%
FS-TA8-SB1-1-0'-2'	Nitrobenzene-d5	38	45-135%
FS-TA8-SB5-1-0'-2'	Phenol-d5	32	35-140%
	2-Fluorophenol	29	45-135%
	Nitrobenzene-d5	25	45-135%
	2-Fluorobiphenyl	36	
FS-TA8-SB4-1-0'-2'	Ntirobenzene-d5	37	45-135%
FS-TA8-SB7-1-0'-2'	Nitrobenzene-d5	37	45-135%
FS-TA8-SBK-2-0'-2'	Ntirobenzene-d5	38	45-135%

In addition, the MSD of sample FS-TA8-SB4-1-0'-2' had Nitrobenzene-d5 2% low at 43%. Due to the surrogate failures, all samples and QC were re-extracted on July 24, 2003. However, because the re-extract was performed outside of hold time, the results of the original extraction were used. The method allows for one base/neutral and one acid surrogate to fail without need for corrective action. Samples with more than one base/neutral or acid surrogate failing had surrogates that failed by only a few percent, and the results of the re-extract confirmed the original results, so no corrective action was deemed necessary.

The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in either the MS or MSD except for the following: 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, hexachloroethane, 4-chloroaniline, 2,4,6-trichlorophenol, aniline, benzidine, benzoic acid and pyridine. All non-compliant analytes were recovered low in the MS and MSD.

These analytes were flagged "J" if detected or "UJ" if non-detect in all samples with a similar matrix to the parent sample. All analytes met criteria in the field duplicate pair.

Herbicides - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. All analytes met criteria in the MS and/or MSD except Dinoseb, which was recovered high in both the MS and MSD. All samples were non-detect for this analyte, so no corrective action was necessary. All analytes met criteria in the field duplicate pair except 2,4-DB. This analyte was flagged "J" if detected or "UJ" if non-detect in all samples with a matrix similar to the parent sample.

Pesticides & PCBs - The samples were extracted and analyzed within hold time. All surrogate recoveries met criteria, except for samples run at a significant dilution. The surrogates were diluted out (0% recovery) for the following samples: FS-TA8-SB5-1-0'-2' (40x), FS-TA8-SB7-1-0'-2' (20x) and FS-TA8-SBK-2-0'-2' (25x). No corrective action was necessary because the failing surrogate recoveries were due to the dilution run. The method blank was non-detect for all target analytes. The LCS met QAPP criteria for all target analytes. The MS/MSD was deemed not applicable for dieldrin because the parent sample concentration was greater than five times the spike amount. All other target analytes met criteria in the MS and/or MSD. All analytes met criteria in the field duplicate pair except dieldrin (RPD = 50%). This analyte was flagged "J" if detected or "UJ" if non-detect in all samples with a matrix similar to the parent sample.

Metals - The samples were digested and analyzed within hold time. The method blank was non-detect for all target analytes except aluminum, barium, chromium iron, sodium and zinc. Aluminum was detected at a negative concentration less than one half the RL and barium, chromium and zinc were detected at a concentration less than one half the RL, so no corrective action was necessary for these metals. Iron was present in all samples at a level greater than ten times the amount found in the blank, so no corrective action was necessary. Sodium was flagged "J" in all samples with a result less than 10x the blank concentration (350 mg/kg) due to the possible contamination and high bias present for this metal. No corrective action was necessary for samples with a sodium concentration above 350 mg/kg. The LCS met QAPP criteria for all target metals. All metals met criteria in the MS and/or MSD except antimony, which was recovered low in both the MS and MSD. The antimony results were flagged "J" if detected or "UJ" if non-detect in all samples with a similar matrix to the parent sample. All analytes met criteria in the field duplicate pair except cobalt. This analyte was flagged "J" if detected or "UJ" if non-detect in all samples with a matrix similar to the parent sample

Cyanide - The samples were analyzed within hold time. The method blank was non-detect for cyanide. The LCS recovery for cyanide met QAPP criteria. Cyanide met criteria in the MS/MSD. Cyanide met criteria in the field duplicate pair.

FSG013

The following data validation report covers soil samples and the associated field QC samples collected from the former Fort Segarra during the period of June 11, 2003

through June 17, 2003. The samples in the following SDG were analyzed for SVOCs, herbicides, pesticides, PCBs, metals, cyanide and explosives:

FSG013

The field QC samples collected in association with this SDG included two MS/MSD pairs and one field duplicate. In addition, three equipment blanks were collected in association with the samples in this SDG. The equipment blanks were reported in SDGs FSG001, FSG007 and FSG010. All field QC samples were analyzed for SVOCs, herbicides, pesticides, PCBs, cyanide and metals. The equipment blanks were also analyzed for explosives.

All samples were collected by Parsons. The explosives analyses were performed by STL-Tallahassee and all other analyses were performed by STL-Savannah following the procedures outlined in the Ft. Segarra Field Sampling Plan (FSP), the Ft. Segarra Quality Assurance Project Plan (QAPP), and all other documents specified therein.

There were four (4) coolers associated with the samples in this SDG. The coolers were received by the laboratory at temperatures of 3.1^0 C, 3.8^0 C, 1.3^0 C and 3.4^0 C, all of which are within the recommended range.

It should be noted that all samples in this SDG were received by the laboratory outside of the 14-day hold time for organic analyses. Thus, the extraction and analysis for all organic methods were performed outside of the holding time designated by the method. The results for samples extracted within two times the method-required hold time were flagged "J" or "UJ" as estimated. The results for samples extracted after more than twice the method-required hold time were flagged "R" as rejected. See individual methods below for details.

SEMIVOLATILES

General

The semivolatiles portion of this SDG consisted of twenty-six (26) samples, including twenty-one (21) soil samples, two MS/MSD pair, and one field duplicate. The samples were collected during the period of June 11, 2003 through June 17, 2003 and were analyzed for the full list of SVOCs as specified in the Ft. Segarra QAPP.

The SVOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8270C.

All samples were extracted outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. Thus, all sample results were flagged "J" if detected or "UJ" if non-detect due to the possible low bias that resulted from the expired hold time. The maximum extraction hold time was 28 days, so rejection of the data was deemed unnecessary.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample, MS/MSD samples and the surrogate spikes. Samples FS-TA4-TP-2-1-4' and FS-TA5-TP-1-1-5.5' were designated for MS/MSD analysis on the COC.

All LCS and surrogate recoveries were within acceptance criteria.

A total of six surrogates are spiked for method 8270C, three acid surrogates and three base/neutral surrogates. The method allows for one acid surrogate and one base/neutral surrogate to fail without the need for corrective action. All samples met this requirement.

All MS/MSD were within acceptance criteria except for the following:

Parent	Analyte	MS %R	MSD %R	Criteria
FS-TA4-TP-2-1-4'	1,3-Dichlorobenzene	42	42	45-135%
	Hexachloroethane	35	42	45-135%
	Hexachlorocyclopentadiene	18	15	45-135%
	2,4-Dinitrophenol	35	40	45-135%
	4,6-Dinitro-2-methylphenol	40	44	45-135%
	Pentachlorophenol	28	32	45-135%
	Benzidine	19	20	45-135%
	Benzoic Acid	13	17	45-135%
	Pyridine	28	35	45-135%
FS-TA5-TP-1-1-5.5'	1,3-Dichlorobenzene	(48)	40	45-135%
	Hexachloroethane	(45)	40	45-135%
	Hexachlorocyclopentadiene	38	35	45-135%
	2,4-Dinitrophenol	42	30	45-135%
	4,6-Dinitro-2-methylphenol	(50)	42	45-135%
	Pentachlorophenol	0	0	45-135%
	Benzidine	35	30	45-135%
	Benzoic Acid	28	30	45-135%
	Pyridine	35	30	45-135%

( ) Indicates the recovery met criteria

All analytes were flagged as estimated due to the hold time exceedance, so no additional corrective action was necessary.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD samples and the field duplicate analyte results. Sample FS-TA5-SBK-1B-2' was collected as the field duplicate of sample FS-TA5-SBK-1-2'.

All MS/MSD and field duplicate RPDs were within acceptance criteria.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;

- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were extracted outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. Thus, all sample results were flagged "J" if detected or "UJ" if non-detect due to the possible low bias that resulted from the expired hold time. The maximum extraction hold time was 21 days, so rejection of the data was deemed unnecessary.

- All instrument tune criteria were met.
- All initial calibration criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.
- All calibration verification criteria were met, except for the following:

  Benzidine failed low in the CCVs analyzed on 7/24/03, 7/25/03 and 7/28/03. In addition, Indeno(1,2,3-cd)pyrene failed low in the CCV analyzed 7/21/03. All analytes were flagged as estimated due to the hold time exceedance, so no additional corrective action was necessary.

- Several internal standards failed low for the following samples FS-TA4-TP-2-1-4' and FS-TA4-TP12-1/QA-3'. A low internal standard response results in a high bias. All analytes were flagged as estimated due to the hold time exceedance, so no additional corrective action was necessary. The internal standards also failed in the Matrix Spike Duplicate analyzed on sample FS-TA4-TP-2-1-4' and the Matrix Spike analyzed on sample FS-TA5-TP-1-1-5.5'. The MS/MSD recoveries are detailed in the Accuracy section above.
- All MDL studies were performed within 12 months prior to the date samples were analyzed.

There were three method blanks associated with the SVOC analyses in this SDG. All blanks were free of any target SVOCs at or above 1/2 the RL.

Three equipment blanks were collected in association with the samples in this SDG. The equipment blanks were reported in SDGs FSG001, FSG007 and FSG010. No target analytes were detected above the RL in the equipment blanks.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All SVOC results for the samples in this SDG were considered usable. The completeness for the SVOC portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

HERBICIDES

General

The herbicide portion of this SDG consisted of twenty-six (26) samples, including twenty-one (21) soil samples, two MS/MSD pair, and one field duplicate. The samples were collected during the period of June 11, 2003 through June 17, 2003 and were analyzed for the full list of herbicides as specified in the Ft. Segarra QAPP.

The herbicide analyses were performed using USEPA SW846 Method 8151. All positive detections for target analytes were confirmed on a secondary column. The laboratory reported the higher of the two results unless the primary and secondary column results differed by more than 40% RPD. If the results from the primary and secondary column had an RPD of greater than 40, the laboratory reported the lower result and the value was qualified "J" as estimated.

All samples were extracted outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. The results for all samples extracted within 28 days (two times the method-required hold time) were flagged "J" if detected or "UJ" if non-detect due to the possible low bias that resulted from the expired hold time. The results for the following samples were flagged "R" as rejected because they were extracted 29 days after collection, which is greater than two times the method required hold time: FS-TA5-195-1-1', FS-TA5-204-1-6", and FS-TA5-SBK-2-2'.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample, MS/MSD samples and the surrogate spikes. Samples FS-TA4-TP-2-1-4' and FS-TA5-TP-1-1-5.5' and were designated for MS/MSD analysis on the COC.

All LCS, MS/MSD and surrogate recoveries were within acceptance criteria, except for the following: Dinoseb failed high in the LCS and MSD. All samples were non-detect for dinoseb, therefore no corrective action was necessary.

Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the MS/MSD samples and the field duplicate analyte results. Sample FS-TA5-SBK-1B-2' was collected as the field duplicate of sample FS-TA5-SBK-1-2'.

All MS/MSD and field duplicate RPDs were within acceptance criteria.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and

- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were prepared and analyzed outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired.

- All initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.
- All MDL studies were performed within 12 months prior to the date samples were analyzed.

There were two method blanks associated with the herbicides analyses in this SDG. Both blanks were free of any target herbicides at or above 1/2 the RL.

Three equipment blanks were collected in association with the samples in this SDG. The equipment blanks were reported in SDGs FSG001, FSG007 and FSG010. No target analytes were detected above the RL in the equipment blanks.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All herbicide results for the samples in this SDG were considered usable, except for the three samples extracted grossly outside of the method required hold time. There were 286 analytical results for herbicides (26 samples with 11 analytes reported for each). Thirty three (33) results were rejected, so the completeness for the herbicide portion of this SDG is 88.5%, which is below the minimum acceptance criteria of 95%. However, the completeness for the entire data set (all 13 data packages) is 97.4%, which meets criteria.

PESTICIDES

General

The pesticide portion of this SDG consisted of twenty-six (26) samples, including twenty-one (21) soil samples, two MS/MSD pair, and one field duplicate. The samples were collected during the period of June 11, 2003 through June 17, 2003 and were analyzed for the full list of pesticides as specified in the Ft. Segarra QAPP.

The pesticide analyses were performed using USEPA SW846 Method 8081A. All positive detections for target analytes were confirmed on a secondary column. The laboratory reported the higher of the two results unless the primary and secondary column results differed by more than 40% RPD. If the results from the primary and

secondary column had an RPD of greater than 40, the laboratory reported the lower result and the value was qualified "J" as estimated.

All samples were extracted outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. Thus, all sample results were flagged "J" if detected or "UJ" if non-detect due to the possible low bias that resulted from the expired hold time. The maximum extraction hold time was 28 days, so rejection of the data was deemed unnecessary.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample, MS/MSD samples and the surrogate spikes. Samples FS-TA4-TP-2-1-4' and FS-TA5-TP-1-1-5.5' and were designated for MS/MSD analysis on the COC.

All LCS recoveries were within acceptance criteria.

All surrogate recoveries were within acceptance criteria, except for the following:

Sample ID	Surrogate	%R	Criteria
FS-TA4-TP-2-1-4'	TCMX	28	40-140%
FS-TA4-TP-2-1-4'(MS)	TCMX	35	40-140%
FS-TA4-TP-2-1-4'(MSD)	TCMX	37	40-140%
FS-TA5-204-1-6"	TCMX	33	40-140%
FS-TA5-TP-1-1-5.5'	TCMX	18	40-140%
FS-TA5-TP-1-1-5.5' (MS)	TCMX	23	40-140%
FS-TA5-TP-1-1-5.5' (MSD)	TCMX	19	40-140%
FS-TA5-TP-3-1-6.5'	TCMX	20	40-140%

In addition, surrogates were diluted out (0% recovery) in those samples which required a significant dilution. All sample results were flagged as estimated due to the hold time exceedance, so no additional corrective action was necessary.

Many compounds failed criteria in the MS/MSD samples. The MS/MSDs were re-extracted and all analytes met criteria in the re-extracted results. However, because the re-extraction was performed grossly outside of hold time, the original analysis was used. For the MS/MSD analyzed on sample FS-TA5-TP-1-1-5.5, the following analytes failed (recoveries below tolerance) in both the MS and the MSD: alpha-BHC, gamma-BHC, heptachlor, aldrin, and dieldrin. For the MS/MSD analyzed on sample FS-TA4-TP2-1-4', the following analytes failed (recoveries below tolerance) in both the MS and the MSD: alpha-BHC, gamma-BHC, aldrin, heptachlor epoxide and Endosulfan I. All sample results were flagged as estimated due to the hold time exceedance, so no additional corrective action was necessary due to the failing MS/MSD recoveries.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD samples and the field duplicate analyte results. Sample FS-TA5-SBK-1B-2' was collected as the field duplicate of sample FS-TA5-SBK-1-2'.

All MS/MSD and field duplicate RPDs were within acceptance criteria.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were prepared and analyzed outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired.

- All initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.
- All MDL studies were performed within 12 months prior to the date samples were analyzed.

There were three method blanks associated with the pesticide analyses in this SDG. All blanks were free of any target pesticides at or above 1/2 the RL.

Three equipment blanks were collected in association with the samples in this SDG. The equipment blanks were reported in SDGs FSG001, FSG007 and FSG010. No target analytes were detected above the RL in the equipment blanks.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All pesticide results for the samples in this SDG were considered usable. The completeness for the pesticide portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

PCB

General

The PCB portion of this SDG consisted of twenty-six (26) samples, including twenty-one (21) soil samples, two MS/MSD pair, and one field duplicate. The samples

were collected during the period of June 11, 2003 through June 17, 2003 and were analyzed for the full list of PCBs as specified in the Ft. Segarra QAPP.

The PCB analyses were performed using USEPA SW846 Method 8082. All positive detections for target analytes were confirmed on a secondary column. The laboratory reported the higher of the two results unless the primary and secondary column results differed by more than 40% RPD. If the results from the primary and secondary column had an RPD of greater than 40, the laboratory reported the lower result and the value was qualified "J" as estimated.

All samples were extracted outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. Thus, all sample results were flagged "J" if detected or "UJ" if non-detect due to the possible low bias that resulted from the expired hold time. The maximum extraction hold time was 28 days, so rejection of the data was deemed unnecessary.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample, MS/MSD samples and the surrogate spikes. Samples FS-TA4-TP-2-1-4' and FS-TA5-TP-1-1-5.5' and were designated for MS/MSD analysis on the COC. Only Aroclor-1016 and Aroclor-1260 were spiked for the LCS and MS/MSD as per the method.

All LCS and MS/MSD recoveries were within acceptance criteria.

All surrogate recoveries were within acceptance criteria, except for the following:

Sample ID	Surrogate	%R	Criteria
FS-TA4-TP-2-1-4'	TCMX	28	40-140%
FS-TA4-TP-2-1-4'(MS)	TCMX	35	40-140%
FS-TA4-TP-2-1-4'(MSD)	TCMX	37	40-140%
FS-TA5-204-1-6"	TCMX	33	40-140%
FS-TA5-TP-1-1-5.5'	TCMX	18	40-140%
FS-TA5-TP-1-1-5.5' (MS)	TCMX	23	40-140%
FS-TA5-TP-1-1-5.5' (MSD)	TCMX	19	40-140%
FS-TA5-TP-3-1-6.5'	TCMX	20	40-140%

In addition, surrogates were diluted out (0% recovery) in those samples which required a significant dilution. All sample results were flagged as estimated due to the hold time exceedance, so no additional corrective action was necessary.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD samples and the field duplicate analyte results. Sample FS-TA5-SBK-1B-2' was collected as the field duplicate of sample FS-TA5-SBK-1-2'.

All MS/MSD and field duplicate RPDs were within acceptance criteria.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were prepared and analyzed outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired.

- All initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.
- All MDL studies were performed within 12 months prior to the date samples were analyzed.

There were three method blanks associated with the PCBs analyses in this SDG. All blanks were free of any target PCBs at or above 1/2 the RL.

Three equipment blanks were collected in association with the samples in this SDG. The equipment blanks were reported in SDGs FSG001, FSG007 and FSG010. No target analytes were detected above the RL in the equipment blanks.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All PCB results for the samples in this SDG were considered usable. The completeness for the PCB portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

ICP METALS

General

The metals portion of this SDG consisted of twenty-six (26) samples, including twenty-one (21) soil samples, two MS/MSD pair, and one field duplicate. The samples were collected during the period of June 11, 2003 through June 17, 2003 and were analyzed for the full list of ICP metals as specified in the Ft. Segarra QAPP.

The ICP metals analyses were performed using USEPA SW846 Method 6010B.

It should be noted that the reporting limits for arsenic, lead, selenium and thallium were raised above the levels listed in the QAPP. The higher RLs were necessary to meet the Ft. Segarra QAPP requirement that the RL be at least three times the MDL concentration. In addition, the metals analyses for the samples in this SDG were performed at multiple dilutions to ensure all concentrations were within the working linear range of the instrument. However, due to the limitations of the Laboratory Information Management System (LIMS), the Analytical Data Report (for final sample results) indicates all metals were analyzed undiluted (dilution factor of 1). Form XIV, provided in the raw data, details the actual dilution factors used for each metal.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS/LCSD samples and the MS/MSD samples. Samples FS-TA4-TP-2-1-4' and FS-TA5-TP-1-1-5.5' and were designated for MS/MSD analysis on the COC. It should be noted that several metals could not be evaluated using the MS/MSD because the amount spiked was insignificant when compared to the native sample concentration.

All LCS recoveries were within acceptance criteria.

All MS/MSD recoveries were within acceptance criteria except for the following:

Parent	Analyte	MS %R	MSD %R	Criteria
FS-TA4-TP-2-1-4'	Antimony	68	62	75-125%
	Manganese	173	(104)	75-125%
	Potassium	130	136	75-125%
FS-TA5-TP-1-1-5.5'	Antimony	47	62	75-125%
	Calcium	530	(94)	75-125%
	Copper	36	(76)	75-125%
	Potassium	145	(94)	75-125%
	Strontium	128	(101)	75-125%
	Zinc	(79)	69	75-125%

( ) Indicates the recovery met criteria.

No corrective action was necessary for those metals that met criteria in either the MS or the MSD. Potassium failed high in both the MS and MSD. All potassium results were flagged "J" if detected in samples with a similar matrix to the parent samples. Antimony failed low in both MS and MSD. All antimony results were flagged "J" if detected or "UJ" if non-detect in samples with similar matrix to the parent samples.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD samples and the field duplicate analyte results. Sample FS-TA5-SBK-1B-2' was collected as the field duplicate of sample FS-TA5-SBK-1-2'.

All MS/MSD RPDs were within acceptance criteria, except for antimony and potassium. These metals were previously flagged "J" or "UJ", therefore no further corrective action was required. Calcium also failed the RPD criteria, although no flags were applied since the MSD recovery was within limits.

All field duplicate RPDs were within acceptance criteria (RPD $\leq$ 25) except for calcium (RPD = 50) and strontium (RPD = 40). The results for these metals were flagged "J" if detected or "UJ" if non-detect in all samples with a similar matrix to the parent sample.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were prepared and analyzed within the holding time required by the method.

- All initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source calibration criteria were met. The ICV was prepared using a secondary source.
- All interference check criteria were met.

- Dilution tests were analyzed on three samples, one sample in each of the three analytical batches. Several metals failed criteria. However, all metals that failed criteria in the dilution test met criteria in the post digestion spike, so no corrective action was necessary.
- Post digestion spikes were analyzed on three samples, one sample in each of the three analytical batches. The post digestion spike (PDS) was not applicable for several metals because the spike amount was insufficient when compared to the native sample concentration. These metals all met criteria in the associated dilution tests, so no corrective action was necessary. All other metals met criteria in the PDS.
- All MDL studies were performed within 12 months prior to the date samples were analyzed.

There were three method blanks and multiple calibration blanks analyzed in association with the ICP metals analyses in this SDG. The method blanks had detections of calcium, iron, and sodium at greater than 1/2 the RL. However, all associated sample concentrations were significantly higher than (greater than 5 times) the blank concentration, so no corrective action was necessary. Several calibration blanks had detections of aluminum, iron, manganese, strontium and vanadium. All concentrations were below the RL, so no corrective action was necessary.

Three equipment blanks were collected in association with the samples in this SDG. The equipment blanks were reported in SDGs FSG001, FSG007 and FSG010. Only calcium and manganese were detected above the RL in the equipment blanks. However, all associated sample concentrations were significantly higher than (greater than 5 times) the blank concentration, so no corrective action was necessary.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All ICP metals results for the samples in this SDG were considered usable. The completeness for the ICP metals portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

MERCURY

General

The mercury portion of this SDG consisted of twenty-six (26) samples, including twenty-one (21) soil samples, two MS/MSD pair, and one field duplicate. The samples were collected during the period of June 11, 2003 through June 17, 2003 and were analyzed for mercury as specified in the Ft. Segarra QAPP.

The mercury analyses were performed using USEPA SW846 Method 7471A.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample and MS/MSD samples. Samples FS-TA4-TP-2-1-4' and FS-TA5-TP-1-1-5.5' and were designated for MS/MSD analysis on the COC.

All LCS and MS/MSD recoveries were within acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD samples and the field duplicate analyte results. Sample FS-TA5-SBK-1B-2' was collected as the field duplicate of sample FS-TA5-SBK-1-2'.

The MS/MSD RPD was within acceptance criteria.

Mercury was non-detect in both the parent and the field duplicate.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were digested within the 28-day hold time, except for the five samples collected on 6/11/03. These five samples were digested on day 29. In addition, the samples collected on 6/11/03, 6/12/03 and 6/13/03 were analyzed outside of the 28-day hold time. However, because all samples were digested within 29 days of collection, all data was considered usable.

- All initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.
- All MDL studies were performed within 12 months prior to the date samples were analyzed

There were two method blanks and several calibration blanks associated with the mercury analyses in this SDG. All blanks were non-detect for mercury.

Three equipment blanks were collected in association with the samples in this SDG. The equipment blanks were reported in SDGs FSG001, FSG007 and FSG010. No target analytes were detected above the RL in the equipment blanks.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All mercury results for the samples in this SDG were considered usable. The completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

CYANIDE

General

The cyanide portion of this SDG consisted of twenty-six (26) samples, including twenty-one (21) soil samples, two MS/MSD pair, and one field duplicate. The samples were collected during the period of June 11, 2003 through June 17, 2003 and were analyzed for cyanide as specified in the Ft. Segarra QAPP.

The cyanide analyses were performed using USEPA Method 9012A.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample and the MS/MSD samples. Samples FS-TA4-TP-2-1-4' and FS-TA5-TP-1-1-5.5' and were designated for MS/MSD analysis on the COC.

All LCS and MS/MSD recoveries were within acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD samples and the field duplicate analyte results. Sample FS-TA5-SBK-1B-2' was collected as the field duplicate of sample FS-TA5-SBK-1-2'.

The MS/MSD RPD for cyanide was within acceptance criteria.

Cyanide was non-detect in both the parent and the field duplicate.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples

were prepared and analyzed outside of the holding time required by the method because all samples were received by the laboratory after the 14-day hold time had expired.

- All initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.
- The MDL study was performed within 12 months prior to the date samples were analyzed.

There were two method blanks associated with the cyanide analyses in this SDG. Both blanks were free of any target cyanide at or above 1/2 the RL.

Three equipment blanks were collected in association with the samples in this SDG. The equipment blanks were reported in SDGs FSG001, FSG007 and FSG010. No target analytes were detected above the RL in the equipment blanks.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All cyanide results for the samples in this SDG were considered usable. The completeness for the cyanide portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

EXPLOSIVES

General

The explosives portion of this SDG consisted of three (3) samples. The samples were collected on June 12, 2003 and June 13, 2003 and were analyzed for the full list of explosives as specified in the Ft. Segarra QAPP, with two exceptions:

(1) Two of the target compounds for explosives listed in the Ft. Segarra QAPP were analyzed by method 8270C (SVOCs). N-nitrosodiphenylamine and Diphenylamine, were analyzed by method 8270C and were not determined by method 8330. As indicated in method 8270C, N-nitrosodiphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine, therefore Diphenylamine is reported as N-nitrosodiphenylamine.

(2) The explosives analyses were subcontracted to STL-Tallahassee. It should be noted that the reporting limits for Nitrobenzene, 3-Nitrotoluene and Tetryl were raised above the level listed in the QAPP. The higher RLs were necessary to meet the Ft. Segarra QAPP requirement that the RL be at least three times the MDL concentration.

The explosive analyses were performed using USEPA SW846 Method 8330. No explosives were positively identified in any of the samples, so evaluation of second column results was not necessary.

All samples were extracted outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. Thus, all sample results were flagged "J" if detected or "UJ" if non-detect due to the possible low bias that resulted from the expired hold time. The maximum extraction hold time was 28 days, so rejection of the data was deemed unnecessary

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample, MS/MSD samples and the surrogate spikes. There were no samples designated on the COC for the MS/MSD. However, the laboratory analyzed an MS/MSD on sample FS-TA4-TP-2-1-4'.

All LCS, MS/MSD and surrogate recoveries were within acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD samples. There were no field duplicate samples associated with the explosives analyses.

All MS/MSD RPDs were within acceptance criteria.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP. All samples were prepared and analyzed outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired.

The following QC was also examined:

- All initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.
- The MDL studies were performed more than 12 months prior to the date samples were analyzed. No qualification of data was performed based on the expired MDLs.

There was one method blank associated with the explosives analyses in this SDG. The method blank was free of any target analytes at or above 1/2 the RL.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All explosive results for the samples in this SDG were considered usable. The completeness for the explosives portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

DATA VERIFICATION REPORT

for samples collected from

FORMER FORT SEGARRA

WATER ISLAND, U.S. VIRGIN ISLANDS

Data Verification by: Katherine LaPierre
Parsons - Austin

INTRODUCTION

One cooler of soil samples was mistakenly shipped to the United States Army Corps of Engineers (USACE) Analytical Laboratory instead of to its intended destination (Severn-Trent Laboratories). The samples were analyzed by the USACE lab for all requested parameters. This report covers the data package that contained these samples. The samples were collected from Fort Segarra on June 13, 2003 and were analyzed and reported in sample delivery group (SDG) M030671. The SDG consisted of ten soil samples, including nine (9) field samples and one field duplicate. The samples were analyzed for semivolatile organic compounds (SVOCs), herbicides, pesticides, polychlorinated biphenyls (PCBs), metals, explosives and cyanide. No raw data was received for these analyses, so data review and validation was limited to the information presented in the laboratory data package. The information in the data package was reviewed for accuracy, precision, representativeness, and completeness.

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the Ft. Segarra Sampling and Analysis Plan (SAP), Section 8.2. Data was validated in accordance with the requirements contained in the QAPP, EM 200 1-3, Region II SOPs and the USEPA *National Functional Guidelines for Data Review* (EPA, 1999, 2002). The data qualifiers defined in the Ft. Segarra QAPP were applied to the data based on the review of the data and any non-compliance found. Information reviewed in the data packages included sample results; field and laboratory QC sample results; surrogate recoveries; case narratives; and chain-of-custody (COC) forms. The findings presented in this report are based on the reviewed information, and whether the guidelines in the specified project documents were met.

GENERAL

All samples were collected by Parsons. The herbicide analyses were performed by Continental Analytical Services, Inc. in Salina Kansas. All other analyses were performed by the USACE Laboratory following the procedures outlined in the Ft. Segarra Field Sampling Plan (FSP), the Ft. Segarra Quality Assurance Project Plan (QAPP), and the United States Army Corps of Engineers (USACE) Shell document.

There was one (1) cooler associated with the samples in this SDG. The cooler was received by the laboratory at a temperature of 2.0^0 C, which is within the recommended range.

It should be noted that all samples in this SDG were received by the laboratory outside of the 14-day hold time for organic analyses. Thus, the extraction and analysis for all organic methods were performed outside of the holding time designated by the method. The results for samples extracted within two times the method-required hold time were flagged "J" or "UJ" as estimated. The results for samples extracted after more than twice the method-required hold time were flagged "R" as rejected. See individual methods below for details.

SEMIVOLATILES

General

The semivolatiles portion of this SDG consisted of ten (10) samples, including nine (9) soil samples and one field duplicate. The samples were collected on June 13, 2003 and were analyzed for the full list of SVOCs as specified in the Ft. Segarra QAPP, with the following exceptions:

(1) The following analytes were requested in the QAPP, but were not reported: Acetophenone, aniline, benzidine, 2,6-dichlorophenol, 1,2-diphenylhydrazine, hexachloropropene, 2-naphthylamine, n-nitrosodimethylamine, n-nitrosopyrolidine, pyridine and 1,2,4,5-tetrachlorobenzene.

(2) Many analytes were reported with method detection limits (MDLs) and reporting limits (RLs) that significantly exceeded those required by the QAPP. Thus, the following analytes may be present in the samples at a concentration above the MDL level listed in the Ft. Segarra QAPP: Benzyl alcohol, 2-nitrophenol, 2,4-dimethylphenol, benzoic acid, 4-chloroaniline, 2-nitroaniline, 3-nitroaniline, 4-nitrophenol, 4-nitroaniline, 4,6-dinitro-2-methylphenol, pentachlorophenol, and 3,3'-dichlorobenzidine.

The SVOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8270C. The samples were received by the laboratory outside of the 14-day extraction hold time and were extracted using Method SW3540C twenty-four (24) days after collection, ten (10) days past the recommended hold time. Thus, all sample results were flagged "J" if detected or "UJ" if non-detect due to the possible low bias that resulted from the expired hold time. All samples were analyzed within forty (40) days of extraction, as required by the method.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample and the surrogate spikes. No sample was designated for MS/MSD analysis on the COC. . The laboratory included a MS/MSD and a matrix (analytical) duplicate in the data package. However, because the QC was analyzed on a sample from a different client, the results were considered not applicable to the Fort Segarra data.

All LCS recoveries met the USACE Shell acceptance criteria, except for 4-chloroaniline. 4-Chloroaniline was recovered low at 14% in the LCS and is possibly

biased low. However, all results were flagged as estimated due to the hold time exceedance, so no additional corrective action was necessary.

Two samples had recoveries for the surrogate Terphenyl-d14 above the laboratory in-house tolerances, but all surrogate recoveries met the USACE Shell acceptance criteria, so no corrective action was necessary.

Precision

Precision was evaluated using the RPD obtained from the field duplicate analyte results. Sample FS-TA-4-TP12B was collected and analyzed as a field duplicate of sample FS-TA-4-TP12.

No analytes were detected in either the parent or the field duplicate above the RL, so no assessment of precision could be made.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were extracted outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. All samples were analyzed within forty (40) days of extraction, as required by the method.

There were two method blanks associated with the SVOC analyses in this SDG. Both blanks were free of any target SVOCs at or above 1/2 the RL. However, it should be noted that both method blanks and most samples contained bis(2-ethylhexyl)phthalate at a concentration of approximately 100 ug/kg. (Actual concentrations range from non-detect to 300µg/kg.) Due to the detections of this analyte in the method blanks, all sample detections for bis(2-ethylhexyl)phthalate are attributed to laboratory contamination.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All SVOC results for the samples in this SDG were considered usable. The completeness for the SVOC portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

HERBICIDES

General

The herbicide portion of this SDG consisted of ten (10) samples, including nine (9) soil samples and one field duplicate. The samples were collected on June 13, 2003 and were analyzed for the full list of herbicides as specified in the Ft. Segarra QAPP, with the following exceptions:

(1) One of the target compounds for herbicides listed in the Ft. Segarra QAPP was analyzed by method 8270C (SVOCs). Pentachlorophenol was analyzed by method 8270C and was not determined by method 8151.

(2) No MDLs were provided for the analysis. All analytes except dalapon, dichlorprop, and dinoseb were reported with RLs that significantly exceeded those required by the Ft. Segarra QAPP. Thus, the following analytes may be present in the samples at a concentration above the MDL level listed in the QAPP: 2,4,5-T, 2,4,5-TP, 2,4-D, 2,4-DB, dicamba, MCPA and MCPP.

The herbicide analyses were performed using USEPA SW846 Method 8151. The samples were received by the laboratory outside of the 14-day extraction hold time and were prepared twenty-six (26) days after collection, twelve (12) days past the recommended hold time. Thus, all sample results were flagged "J" if detected or "UJ" if non-detect due to the possible low bias that resulted from the expired hold time. All samples were analyzed within forty (40) days of extraction, as required by the method.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample, MS sample and the surrogate spikes. No sample was designated for MS/MSD analysis on the COC. However, the laboratory analyzed a matrix spike on sample FS-TA-4-TP11-1-3'. The lab did not receive sufficient sample volume to analyze a matrix spike duplicate, so only MS results were reported.

All LCS and surrogate spike recoveries were within the laboratory's in-house acceptance criteria. All MS recoveries were within the in-house acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the field duplicate analyte results. Sample FS-TA-4-TP12B was collected and analyzed as a field duplicate of sample FS-TA-4-TP12.

No analytes were detected in either the parent or the field duplicate, so no further assessment of precision could be made.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;

- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were prepared and analyzed outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. All samples were analyzed within forty (40) days of extraction, as required by the method.

There was one method blank associated with the herbicides analyses in this SDG. The blank was free of any target herbicides.

The "Data Qualifier Summary" provided by Continental Analytical Services, Inc. and included with the report indicated that the CCV associated with this data failed low for 2,4,5-T. The laboratory qualified all sample results for this analyte with a "Q" flag. The "Q" flag was changed to "UJ" to reflect the required Ft. Segarra QAPP data qualifiers. The "UJ" flag for this analyte designates a possible low bias is present, as demonstrated by the CCV.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All herbicide results for the samples in this SDG were considered usable. The completeness for the herbicide portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

PESTICIDES

General

The pesticide portion of this SDG consisted of ten (10) samples, including nine (9) soil samples and one field duplicate. The samples were collected on June 13, 2003 and were analyzed for the full list of pesticides as specified in the Ft. Segarra QAPP, with the following exceptions:

(1) All pesticides except Toxaphene were reported with MDLs and RLs that significantly exceeded those required by the Ft. Segarra QAPP. Thus, all pesticides (except Toxaphene) may be present in the samples at a concentration above the MDL level listed in the QAPP.

(2) The Ft. Segarra QAPP lists "Technical chlordane" as a target pesticide. The laboratory reported alpha-chlordane and gamma-chlordane in lieu of technical chlordane.

The pesticide analyses were performed using USEPA SW846 Method 8081A. The samples were received by the laboratory outside of the 14-day extraction hold time and were extracted using method SW3540C nineteen (19) days after collection, five (5) days past the recommended hold time. Thus, all sample results were flagged "J" if detected or "UJ" if non-detect due to the possible low bias that resulted from the expired hold time. All samples were analyzed within forty (40) days of extraction, as required by the method.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample, MS/MSD samples and the surrogate spikes. No sample was designated for MS/MSD analysis on the COC. However, the laboratory analyzed an MS/MSD on sample FS-TA-4-TP12B. It should be noted that no spike data was reported for Toxaphene.

All LCS recoveries were within acceptance criteria.

All MS/MSD recoveries were within acceptance criteria, with the exception of 4,4'-DDE which was recovered high in both the MS and MSD (MS/MSD recoveries were 191% & 235% respectively). The MS/MSD demonstrated a high bias for this analyte, however, because all sample results were qualified as estimated due to the hold time exceedance, no additional corrective action was necessary.

All surrogate recoveries were within acceptance criteria, except for the following:

Sample ID	Surrogate	%R	Criteria
FS-TA-4-TP9	Tetrachloro-m-xylene	36	40-140%

The second surrogate (Decachlorobiphenyl) met criteria in this sample (%R = 106) and all pesticides were non-detect, so no corrective action was necessary

Precision

Precision was evaluated using the RPD obtained from the MS/MSD results, field duplicate analyte results and matrix (analytical) duplicate results. Sample FS-TA-4-TP12B was collected and analyzed as a field duplicate of sample FS-TA-4-TP12. In addition, the laboratory analyzed a matrix (analytical) duplicate on sample FS-TA-4-TP12B.

All MS/MSD RPDs were within USACE Shell criteria.

For the field duplicate pair, 4,4'-DDE was detected above the RL in the parent sample, but was non-detect in the field duplicate. The field duplicate demonstrated a high degree of variability for 4,4'-DDE, however, because all sample results were qualified as estimated due to the hold time exceedance, no additional corrective action was necessary.

For the analytical duplicate pair, gamma chlordane was detected in the analytical duplicate, but was non-detect in the parent sample. The field duplicate demonstrated a high degree of variability for gamma chlordane, however, because all sample results were qualified as estimated due to the hold time exceedance, no additional corrective action was necessary.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were extracted outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. All samples were analyzed within forty (40) days of extraction, as required by the method.

There was one method blank associated with the pesticide analyses in this SDG. The method blank was free of any target pesticides.

A case narrative included in the data package indicated that three continuing calibration verification (CCV) samples were analyzed in association with the pesticide samples from Fort Segarra. The following analytes were recovered low in CCV1: Endosulfan II (-16%), Endrin aldehyde (-22%) and Methoxychlor (-19%). The following analytes were recovered high in CCV2: alpha-BHC (34%), beta-BHC (41%), gamma-BHC (28%), delta-BHC (25%), aldrin (21%), gamma-chlordane (18%), alpha-chlordane (19%), 4,4'-DDE (38%), 4,4'-DDD (29%), Endosulfan II (32%) and Endrin (18%). The following analytes were recovered high in CCV3: alpha-BHC (18%), beta-BHC (25%), 4,4'-DDE (28%), Endosulfan I (19%), Endrin ketone (27%) and Endosulfan sulfate (16%). All sample results were flagged as estimated due to the hold time exceedance, so no additional corrective action was necessary.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All pesticide results for the samples in this SDG were considered usable. The completeness for the pesticide portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

PCB

General

The PCB portion of this SDG consisted of ten (10) samples, including nine (9) soil samples and one field duplicate. The samples were collected on June 13, 2003 and were analyzed for the full list of PCBs as specified in the Ft. Segarra QAPP.

The PCB analyses were performed using USEPA SW846 Method 8082. The samples were received by the laboratory outside of the 14-day extraction hold time and were extracted using Method SW3540C nineteen (19) days after collection, five (5) days past the recommended hold time. Thus, all sample results were flagged "J" if detected or "UJ" if non-detect due to the possible low bias that resulted from the expired hold time. All samples were analyzed within forty (40) days of extraction, as required by the method.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample, MS/MSD samples and the surrogate spikes. No sample was designated for MS/MSD analysis on the COC. However, the laboratory analyzed an MS/MSD on sample FS-TA-4-TP12B. Only Aroclor-1016 and Aroclor-1260 were spiked for the LCS and MS/MSD as per the method.

All LCS and MS/MSD recoveries were within acceptance criteria.

All surrogate recoveries were within acceptance criteria, except for the following:

Sample ID	Surrogate	%R	Criteria
FS-TA-4-TP9	Tetrachloro-m-xylene	33	40-140%

The second surrogate (Decachlorobiphenyl) met criteria in this sample (%R = 107) and all PCBs were non-detect, so no corrective action was necessary.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD samples, matrix duplicate sample and the field duplicate analyte results. Sample FS-TA-4-TP12B was collected and analyzed as a field duplicate of sample FS-TA-4-TP12. In addition, the laboratory analyzed a matrix (analytical) duplicate on sample FS-TA-4-TP12B.

All MS/MSD RPDs were within acceptance criteria. No PCBs were detected in the parent sample, field duplicate or analytical duplicate, so no further assessment of precision could be made from these samples.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples

were extracted outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. All samples were analyzed within forty (40) days of extraction, as required by the method.

There was one method blank associated with the PCBs analyses in this SDG. The blank was free of any target PCBs.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All PCB results for the samples in this SDG were considered usable. The completeness for the PCB portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

ICP METALS

General

The metals portion of this SDG consisted of ten (10) samples, including nine (9) soil samples and one field duplicate. The samples were collected on June 13, 2003 and were analyzed for the full list of ICP metals as specified in the Ft. Segarra QAPP, with the following exceptions:

(1) Strontium was listed in the Ft. Segarra QAPP, but was not reported by the lab.

(2) With the exception of selenium, all metals were reported with MDLs and RLs that significantly exceeded those required by the Ft. Segarra QAPP. Thus, the metals may be present in the samples at a concentration above the MDL level listed in the QAPP.

The ICP metals analyses were performed using USEPA SW846 Method 6010B.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample. No sample was designated for MS/MSD analysis on the COC. The laboratory included a MS/MSD and a matrix (analytical) duplicate in the data package. However, because the QC was analyzed on a sample from a different client, the results were considered not applicable to the Fort Segarra data.

All LCS recoveries were within acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the field duplicate analyte results. Sample FS-TA-4-TP12B was collected and analyzed as a field duplicate of sample FS-TA-4-TP12.

Most analytes failed to meet the field duplicate criteria. The following table illustrates the metals that had a field duplicate RPD greater than 25:

Metal	Parent Conc.	Duplicate Conc.	RPD	Criteria

	(mg/kg)	(mg/kg)		
Aluminum	18600	9620	64	RPD ≤ 25
Arsenic	3.8	2	62	
Barium	21.9	15.5	34	
Calcium	153,000	203,000	28	
Chromium	16	11	37	
Cobalt	8.5	4.9	54	
Copper	23.9	13	59	
Iron	23,600	12,100	64	
Lead	19	9.2	70	
Magnesium	14,900	10,900	31	
Manganese	444	290	42	
Potassium	2000	935	73	
Vanadium	74.6	39	63	
Zinc	54.4	30.7	56	

Due to the variability demonstrated, the results for these metals were flagged as estimated ("J" if detected or "UJ" if non-detect) in all samples with a similar matrix to the parent sample.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were prepared and analyzed within the holding time required by the method.

There was one method blank analyzed in association with the ICP metals analyses in this SDG. The method blank contained barium at a level less than one half the RL AT 0.2mg/kg (RL = 0.5mg/kg). The laboratory qualified all barium results with a "B" flag to indicate the presence of this metal in the blank. However all sample results for barium were greater than ten times the blank result, so all "B" flags were removed.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All ICP metals results for the samples in this SDG were considered usable. The completeness for the ICP metals portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

MERCURY

General

The mercury portion of this SDG consisted of ten (10) samples, including nine (9) soil samples and one field duplicate. The samples were collected on June 13, 2003 and were analyzed for mercury as specified in the Ft. Segarra QAPP.

The mercury analyses were performed using USEPA SW846 Method 7471A. The samples were received by the laboratory outside of the 28-day analytical hold time and were analyzed thirty-two (32) days after collection, four (4) days past the method-required hold time.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample. No sample was designated for MS/MSD analysis on the COC. The laboratory included a MS/MSD and a matrix (analytical) duplicate in the data package. However, because the QC was analyzed on a sample from a different client, the results were considered not applicable to the Fort Segarra data.

The LCS recovery met criteria at 103%.

Precision

Precision was evaluated using the RPD obtained from the field duplicate analyte results. Sample FS-TA-4-TP12B was collected and analyzed as a field duplicate of sample FS-TA-4-TP12.

Mercury failed to meet the USACE Shell precision criteria as follows:

Parent Conc. (mg/kg)	Duplicate Conc. (mg/kg)	RPD	Criteria
0.025	0.014	56	RPD ≤ 25

The results for mercury were flagged "J" if detected or "UJ" if non-detect in all samples with a similar matrix to the parent sample

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and

- Examining laboratory blanks for cross contamination of samples during analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were analyzed outside of the 28-day hold time.

There was one method blank associated with the mercury analyses in this SDG. The blank was non-detect for mercury.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All mercury results for the samples in this SDG were considered usable. The completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

CYANIDE

General

The cyanide portion of this SDG consisted of ten (10) samples, including nine (9) soil samples and one field duplicate. The samples were collected on June 13, 2003 and were analyzed for cyanide as specified in the Ft. Segarra QAPP.

The cyanide analyses were performed using USEPA Method 9012A. The samples were received by the laboratory outside of the 14-day analytical hold time and were analyzed twenty-six (26) days after collection, twelve (12) days past the method-required hold time.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample and the MS/MSD samples. No sample was designated for MS/MSD analysis on the COC. However, the laboratory analyzed an MS/MSD on sample FS-TA-4-TP11-1-3'.

All LCS and MS/MSD recoveries were within the laboratory's in-house acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the field duplicate analyte results. Sample FS-TA-4-TP12B was collected and analyzed as a field duplicate of sample FS-TA-4-TP12.

Cyanide was not detected in either the parent or the field duplicate, so no further assessment of precision could be made.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP except as noted in this report. All samples were prepared and analyzed outside of the holding time required by the method because all samples were received by the laboratory after the 14-day hold time had expired.

There was one method blank associated with the cyanide analyses in this SDG. The method blank was free of cyanide.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All cyanide results for the samples in this SDG were considered usable. The completeness for the cyanide portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

EXPLOSIVES

General

The explosives portion of this SDG consisted of ten (10) samples, including nine (9) soil samples and one field duplicate. The samples were collected on June 13, 2003 and were analyzed for the full list of explosives as specified in the Ft. Segarra QAPP, with the following exceptions:

(1) Two of the target compounds for explosives listed in the Ft. Segarra QAPP were analyzed by method 8270C (SVOCs). N-nitrosodiphenylamine and diphenylamine, were analyzed by method 8270C and were not determined by method 8330. As indicated in method 8270C, n-nitrosodiphenylamine decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine, therefore diphenylamine is reported as n-nitrosodiphenylamine.

(2) All MDLs and RLs for explosives were significantly greater than those listed in the Ft. Segarra QAPP. Therefore, the explosives may be present in the samples at a concentration greater than the MDLs listed in the QAPP.

The explosive analyses were performed using USEPA SW846 Method 8330. The samples were received by the laboratory outside of the 14-day extraction hold time and were extracted twenty-four (24) days after collection, ten (10) days past the recommended hold time. Thus, all sample results were flagged “J” if detected or “UJ” if

non-detect due to the possible low bias that resulted from the expired hold time. All samples were analyzed within forty (40) days of extraction, as required by the method.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample and the surrogate spikes. No sample was designated for MS/MSD analysis on the COC. The laboratory included a MS/MSD and a matrix (analytical) duplicate in the data package. However, because the QC was analyzed on a sample from a different client, the results were considered not applicable to the Fort Segarra data.

All LCS and surrogate spike recoveries were within USACE Shell acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the field duplicate analyte results. Sample FS-TA-4-TP12B was collected and analyzed as a field duplicate of sample FS-TA-4-TP12.

No analytes were detected in either the parent or the field duplicate, so no further assessment of precision could be made.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Ft. Segarra FSP;
- Comparing actual analytical procedures to those described in the Ft. Segarra QAPP;
- Evaluating holding times; and
- Examining field and laboratory blanks for cross contamination of samples during sample collection or analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Ft. Segarra QAPP, with the exceptions noted in this report. All samples were extracted outside of the holding time required by the method because all samples were received by the laboratory after the 14-day extraction hold time had expired. All samples were analyzed within forty (40) days of extraction, as required by the method.

There was one method blank associated with the explosives analyses in this SDG. The method blank was free of any target explosives.

A case narrative included in the data package indicated that three continuing calibration verification (CCV) samples were analyzed in association with the explosives samples from Fort Segarra. The case narrative also indicated that the analyte tetryl was recovered low in all three CCVs analyzed. Tetryl was not detected in any of the samples.

All sample results were flagged as estimated due to the hold time exceedance, so no additional corrective action was necessary.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All explosive results for the samples in this SDG were considered usable. The completeness for the explosives portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

DATA VERIFICATION REPORT

for samples collected from

FORMER FORT SEGARRA

WATER ISLAND, U.S. VIRGIN ISLANDS

Data Verification by: Katherine LaPierre
Parsons - Austin

INTRODUCTION

All samples collected were screened for chemical warfare materiel (CWM) prior to submittal to an outside lab for traditional analysis. The CWM analyses were performed by Edgewood Chemical Biological Center (ECBC) in Maryland. A total of one hundred and one (101) samples were analyzed by ECBC for the following parameters: 1,4-Dithiane, 1,4-Thioxane, GA (dimethylamidocyanethyl-o-phosphate) and HD (bis-(2-chloroethyl) sulfide). The samples were collected from Fort Segarra during the period of May 19, 2003 through June 17, 2003 and were analyzed and reported in a single data package. No raw data was received for these analyses, so data review and validation was limited to the information presented in the laboratory data package.

All samples were collected by Parsons and all analyses were performed by ECBC. No chain-of-custody or cooler receipt information was available for review.

CWM results were not reported for the following six samples: FS-TA4-SB3-S1-0'-2', FS-TA4-SB3-1-18", FS-TA4-SB1-1-3', FS-TA4-SB2-S1-0'-2' FS-TA4-SBK-2-3' and FS-TA4-SB4-1-2.5'. No CWM data is available for these five samples at this time. This data was unable to be reported by ECBC. If additional CWM analytical results are obtained, those data will be included in the final report.

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed. However, due to the lack of guidance available on these types of analyses, no reference documents were used for verification. This report contains only the findings of the data review.

CWM

No target analytes were detected in any of the samples. The samples were extracted and analyzed in ten batches. Each batch contained a Laboratory Control Spike (LCS), a LCS Duplicate (LCSD) and a method blank. Each batch contained also contained an MS/MSD. Details on the individual batches can be found below:

Batch 03052201 (extracted 5/22/03) contained seven soil samples and one matrix spike/matrix spike duplicate pair (MS/MSD) analyzed on sample FS-FBL-SB2-1-3'.

Batch 03052701 (extracted 5/27/03) contained five soil samples and one MS/MSD analyzed on sample FS-FBL-G9-1-4'.

Batch 03052801 (extracted 5/28/03) contained twelve soil samples and one MS/MSD analyzed on sample FS-FBL-SB1-1-0'-2'.

Batch 03052901 (extracted 5/29/03) contained seven soil samples and one MS/MSD analyzed on sample FS-FBL-G15-1-2.5'. .

Batch 03060402 (extracted 6/4/03) contained five soil samples and one MS/MSD analyzed on sample FS-FBL-SBK-1-0'-2'.

Batch 03060601 (extracted 6/6/03) contained six soil samples. The MS/MSD run in this batch was analyzed on a sample from a different client.

Batch 03061203 (extracted 6/12/03) contained twenty-two soil samples and one MS/MSD analyzed on sample FS-TA4-SB2-1-2.5'.

Batch 03061901 (extracted 6/19/03) contained eight soil samples and one MS/MSD analyzed on sample FS-TA8-SBK-2-0'-2'.

Batch 03062701 (extracted 6/27/03) contained nine soil samples and one MS/MSD analyzed on sample FS-TA4-TP2-1-4'.

Batch 03063001 (extracted 6/30/03) contained nineteen soil samples and one MS/MSD analyzed on sample FS-TA5-SBK-1-2'.

Three samples were collected and submitted to the lab on two different days. Sampling and analysis details for these three samples are detailed in the following table:

Sample ID	Collection Date	Analytical Batch
FS-FBL-SB3-1-0'-2'	5/20/03	03052201
	5/28/03	03052901
FS-FBL-SB3-2-3'	5/20/03	03052201
	5/28/03	03052901
FS-FBL-SB7-1-4.5'	5/19/03	03052201
	5/28/03	03052901

Only the samples collected 5/28/03 were submitted to Severn-Trent Laboratories for additional analysis.

The surrogate BFB was spiked into all samples and QC. Surrogate spike recoveries ranged from a low of 70% to a high of 129% and were considered acceptable. The provisional laboratory tolerances in place at the time these samples were analyzed were 70-130%. The surrogate recoveries for all samples were within the provisional tolerances.

There were ten LCS/LCSD pairs (one for each batch) associated with the CWM data. All four analytes were spiked into the LCS/LCSD samples. The recoveries for 1,4-Dithiane ranged from 68-135% and were considered acceptable. The recoveries for 1,4-Thioxane ranged from 71-142% and were considered acceptable. The recoveries for GA ranged from 78-139% and were considered acceptable. The recoveries for HD ranged from 63-145% and were considered acceptable. Agreement between the LCS and LCSD analyzed

in each batch was excellent with the highest LCS/LCSD relative percent difference (RPD) calculated at 21.5%. The provisional laboratory tolerances in place at the time these samples were analyzed were 70-130%. Although a few LCS/LCSD samples had recoveries above the provisional limits, no corrective action was necessary because all sample results were non-detect. The following LCS samples had percent recoveries (%R) below the provisional lower tolerance of 70%:

Batch	Analyte	LCS %R	LCSD %R
03052201	1,4-Dithiane	68	(80)
	HD	69	(80)
03052701	1,4-Dithiane	(71)	68
	HD	67	63

( ) indicates the recovery was within the provisional tolerances.

No corrective action was deemed necessary since all analytes except HD met criteria in either the LCS or the LCSD, and all low recoveries were within 7% of the provisional tolerances.

There were nine MS/MSD pairs samples associated with the CWM data. The MS/MSD analyzed in one of the ten batches was run on a sample from a different client and was considered not applicable to the Fort Segarra data set. All four analytes were spiked into the MS/MSD samples. The recoveries for 1,4-Dithiane ranged from 65-119% and were considered acceptable. The recoveries for 1,4-Thioxane ranged from 69-128% and were considered acceptable. The recoveries for GA ranged from 72-110% and were considered acceptable. The recoveries for HD ranged from 62-125% and were considered acceptable. Agreement between the MS/MSD pair recoveries was excellent with the highest MS/MSD RPD calculated at 15.7%. The provisional laboratory tolerances in place at the time these samples were analyzed were 70-130%. Only one MS/MSD pair had recoveries outside the provisional tolerance:

Parent	Batch	Analyte	MS %R	MSD %R
FS-FBL-G9-1-4’	03052701	1,4-Dithiane	(70)	65
		1,4-Thioxane	(74)	69
		HD	67	62

( ) indicates the recovery was within the provisional tolerances.

No corrective action was deemed necessary since all analytes except HD met criteria in either the MS or the MSD, and all low recoveries were within 8% of the provisional tolerances.

There were ten method blanks (one for each batch) associated with the CWM data. All method blanks were non-detect for all four target analytes.

Based on the surrogate, LCS/LCSD and MS/MSD recoveries, the accuracy of the data was considered acceptable. Based on the LCS/LCSD and MS/MSD RPDs, the precision of the data was considered acceptable. No data was qualified or rejected as a result of the data review. All data was considered acceptable.

PARSONS

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January 19, 2005

U.S. Army Engineering and Support Center, Huntsville
ATTN: CEHNC-PM-CR (Mr. Roger Fitzpatrick)
4820 University Square
Huntsville, AL 35816-1822

Subject: Descriptions of Excavated Items
Contract DACA87-00-D-0038, Delivery Order 22 for
Chemical Warfare Materiel (CWM) Engineering Evaluation/Cost Analysis (EE/CA)
Former Fort Segarra, Water Island, U.S. Virgin Islands

Dear Mr. Fitzpatrick:

This letter provides information on items excavated during the Former Fort Segarra EE/CA Investigation in 2003 to fulfill a request for information by the State Historical Preservation Office for the U.S. Virgin Islands. At Former Fort Segarra, excavations were made at predetermined locations within four sites: the Flamingo Bay Landfill Area, Test Area 4, Test Area 5, and Test Area 8. The purposes of the excavations were to collect soil samples and to investigate selected anomalies that had been identified using magnetic locators with the ultimate goal of determining the nature and extent of contamination by CWM and chemical agent contaminated media. No CWM was found during the investigation and the only suspected chemical agent contaminated media were a 1-ton storage cylinder and a 500-lb chemical bomb, both of which have been demilitarized and no longer contained any chemical agent. The locations of the sample points and excavations were marked in the field using a survey-grade global positioning system (GPS) receiver. Maps from Section 4 of the EE/CA Report are enclosed to show the locations of the sample points.

The attached Table 1 lists the Soil Sample ID or Anomaly Location, Date, digital photograph filename, and description of the items found. The samples were numbered using the system in Table 2, which was taken from the project Sampling and Analysis Plan. The locations are shown on the maps using the site name, sampling location, sample type, and sample number. Digital photographs were made of many of the items found and the photos are provided attached to this letter. Table 1 also lists the number of the photo associated with the sample location. Multiple photos are denoted by commas. Note that at many locations no buried items were found, only soil; these locations are noted by 'No Items' in the description column. Descriptions were taken from the Command Post logbook for intrusive operations.

Table 2
Sample and Anomaly Numbering System

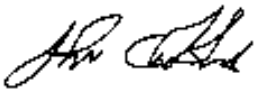
Site Name – Sampling Location – Sample Type – Sample Number – Sample Depth Example: FS-FBL-SB9-1-3.5’				
FS = Fort Segarra	FBL = Flamingo Bay Landfill Area TA4 = Test Area 4 TA5 = Test Area 5 TA8 = Test Area 8	SB# = Soil Boring	Sample number (at that location)	Depth or range of depths of soil sample in feet below ground surface
		G# = Grid		
		ST# = Suspected Trench		
		1T = 1-Ton Container		
		TP# = Test Pit		
		GS# = Ground Scar		
		SR# = Residential Sample		
		SBK# = Site Background Sample		
		“number” = Anomaly Number		
		A or B = Duplicate Samples		

The Work Plan for the Fort Segarra EE/CA investigation required that all field personnel be briefed on the proper procedures in the event of the discovery of cultural resources, which consisted of contacting the Virgin Islands SHPO before conducting further activities at that location and not removing any items from the find. The training was based on information from the study conducted by theSoutheast Archeological Center, National Park Service. In addition, all field personnel were required to read the project Work Plan.

Please contact me at 678-969-2409 or at john.a.chulick@parsons.com, if you have any questions regarding this submittal.

Sincerely,

PARSONS



John A. Chulick, P.G.
Project Manager

c/enc: Project File (742325)

Table 1: Descriptions of Excavated Items at Former Fort Segarra, USVI

Soil Sample ID/Location	Date	Photo ID	Description
FS-FBL-SB9-1-3.5'	5/19/2003		Small pieces of plastic
FS-FBL-SB10-1-0'-2'	5/19/2003		No Items
FS-FBL-SB7-S-1-0'-2'	5/19/2003	FBL SB7_1,2, 3, 4	Heavy steel banding ~1/2-inch thick
FS-FBL-SB2-1-3'	5/20/2003		Trash and glass bottles
FS-FBL-G1-1-4'	5/20/2003		Concrete and 6-inch U-bolt
FS-FBL-G6-1-3.5'	5/20/2003	FBL G6_1,2,3	Metal trash and wood debris, plastic pipe and 1-inch metal pipe, and steering wheel
FS-FBL-G9-1-4'	5/21/2003		Large metal trash, electrical wiring, washing machine, car debris, concrete, and garbage
FS-FBL-SB6-1-0'-2'	5/21/2003		Large rock
FS-FBL-SB6-2-3.5'	5/21/2003		No Items
FS-FBL-G20-1-3.5'	5/21/2003	FBL G 20_1,2, 3	Expended blasting cap and wire (from demo of hotel), chain link fencing
FS-FBL-G20B-S-1-3.5'	5/21/2003		No Items
FS-FBL-SB4-1-3.5'	5/22/2003		Sheet metal, fencing leaf spring, bottles, and paper
FS-FBL-SB4B-S-1-3.5'	5/22/2003		No Items
FS-FBL-SB5-1-3.5'	5/22/2003	FBL SB 5_1,2	Trash
FS-FBL-SB5B-1-3.5'	5/22/2003		No Items
FS-FBL-SB8-1-0'-2'	5/22/2003		PVC Pipe with water inside, metal, and concrete blocks. Car parts and other junk
FS-FBL-SB8-2-3.5'	5/22/2003		No Items
FS-FBL-SB10-2-3'	5/22/2003		No Items
FS-FBL-ST2-S-1-0'-2'	5/27/2003		Trash and other debris
FS-FBL-ST2-1-3.5'	5/27/2003		No Items
FS-FBL-ST1-S-1-0'-2'	5/27/2003		No Items
FS-FBL-ST1-1-3.5'	5/27/2003		No Items
FS-FBL-SB1-1-0'-2'	5/27/2003	FBL SB1_1,2	Probable compressor from air conditioning/refrigeration unit
FS-FBL-SB1-2-3'	5/27/2003		No Items
FS-FBL-G15-1-2.5'	5/27/2003	FBL G15_1,2,3	General trash
FS-FBL-G15B-1-2.5'	5/27/2003		No Items
FS-FBL-1T-1-3'	5/27/2003	FBL 1T_1,2	1-ton cylinder on ground surface
FS-FBL-SR-2-0'-2'	5/27/2003		No Items
FS-FBL-SR-1-0'-2'	5/27/2003		No Items
FS-FBL-SB3-1-0'-2'	5/28/2003		Metal scrap
FS-FBL-SB3-2-3'	5/28/2003		Household trash
FS-FBL-SB7-1-4.5'	5/28/2003		Chunks of asphalt
FS-FBL-SBK-2-0'-2'	5/28/2003		No Items
FS-FBL-SBK-1-0'-2'	5/28/2003		No Items

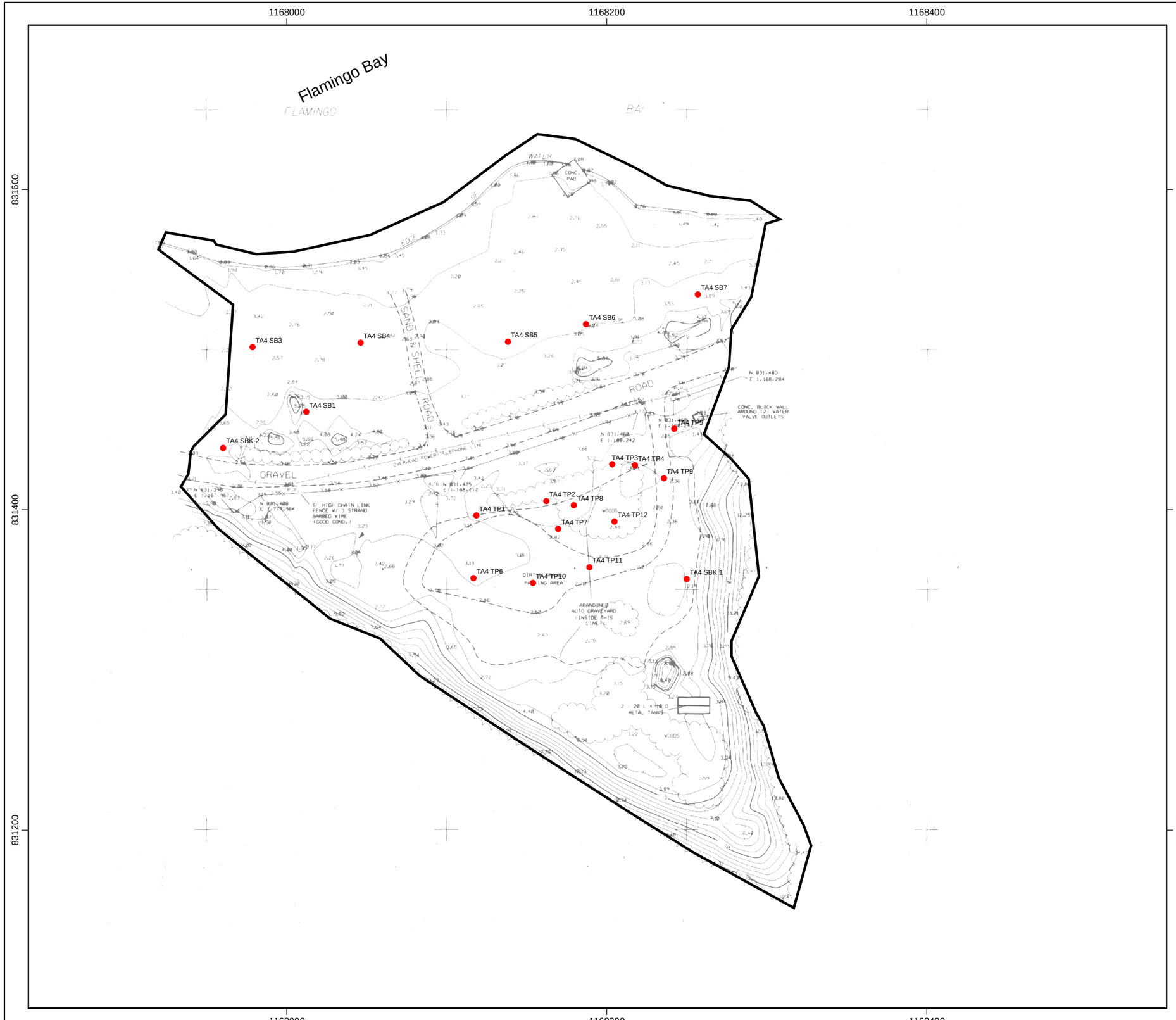
Soil Sample ID/Location	Date	Photo ID	Description
FS-TA5-TP2-1-6'	5/29/2003	TA5 TP2_1,2,3	PVC Pipe, stack of corrigated sheet metal, gear shifter, household trash
FS-TA4-SB3-S1-0-2'	6/2/2003		No Items
FS-TA4-SB3-1-18'	6/2/2003		No Items
FS-TA4-SB1-1-3'	6/3/2003		No Items
FS-TA4-SB2-S1-0-2'	6/3/2003		No Items
FS-TA4-SB4-1-2.5'	6/4/2003		No Items
FS-TA4-SB2-1-2.5'	6/4/2003		No Items
FS-TA4-SB2B-1-2.5'	6/4/2003		No Items
FS-TA4-SB7-1-3.5'	6/4/2003		No Items
FS-TA4-SB6-1-3'	6/4/2003		No Items
FS-TA4-SB2-S1-0-2'	6/5/2003		No Items
FS-TA4-SB5-1-3'	6/5/2003		No Items
FS-TA4-TP6-S1-0'-2'	6/5/2003		No Items
FS-TA4-TP6-1-5.5'	6/5/2003		No Items
FS-TA4-TP1-1-4.5'	6/5/2003	TA4 TP1_1,2	Fibrous material
FS-TA4-TP10-1-3'	6/5/2003		No Items
FS-TA4-TP8-1-5.5'	6/5/2003		No Items
FS-TA5-GS5-1-4'	6/9/2003		No Items
FS-TA5-GS5-S1-0'-2'	6/9/2003		No Items
FS-TA5-GS5-S2-3.5'	6/9/2003		No Items
FS-TA5-GS4-1-3'	6/9/2003		No Items
FS-TA5-GS4-2-1.5'	6/9/2003		No Items
FS-TA5-GS3-S1-0'-2'	6/10/2003		Light trash in first 6-inches of soil
FS-TA5-GS3B-S1-0'-2'	6/10/2003		No Items
FS-TA5-GS3-1-2'	6/10/2003		No Items
FS-TA5-GS3B-1-2'	6/10/2003		No Items
FS-TA5-GS2-1-1.5'	6/10/2003		No Items
FS-TA5-GS1-S1-0'-2'	6/10/2003		No Items
FS-TA5-GS1-1-4'	6/10/2003		No Items
FS-TA5-199-1-1.5'	6/10/2003		No Items
FS-TA5-193-1-4'	6/10/2003	TA5 193_1,2	Metal drum possibly water heater
FS-TA5-147-1-1'	6/11/2003		No Items
FS-TA5-146-1-1'	6/11/2003		No Items
FS-TA5-153-1-14'	6/11/2003		No Items
FS-TA5-195-1-1'	6/11/2003		No Items
FS-TA5-204-1-6'	6/11/2003		No Items

Soil Sample ID/Location	Date	Photo ID	Description
FS-TA5-SBK-2-2'	6/11/2003		No Items
FS-TA4-TP-2-1	6/12/2003		No Items
FS-TA4-TP-7-S1	6/12/2003		No Items
FS-TA4-TP-7-1	6/12/2003		Small car parts in first 18-inches, reddish material identified
FS-TA5-TP1-1-5.5'	6/12/2003		No Items
FS-TA5-TP3-1-6.5'	6/12/2003		No Items
FS-TA4-TP12-1/QA-3'	6/13/2003		No Items
FS-TA4-SR-1-0'-2'	6/16/2003		No Items
FS-TA4-SR-2-0'-2'	6/16/2003		No Items
FS-TA5-SBK-1-2'	6/16/2003		No Items
FS-TA5-SBLK-1B-2'	6/16/2003		No Items
FS-TA5-SR-1-0'-2'	6/16/2003		No Items
FS-TA5-SR-2-0'-2'	6/16/2003		No Items
FS-TA8-SB3-1-0'-2'	6/17/2003		No Items
FS-TA8-SB2-1-0'-2'	6/17/2003		No Items
FS-TA8-SB1-1-0'-2'	6/17/2003		No Items
FS-TA8-SB5-1-0'-2'	6/17/2003		No Items
FS-TA8-SB4-1-0'-2'	6/17/2003		No Items
FS-TA8-SB7-1-0'-2'	6/17/2003		No Items
FS-TA8-SB9-1-0'-2'	6/17/2003		No Items
FS-TA8-SBK-2-0'-2'	6/17/2003		No Items
FS-TA8-SB2B-1-0'-2'	6/17/2003		No Items
FS-TA8-SB6-1-0'-2'	6/17/2003		No Items
FS-TA8-SBK-1-0'-2'	6/17/2003		No Items
FS-TA8-SB8-1-0'-2'	6/17/2003		No Items
FSA-TA8-SB10-1-0'-2'	6/17/2003		No Items

Figure 4.1

Sample Locations
Test Area 4

Former Fort Segarra
Water Island, U.S. Virgin Islands



Legend

- Sample Location
- Test Area 4 Boundary

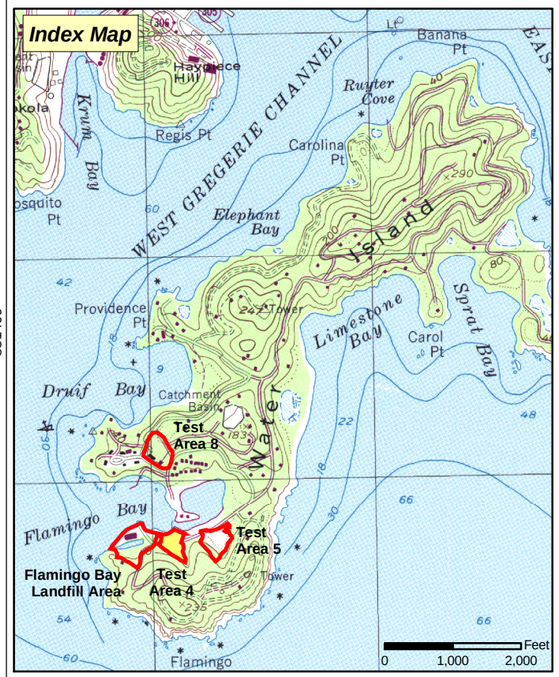


Image Source: MTA Investigation, 1994.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

60 30 0 60 Feet

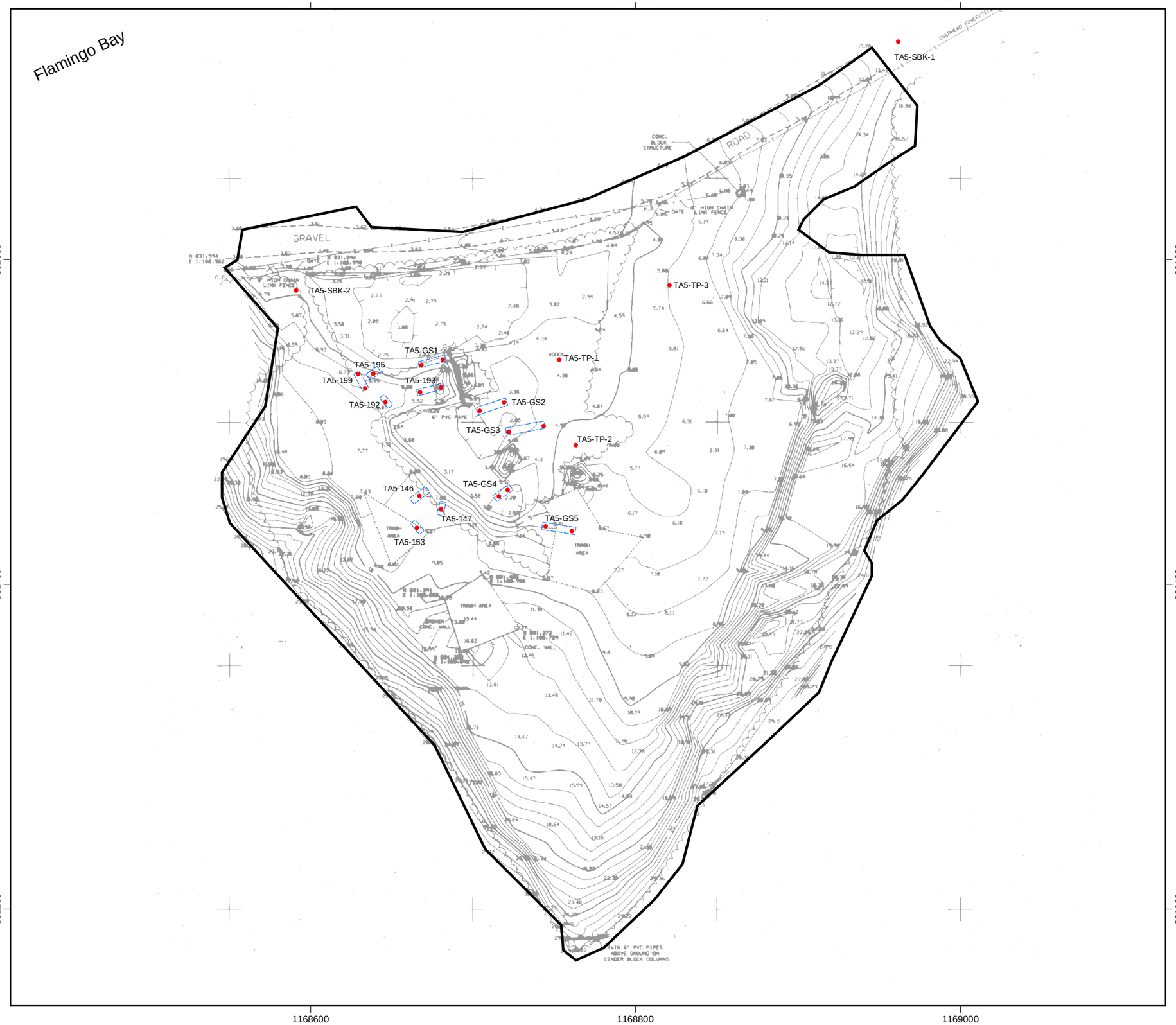
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PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER
DESIGNED BY: BT	Sample Locations Test Area 4
DRAWN BY: BT	
CHECKED BY: JM	SCALE: As Shown — PROJECT NUMBER: 742325
SUBMITTED BY: TR	DATE: December 2003 — PAGE NUMBER: 4 - 15
	FILE: x:\gis\739122\gis\maps\draft_eeca\figure4_1_TA4.mxd

Figure 4.2

Sample Locations Test Area 5

Former Fort Segarra
Water Island, U.S. Virgin Islands



Legend

- Sample Location
- Trench/Test Pit
- Test Area 5 Boundary

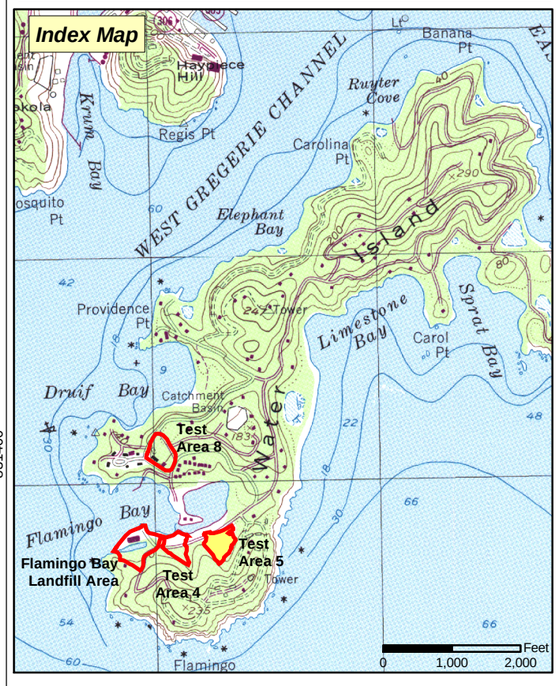


Image Source: MTA Investigation, 1994.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

60 30 0 60 Feet

N

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER
DESIGNED BY: BT	Sample Locations Test Area 5
DRAWN BY: BT	
CHECKED BY: JM	SCALE: As Shown; PROJECT NUMBER: 732325
SUBMITTED BY: TR	DATE: December 2003; PAGE NUMBER: 4 - 16
	FILE: x:\gis\739122\gis\maps\draft_eeca\figure4_2_TA5.mxd

Figure 4.3

Sample Locations
Test Area 8

Former Fort Segarra
Water Island, U.S. Virgin Islands

1167600 1167800 1168000 1168200

833000 832800 832600

TA8 SB01
TA8 SB02
TA8 SB03
TA8 SB04
TA8 SB05
TA8 SB06
TA8 SB07
TA8 SB08
TA8 SB09
TA8 SB10
TA8 SBK1
TA8 SBK2

Legend

- Sample Location
- Test Area 8 Boundary

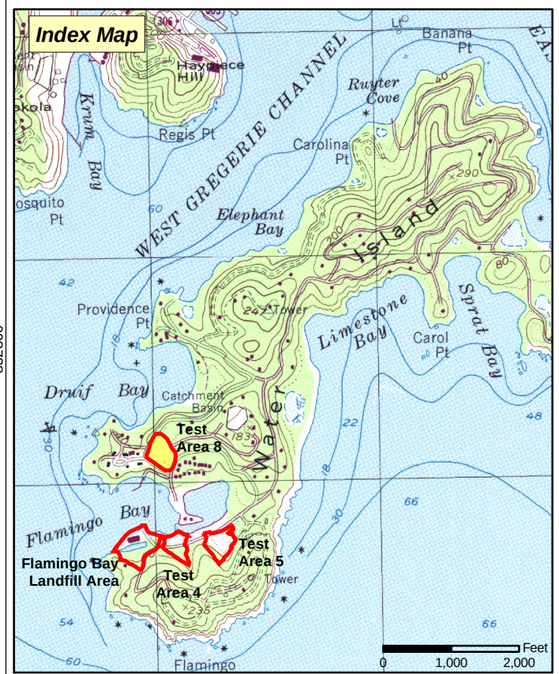


Image Source: Engineering Drawings, Dated 1991, by Lowe Engineers, and Mosaicked by TEC.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

N

60 30 0 60 Feet

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	Sample Locations Test Area 8		
DRAWN BY: BT			
CHECKED BY: JM	SCALE: As Shown	PROJECT NUMBER: 732325	
SUBMITTED BY: TR	DATE: December 2003	PAGE NUMBER: 4 - 17	
	FILE: x:\gis\739122\gis\maps\draft_eeca\figure4_2_TA5.mxd		

1167200 1167400 1167600 1167800

831600 831400 831200

FBL-G-20W
FBL-G-1W
FBL-G-1E
FBL-G-6W
FBL-G-6E
FBL-SB-7
FBL-SB-4
FBL-SB-5
FBL-SB-9
FBL-SBK-1
FBL-SB-10
FBL-SB-8
FBL-SBK-2
FBL-SB-2
FBL-SB-6
FBL-G-9E
FBL-G-9W
FBL-G-15W
FBL-G-15E
FBL-SB-3
FBL-SB-1
FBL-ST-2
FBL-ST-1
FBL-1T

Figure 4.4

Sample Locations
Flamingo Bay Landfill Area

Former Fort Segarra
Water Island, U.S. Virgin Islands

Legend

- Sample Location
- Flamingo Bay Landfill Area Boundary

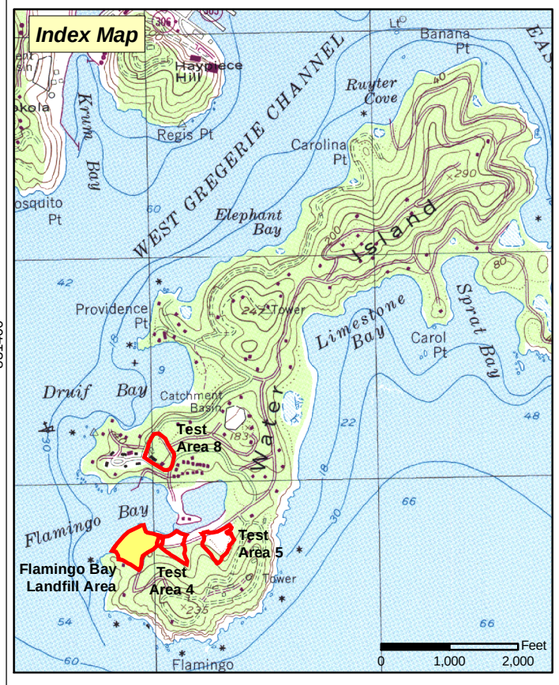


Image Source: MTA Investigation, 1994.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

70 35 0 70 Feet

N

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER
DESIGNED BY: BT	Sample Locations Flamingo Bay Landfill Area
DRAWN BY: BT	
CHECKED BY: JM	SCALE: As Shown — PROJECT NUMBER: 732325
SUBMITTED BY: TR	DATE: December 2003 — PAGE NUMBER: 4 - 18
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Figure 4.5

Residential Sample Locations

Former Fort Segarra
Water Island, U.S. Virgin Islands



Legend

- Residential Sample Location
- Residential Sample Location (Approximate)
- Boundary of Area of Interest

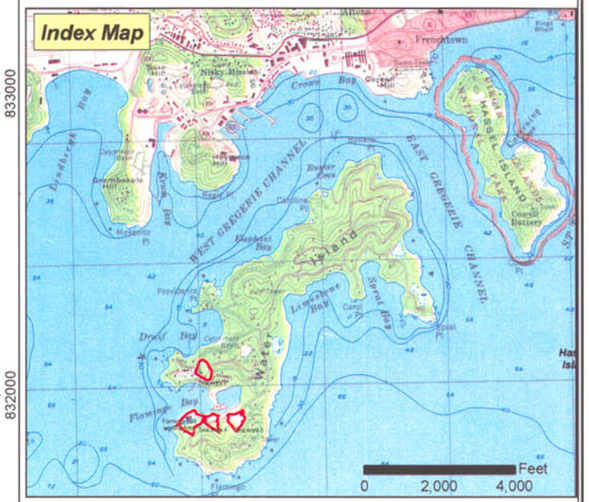


Image Source: USGS Topographic Map.
Coordinate System: State Plane PR Virgin Islands, NAD83, Units in Feet.

500 250 0 500 Feet

N

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: BT	Residential Sample Locations		
DRAWN BY: BT		SCALE: As Shown	PROJECT NUMBER: 732325
CHECKED BY: JM		DATE: May 2004	PAGE NUMBER: 4 - 20
SUBMITTED BY: TR		FILE: x:\gis\739122\gis\maps\draft_eeca\figure4_5_Res_samps.mxd	



Photo: FBL SB7_1 - Location: FS-FBL-SB7-S-1-0′-2′



Photo: FBL SB7_2 - Location: FS-FBL-SB7-S-1-0'-2'



Photo: FBL SB7_3 - Location: FS-FBL-SB7-S-1-0′-2′



Photo: FBL SB7_4 - Location: FS-FBL-SB7-S-1-0'-2'



Photo: FBL G6_1 - Location: FS-FBL-G6-1-3.5′



Photo: FBL G6_2 - Location: FS-FBL-G6-1-3.5′



Photo: FBL G6_3 - Location: FS-FBL-G6-1-3.5′



Photo: FBL G 20_1 - Location: FS-FBL-G20-1-3.5′



Photo: FBL G 20_2 - Location: FS-FBL-G20-1-3.5′



Photo: FBL G 20_3 - Location: FS-FBL-G20-1-3.5′



Photo: FBL SB5_1 - Location: FS-FBL-SB5-1-3.5′



Photo: FBL SB5_2 - Location: FS-FBL-SB5-1-3.5′



Photo: FBL SB1_1 - Location: FS-FBL-SB1-1-0'-2'



Photo: FBL SB1_2 - Location: FS-FBL-SB1-1-0′-2′



Photo: FBL G15_1 - Location: FS-FBL-G15-1-2.5'



Photo: G15_2 - Location: FS-FBL-G15-1-2.5'



Photo: G15_3 - Location: FS-FBL-G15-1-2.5'



Photo: FBL 1T_1 - Location: FS-FBL-1T-1-3'



Photo: FBL 1T_2 - Location: FS-FBL-1T-1-3



Photo: TA5 TP2_1 - Location: FS-TA5-TP2-1-6′



Photo: TA5 TP2_2 - Location: FS-TA5-TP2-1-6′



Photo: TA5 TP2_3 - Location: FS-TA5-TP2-1-6′



Photo: TA4 TP1_1 - Location: FS-TA4-TP1-1-4.5′



Photo: TA4 TP1_2 - Location: FS-TA4-TP1-1-4.5′



Photo: TA5 193_1 - Location: FS-TA5-193-1-4′



Photo: TA5 193_2 - Location: FS-TA5-193-1-4′